THE UNIVERSITY OF TEXAS AT EL PASO

Public Health Project
Backup Slides

College of Health Sciences
Interdisciplinary Health Sciences Ph.D. Program
Public Health Data Management (5357)
Instructor: Dr Amy Wagler, PhD

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May 12, 2025

DESCRIPTION OF DATA SOURCE AND SAMPLE POPULATION

Title of Study or Project:
The Military Health and Well-Being Project 2020 (MHWP) from the online repository, ICPSR Michigan

Purpose for the data collection:
The purpose of the study was to collect information regarding psychosocial antecedents of health and wellness, including military identity, self-stigma, daily stress, combat exposure, purpose and value, substance use, traumatic brain injury, moral injury, suicide risk, social integration and contribution, and six of eight Substance Abuse and Mental Health Services Administration (SAMHSA) dimensions of wellness (social, emotional, spiritual, intellectual, physical, and environmental components for this study).

Agency: North Carolina State University 2019 Non-Laboratory Research Scholarship Program.

Principal Investigator (PI)/Funder:
Sarah L. Desmarais

Website address:
https://www.icpsr.umich.edu/web/ICPSR/studies/38304

DESCRIPTION OF DATA SOURCE AND SAMPLE POPULATION

The process of gaining access to the dataset:
UTEP belongs to the international consortium ICPSR Michigan, an online repository of open-source datasets. The keywords “well-being,” “military service,” and “veteran” were used to identify the dataset.

Study Participants:
Veterans of the US military who served post-Vietnam, aged 18 and older at the time of data collection, who resided in the United States. Qualtrics Panels service was used for data collection. Black and female veterans were oversampled since these groups have been historically under-represented in veteran studies (Schafer, 2024).

Sample Size (n): 1,495

Year data was collected: 2020

MULTIPLE LINEAR REGRESSION HYPOTHESIS
Protective Factors

H_o: Among veterans, the protective factors* are NOT independently associated with alcohol and drug abuse risk.

H_a: Among veterans, the protective factors* are independently associated with alcohol and drug abuse risk.

*Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation, and Overall Wellness.

MULTIPLE LINEAR REGRESSION HYPOTHESIS
Risk Factors

H_o: Among veterans, the risk factors* are NOT independently associated with alcohol and drug abuse risk.

H_a: Among veterans, the risk factors* are independently associated with alcohol and drug abuse risk.

**Combat Exposure, Daily Stress Status, Loneliness Level, Degree of Moral Injury, Self-Stigmatization Level, Suicide Risk Status, and History of Traumatic Brain Injury.

MULTIPLE LINEAR REGRESSION HYPOTHESIS
Buffering Effect

H_o: Among veterans, the protective* do not buffer the risk factors** associated with alcohol and drug abuse risk.

H_a: Among veterans, the protective factors* do buffer the risk factors** associated with alcohol and drug abuse risk.

***Protective Factors** = Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation, and Overall Wellness.
****Risk Factors** = Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

MULTIPLE LINEAR REGRESSION
Research Aims

1. What is the association of protective* and risk factors** with alcohol abuse and drug risk use among US Veterans?

2. What is the buffering effect of protective factors* on the risk factors** related to alcohol and drug abuse risk in US Veterans?

3. When evaluating all the factors simultaneously, which construct accounts for the greatest variability in alcohol and drug abuse risk, an exploratory approach?

*__Protective Factors__ = Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation, and Overall Wellness.
**__Risk Factors__ = Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

MULTIPLE LINEAR REGRESSION HYPOTHESIS
Assumptions And Missing Values

Variables —The dataset variables used in this project were all composite, scalable variables derived from the summation of the related metrics questions. Within the analysis, the composite variables were used in their continuous state. This is a reasonable assumption since the overall scores measure the degree of the screening tools. The exceptions are the nominal variable RACE, the binary variable TBI, and the continuous variables AGE and INCOME.

Confounders – Age, gender, race, and socioeconomic status (proxy is income) are known confounders for alcohol and drug abuse risk and are used in the modeling (Brown 1995).

Income – Based on the IQR rule, there were 56 outliers. Descriptive Statistics included analysis with and without outliers. The data without outliers was used for analysis.

MULTIPLE LINEAR REGRESSION HYPOTHESIS
Assumptions And Missing Values

Suicide Risk Variable—There were 26 missing values, representing 1.7% of the total sample size of 1,495. The mean for the variable (5.298) was imputed for the missing value.

Analyses

Regression — An R-value of ≥ 0.5 and ≤ -0.5 was considered statistically significant

p-value – A p-value of <0.05 was considered statistically significant

Linear Regression Analysis – Saturated models of the protective and risk factors were independently performed. A combined, saturated model of protective and risk factors was then performed. The final reduced model of only those variables that were statistically significant to the combined saturated model was then performed.

Variables

MULTIPLE LINEAR REGRESSION
Data Management

Dependent Variable	Units/Levels/Missing Values Code
Y: Alcohol and Drug Abuse Risk (Continuous) (CAGEAID_TOTAL) CAGEAID_TOTAL is the summation of CAGEAID_1 through CAGEAID_5	**Units/Range (Min, Max):** Scale /4 (0,4) **Missing Values** None

MULTIPLE LINEÅR REGRESSION
Data Management

Independent Variables (Protective Behaviors)	Units/Levels/Missing Values Code
X_{P1}: Calling and Purpose (Continuous) (PUR_TOTAL) **Recoded** from the summation of PURPOSE_1 through PURPOSE_5	**Units/Range (Min, Max):** Scale /20 (5,25) **Missing Values** None
X_{P2}: Community Engagement (Continuous) (SOC_TOTAL) **Recoded** from (**SOC_TOTAL** = SOC_INT_TOTAL + SOC_CON_TOTAL) (**SOC_INT_TOTAL** = SOC_INTEGRATION_1R, + 2 +3) (**SOC_CON_TOTAL** =SOC_CONTRIBUTION_1 + 2R + 3R)	**Units/Range (Min, Max):** Scale / 24 (12, 36) **Missing Values** None

MULTIPLE LINEAR REGRESSION
Data Management

Independent Variables (Protective Behaviors)	Units/Levels/Missing Values Code
X_{P3}: Help-seeking Behaviors (Continuous) (HELP_TOTAL) **Recoded** from summation of HELP_SEEKING_1 through HELP_SEEKING_3	**Units/Range (Min, Max):** Years / 18 (3, 21) **Missing Values** None
X_{P4}: Military Calling (Continuous) (MIL_CALL) **Recoded** from summation of NPIS_1 through 3	**Units/Range (Min, Max):** Years /18 (3, 21) **Missing Values** None

MULTIPLE LINEAR REGRESSION
Data Management

Independent Variables (Protective Behaviors)	Units/Levels/Missing Values Code
X_{P5}: Quality of Life (Continuous) (WHO_TOTAL) **Recoded** from WHO1 through WHO26 with reverse codes for (3R, 4R, and 26R).	**Units/Range (Min, Max):** Scale / 104 (26, 130) **Missing Values** None
X_{P6}: Public Service Motivation (Continuous) (PUB_SER) **Recoded** from the summation of PUBLIC_1 through PUBLIC_5	**Units/Range (Min, Max):** Scale / 20 (5, 25) **Missing Values** None

MULTIPLE LINEAR REGRESSION
Data Management

Independent Variables (Protective Behaviors)	Units/Levels/Missing Values Code
X_{P7}: Overall Wellness Level (WELL_MAG) **Recoded** from WELLNESS_1 through 30 with reverse codes for 2, 6, 8, 9, 10, 12, 14, 17, 21, 23, 24, 26, 30.	**Units/Range (Min, Max):** Scale / 110 (40, 150) **Missing Values** None

MULTIPLE LINEAR REGRESSION
Data Management

Independent Variables (Risk Factors)	Units/Levels/Missing Values Code
X_{N1}: Combat Exposure (Continuous) (COM_TOTAL) **Recoded** COM_TOTAL = Summation of CES_1 through CES_7	**Units/Range (Min, Max):** Scale / 28 (7, 35) **Missing Values** None
X_{N2}: Daily Stress (Continuous) (STRESS_TOTAL) **Recoded** STRESS_TOTAL as summation of STRESS_1 through STRESS_7	**Units/Range (Min, Max):** Scale / 7 (0, 7) **Missing Values** None

MULTIPLE LINEAR REGRESSION
Data Management

Independent Variables (Risk Factors)	Units/Levels/Missing Values Code
X_{N3}: Loneliness (Categorical) (LONE_TOTAL) **Recoded** LONE_TOTAL from summation of LONELINESS_1 through LONLINESS_3	**Units/Range (Min, Max):** Scale / 6 (3, 9) **Missing Values** None
X_{N4}: Moral Injury (Categorical) (MOR_INJ) **Recoded** MOR_INJ from the summation of MISSSF_1 through MISSSF_11 using reverse for 5R, 6R, 7R, 9R and 10R.	**Units/Range (Min, Max):** Scale / 87 (11, 98) **Missing Values** None

MULTIPLE LINEAR REGRESSION
Data Management

Independent Variables (Risk Factors)	Units/Levels/Missing Values Code
X_{N5}: Self-Stigma (Continuous) (STIGMA) **Recoded** from the summation of DD_1 through DD_4	**Units/Range (Min, Max):** Scale / 24 (4, 28) **Missing Values** None
X_{N6}: Suicide-Risk Status(Binary) (SUICIDE_TOTAL) **Recoded** SUICIDE_TOTAL = the summation of SBQ_1 through SBQ_4	**Units/Range (Min, Max):** Scale / 28 (7, 35) **Missing Values** There are 26 missing values (1.7%) The mean was imputed for the missing values.

MULTIPLE LOGISTIC REGRESSION
Data Management

Independent Variables (Risk Factors)	Units/Levels/Missing Values Code
X_{N7}: History of Traumatic Brain Injury (TBI) (TBI)	**Levels / Coding**: 0 No 1 Yes

MULTIPLE LINEÅR REGRESSION
Data Management

Confounding Variables (Brown, 1995)	Units/Levels/Missing Values Code
X_{C1}: Age (Continuous) (AGE)	**Units/Range (Min, Max):** Years / 68 (18,86) **Missing Values** None
X_{C2}: Gender (Categorical – three levels) (GENDER)	**Levels** 1 Male 2 Female 3 Other **Missing Values** None

MULTIPLE LINEÅR REGRESSION
Data Management

Confounding Variables (Brown, 1995)	Units/Levels/Missing Values Code
X_{C1}: Race (Categorical – 6 levels) (RACE_R) Recoded to 2 levels White and Non-White. White includes Hispanics.	**Levels** 1 White 2 Non-White
X_{C2}: Income (Continuous) (INCOME_WO) Recoded to INCOME_WO from INCOME with the removal of the 56 outliers	**Units/Range (Min, Max):** $ USD / 24 (0, 200,000) **Missing Values** None

Results

DESCRIPTIVE STATISTICS

The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Table 3 Descriptive Statistics for Dataset Variables	N	Median (Q1, Q3)	Frequency (%)
Age (years)	1495	68.0 (18.0, 86.0)	
Branch			
Air Force/Air Force Reserve			366 (24.5%)
Air National Guard			36 (2.4%)
Army/Army Reserve			491 (32.8%)
Army National Guard			115 (7.7%)
Coast Guard/Coast Guard Reserve			42 (2.8%)
Marine Corps/Marine Corps Reserve			122 (8.2%)
Navy/Navy Reserve			323 (21.6%)
Employed	1495		
No			604 (40.4%)
Yes			891 (59.6%)
Gender	1495		
Male			1004 (67.2%)
Female			483 (32.3%)
Other			8 (0.5%)
Income with outliers (USD)	1495	$60,000 ($0.0, $1.5M)	
Income without outliers (USD)	1495	$59, 000 ($0.0, $200,000)	
Length of Service (years)	1495	6.0 (0.03, 40.0)	
Marital Status	1495		
Single			282 (18.9%)
Married			886 (59.3%)
Domestic Partnership			73 (4.9%)
Divorced			211 (14.1%)
Widowed			43 (2.9%)
Race	1495		
White			1129 (75.5%)
Black			215 (14.4%)
Hispanic			86 (5.8%)
Asian			42 (2.8%)
American Indian/Alaska Native			13 (0.9%)
Native Hawaiian/Other Pacific Islander			10 (0.7%)
Region			
Southeast			507 (33.9%)
Northeast			262 (17.5%)
Midwest			272 (18.2%)
West			295 (19.7%)
Southwest			159 (10.7%)
Number of Years Since Discharge from 2022 (years)	1495	21.0 (0.0, 45.0)	

MULTIPLE LINEAR REGRESSION HYPOTHESIS
Models used in the Analysis

Table 1

Protective Factors Models

model1 Protective Factors – saturated

model2 Protective Factors – reduced (only statistically significant model1, backup slides)

Risk Factors Model

model3 Risk Factors – saturated

Combined Factors Models

model5 Combined model of protective and risk factors (backup slides)

model6 model5 adjusted for confounders of age and race

Models Adjusted for the Confounders (Age, Gender, Race, Income)

model1a Protective Factors – saturated, adjusted for confounders (Age, Gender, Race, Income)

model3a Risk Factors – saturated, adjusted for confounders (Age, Gender, Race, Income)

model5a Combined model of protective and risk factors, adjusted for confounders (Age, Gender, Race, Income) – saturated

model6a model6 reduced (only statistically significant factors of model6)

MULITPLE LINEAR REGRESSION SUMMARY TABLES

Table 2 Comparative Chart of the *ß* Coefficients

Protective and Risk Factors Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	Model 1	Model 2	Model 1a	Model 3	Model 3a	Model 5	Model 6	Model 5a	Model 6a
	ß	*ß*	*ß*	*ß*	*ß*	*ß*	*ß*	*ß*	*ß*
Constant	**2.999**	**3.358**	**3.609**	**-0.787**	**-0.403**	**-1.109**	**-1.27**	**-0.726**	**-0.2042**
Calling and Purpose	0.011		0.019			0.020	0.018	0.016	
Community Engagement	0.001		-0.004			0.001	0.001	0.002	
Help-Seeking Behavior	0.031	0.036	0.017			0.014	0.014	0.015	
Military Calling	-0.020		-0.008			0.004	0.005	0.003	
Quality of Life	-0.013	-0.014	-0.016			-0.001	-0.001	-0.002	
Public Service Motivation	0.021		0.016			-0.005	-0.004	-0.002	
Overall Wellness	-0.016	-0.015	-0.010			-0.001	-0.001	-0.000	
Combat Exposure				0.015	0.012	0.014	0.014	0.011	
Daily Stress				0.121	0.129	0.115	0.116	0.124	0.134
Loneliness				0.054	0.052	0.049	0.049	0.048	0.053
Moral Injury				0.014	0.013	0.014	0.014	0.013	0.014
Self-Stigmatization				0.004	0.001	0.007	0.007	0.004	
Suicide Risk				0.076	0.081	0.075	0.075	0.081	0.082
History of Traumatic Brain Injury				0.014	0.011	0.018	0.023	0.014	
Confounders									
Age			0.015		-0.001		0.001	-0.000	-0.003
Gender (*Male vs. Female vs. Other*)			-0.223		-0.027		0.106	0.271	-0.029
Race (*White vs. Non-white*)			0.196		0.151			0.139	0.161
Income			<0.001		<0.001			<0.001	<0.001
Correlations/Model p-value/ Greatest Contributor to the Model									
R Correlation	0.381	0.374	0.414	0.491	0.512	0.518	0.519	0.518	0.511
R^2 % of Variance	14.5%	14.0%	17.1%	24.1%	26.2%	26.8%	26.9%	26.8%	26.0%
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Factor Contributing the most to the model	Help-Seeking	Help-Seeking	Calling and Purpose	Daily Stress	Daily Stress	Daily Stress	Daily Stress	Daily Stress	Dai Stress

*Denotes when the p-value < 0.05

MULTIPLE LINEAR REGRESSION HYPOTHESIS
Protective Factors* Model 1a
(adjusted for confounders**)

H_o: Among veterans, the protective factors* are NOT independently associated with alcohol abuse risk.

H_a: Among veterans, the protective factors* are independently associated with alcohol abuse risk.

Reject the H_o

The Protective Factors adjusted for confounders are **independently associated** with Alcohol and Drug Abuse Risk ($p < 0.001$).

***Protective Factors** = Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Overall Wellness
****Confounding Factors** = Age, Gender, Race, and Income (Brown, 1995)

MULTIPLE LINEAR REGRESSION HYPOTHESIS
Risk Factors* Model 3a
(adjusted for confounders**)

H_o: Among veterans, the risk factors* are NOT independently associated with alcohol abuse risk.

H_a: Among veterans, the risk factors* are independently associated with alcohol abuse risk.

Reject the H_o

The Risk Factors adjusted for confounders are **independently associated** with Alcohol and Drug Abuse Risk ($p < 0.001$).

*** Risk Factors** = Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

****Confounding Factors** = Age, Gender, Race, and Income (Brown, 1995)

MULTIPLE LINEAR REGRESSION HYPOTHESIS
Saturated Model 5a Comparision to Models 1a and 3a
Buffering Effect
(adjusted for confounders***)

H_o: Among veterans, the protective* do not buffer the risk factors** associated with alcohol abuse risk.

H_a: Among veterans, the protective factors* do buffer the risk factors** associated with alcohol abuse risk.

Accept the H_o

Since the alcohol and drug abuse risk is primarily attributed to the risk factors without significant change when the protective factors are added, it suggests that the protective factors **do not buffer** the risk factors associated with alcohol and drug abuse risk.

***Protective Factors** = Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation, and Overall Wellness.
****Risk Factors** = Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury.
*****Confounders** = Age, Gender, Race, and Income (Brown, 1995)

MULTIPLE LINEAR REGRESSION
Research Aims

1. **What is the association of protective* and risk factors** with alcohol abuse and drug risk use among US Veterans?**

   There is **a correlation** between Alcohol and Drug Abuse Risk and combined, saturated model (5a) adjusted for confounding factors (R = 0.5181)

2. **What is the buffering effect of protective factors* on the risk factors** related to alcohol and drug abuse risk in US Veterans?**

   Since the alcohol and drug abuse risk is primarily attributed to the risk factors without significant change when the protective factors are added, it suggests that the protective factors **do not buffer** the risk factors associated with alcohol and drug abuse risk.

3. **When evaluating all the factors simultaneously, which construct accounts for the greatest variability in alcohol and drug abuse risk, an exploratory approach?**

   Daily Stress (0.124)

*__Protective Factors__ = Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation, and Overall Wellness.
**__Risk Factors__ = Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury
*** __Confounders__ = Age, Gender, Race, and Income

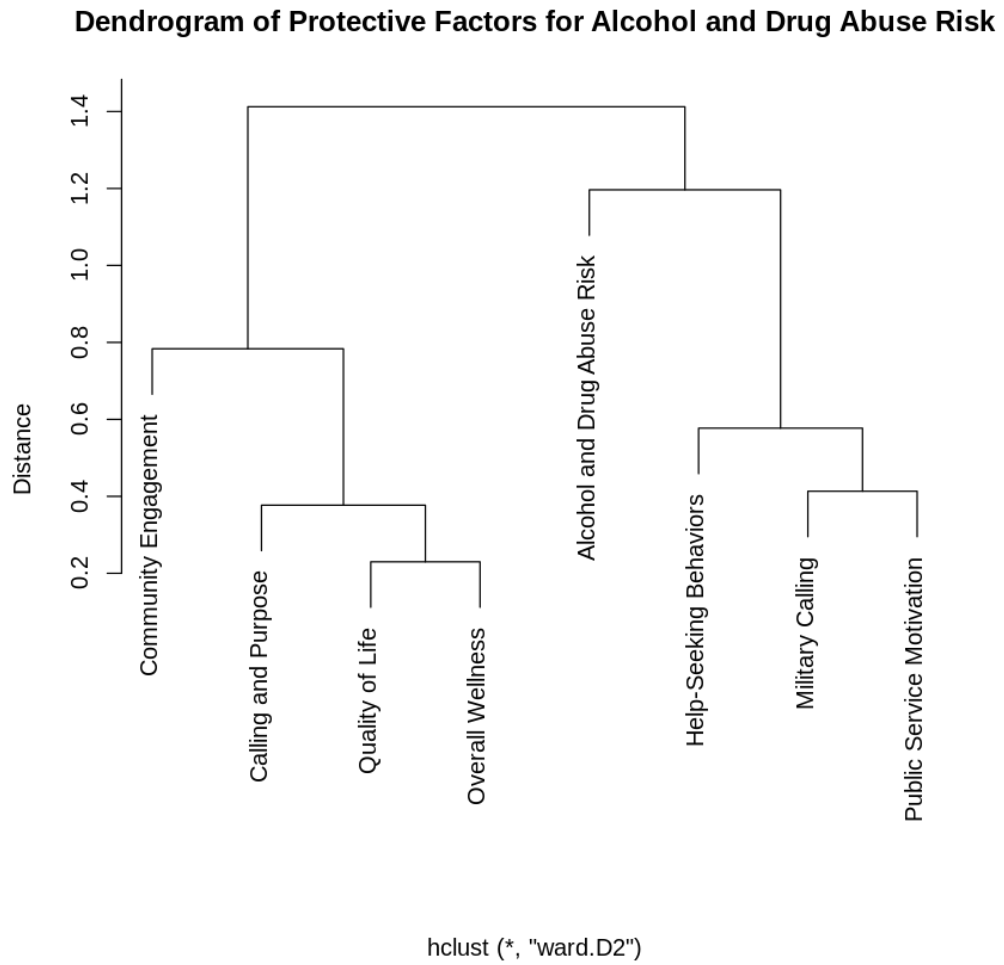
MULITPLE LINEAR REGRESSION SUMMARY TABLES

Table 3 Protective and Risk Factors Independently Associated with Alcohol and Drug Abuse Risk using Cohen F among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495) (adjusted for confounders)

Variables	Effect Size (sr^2)	Interpretation
Calling and Purpose	0.0083	Very small
Community Engagement	0.0002	Negligible
Help-Seeking Behavior	0.015	Small
Military Calling	0.0003	Negligible
Quality of Life	0.0026	Very small
Public Service Motivation	0.0001	Negligible
Overall Wellness	0.0002	Negligible
Combat Exposure	0.0155	Small
Daily Stress	0.1541	Medium to large
Loneliness	0.0243	Small
Moral Injury	0.0773	Medium
Self-Stigmatization	0.0016	Very small
Suicide Risk	0.2313	Large
History of Traumatic Brain Injury	0.0001	Negligible
Age	0	Negligible
Gender	0.0785	Medium
Race	0.0151	Small
Income	0.0088	Very small

MULTIPLE LINEAR REGRESSION
Dendrogram for Protective Factors

Figure 2



Interpretation Statement

The dendrogram suggests there may be collinearity between Quality of Life and Overall Wellness and between Military Calling and Public Service Motivation.

MULITPLE LINEAR REGRESSION Summary Tables

Table 5: Variance Inflation Factors for the Protective Factors* Model among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	Variance Inflation Factors
Calling and Purpose	1.594
Community Engagement	2.388
Help-Seeking Behavior	1.359
Military Calling	1.531
Quality of Life	2.628
Public Service Motivation	2.038
Overall Wellness	3.385

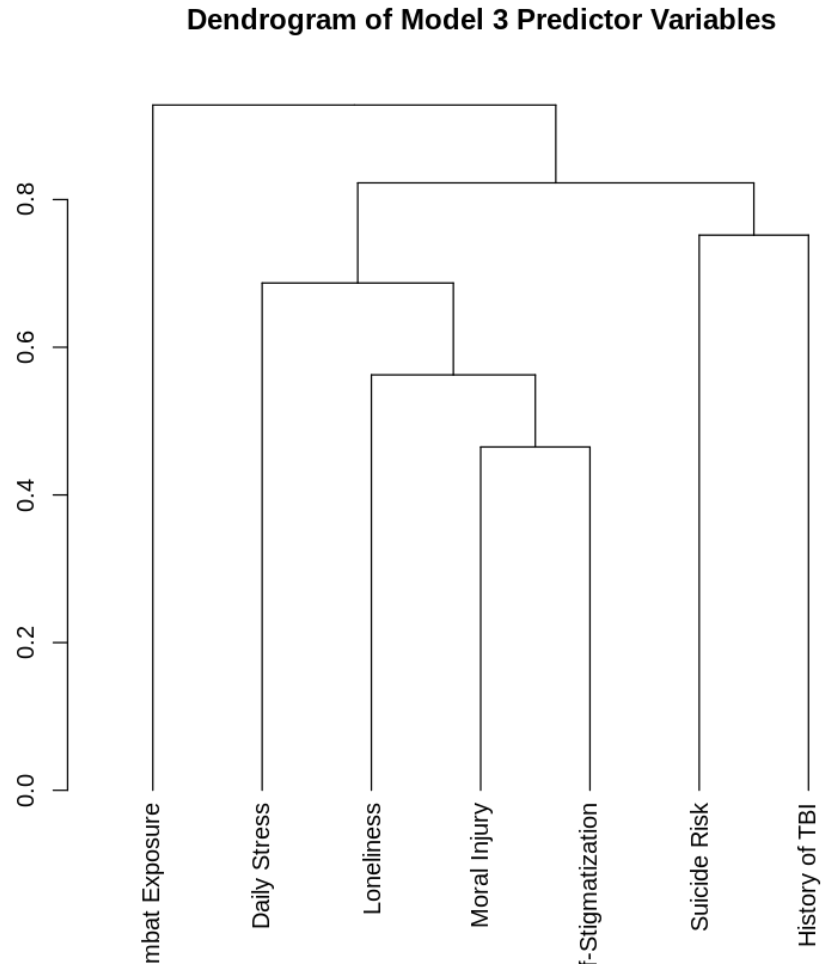
*Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Wellness

Interpretation Statement

The Variance Inflation Factors (VIF) for the Protective Factors for Alcohol and Drug Abuse are below 5. Therefore, it suggests a **moderate or low correlation** between predictor variables, indicating that multicollinearity is **unlikely to significantly impact the regression model**. However, the highest VIF value (3.385) suggests some degree of correlation, but it is still within an acceptable range.

MULTIPLE LINEAR REGRESSION
Dendrogram for Risk Factors

Figure 4



Interpretation Statement

The dendrogram suggests there **may not** be collinearity between the risk factors.

MULITPLE LINEAR REGRESSION Summary Tables

TABLE 8: Variance Inflation Factors for the Risk Factors* among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	Variance Inflation Factors
Combat Exposure	1.193
Daily Stress	1.349
Loneliness	1.472
Moral Injury	2.052
Self-Stigmatization	1.299
Suicide Risk	1.448
History of Traumatic Brain Injury	1.075

*Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

Interpretation Statement

The Variance Inflation Factors (VIF) for the Risk Factors for Alcohol and Drug Abuse are below 5. Therefore, it suggests a **moderate or low correlation** between predictor variables, indicating that multicollinearity is **unlikely to significantly impact the regression model**.

REFERENCES

Brown, R. L., & Rounds, L. A. (1995). Conjoint screening questionnaires for alcohol and other drug abuse: criterion validity in a primary care practice. *Wis Med J*, *94*(3), 135-140. https://pubmed.ncbi.nlm.nih.gov/7778330/

Schafer, K. M., Melia, R., & Joiner, T. (2024). Risk and protective correlates of suicidality in the Military Health and Well-being Project. *Journal of Affective Disorders*. https://doi.org/10.1016/j.jad.2024.07.141

Backup Slides

PROTECTIVE FACTORS
(X_{P1} through X_{P7})

Calling and Purpose
Community Engagement
Help-Seeking Behaviors
Military Calling
Quality of Life
Public Service Motivation
Overall Wellness

MULTIPLE LINEAR REGRESSION
Pearson's Correlation Table Between All Protective Factors* and Alcohol and Drug Abuse Risk (adjusted for confounders**)

Table 4

	Alcohol and Drug Abuse Risk	Calling and Purpose	Community Engagement	Help-Seeking Behavior	Military Calling	Quality of Life	Public Service Motivation	Overall Wellness	Age	Gender	Race	Income
Alcohol and Drug Abuse Risk	1											
Calling and Purpose	-0.016579	1										
Community Engagement	-0.221774	0.285247	1									
Help-Seeking Behavior	-0.012438	0.291237	0.463018	1								
Military Calling	-0.051177	0.367074	0.205557	0.237028	1							
Quality of Life	-0.339094	0.176766	0.611548	0.28606	0.128713	1						
Public Service Motivation	0.004457	0.584609	0.224216	0.295867	0.590143	0.108495	1					
Overall Wellness	-0.333532	0.270678	0.711287	0.298732	0.198751	0.781458	0.212111	1				
Age	-0.241625	0.064733	0.086323	-0.152675	0.122537	0.177232	0.031435	0.280378	1			
Gender	-0.011568	0.05094	-0.017384	0.02742	-0.039776	-0.104542	-0.002392	-0.093092	-0.158909	1		
Race	0.092413	0.051477	0.00586	0.042329	-0.101588	-0.041334	-0.065196	-0.013059	-0.156999	0.069012	1	
Income	-0.086518	-0.002595	0.191311	0.064504	0.052881	0.256309	0.054456	0.19516	0.061009	-0.160687	-0.068207	1

* **Protective Factors** = Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Overall Wellness
** **Confounding Factors** = Age, Gender, Race, and Income (Brown, 1995)
Green filled boxes indicate correlation >0.50

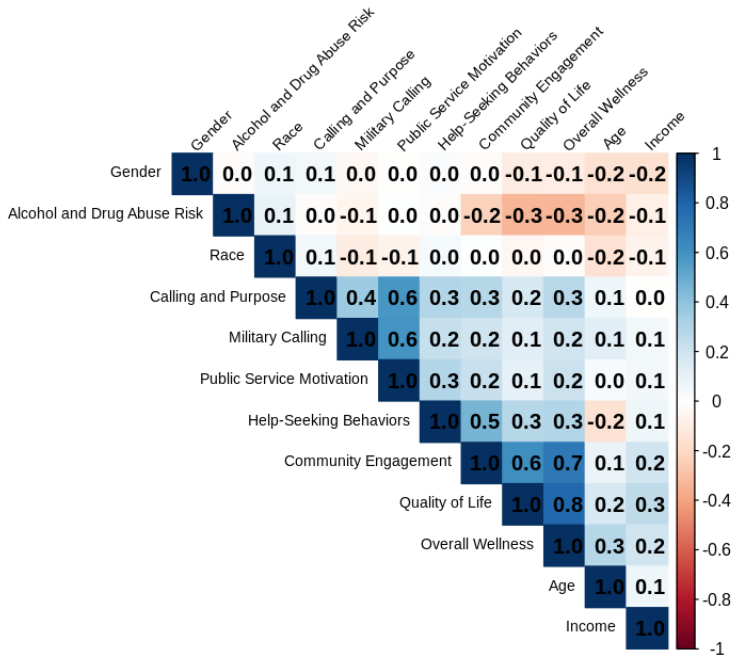
Interpretation Statements

Direct Correlations

Calling and Purpose with Public Service Motivation (0.58)
Community Engagement with Quality of Life (0.61)
Community Engagement and Overall Wellness (0.71)
Military Calling and Public Service Motivation (0.59)
Quality of Life and Overall Wellness (0.78)

MULTIPLE LINEAR REGRESSION
Correlation Plot Between All Protective Factors* and Alcohol and Drug Abuse Risk (adjusted for confounders**)

Figure 1



	Gender	Alcohol and Drug Abuse Risk	Race	Calling and Purpose	Military Calling	Public Service Motivation	Help-Seeking Behaviors	Community Engagement	Quality of Life	Overall Wellness	Age	Income
Gender	1.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.2
Alcohol and Drug Abuse Risk		1.0	0.1	0.0	-0.1	0.0	0.0	-0.2	-0.3	-0.3	-0.2	-0.1
Race			1.0	0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.2	-0.1
Calling and Purpose				1.0	0.4	0.6	0.3	0.3	0.2	0.3	0.1	0.0
Military Calling					1.0	0.6	0.2	0.2	0.1	0.2	0.1	0.1
Public Service Motivation						1.0	0.3	0.2	0.1	0.2	0.0	0.1
Help-Seeking Behaviors							1.0	0.5	0.3	0.3	-0.2	0.1
Community Engagement								1.0	0.6	0.7	0.1	0.2
Quality of Life									1.0	0.8	0.2	0.3
Overall Wellness										1.0	0.3	0.2
Age											1.0	0.1
Income												1.0

*** Protective Factors** = Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Overall Wellness

****Confounding Factors** = Age, Gender, Race, and Income (Brown, 1995)

MULITPLE LINEAR REGRESSION SUMMARY TABLES

Table 6 Protective Factors Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495) (adjusted for confounders)

Measures	ß	SE	t value	p-value			
Constant	3.609	0.324	11.124			**R =**	0.414
Calling and Purpose	0.0186	0.013	1.437	0.151		**R^2 =**	0.171
Community Engagement	-0.0035	0.010	-0.365	0.715		**Overall p value** =	<0.001
Help-Seeking Behavior	0.0173	0.009	1.944	0.052			
Military Calling	-0.0084	0.110	-0.770	0.442			
Quality of Life	-0.0158	0.003	-5.348	<0.001	*		
Public Service Motivation	0.0164	0.014	1.206	0.228			
Overall Wellness	-0.0098	0.003	-3.207	<0.001	*		
Confounders							
Age	0.0152	0.003	-5.747	<0.001	*		
Gender (*Male vs. Female vs. Other*)	-0.222	0.068	-3.277	0.001	*		
Race (*White vs. Non-white*)	0.196	0.085	2.314	0.021	*		
Income	<0.001	<0.001	-0.132	0.8950			

*Denotes p-value < 0.05

MULITPLE LINEAR REGRESSION
Regression Analysis Protective Factors
(adjusted for confounders)

Interpretation Statements

There is **no correlation** between Alcohol and Drug Abuse Risk and the Protective Factors (R = 0.381).

17.1 % of the variance in Alcohol and Drug Abuse Risk is explained by the Protective Factors.

The Protective Factors are **independently associated** with Alcohol and Drug Abuse Risk ($p < 0.001$).

Among the Protective Factors, **Calling and Purpose** contributed the greatest to the variance (0.0186) to Alcohol and Drug Abuse Risk; however, it was not statistically significant.

Quality of Life (-0.0158) and **Overall Wellness** (-0.0098) contributed less; however, they were statistically significant.

MULITPLE LINEAR REGRESSION
Regression Analysis Protective Factors
(adjusted for confounders)

Interpretation Statements

After adjusting for Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Public Service Motivation, and Overall Wellness, **Quality of Life is significantly associated** with Alcohol and Drug Risk Abuse ($p < 0.001$).

After adjusting for Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Public Service Motivation, and Quality of Life, **Overall Wellness is significantly associated** with Alcohol and Drug Risk Abuse ($p < 0.001$).

RISK FACTORS
(X_{N1} through X_{N7})

Combat Exposure
Daily Stress
Loneliness
Moral Injury
Self-Stigmatization
Suicide Risk
History of Traumatic Brain Injury

MULTIPLE LINEAR REGRESSION
Pearson's Correlation Table Between Risk Factors* and Alcohol and Drug Abuse Risk (adjusted for confounders**)

Table 7	Alcohol and Drug Abuse Risk	Combat Exposure	Daily Stress	Loneliness	Moral Injury	Self-Stigma	Suicide Risk	History of Traumatic Brain Injury	Age	Gender	Race	Income
Alcohol and Drug Abuse Risk	1											
Combat Exposure	0.24	1										
Daily Stress	0.36	0.31	1									
Loneliness	0.33	0.2	0.33	1								
Moral Injury	0.42	0.33	0.44	0.54	1							
Self-Stigma	0.22	0.25	0.3	0.23	0.46	1						
Suicide Risk	0.4	0.22	0.33	0.41	0.51	0.21	1					
History of Traumatic Brain Injury	0.14	0.18	0.18	0.16	0.19	0.1	0.2	1				
Age	-0.25	-0.43	-0.43	-0.26	-0.41	-0.4	-0.25	-0.1	1			
Gender	-0.01	-0.07	0.1	0.11	0.08	0	0.18	0.01	-0.15	1		
Race	0.09	0.1	0.09	0.04	0.09	0.1	0.07	-0.01	-0.15	0.08	1	
Income	-0.09	0.1	-0.01	-0.18	-0.13	-0.05	-0.12	-0.05	0.05	-0.16	-0.07	1

* **Risk Factors** = Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury
Confounding Factors = Age, Gender, Race, and Income (Brown, 1995)
Green filled boxes indicate correlation >0.50

Interpretation Statements

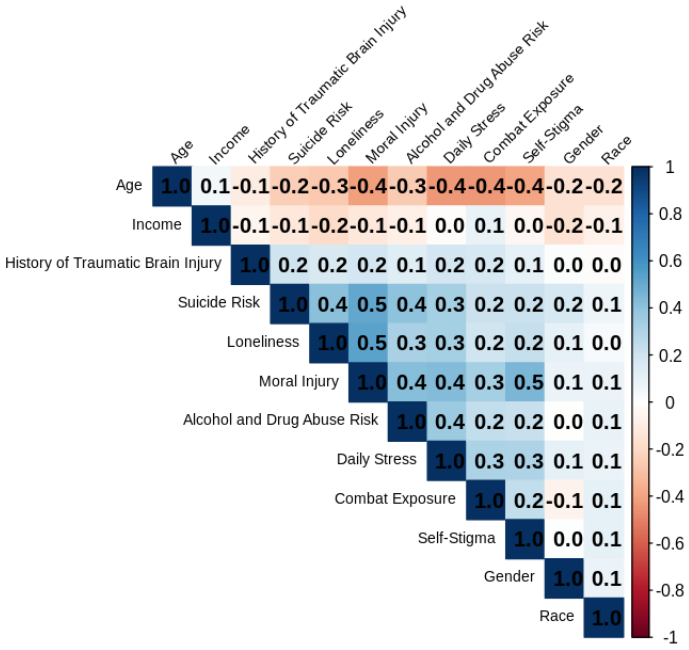
Direct Correlations

Moral Injury and Loneliness (0.54)

Moral Injury and Suicide Risk (0.51)

MULTIPLE LINEAR REGRESSION
Correlation Plot Between All Risk Factors* and Alcohol and Drug Abuse Risk (adjusted for confounders)

Figure 3



*** Risk Factors** = Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury
Confounding Factors = Age, Gender, Race, and Income (Brown, 1995)

MULITPLE LINEAR REGRESSION SUMMARY TABLES

Table 9 Risk Factors Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495) (adjusted for confounders)

Measures	ß	SE	t value	p-value			
Constant	-0.040	0.272	-1.483	0.138		**R =**	0.5122
Combat Exposure	0.1154	0.058	1.989	0.047	*	**R^2 =**	0.2624
Daily Stress	0.1286	0.020	6.408	<0.001	*	**Overall p value** =	<0.001
Loneliness	0.0523	0.019	2.730	0.006	*		
Moral Injury	0.0131	0.003	4.693	<0.001	*		
Self-Stigmatization	0.0110	0.007	0.159	0.874			
Suicide Risk	0.0808	0.010	8.234	<0.001	*		
History of Traumatic Brain Injury	0.1110	0.083	0.135	0.8930			
Confounders							
Age	-0.0107	0.003	-0.383	0.7019			
Gender (*Male vs. Female vs. Other*)	-0.2656	0.064	-4.123	<0.001	*		
Race (*White vs. Non-white*)	0.1512	0.077	1.952	0.0512			
Income	<0.001	<0.001	-1.655	0.0981			

*Denotes p-value < 0.05

MULITPLE LINEAR REGRESSION
Regression Analysis Model Risk Factors
(adjusted for confounders)

Interpretation Statements

There is **a correlation** between Alcohol and Drug Abuse Risk and the Risk Factors (R = 0.5122).

26.2 % of the variance in Alcohol and Drug Abuse Risk is explained by the Risk Factors.

The Risk Factors are **independently associated** with Alcohol and Drug Abuse Risk ($p < 0.001$).

Among the Risk Factors, **Daily Stress** contributes the greatest to the variance (0.129) to Alcohol and Drug Abuse Risk.

MULITPLE LINEAR REGRESSION
Regression Analysis Model Risk Factors
(adjusted for confounders)

Interpretation Statements

After adjusting for Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury, **Combat Exposure is significantly associated** with Alcohol and Drug Risk Abuse ($p = 0.047$).

After adjusting for Combat Exposure, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury, **Daily Stress is significantly associated** with Alcohol and Drug Risk Abuse ($p < 0.001$).

After adjusting for Combat Exposure, Daily Stress, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury, **Loneliness is significantly associated** with Alcohol and Drug Risk Abuse ($p < 0.0006$).

After adjusting for Combat Exposure, Daily Stress, Loneliness, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury, **Moral Injury is significantly associated** with Alcohol and Drug Risk Abuse ($p < 0.001$).

After adjusting for Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, and History of Traumatic Brain Injury, **Suicide Risk is significantly associated** with Alcohol and Drug Risk Abuse ($p < 0.001$)

BUFFERING EFFECTS OF PROTECTIVE VS.RISK FACTORS

(X_{P1} through X_{P7} and X_{N1} through X_{N7})

Combat Exposure
Daily Stress
Loneliness
Moral Injury
Self-Stigmatization
Suicide Risk
History of Traumatic Brain Injury

Calling and Purpose
Community Engagement
Help-Seeking Behaviors
Military Calling
Quality of Life
Public Service Motivation
Overall Wellness

MULTIPLE LINEAR REGRESSION

Pearson's Correlation Table Between Protective* and Risk Factors** and Alcohol and Drug Abuse Risk (adjusted for confounders***)

Table 10

	Alcohol and Drug Abuse Risk	Purpose in Life	Social Support	Help-Seeking Behaviors	Military Calling	Quality of Life	Public Service Motivation	Overall Wellness	Combat Exposure	Daily Stress	Loneliness	Moral Injury	Self-Stigma	Suicide Risk	History of Traumatic Brain Injury	Age	Gender	Race	Income
Alcohol and Drug Abuse Risk	1																		
Purpose in Life	-0.01	1																	
Social Support	-0.22	0.28	1																
Help-Seeking Behaviors	0	0.29	0.46	1															
Military Calling	-0.06	0.36	0.2	0.22	1														
Quality of Life	-0.33	0.17	0.61	0.28	0.13	1													
Public Service Motivation	0.01	0.59	0.23	0.29	0.58	0.11	1												
Overall Wellness	-0.34	0.27	0.71	0.29	0.2	0.78	0.22	1											
Combat Exposure	0.24	0.01	-0.01	0.14	0.02	-0.13	0.11	-0.14	1										
Daily Stress	0.36	-0.04	-0.15	0.03	-0.1	-0.33	0.01	-0.32	0.31	1									
Loneliness	0.33	0	-0.47	-0.19	-0.05	-0.59	0.02	-0.58	0.2	0.33	1								
Moral Injury	0.42	-0.18	-0.51	-0.14	-0.2	-0.62	-0.13	-0.7	0.33	0.44	0.54	1							
Self-Stigma	0.22	-0.21	-0.2	0.01	-0.41	-0.22	-0.27	-0.31	0.25	0.3	0.23	0.46	1						
Suicide Risk	0.4	-0.07	-0.39	-0.12	-0.09	-0.53	-0.02	-0.53	0.22	0.33	0.41	0.51	0.21	1					
History of Traumatic Brain Injury	0.14	0	-0.13	-0.04	0.01	-0.22	0.02	-0.16	0.18	0.18	0.16	0.19	0.1	0.2	1				
Age	-0.25	0.06	0.08	-0.16	0.13	0.18	0.03	0.28	-0.43	-0.43	-0.26	-0.41	-0.4	-0.25	-0.1	1			
Gender	-0.01	0.05	-0.03	0.03	-0.05	-0.11	-0.01	-0.1	-0.07	0.1	0.11	0.08	0	0.18	0.01	-0.15	1		
Race	0.09	0.05	0	0.04	-0.11	-0.04	-0.06	-0.02	0.1	0.09	0.04	0.09	0.1	0.07	-0.01	-0.15	0.08	1	
Income	-0.09	0	0.2	0.07	0.05	0.26	0.06	0.2	0.1	-0.01	-0.18	-0.13	-0.05	-0.12	-0.05	0.05	-0.16	-0.07	1

***Protective Factors** = Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Overall Wellness

****Risk Factors** = Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

*****Confounding Factors** = Age, Gender, Race, and Income (Brown, 1995)

Green filled boxes indicate correlation >0.50

Red filled boxes indicate correlation < -0.05

Interpretation Statements

Direct Correlations

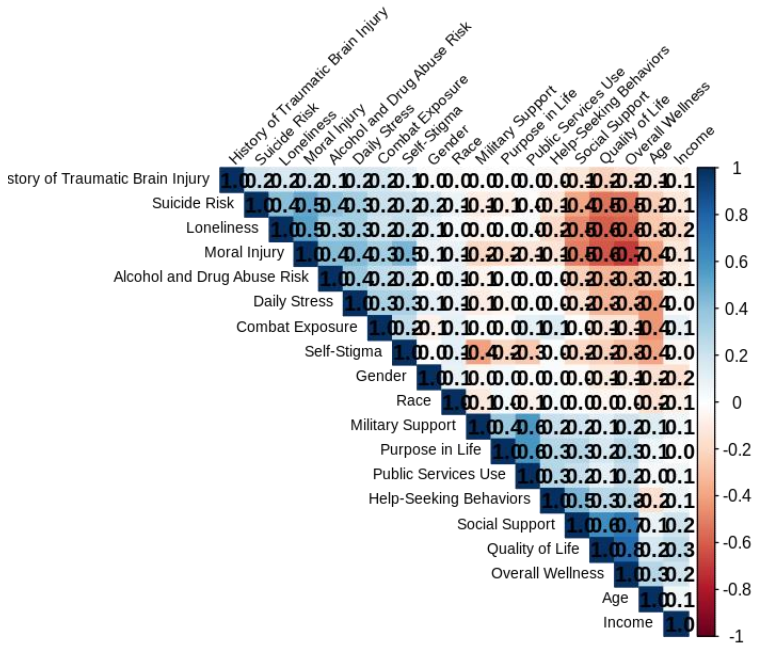
Purpose in Life and Public Service Motivation (0.59)
Social Support and Quality of Life (0.61)
Social Support and Overall Wellness (0.71)
Military Calling and Public Service Motivation (0.58)
Quality of Life and Overall Wellness (0.78)

Indirect Correlations

Moral Injury and Social Support (-0.51)
Quality of Life and Loneliness (-0.59)
Quality of Life and Moral Injury (-0.62)
Quality of Life and Suicide Risk (-0.53)
Overall Wellness and Loneliness (-0.58)
Overall Wellness and Moral Injury (-0.70)
Overall Wellness and Suicide Risk (-0.53)

MULTIPLE LINEAR REGRESSION
Correlation Plot Between Protective* and Risk Factors** and Alcohol and Drug Abuse Risk (adjusted for confounders***)

Figure 4



***Protective Factors** = Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Overall Wellness
****Risk Factors** = Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury
*****Confounding Factors** = Age, Gender, Race, and Income

MULITPLE LINEAR REGRESSION SUMMARY TABLES

Table 11 Protective and Risk Factors Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495) (adjusted for confounders)

Measures	ß	SE	t value	p-value			
Constant	-0.726	0.515	-1.410			**R =**	0.5181
Calling and Purpose	0.160	0.012	1.292	0.1964		**R^2 =**	0.2684
Community Engagement	0.002	0.009	0.184	0.8542		**Overall p value** =	<0.001
Help-Seeking Behavior	0.015	0.008	1.744	0.0813			
Military Calling	0.003	0.110	0.244	0.8076			
Quality of Life	-0.002	0.003	-0.716	0.4742			
Public Service Motivation	-0.002	0.013	-0.142	0.8873			
Overall Wellness	-0.000	0.003	-0.184	0.8542			
Combat Exposure	0.011	0.006	1.771	0.0768			
Daily Stress	0.124	0.021	6.034	<0.001	*		
Loneliness	0.048	0.022	2.233	0.0257	*		
Moral Injury	0.013	0.003	4.079	<0.001	*		
Self-Stigmatization	0.004	0.008	0.567	0.5709			
Suicide Risk	0.081	0.010	7.765	<0.001	*		
History of Traumatic Brain Injury	0.014	0.084	0.167	0.8677			
Confounders							
Age	-0.000	0.003	-0.071	0.9431			
Gender (*Male vs. Female vs. Other*)	-0.027	0.066	-4.115	< 0.001	*		
Race (*White vs. Non-white*)	0.139	0.080	1.741	0.0820			
Income	0.000	0.000	-1.336	0.1818			

*Denotes p-value < 0.05

MULITPLE LINEAR REGRESSION
Regression Analysis for Protective and Risk Factors (adjusted for confounders)

Interpretation Statements

There is **a correlation** between Alcohol and Drug Abuse Risk and the Risk Factors (R = 0.5181).

26.8 % of the variance in Alcohol and Drug Abuse Risk is explained by the Protective and Risk Factors.

The Protective and Risk Factors are **independently associated** with Alcohol and Drug Abuse Risk ($p < 0.001$).

Among all the factors, Daily Stress contributes the greatest to the variance (0.124) of alcohol and drug abuse.

MULITPLE LINEAR REGRESSION
Regression Analysis Protective and Risk Factors
(adjusted for confounders)

Interpretation Statements

After adjusting for Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation, Overall Wellness, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury, **Daily Stress is significantly associated** with Alcohol and Drug Risk Abuse($p < 0.001$).

After adjusting for Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation, and Overall Wellness, Daily Stress, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury, **Loneliness is significantly associated** with Alcohol and Drug Risk Abuse($p = 0.0257$).

After adjusting for Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation, Overall Wellness, Daily Stress, Loneliness, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury, **Moral Injury is significantly associated** with Alcohol and Drug Risk Abuse($p < 0.001$).

After adjusting for Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation, Overall Wellness, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, and History of Traumatic Brain Injury, **Suicide Risk is significantly associated** with Alcohol and Drug Abuse Risk ($p < 0.001$).

MULTIPLE LINEAR REGRESSION
Combined Saturated Model
Research Aims
(adjusted for confounders)

1. **What is the buffering effect of protective factors on the risk factors related to alcohol abuse risk in US Veterans?**
   Minimal buffering effect.

2. **What is the association of protective and risk factors with alcohol abuse risk use among US Veterans?**
   There is **a correlation** between Alcohol and Drug Abuse Risk and the protective and risk factors (R = 0.5181).

3. **When evaluating all the factors simultaneously, which construct accounts for the greatest variability in alcohol abuse risk?**
   Daily Stress (0.1240)

Reduced Model

MULTIPLE LINEAR REGRESSION

Pearson's Correlation Table Between Reduced Model Factors* and Alcohol and Drug Abuse Risk (adjusted for confounders**)

Table 11

	Alcohol and Drug Abuse Risk	Daily Stress	Loneliness	Moral Injury	Suicide Risk	Age	Gender	Race	Income
Alcohol and Drug Abuse Risk	1								
Daily Stress	0.360395	1							
Loneliness	0.325762	0.330626	1						
Moral Injury	0.420049	0.439269	0.53509148	1					
Suicide Risk	0.40397	0.330806	0.41089095	0.514361	1				
Age	-0.253868	-0.434212	-0.2635684	-0.413756	-0.248279	1			
Gender	-0.005183	0.100829	0.10737591	0.082135	0.179158	-0.15411	1		
Race	0.090843	0.0865	0.03549848	0.087059	0.074025	-0.152828	0.080053	1	
Income	-0.08578	-0.01382	-0.1826259	-0.12795	-0.120156	0.05349	-0.157907	-0.073155	1

***Reduced Model Factors** = Daily Stress, Loneliness, Moral Injury, and Suicide Risk
****Confounding Factors** = Age, Gender, Race, and Income (Brown, 1995)
Green filled boxes indicate correlation >0.50

Interpretation Statements

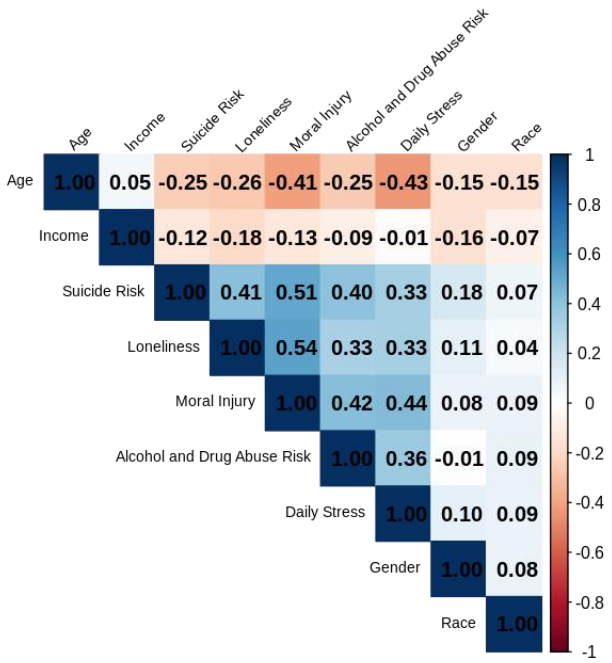
Direct Correlations

Moral Injury and Loneliness (0.54)

Moral Injury and Suicide Risk (0.51)

MULTIPLE LINEAR REGRESSION
Correlation Plot Between Reduced Factors* and Alcohol and Drug Abuse Risk (adjusted for confounders**)

Figure 6



***Reduced Model Factors** = Daily Stress, Loneliness, Moral Injury, Suicide Risk
****Confounding Factors** = Age, Gender, Race, and Income (Brown, 1995)

MULITPLE LINEAR REGRESSION SUMMARY TABLES

Table 12 Reduced Model Factors* Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495) (adjusted for confounders)**

Measures	ß	SE	t value	p-value			
Constant	-0.2042	0.2461	-0.830			**R =**	0.5111
Daily Stress	0.1341	0.1991	6.650	< 0.001	*	**R^2 =**	0.2603
Loneliness	0.0527	0.1914	2.752	0.006	*	**Overall p value** =	<0.001
Moral Injury	0.0138	0.0266	5.202	< 0.001	*		
Suicide Risk	0.0821	0.0097	8.431	< 0.001	*		
Confounders							
Age	-0.0029	0.0026	-1.141	0.2541			
Gender (*Male vs. Female vs. Other*)	-0.0286	0.6347	-4.512	< 0.001	*		
Race (*White vs. Non-white*)	0.1606	0.0772	2.081	0.0376	*		
Income	<0.001	<0.001	-1.393	0.1637			

*Denotes p-value < 0.05

***Reduced Model Factors** = Daily Stress, Loneliness, Moral Injury, Suicide Risk
****Confounding Factors** = Age, Gender, Race, and Income (Brown, 1995)

MULITPLE LINEAR REGRESSION
Regression Analysis for Reduced Model*
(adjusted for confounders**)

Interpretation Statements

There is **a correlation** between Alcohol and Drug Abuse Risk and the reduced model factors (R = 0.5111).

26.0 % of the variance in Alcohol and Drug Abuse Risk is explained by the reduced model factors.

The reduced model factors are **independently associated** with Alcohol and Drug Abuse Risk ($p < 0.001$).

Among all the reduced model factors, **Daily Stress** contributes the greatest to the variance (0.1341) to alcohol and drug abuse.

***Reduced Model Factors** = Daily Stress, Loneliness, Moral Injury, Suicide Risk
****Confounding Factors** = Age, Gender, Race, and Income (Brown, 1995)

MULITPLE LINEAR REGRESSION
Regression Analysis Reduced Factors
(adjusted for confounders)

Interpretation Statements

After adjusting for Loneliness, Moral Injury, and Suicide Risk, **Daily Stress is significantly associated** with Alcohol and Drug Risk Abuse ($p < 0.001$).

After adjusting for Daily Stress, Moral Injury, and Suicide Risk, **Loneliness is significantly associated** with Alcohol and Drug Risk Abuse ($p = 0.006$).

After adjusting for Daily Stress, Loneliness, and Suicide Risk, **Moral Injury is significantly associated** with Alcohol and Drug Risk Abuse ($p < 0.001$).

After adjusting for Daily Stress, Loneliness, and Moral Injury, **Suicide Risk is significantly associated** with Alcohol and Drug Risk Abuse ($p < 0.001$).

MULITPLE LINEAR REGRESSION SUMMARY TABLES

Table 13 Reduced Factors Independently Associated with Alcohol and Drug Abuse Risk using Cohen Convention among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495) (adjusted for confounders)

Measures	Effect Size	Cohen Convention
Constant	0.204	Medium
Daily Stress	0.132	Medium
Loneliness	0.053	Small
Moral Injury	0.014	Small
Suicide Risk	0.082	Small
Confounders		
Age	0.003	Small
Gender (*Male vs. Female vs. Other*)	0.286	Medium
Race (*White vs. Non-white*)	0.161	Medium
Income	<0.001	Small

MULITPLE LINEAR REGRESSION Summary Tables

TABLE 2: Model 3 Risk Factors* Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

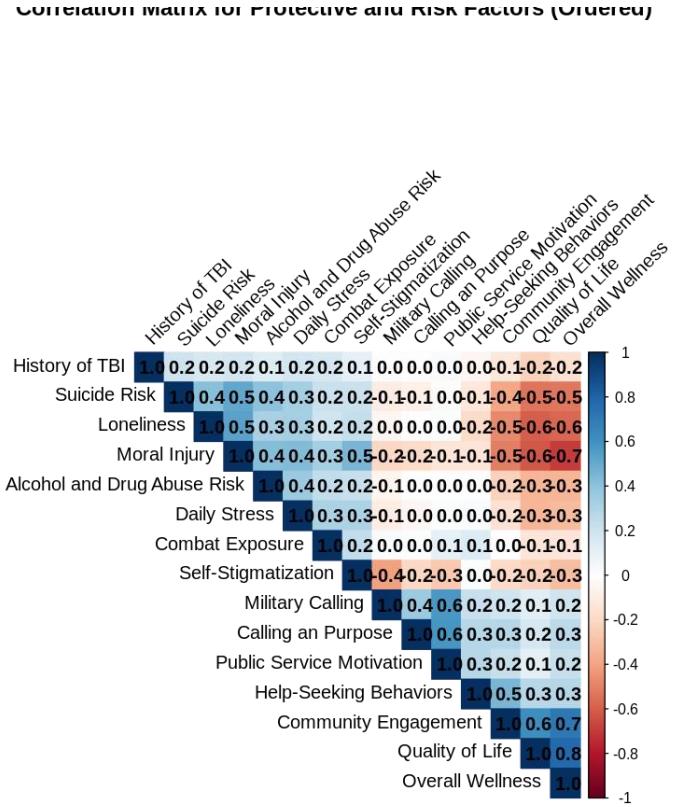
Measures	ß	p-value			
Constant	-0.787		R =	0.4913	
			R^2 =	0.2414	
			Overall p-value	<0.001	
Combat Exposure (scale)	0.015	<0.001#			
Daily Stress (Scale)	0.121	0.004#			
Loneliness (Scale)	0.054	<0.001#			
Moral Injury (Scale)	0.014	<0.001			
Self-Stigmatization (Scale)	0.004	0.492			
Suicide Risk (Scale)	0.076	<0.001#			
History of Traumatic Brain Injury (Binary)	0.014	0.866			

# Denotes p-value < 0.05

*Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

MULTIPLE LINEAR REGRESSION

Correlation Plot Between All Protective* and Risk Factors* and Alcohol and Drug Abuse Risk



MULTIPLE LINEAR REGRESSION
Pearson's Correlation Plot Between All Protective* and Risk Factors** and Alcohol and Drug Abuse Risk Without Confounders

	Alcohol and Drug Abuse Risk	Calling and Purpose	Community Engagement	Help-Seeking Behavior	Public Service Motivation	Military Calling	Quality of Life	Overall Wellness	Community Engagement	Daily Stress	Loneliness	Moral Injury	Self-Stigmatization	Suicide Risk	History of TBI
Alcohol and Drug Abuse Risk	1.000														
Calling and Purpose	-0.007	1.000													
Community Engagement	-0.222	0.280	1.000												
Help-Seeking Behavior	-0.004	0.290	0.457	1.000											
Public Service Motivation	0.007	0.587	0.225	0.289	1.000										
Military Calling	-0.056	0.361	0.196	0.221	0.579	1.000									
Quality of Life	-0.333	0.175	0.611	0.279	0.112	0.125	1.000								
Overall Wellness	-0.338	0.267	0.711	0.289	0.220	0.199	0.778	1.000							
Community Engagement	0.244	0.014	-0.008	0.144	0.106	0.023	-0.135	-0.139	1.000						
Daily Stress	0.360	-0.043	-0.153	0.028	0.010	-0.097	-0.332	-0.317	0.312	1.000					
Loneliness	0.326	0.004	-0.474	-0.188	0.018	-0.048	-0.594	-0.579	0.198	0.331	1.000				
Moral Injury	0.420	-0.183	-0.509	-0.137	-0.131	-0.205	-0.619	-0.697	0.332	0.439	0.535	1.000			
Self-Stigmatization	0.223	-0.207	-0.198	0.014	-0.265	-0.409	-0.222	-0.307	0.248	0.304	0.232	0.456	1.000		
Suicide Risk	0.404	-0.074	-0.390	-0.123	-0.020	-0.091	-0.532	-0.529	0.219	0.331	0.411	0.514	0.211	1.000	
History of TBI	0.136	0.001	-0.127	-0.042	0.021	0.005	-0.221	-0.157	0.179	0.184	0.164	0.188	0.103	0.204	1.000

*Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Overall Wellness

**Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

Green filled box indication correlation >0.50

Interpretation Statements

Positive Correlations

Calling and Purpose with Public Service Motivation
Community Engagement with Quality of Life
Community Engagement and Overall Wellness
Military Calling and Public Service Motivation
Quality of Life and Overall Wellness
Moral Injury with Loneliness
Moral Injury with Suicide Risk

Negative Correlations

Loneliness and Quality of Life
Overall Wellness with Moral Injury
Overall Wellness with Suicide Risk
Overall Wellness with Loneliness
Moral Injury and Quality of Life

MULITPLE LINEAR REGRESSION SUMMARY TABLES

TABLE 2: Protective Factors* without Confounders Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	ß	p-value			
Constant	2.999		R=	0.381	
			R^2=	0.1452	
			Overall p-value	<0.001	
Calling and Purpose (scale)	0.0198	0.121			
Community Engagement (Scale)	0.0011	0.906			
Help-Seeking Behavior (Scale)	0.0311	<0.001#			
Military Calling (Scale)	-0.0202	0.0598			
Quality of Life (Scale)	-0.1327	<0.001#			
Public Service Motivation (Scale)	0.0206	0.124			
Overall Wellness (Scale)	-0.0159	<0.001#			

# Denotes p-value < 0.05

*Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Wellness

MULITPLE LINEAR REGRESSION Summary Tables

TABLE 2: Model 3 Risk Factors* Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	ß	p-value			
Constant	-0.787		R=	0.4913	
			R^2 =	0.2414	
			Overall p-value	<0.001	
Combat Exposure (scale)	0.015	<0.001#			
Daily Stress (Scale)	0.121	0.004#			
Loneliness (Scale)	0.054	<0.001#			
Moral Injury (Scale)	0.014	<0.001			
Self-Stigmatization (Scale)	0.004	0.492			
Suicide Risk (Scale)	0.076	<0.001#			
History of Traumatic Brain Injury (Binary)	0.014	0.866			

# Denotes p-value < 0.05

*Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

PROTECTIVE FACTORS
(X_{P1} through X_{P7})

Calling and Purpose
Community Engagement
Help-Seeking Behaviors
Military Calling
Quality of Life
Public Service Motivation
Overall Wellness

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Alcohol and Drug Abuse Risk (Y)

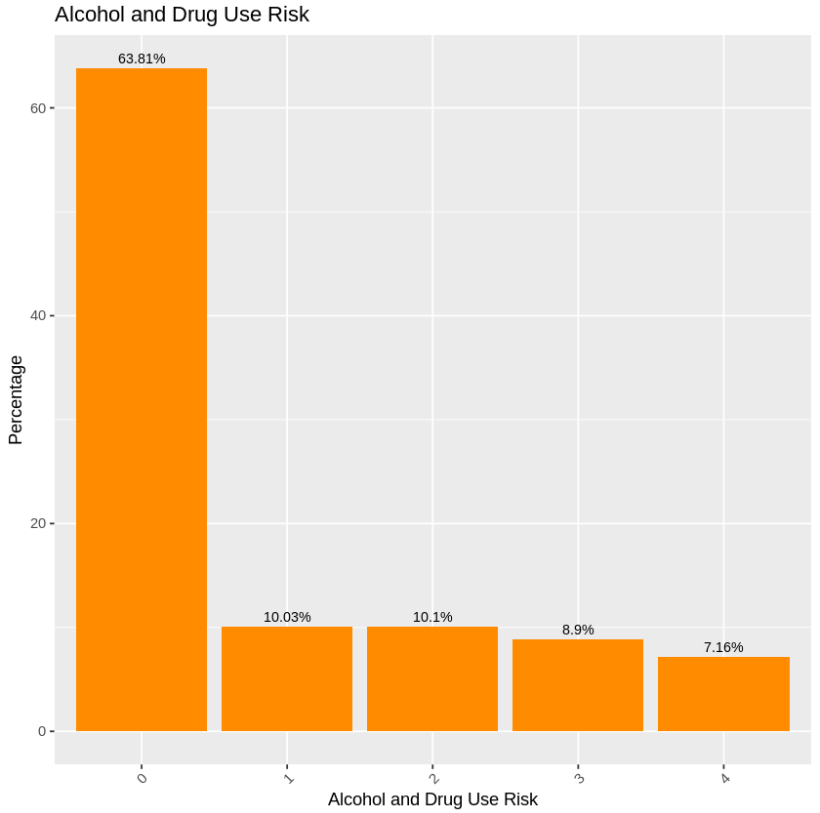
Descriptive Statistics Table

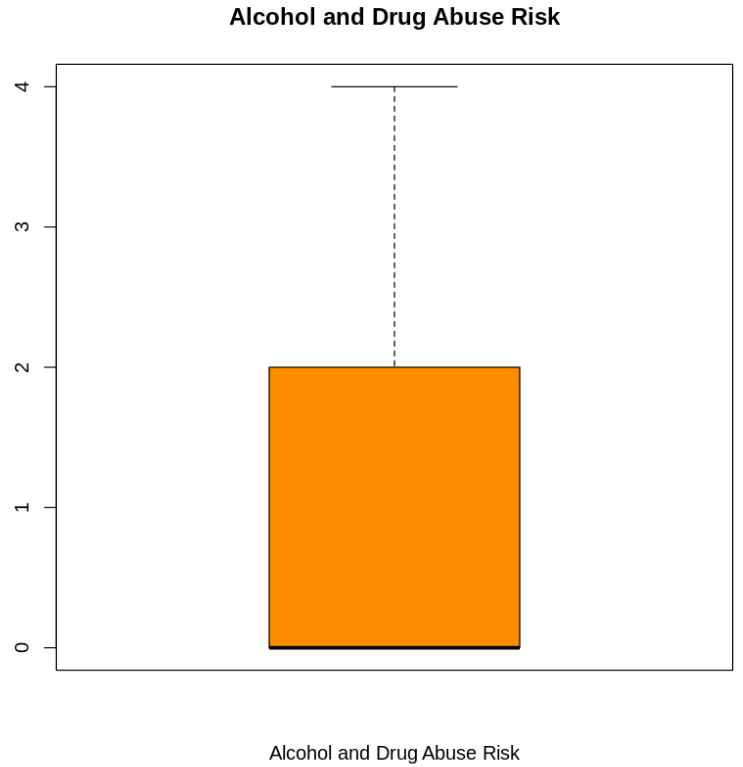
Statistics

Alcohol and Drug Abuse Risk

N	Valid	1,495
	Missing	0
Mean		0.855
Median		0.00
Std. Deviation		1.3113
Minimum		0.00
Maximum		4.00
Percentiles	25	0.00
	50	0.00
	75	2.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Alcohol and Drug Abuse Risk is (0, 0, 1, 2, 4)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Calling and Purpose (X_{P1})

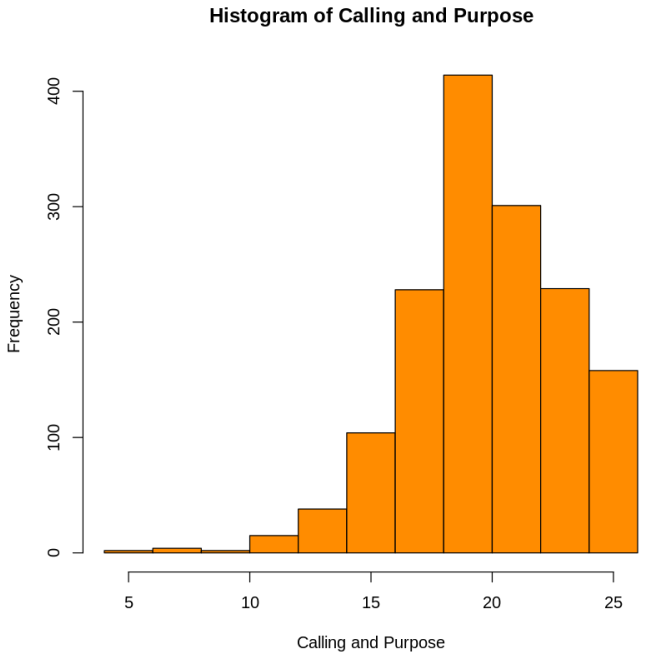
Descriptive Statistics Table

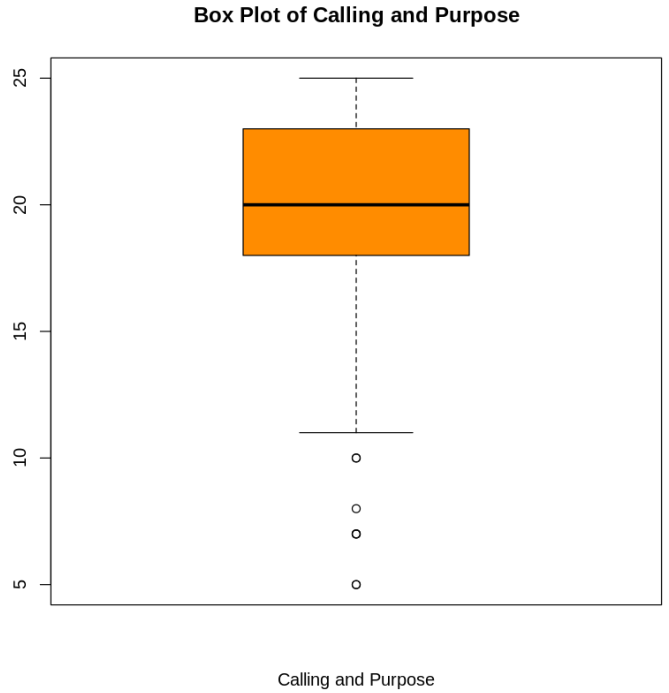
Statistics

Calling and Purpose

N	Valid	1,495
	Missing	0
Mean		20.24
Median		20.00
Std. Deviation		3.1526
Minimum		5.00
Maximum		25.00
Percentiles	25	18.00
	50	20.00
	75	23.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Calling and Purpose is (5, 18, 20, 23, 25)

MULTIPLE LOGISTIC REGRESSION
Univariate Statistics for Community Engagement (X_{P2})

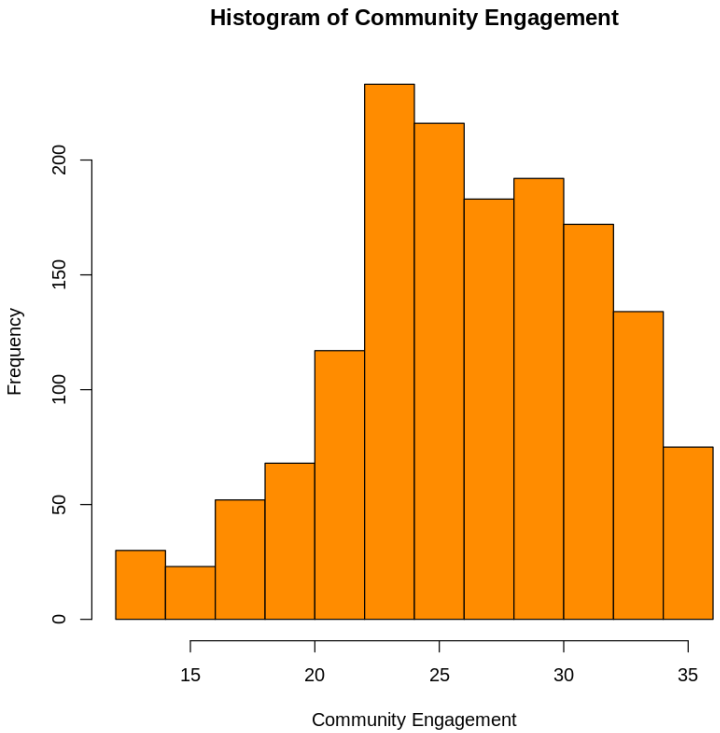
Descriptive Statistics Table

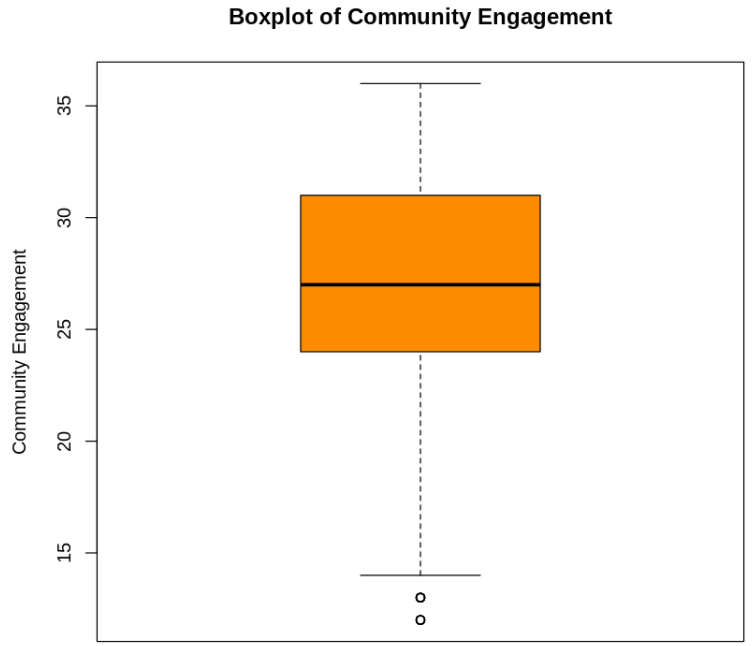
Statistics

Community Engagement

N	Valid	1,495
	Missing	0
Mean		26.67
Median		27.00
Std. Deviation		5.1689
Minimum		12.00
Maximum		36.00
Percentiles	25	24.00
	50	27.00
	75	36.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Community Engagement is (12, 24, 27, 36, 36)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Help-Seeking Behavior (X_{P3})

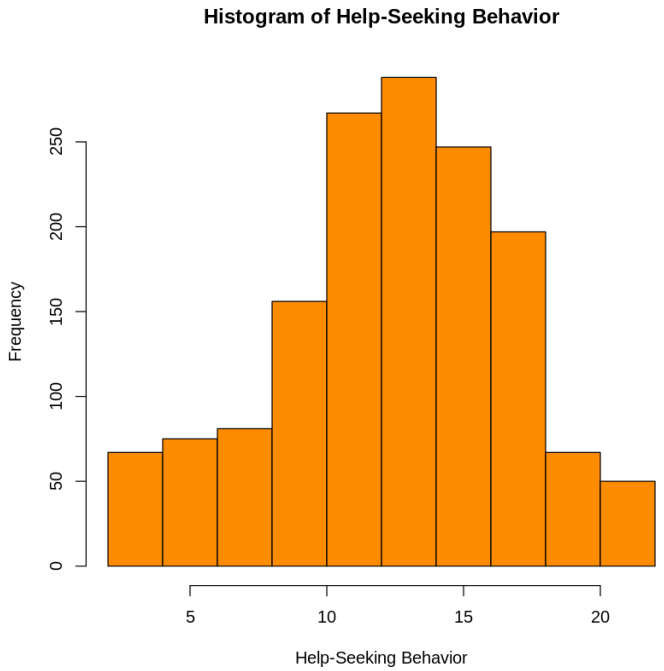
Descriptive Statistics Table

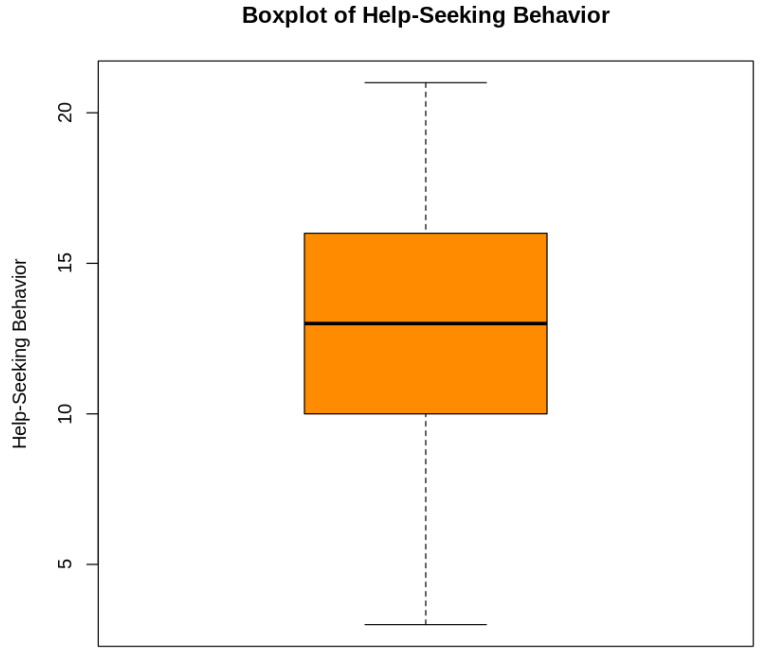
Statistics

Help-Seeking Behavior

N	Valid	1,495
	Missing	0
Mean		12.96
Median		13.00
Std. Deviation		4.2852
Minimum		3.00
Maximum		21.00
Percentiles	25	10.00
	50	12.96
	75	21.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Help-Seeking Behavior is (3, 10, 13, 21, 21)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Military Calling (X_{P4})

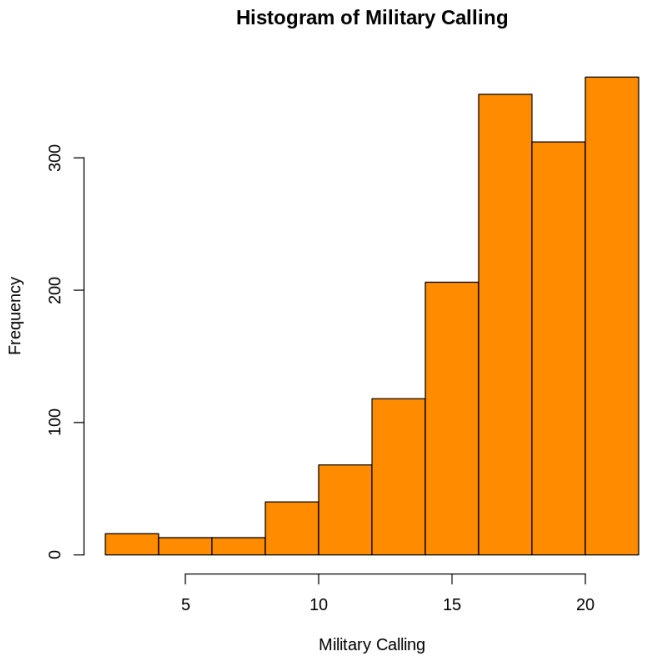
Descriptive Statistics Table

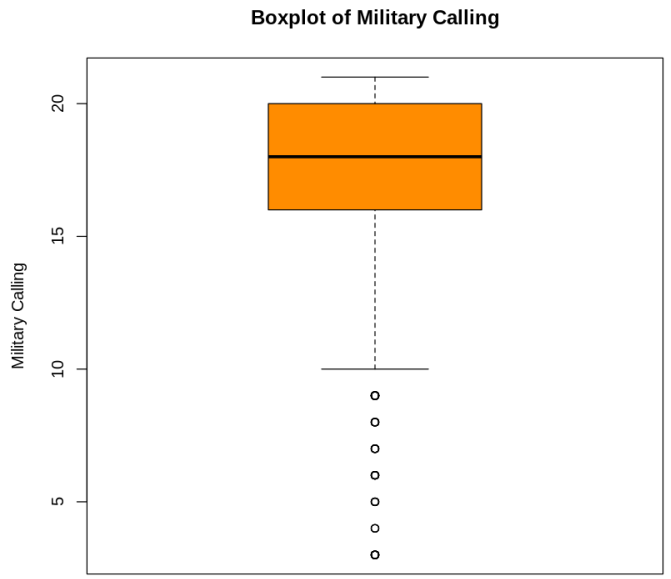
Statistics

Military Calling

N	Valid	1,495
	Missing	0
Mean		17.38
Median		18.00
Std. Deviation		3.6506
Minimum		3.00
Maximum		21.00
Percentiles	25	16.00
	50	18.00
	75	20.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495, the 5-point summary for Military Calling is (3, 16, 18, 20, 21)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Quality of Life (X_{P5})

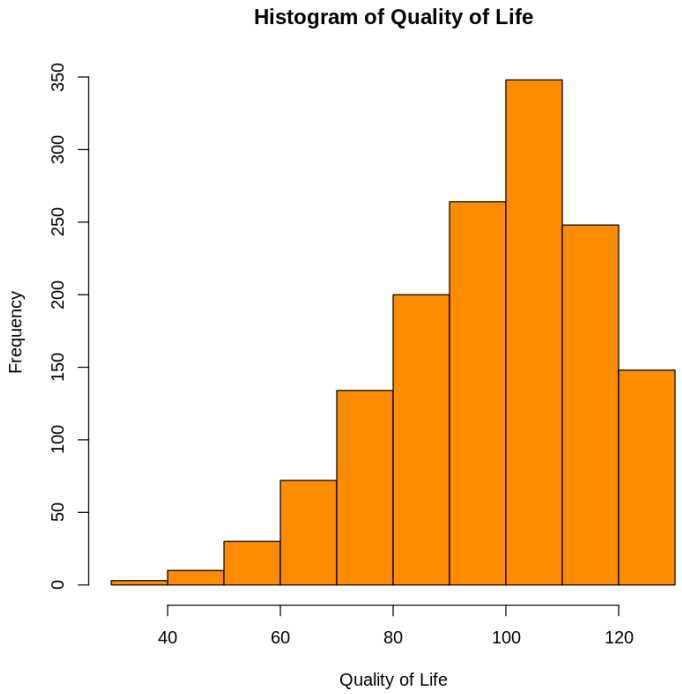
Descriptive Statistics Table

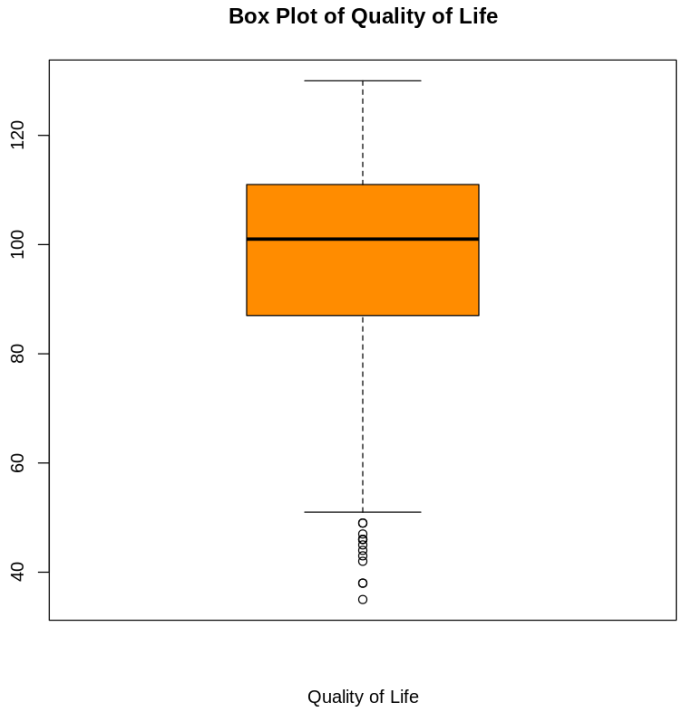
Statistics

Quality of Life

N	Valid	1,495
	Missing	0
Mean		98.33
Median		101.00
Std. Deviation		17.9376
Minimum		35.00
Maximum		130.00
Percentiles	25	87.00
	50	101.00
	75	111.00

Histogram





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Quality of Life is (33, 87, 101, 111, 130)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Public Service Motivation (X_{P6})

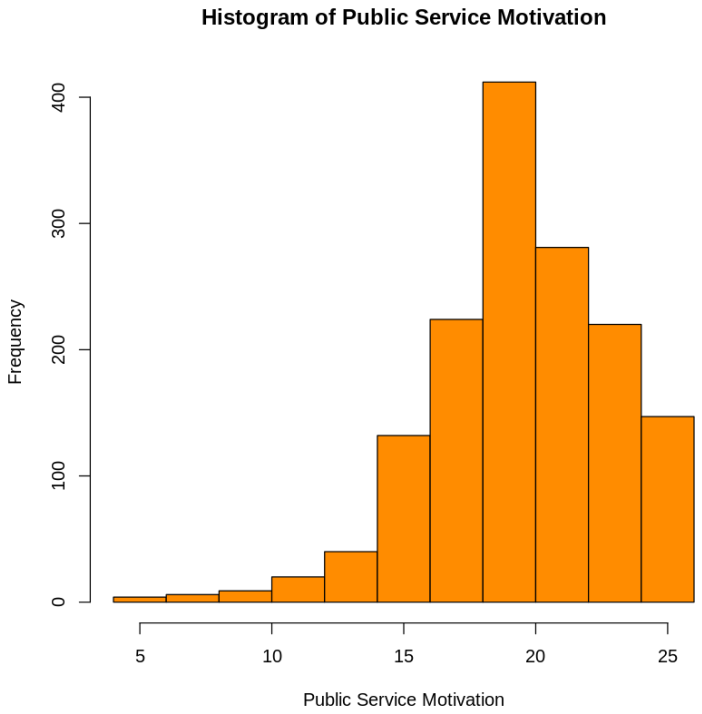
Descriptive Statistics Table

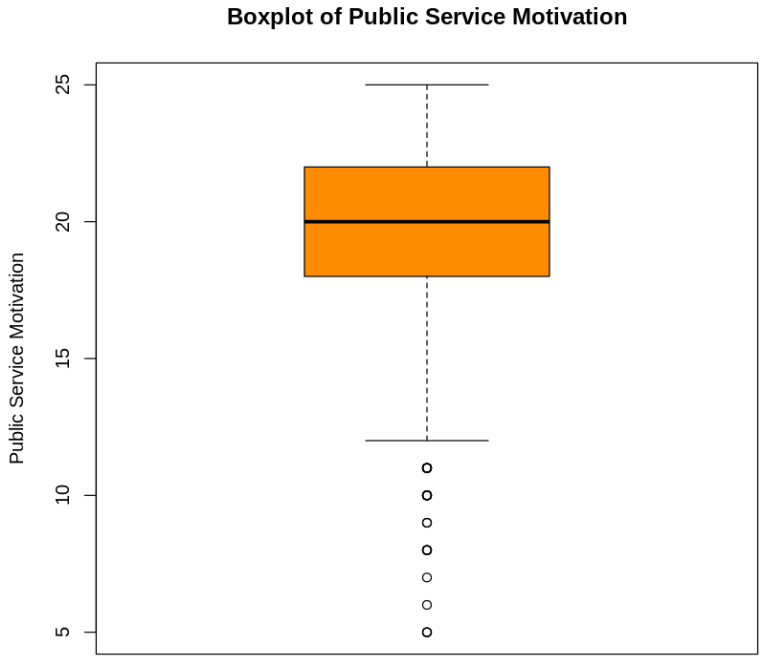
Statistics

Public Service Motivation

N	Valid	1,495
	Missing	0
Mean		19.96
Median		20.00
Std. Deviation		3.3811
Minimum		5.00
Maximum		25.00
Percentiles	25	18.00
	50	20.00
	75	22.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495, the 5-point summary for Public Service Motivation is (5, 18, 20, 22, 25)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Wellness (X_{P7})

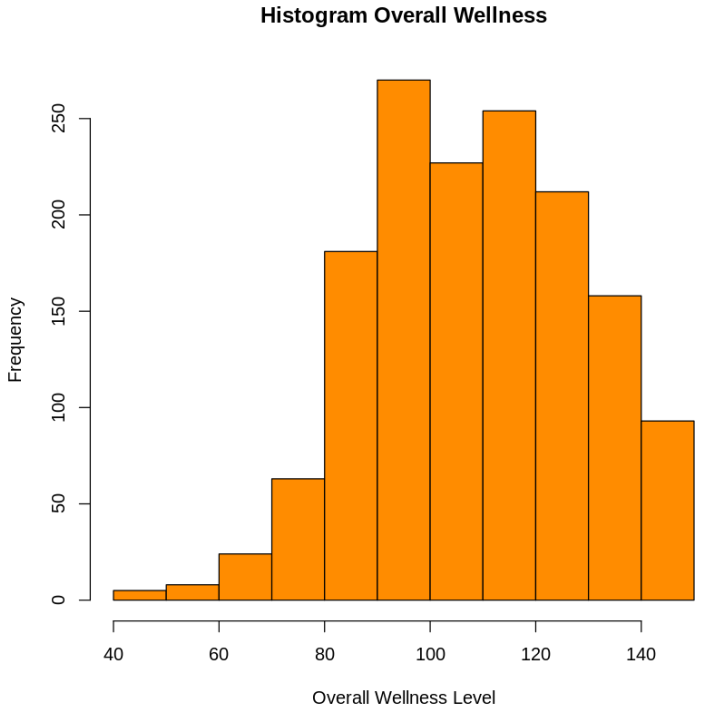
Descriptive Statistics Table

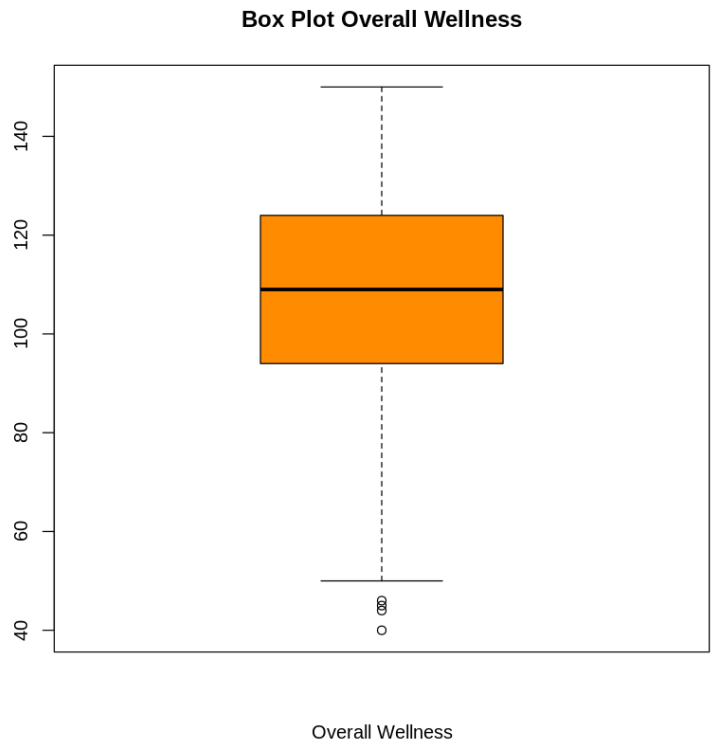
Statistics

Wellness

N	Valid	1,495
	Missing	0
Mean		109.2
Median		109.00
Std. Deviation		20.1099
Minimum		40.00
Maximum		150.00
Percentiles	25	94.00
	50	109.00
	75	124.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495, the **mean and standard deviation** for Overall Wellness are 109.20 and 20.11, respectively.

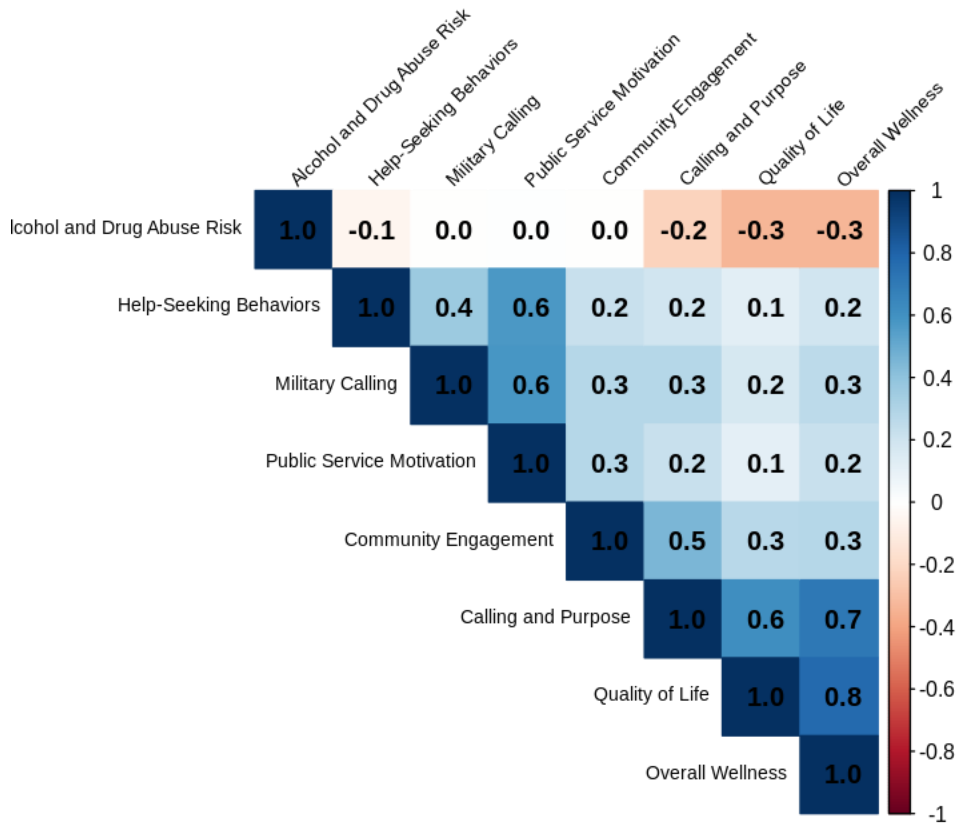
MULTIPLE LINEAR REGRESSION

Pearson's Correlations Between all Model 1 Protective Factor* and Alcohol and Drug Abuse Risk

	Alcohol and Drug Abuse Risk	Calling and Purpose	Community Engagement	Help-Seeking Behavior	Military Calling	Quality of Life	Public Service Motivation	Overall Wellness
Alcohol and Drug Abuse Risk	1.00							
Calling and Purpose	-0.01	1.00						
Community Engagement	-0.22	0.28	1.00					
Help-Seeking Behavior	0.00	0.29	0.46	1.00				
Military Calling	-0.06	0.36	0.20	0.23	1.00			
Quality of Life	-0.33	0.17	0.61	0.28	0.13	1.00		
Public Service Motivation	0.00	0.58	0.23	0.30	0.58	0.11	1.00	
Overall Wellness	-0.34	0.27	0.71	0.29	0.20	0.78	0.22	1.00

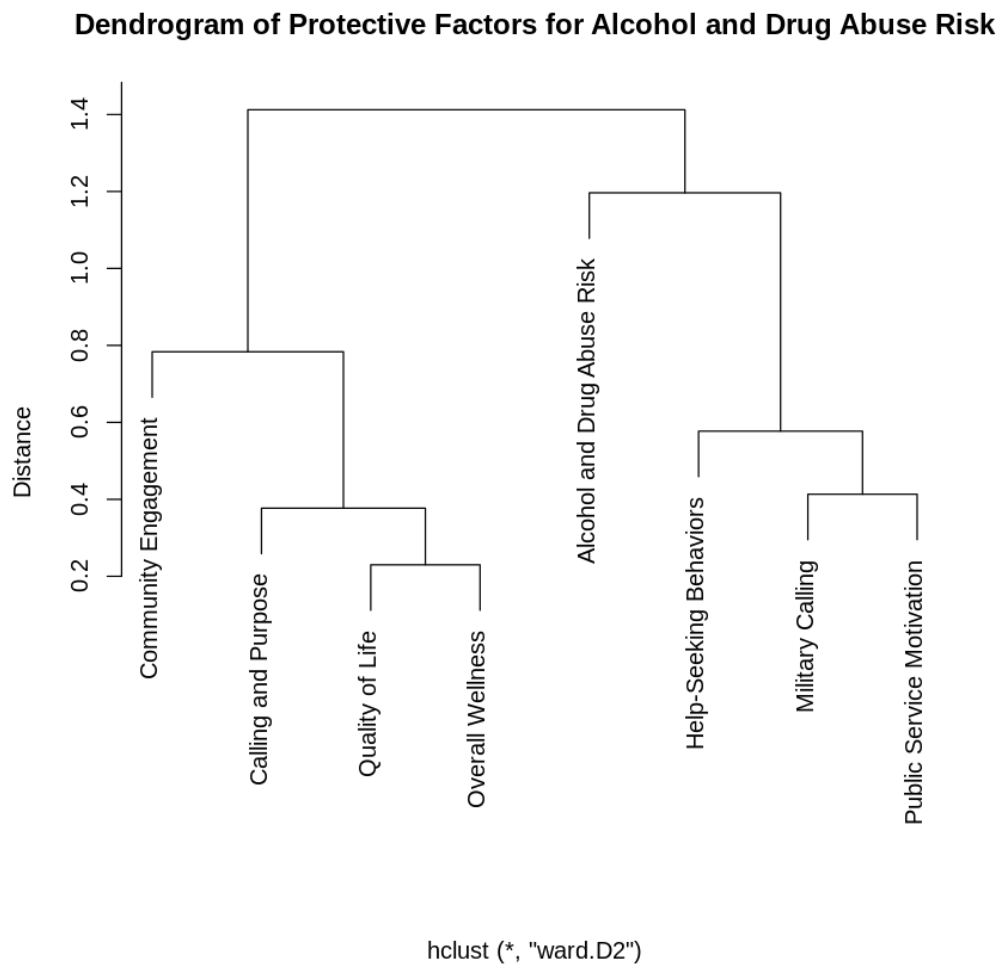
*Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Wellness

MULTIPLE LINEAR REGRESSION
Correlation Plot Between All Model 1 Protective Factor* and Alcohol and Drug Abuse Risk



*Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Wellness

MULTIPLE LINEAR REGRESSION
Dendrogram for Protective Factors



Interpretation Statement

The dendrogram suggests there may be collinearity between Quality of Life and Overall Wellness and between Military Calling and Public Service Motivation.

MULITPLE LINEAR REGRESSION Model 1 Summary Tables

TABLE 2: Variance Inflation Factors for the Model 1 Protective Factors* among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	Variance Inflation Factors
Calling and Purpose	1.594
Community Engagement	2.388
Help-Seeking Behavior	1.359
Military Calling	1.531
Quality of Life	2.628
Public Service Motivation	2.038
Overall Wellness	3.385

*Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Wellness

Interpretation Statement

The Variance Inflation Factors (VIF) for the Protective Factors for Alcohol and Drug Abuse are below 5. Therefore, it suggests a **moderate or low correlation** between predictor variables, indicating that multicollinearity is **unlikely to significantly impact the regression model**. However, the highest VIF value (3.385) suggests some degree of correlation, but it is still within an acceptable range.

MULITPLE LINEAR REGRESSION
Regression Analysis Model 1 Protective Factors
R and R^2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.3812[a]	0.1453	0.1412	1.215

a. Predictors: (Constant), Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Wellness

Interpretation Statements

There is no correlation between Alcohol and Drug Abuse and Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Wellness (R = 0.381).

14.1 % of the variance in Alcohol and Drug Abuse is explained by Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation, and Wellness.

MULITPLE LINEAR REGRESSION
Regression Analysis for Model 1
Regression Equation with Legend

Equation:

$$Y = 2.999 + 0.020*X_{P1} + 0.001*X_{P2} + 0.031*X_{P3} - 0.020*X_{P4} - 0.013*X_{P5} + 0.021*X_{P6} - 0.0159*X_{P7} + e$$

Legend:

Y = Alcohol and Drug Abuse Risk

X_{P1} = Calling and Purpose

X_{P2} = Community Engagement

X_{P3} = Help-Seeking Behavior

X_{P4} = Military Calling

X_{P5} = Quality of Life

X_{P6} = Public Service Motivation

X_{P7} = Overall Wellness

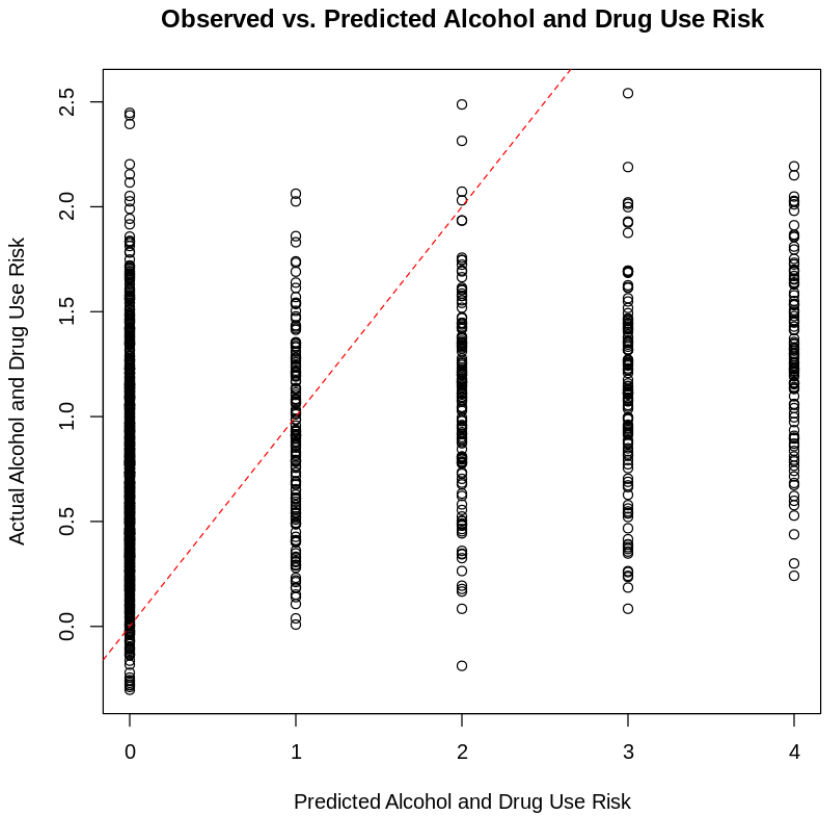
e = error term

Coefficients[a]

Model		Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	2.999	0.267	11.197	
	Calling and Purpose	0.020	0.013	1.552	0.121
	Community Engagement	0.001	0.009	0.119	0.906
	Help-Seeking Behavior	0.031	0.009	3.590	<0.001
	Military Calling	-0.020	0.011	-1.971	0.059
	Quality of Life Score	-0.013	0.003	-4.610	<0.001
	Public Service Motivation	0.021	0.013	1.538	0.124
	Overall Wellness	-0.0159	0.003	-5.486	<0.001

a. Dependent Variable: Alcohol and Drug Abuse

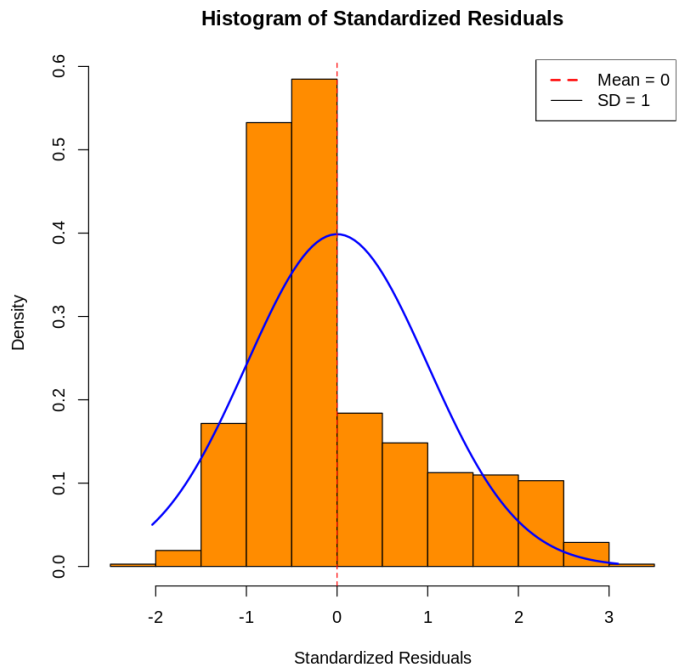
MULITPLE LINEAR REGRESSION
REGRESSION DIAGNOSTICS
Y versus Y –estimate Scatterplot?



Interpretation Statement

There is no strong positive linear pattern. Hence, this model is NOT a good predictor of Y.

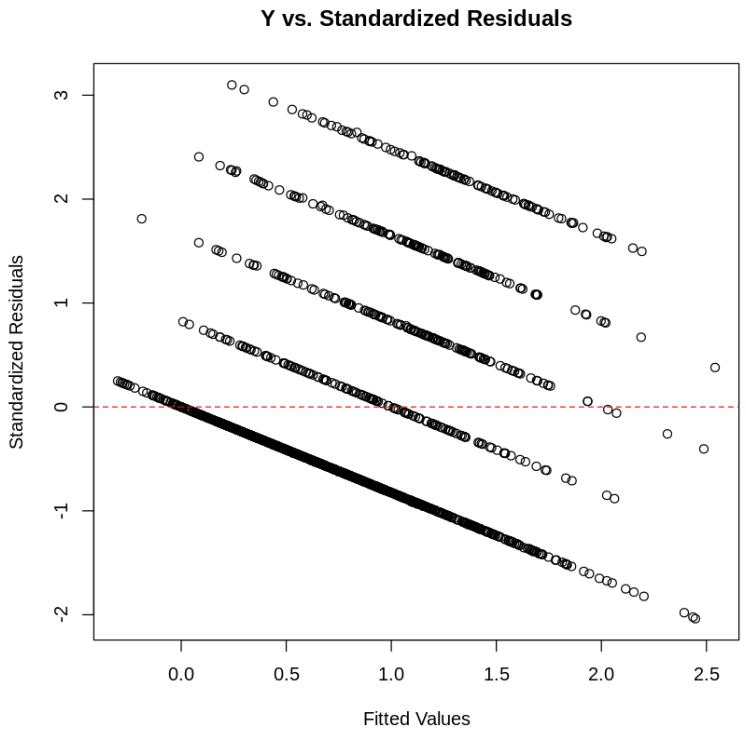
MULITPLE LINEAR REGRESSION
REGRESSION DIAGNOSTICS
Standardized Error Terms Histogram



Interpretation Statement

Error terms are small. The mean is close to 0, with most values are between -2 and 2. The histogram for the STDE is not bell-shaped and symmetric. Therefore, this model is NOT a good predictor of Y.

MULITPLE LINEAR REGRESSION
REGRESSION DIAGNOSTICS
Y versus Standardized Error Terms Scatterplot?



Interpretation Statement

The scatterplot does not show a pattern. Y increases as STDE decreases. Most of the STDE terms are between (-2, 2). Hence, this model is NOT a good predictor of Y.

MULITPLE LINEAR REGRESSION MODEL 1 SUMMARY TABLES

TABLE 1: Descriptive Statistics and Bivariate Associations between Alcohol Abuse Risk and Model 1 Protective Factor* among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

	Overall		
	N	Mean (SD)	Test and p-value
Alcohol and Drug Abuse Risk	1,495		
Calling and Purpose (scale)	1,495	20.24 (3.2)	Pearson's Correlation = 0.121
Community Engagement (scale)	1,495	26.7 (5.2)	Pearson's Correlation = 0.906
Help-Seeking Behavior (scale)	1,495	13.0 (4.3)	Pearson's Correlation < 0.001**
Military Calling (scale)	1,495	17.4 (3.7)	Pearson's Correlation = 0.059
Quality of Life (scale)	1,495	98.3 (17.9)	Pearson's Correlation <0.001**
Public Service Motivation (scale)	1,495	20.0 (3.4)	Pearson's Correlation = 0.124
Overall Wellness (scale)	1,495	109.2 (20.1)	Pearson's Correlation <0.001**

****Denote p value < 0.5**

* Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life, Public Service Motivation and Wellness

MULITPLE LINEAR REGRESSION MODEL 1 SUMMARY TABLES

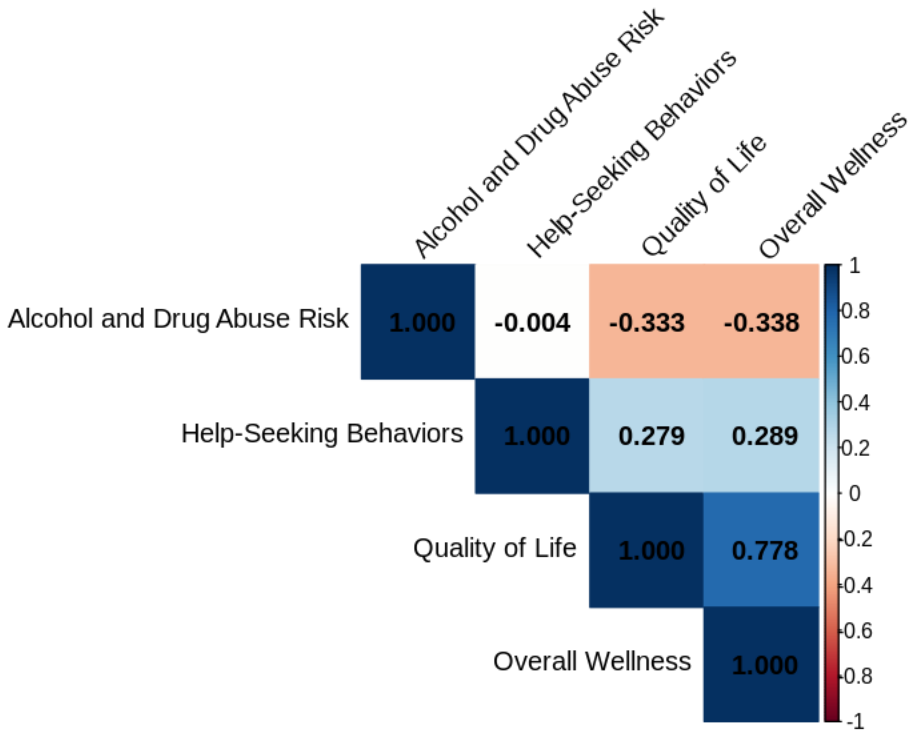
TABLE 2: Protective Factors* Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	ß	p-value					
Constant	2.999			R=	0.381		
				R^2=	0.1452		
				Overall p-value	<0.001		
Calling and Purpose (scale)	0.0198	0.121					
Community Engagement (Scale)	0.0011	0.906					
Help-Seeking Behavior (Scale)	0.0311	<0.001#					
Military Calling (Scale)	-0.0202	0.0598					
Quality of Life (Scale)	-0.1327	<0.001#					
Public Service Motivation (Scale)	0.0206	0.124					
Overall Wellness (Scale)	-0.0159	<0.001#					

# Denotes p-value < 0.05

*Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Overall Wellness

MULTIPLE LINEAR REGRESSION
Correlation Plot Between All Model 1 Statistically Significant Protective Factors and Alcohol and Drug Abuse Risk
Model 2



*Help-Seeking Behaviors, Quality of Life Score, and Overall Wellness

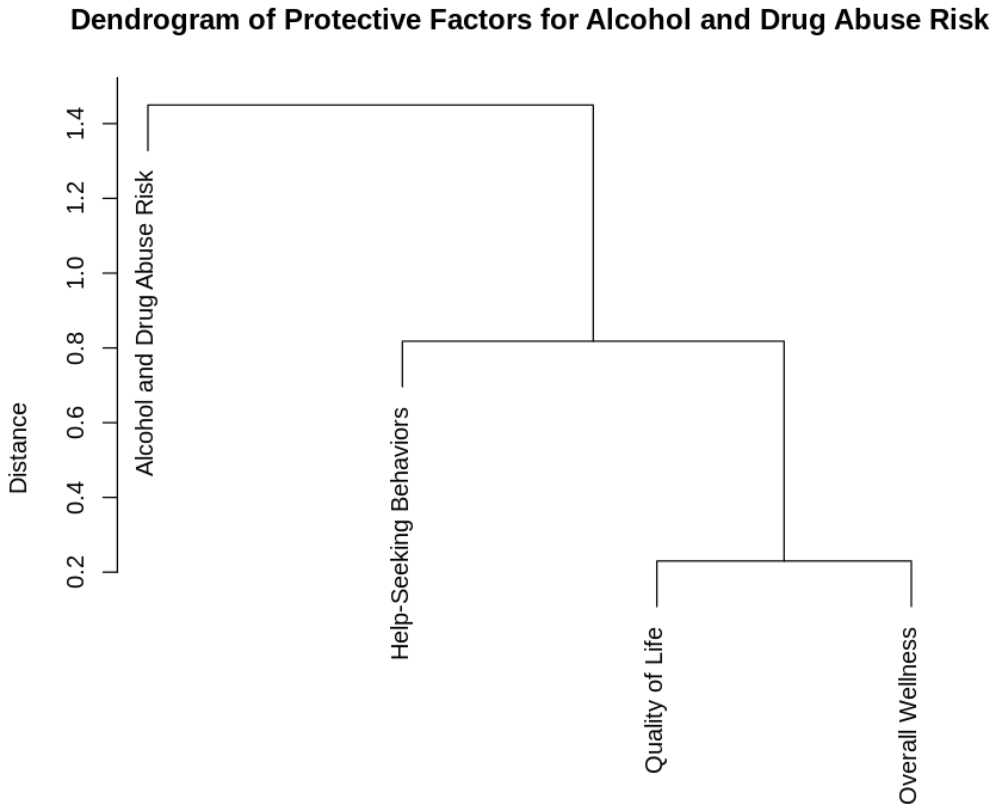
MULTIPLE LINEAR REGRESSION

Pearson's Correlations Between All Model 2 Protective Factors and Alcohol and Drug Abuse Risk

	Alcohol and Drug Abuse Risk	Help-Seeking Behavior	Quality of Life	Overall Wellness
Alcohol and Drug Abuse Risk	1.000			
Help-Seeking Behavior	-0.000	1.000		
Quality of Life	-0.333	0.279	1.000	
Overall Wellness	-0.340	0.288	0.778	1.000

*Help-Seeking Behaviors, Quality of Life Score, and Overall Wellness

MULTIPLE LINEAR REGRESSION
Dendrogram for Model 2 Protective Factors



Interpretation Statement

The dendrogram suggests there may be collinearity between Quality of Life and Overall Wellness.

MULITPLE LINEAR REGRESSION Summary Tables

TABLE 3: Model 2 Protective Factors * Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	Variance Inflation Factors
Help-Seeking Behavior	1.100
Quality of Life	2.555
Overall Wellness	2.569

*Help-Seeking Behaviors, Quality of Life Score, and Overall Wellness

Interpretation Statement

The Variance Inflation Factors (VIF) for the Protective Factors for Alcohol and Drug Abuse are below 5. Therefore, it suggests a **moderate or low correlation** between predictor variables, indicating that multicollinearity is **unlikely to significantly impact the regression model**. However, the highest VIF value (3.385) suggests some degree of correlation, but it is still within an acceptable range.

MULITPLE LINEAR REGRESSION
Regression Analysis Model 2 Protective Factors
R and R^2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.3740[a]	0.1399	0.1381	1.218

a. Predictors: (Constant), Help-Seeking Behaviors, Quality of Life Score, and Overall Wellness

Interpretation Statements

There is no correlation between Alcohol and Drug Use and Help-Seeking Behaviors, Quality of Life Score, and Overall Wellness (R = 0.381).

14.1 % of the variance in Alcohol and Drug Use is explained by Help-Seeking Behaviors, Quality of Life Score, and Overall Wellness.

MULITPLE LINEAR REGRESSION
Regression Analysis For Model 2
Regression Equation with Legend

Equation:

$$Y = 2.999 + + 0.036*X_{P3} - 0.014*X_{P5} - 0.015*X_{P7} + e$$

Legend:

Y = Alcohol and Drug Abuse Risk

X_{P1} = *Calling and Purpose*

X_{P2} = *Community Engagement*

X_{P3} = **Help-Seeking Behavior**

X_{P4} = *Military Calling*

X_{P5} = **Quality of Life**

X_{P6} = *Public Service Motivation*

X_{P7} = **Overall Wellness**

e = error term

Coefficients[a]

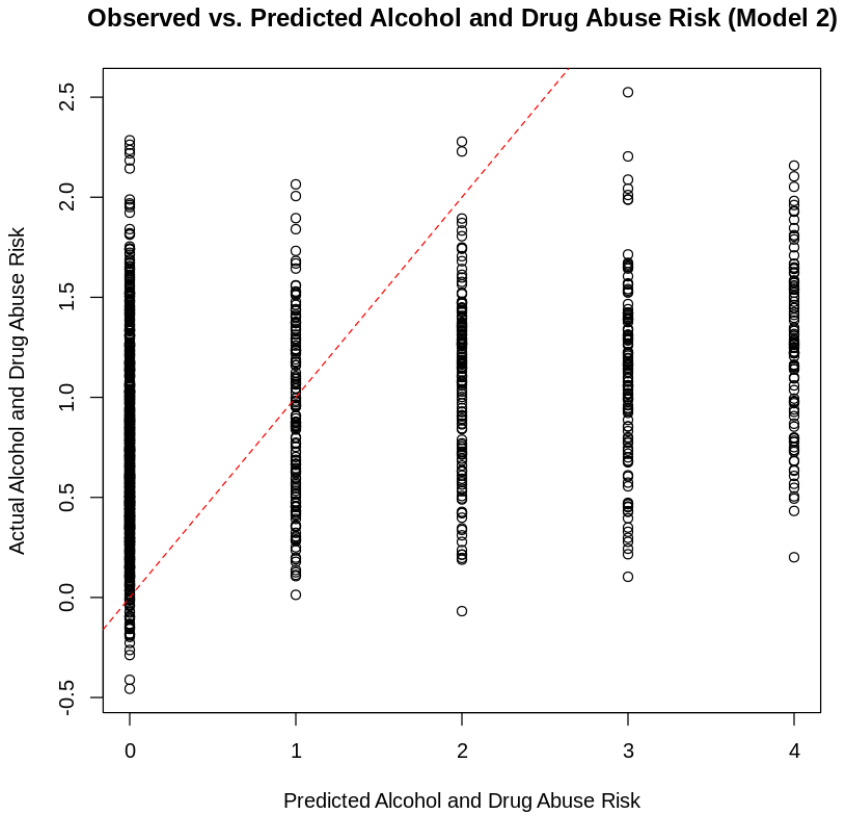
Model 2 (Reduced model from saturated regression to include only those with statistical significance in model 1)		Coefficients B	Coefficients Std. Error	t	Sig.
1	(Constant)	3.3580	.01921	17.480	
	Calling and Purpose				
	Community Engagement				
	Help-Seeking Behavior	0.036	0.008	4.614	<0.001
	Military Calling				
	Quality of Life Score	-0.014	0.003	-4.894	<0.001
	Public Service Motivation				
	Overall Wellness	-0.015	0.003	-5.782	<0.001

a. Dependent Variable: Alcohol and Drug Abuse

Interpretation Statement

No difference in Model 1 and 2

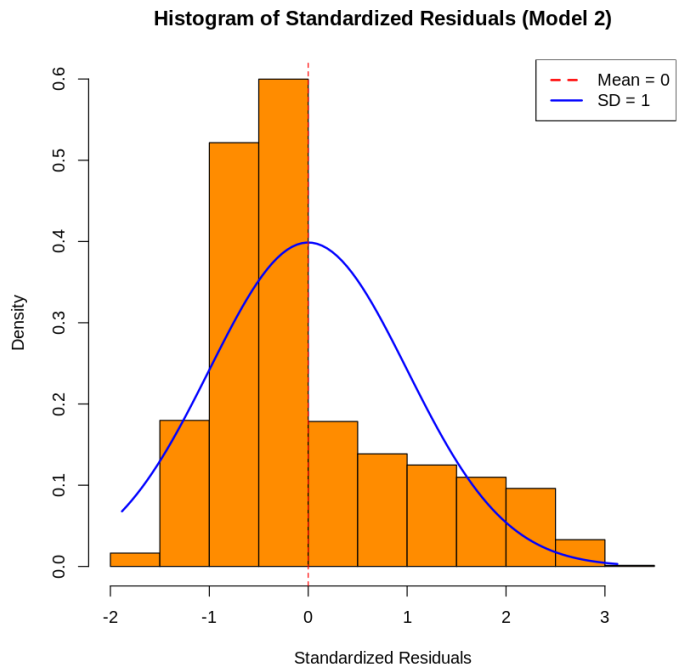
MULITPLE LINEAR REGRESSION
Regression Diagnostics for Model 2
Y versus Y –estimate Scatterplot?



Interpretation Statement

There is no strong positive linear pattern. Hence, this model is NOT a good predictor of Y.

MULITPLE LINEAR REGRESSION
Regression Diagnostics for Model 2
Standardized Error Terms Histogram



Interpretation Statement

Error terms are small. The mean is close to 0, with most values are between -2 and 2. The histogram for the STDE is not bell-shaped and symmetric. Therefore, this model is NOT a good predictor of Y.

Negative Risk Factors
(X_{N1} through X_{N7})

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Combat Exposure (X_{N1})

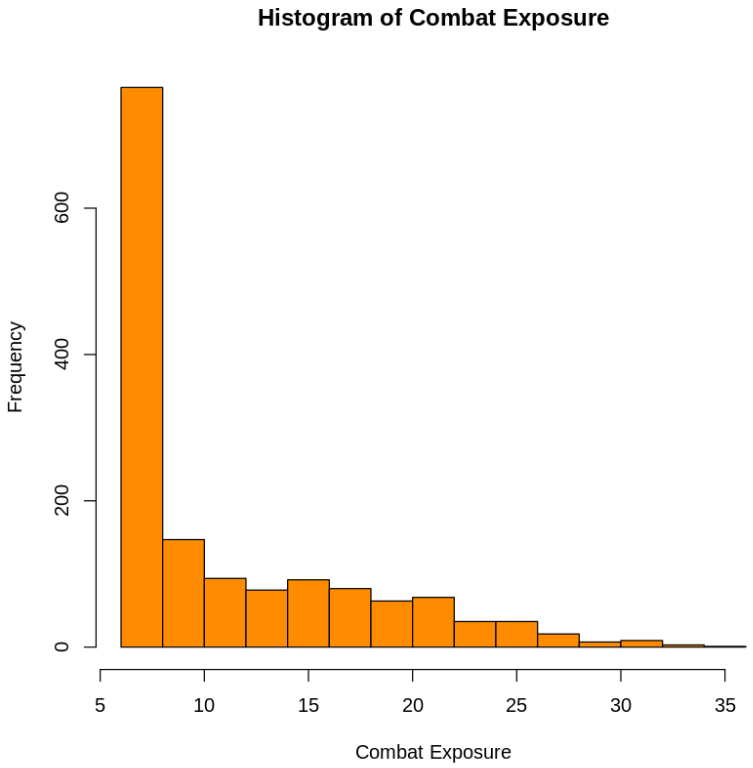
Descriptive Statistics Table

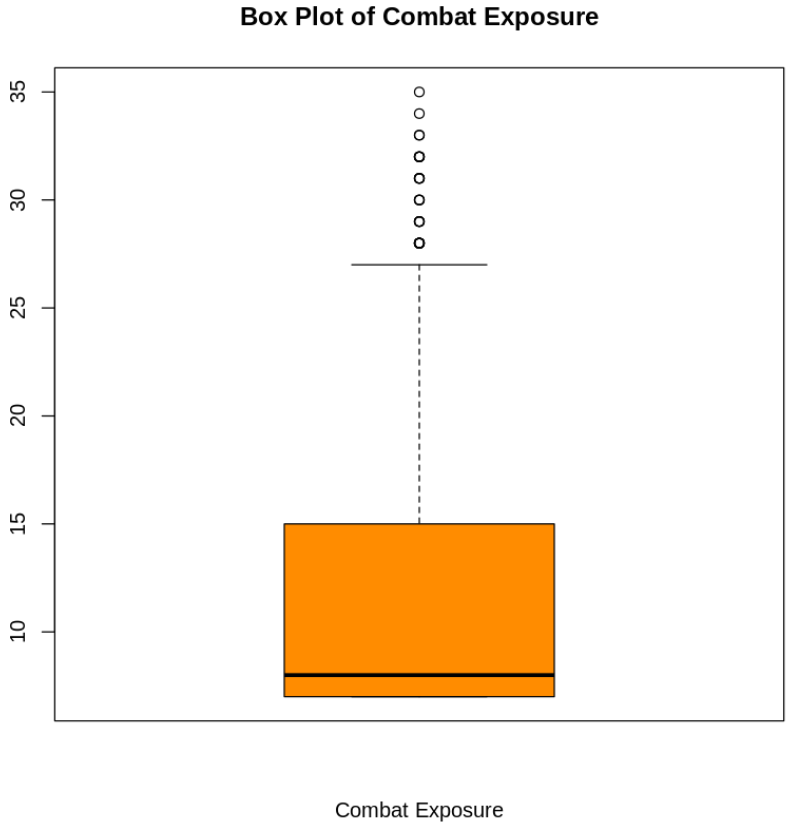
Statistics

Combat Exposure

N	Valid	1,495
	Missing	0
Mean		11.58
Median		8.00
Std. Deviation		6.0553
Minimum		7.00
Maximum		35.00
Percentiles	25	7.00
	50	8.00
	75	15.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Combat Exposure is (7, 7, 8, 15, 35)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Daily Stress (X_{N2})

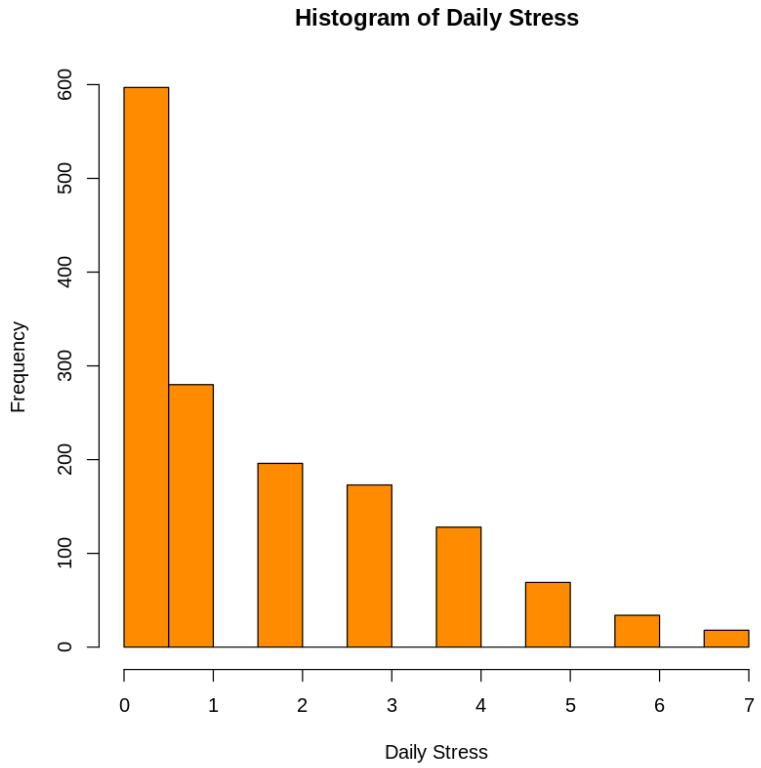
Descriptive Statistics Table

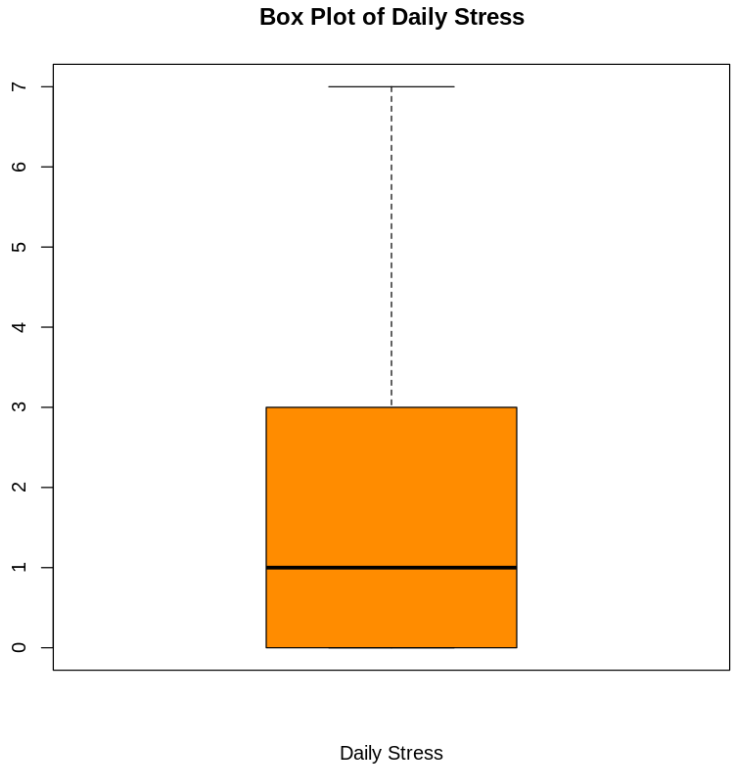
Statistics

Daily Stress

N	Valid	1,495
	Missing	0
Mean		1.591
Median		1.00
Std. Deviation		1.7770
Minimum		0.00
Maximum		7.00
Percentiles	25	0.00
	50	1.00
	75	3.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Daily Stress is (0, 0, 1, 3, 7)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Loneliness (X_{N3})

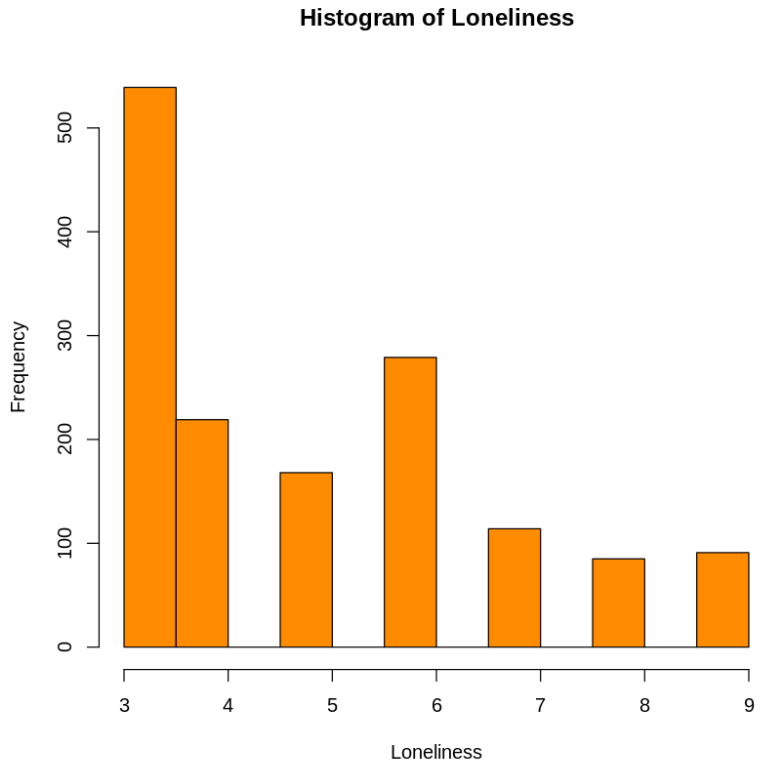
Descriptive Statistics Table

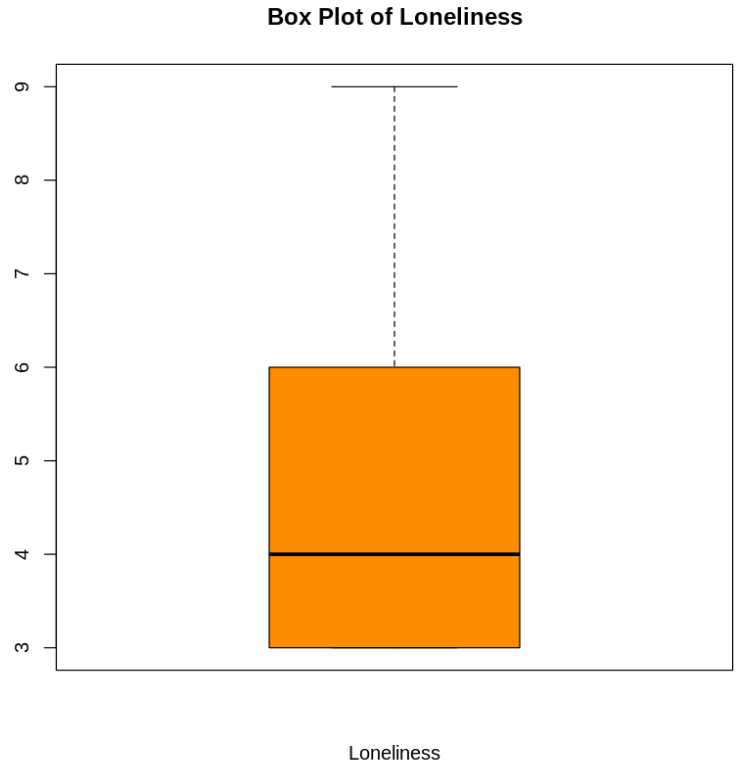
Statistics

Loneliness

N	Valid	1,495
	Missing	0
Mean		4.886
Median		4.00
Std. Deviation		1.886
Minimum		3.00
Maximum		9.00
Percentiles	25	3.00
	50	4.00
	75	6.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Loneliness is (3, 3, 4, 6, 9)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Moral Injury (X_{N4})

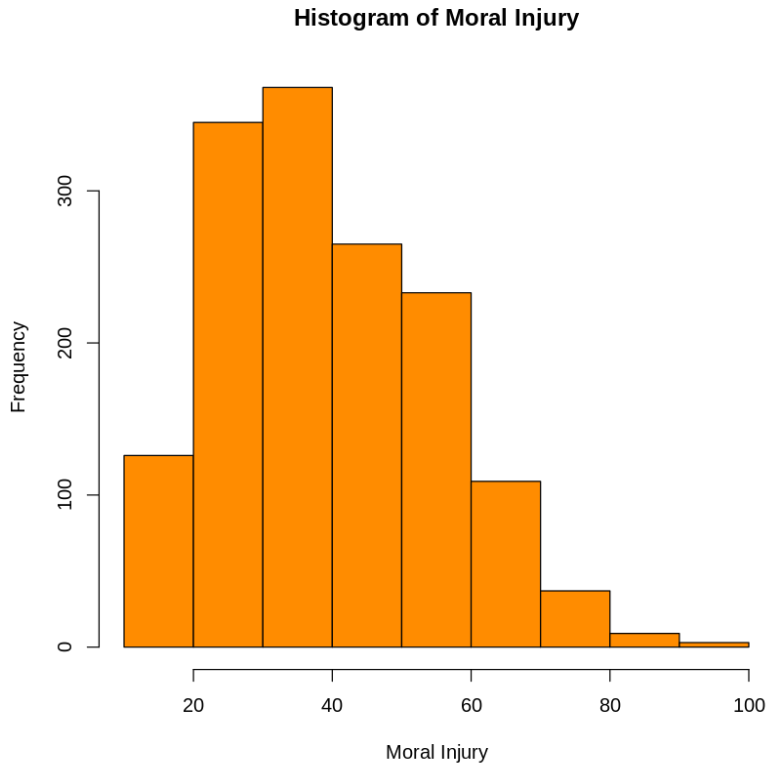
Descriptive Statistics Table

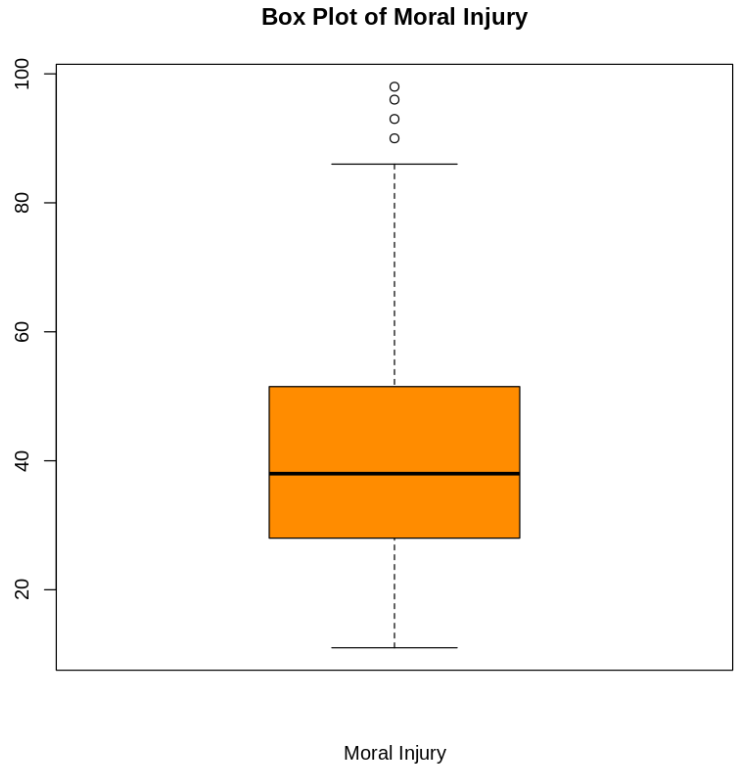
Statistics

Moral Injury

N	Valid	1,495
	Missing	0
Mean		40.13
Median		38.00
Std. Deviation		15.3149
Minimum		11.00
Maximum		98.00
Percentiles	25	28.00
	50	38.00
	75	51.50

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Moral Injury is (11, 28, 38, 51.5, 98)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Self-Stigmatization (X_{N5})

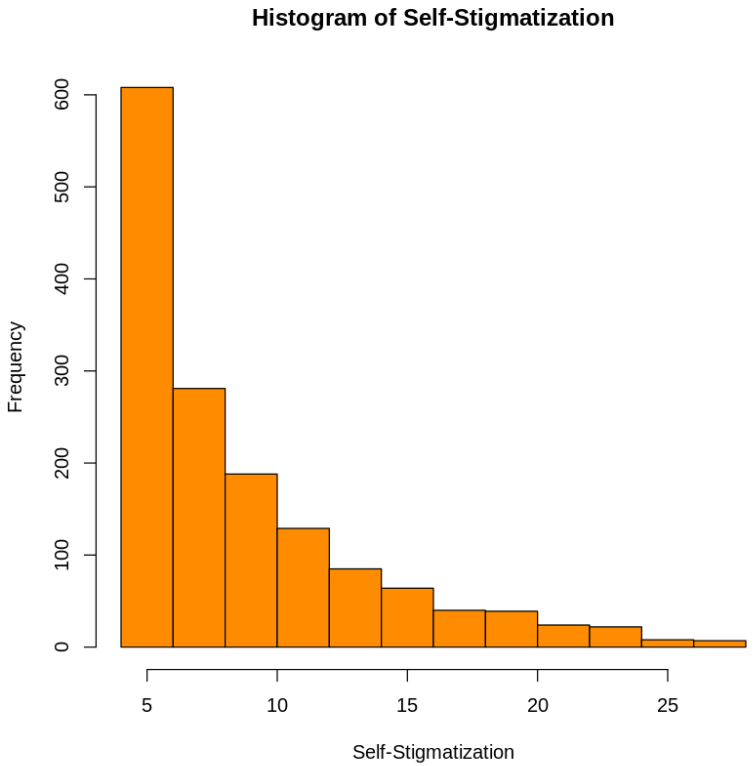
Descriptive Statistics Table

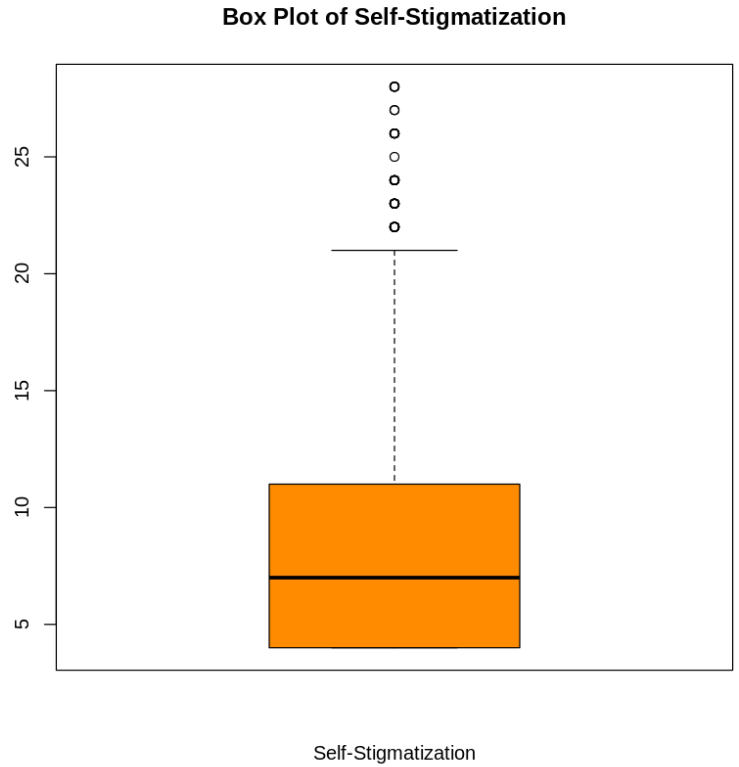
Statistics

Self-Stigmatization

N	Valid	1,495
	Missing	0
Mean		8.80
Median		7.00
Std. Deviation		5.1066
Minimum		4.00
Maximum		28.00
Percentiles	25	4.00
	50	7.00
	75	11.00

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Self-Stigmatization is (4, 4, 7, 11, 28)

MULTIPLE LINEAR REGRESSION
Univariate Statistics for Suicide Risk (X_{N7})

Descriptive Statistics Table

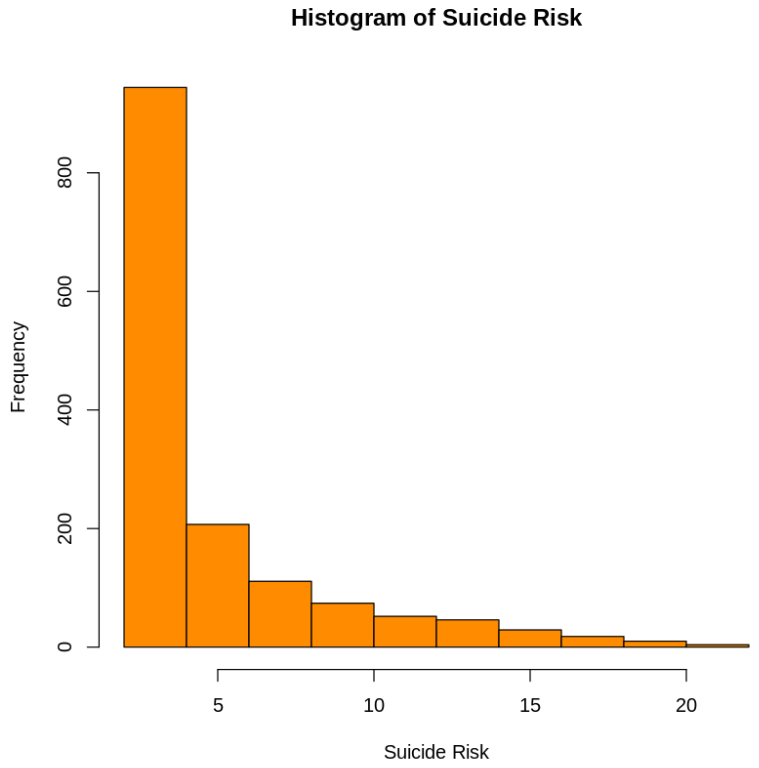
Statistics

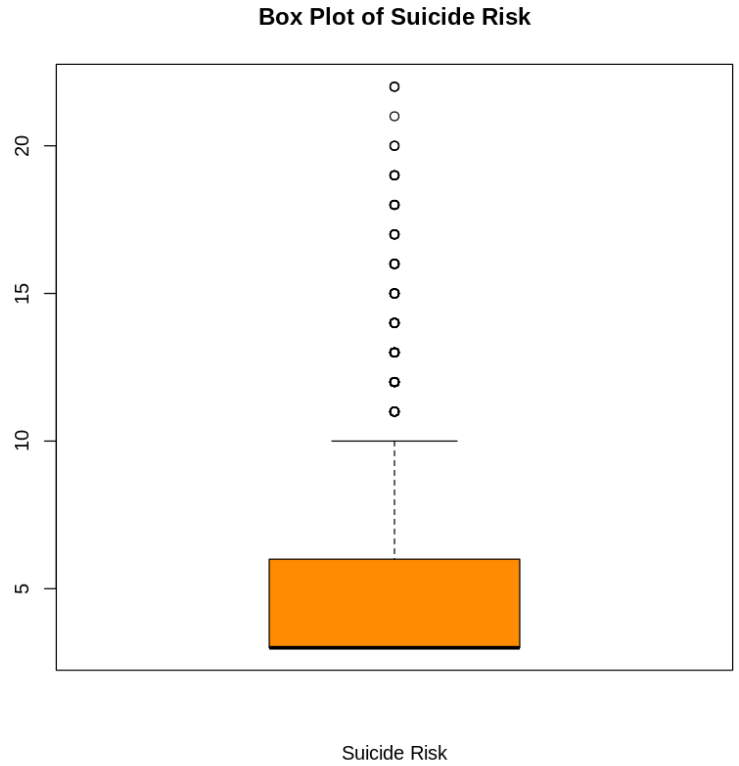
Suicide Risk

N	Valid	1,495
	Missing	26*
Mean		5.298
Median		3.00
Std. Deviation		3.6770
Minimum		3.00
Maximum		22.00
Percentiles	25	3.00
	50	3.00
	75	6.00

*Mean was imputed for missing values

Histogram and Box Plot





Interpretation Statement

Among the 1,495 veterans, the 5-point summary for Suicide Risk is (3, 3, 3, 6, 22)

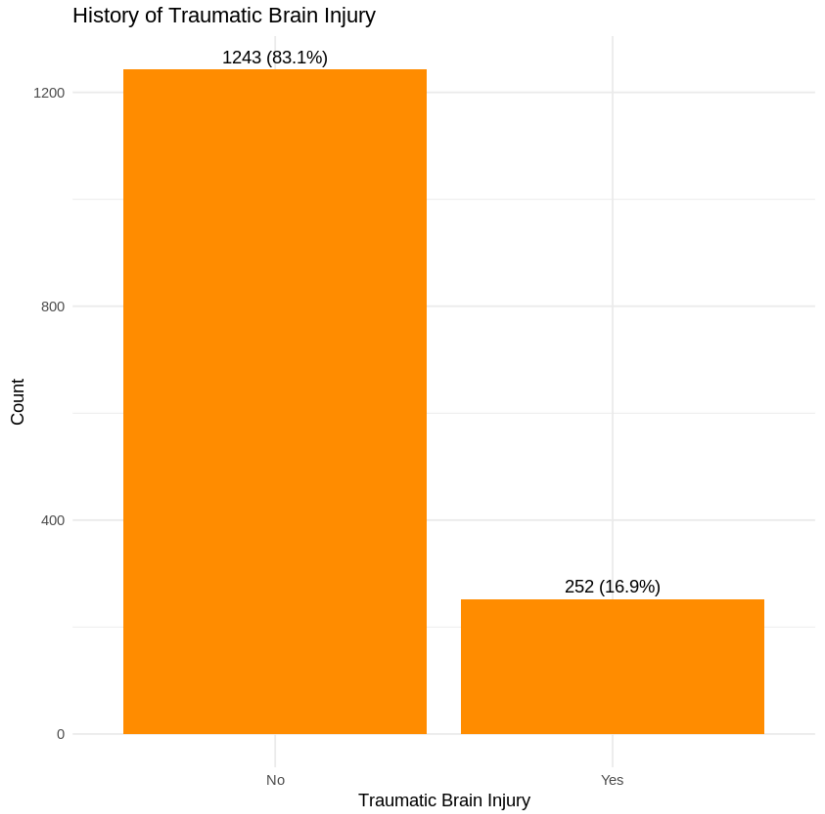
MULTIPLE LOGISTIC REGRESSION
Univariate Statistics for History of Traumatic Brain Injury (X_{N7})

Descriptive Statistics Table

History of Traumatic Brain Injury

	Frequency	Percent	Valid Percent	Cumulative Percent
No	1243	83.1	83.1	83.1
Yes	252	16.9	16.9	100.0
Total	1,495	100.0	100.0	

Bar Plot



Interpretation Statement

Among the 1,495 veterans, 83.1% have a history of a Traumatic Brain Injury, while 16.9% did not.

MULTIPLE LINEAR REGRESSION

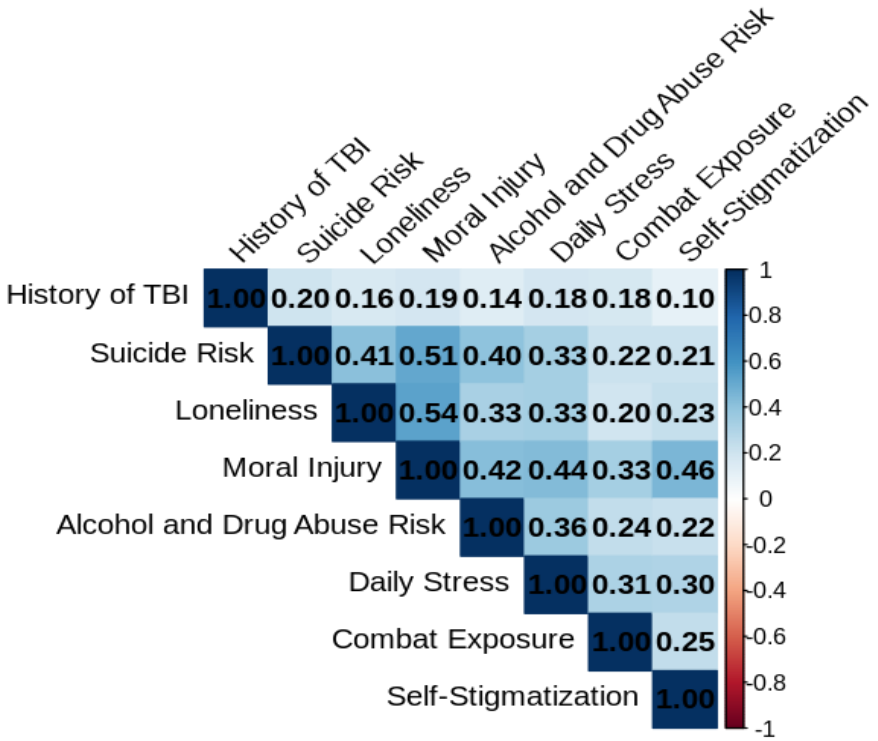
Pearson's Correlations Between all Model 3 Risk Factor *

	Alcohol and Drug Abuse Risk	Combat Exposure	Daily Stress	Loneliness	Moral Injury	Self-Stigmatization	Suicide Risk	History of Traumatic Brain Injury
Alcohol and Drug Abuse Risk	1.00							
Combat Exposure	0.24	1.00						
Daily Stress	0.36	0.31	1.00					
Loneliness	0.33	0.20	0.33	1.00				
Moral Injury	0.42	0.33	0.44	0.54	1.00			
Self-Stigmatization	0.22	0.25	0.30	0.23	0.46	1.00		
Suicide Risk	0.40	0.22	0.33	0.41	0.51	0.21	1.00	
History of Traumatic Brain Injury	0.14	0.18	0.18	0.16	0.19	0.10	0.20	1.00

*Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

MULTIPLE LINEAR REGRESSION

Correlation Plot Between all Model 3 Risk Factors*



*Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

MULITPLE LINEAR REGRESSION
Regression Analysis Model 3 Risk Factors
R and R^2

Model Summary

Model 3	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.4913[a]	0.2414	0.2383	1.144

a. Predictors: (Constant), Combat Exposure, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, History of Traumatic Brain Injury

Interpretation Statements

There is no correlation between Alcohol and Drug Abuse Risk and Combat Exposure, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury (R = 0.491).

23.8 % of the Variance in Alcohol and Drug Abuse Risk is explained by Combat Exposure, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

MULITPLE LINEAR REGRESSION
Regression Analysis Model 3
Regression Equation with Legend

Equation:

$$Y = -0.787 + 0.015*X_{N1} + 0.121*X_{N2} + 0.0.54*X_{N3} + 0.014*X_{N4} + 0.004*X_{N5} + 0.076*X_{N6} + 0.014*X_{N7} + e$$

Legend:

Y = Alcohol and Drug Abuse Risk

X_{P1} = Combat Exposure

X_{P2} = Daily Stress

X_{P3} = Loneliness

X_{P4} = Moral Injury

X_{P5} = Self-Stigmatization

X_{P6} = Suicide Risk

X_{P7} = History of Traumatic Brain Injury

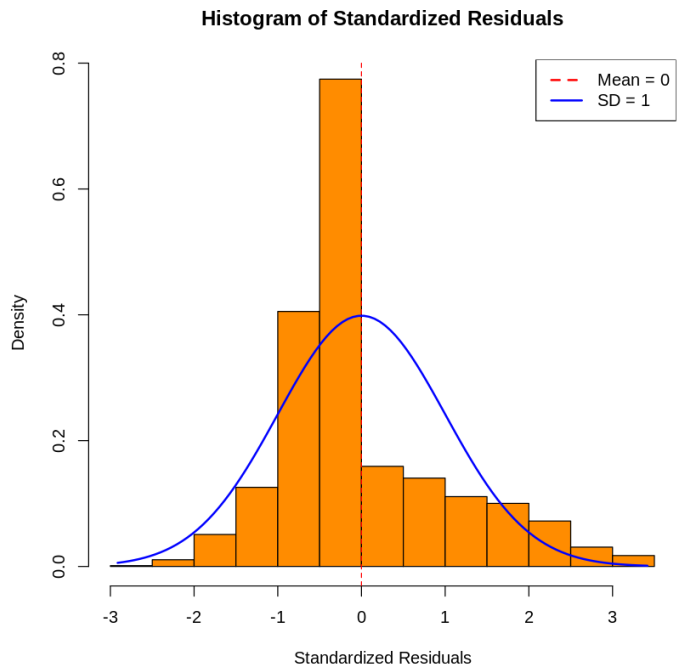
e = error term

Coefficients[a]

Model 3		Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	-0.787	0.101	-7.824	
	Combat Exposure	0.015	0.005	2.906	<0.001
	Daily Stress	0.121	0.019	6.326	0.004
	Loneliness	0.054	0.019	2.845	<0.001
	Moral Injury	0.014	0.003	5.169	<0.001
	Self-Stigmatization	0.004	0.007	0.688	0.492
	Suicide Risk	0.076	0.010	7.952	<0.001
	History of Traumatic Brain Injury	0.014	0.081	0.169	0.866

a. Dependent Variable: Alcohol and Drug Abuse

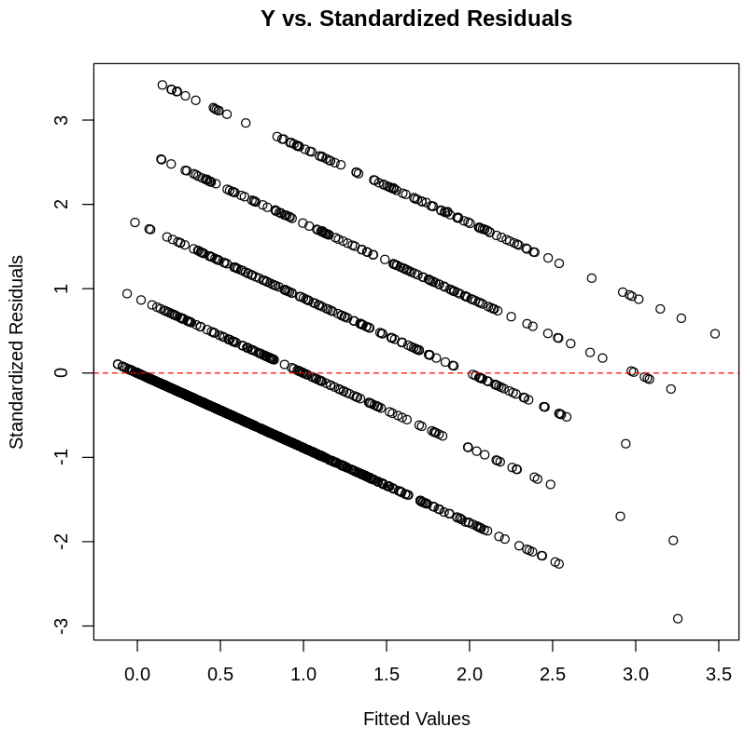
MULITPLE LINEAR REGRESSION
Model 3 Regression Diagnostics
Standardized Error Terms Histogram



Interpretation Statement

Error terms are small. The mean is close to 0, with most values are between -2 and 2. The histogram for the STDE is not bell-shaped and symmetric. Therefore, this model is NOT a good predictor of Y.

MULITPLE LINEAR REGRESSION
Model 3 Regression Diagnostics
Y versus Standardized Error Terms Scatterplot?



Interpretation Statement

The scatterplot does not show a pattern. Y increases as STDE decreases. Most of the STDE terms are between (-2, 2). Hence, this model is NOT a good predictor of Y.

MULITPLE LINEAR REGRESSION MODEL 3 SUMMARY TABLES

TABLE 1: Descriptive Statistics and Bivariate Associations between Alcohol Abuse Risk and Model 3 Risk Factor* among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

	Overall		
	N	Mean (SD) Frequency (%)	Test and p-value
Alcohol and Drug Abuse Risk	1,495		
Combat Exposure(scale)	1,495	11.6 (6.1)	Pearson's Correlation <0.001
Daily Stress (scale)	1,495	1.6 (1.8)	Pearson's Correlation = 0.004
Loneliness (scale)	1,495	4.9 (1.9)	Pearson's Correlation <0.001
Moral Injury (scale)	1,495	40.3 (15.3)	Pearson's Correlation <0.001
Self-Stigmatization (scale)	1,495	8.8 (5.1)	Pearson's Correlation = 0.492
Suicide Risk (scale)	1,495	5.3 (3.7)	Pearson's Correlation = <0.001
History of Traumatic Brain Injury (binary)	1,495		Pearson's Correlation = 0.866
No		1243 (83.1%)	
Yes		252 (16.9%)	
****Denote p value < 0.5**			

*Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

MULITPLE LINEAR REGRESSION Summary Tables

TABLE 2: Model 3 Risk Factors* Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

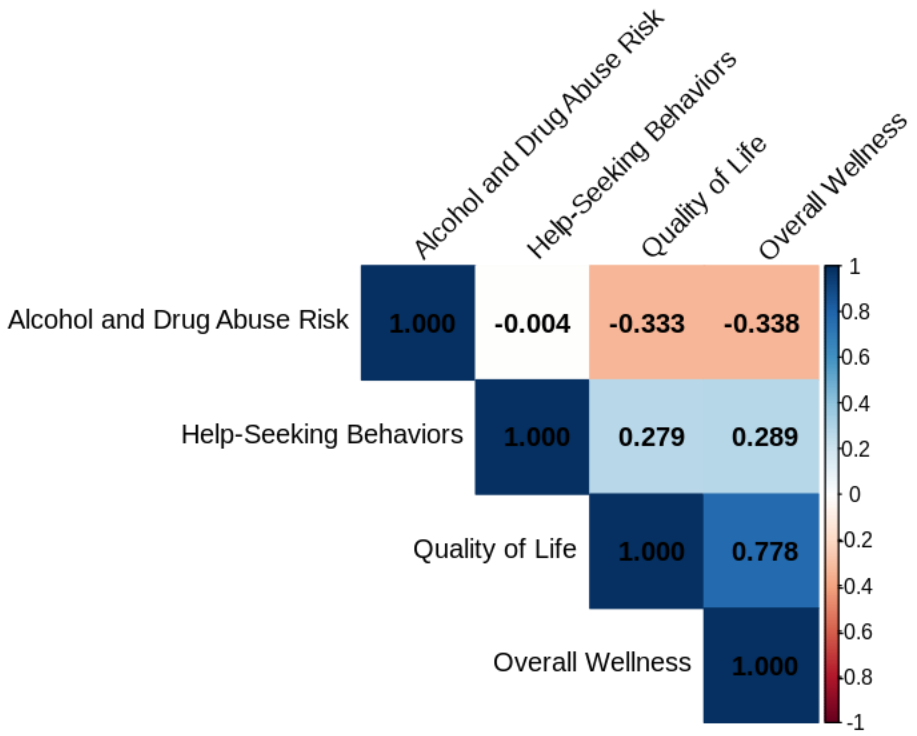
Measures	ß	p-value			
Constant	-0.787		R=	0.4913	
			R^2 =	0.2414	
			Overall p-value	<0.001	
Combat Exposure (scale)	0.015	<0.001#			
Daily Stress (Scale)	0.121	0.004#			
Loneliness (Scale)	0.054	<0.001#			
Moral Injury (Scale)	0.014	<0.001			
Self-Stigmatization (Scale)	0.004	0.492			
Suicide Risk (Scale)	0.076	<0.001#			
History of Traumatic Brain Injury (Binary)	0.014	0.866			

# Denotes p-value < 0.05

*Combat Exposure, Daily Stress, Loneliness, Moral Injury, Self-Stigmatization, Suicide Risk, and History of Traumatic Brain Injury

MULTIPLE LINEAR REGRESSION

Correlation Plot Between all Protective Factor

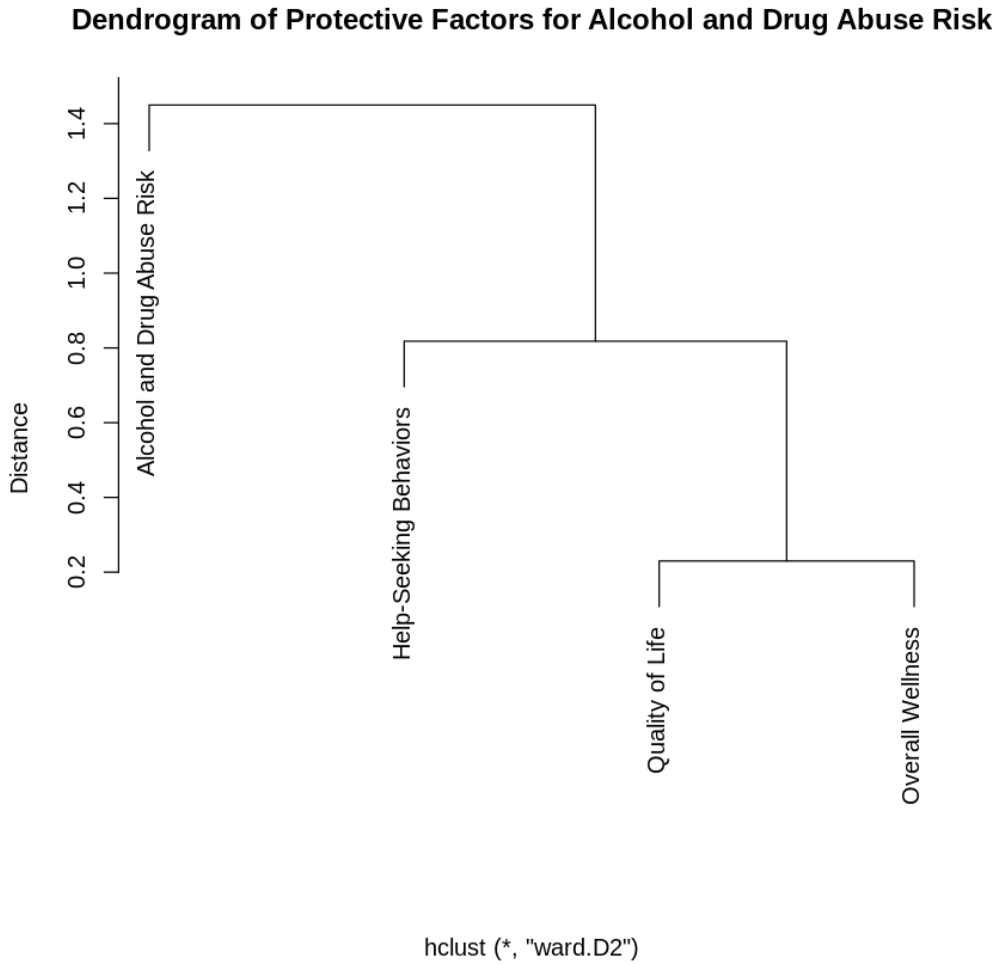


MULTIPLE LINEAR REGRESSION

Pearson's Correlations Between all Protective Factor

	Alcohol and Drug Use Risk	Help-Seeking Behavior	Quality of Life	Overall Wellness
Alcohol and Drug Use Risk	1.000			
Help-Seeking Behavior	-0.000	1.000		
Quality of Life	-0.333	0.279	1.000	
Overall Wellness	-0.340	0.288	0.778	1.000

MULTIPLE LINEAR REGRESSION
Dendrogram for Protective Factors



Interpretation Statement

The dendrogram suggests there may be collinearity between Quality of Life and Overall Wellness.

MULITPLE LINEAR REGRESSION Summary Tables

TABLE 3: Protective Factors * Independently Associated with Alcohol and Drug Abuse Risk using Multiple Linear Regression among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	Variance Inflation Factors
Help-Seeking Behavior	1.100
Quality of Life	2.555
Overall Wellness	2.569

Interpretation Statement

The Variance Inflation Factors (VIF) for the Protective Factors for Alcohol and Drug Abuse are below 5. Therefore, it suggests a **moderate or low correlation** between predictor variables, indicating that multicollinearity is **unlikely to significantly impact the regression model**. However, the highest VIF value (3.385) suggests some degree of correlation, but it is still within an acceptable range.

MULITPLE LINEAR REGRESSION
Model 2 REGRESSION ANALYSIS PROTECTIVE FACTORS
R and R^2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.3740[a]	0.1399	0.1381	1.218

a. Predictors: (Constant), Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation and Wellness

Interpretation Statements

There is no correlation between Alcohol and Drug Use and Help-Seeking Behaviors, Quality of Life Score, and Wellness (R = 0.381).

14.1 % of the variance in Alcohol and Drug Use is explained by Calling and Purpose, Community Engagement, Help-Seeking Behaviors, Military Calling, Quality of Life Score, Public Service Motivation, and Wellness.

MULITPLE LINEAR REGRESSION
REGRESSION ANALYSIS
Model 1 Regression Equation with Legend

Equation:

$Y = 2.999 + + 0.036*X_{P3} - 0.014*X_{P5} - 0.015*X_{P7} + e$ (no significant change in the model)

Legend:

Y = Alcohol and Drug Abuse Risk

X_{P1} = *Calling and Purpose*

X_{P2} = *Community Engagement*

X_{P3} = **Help-Seeking Behavior**

X_{P4} = *Military Calling*

X_{P5} = **Quality of Life**

X_{P6} = *Public Service Motivation*

X_{P7} = **Overall Wellness**

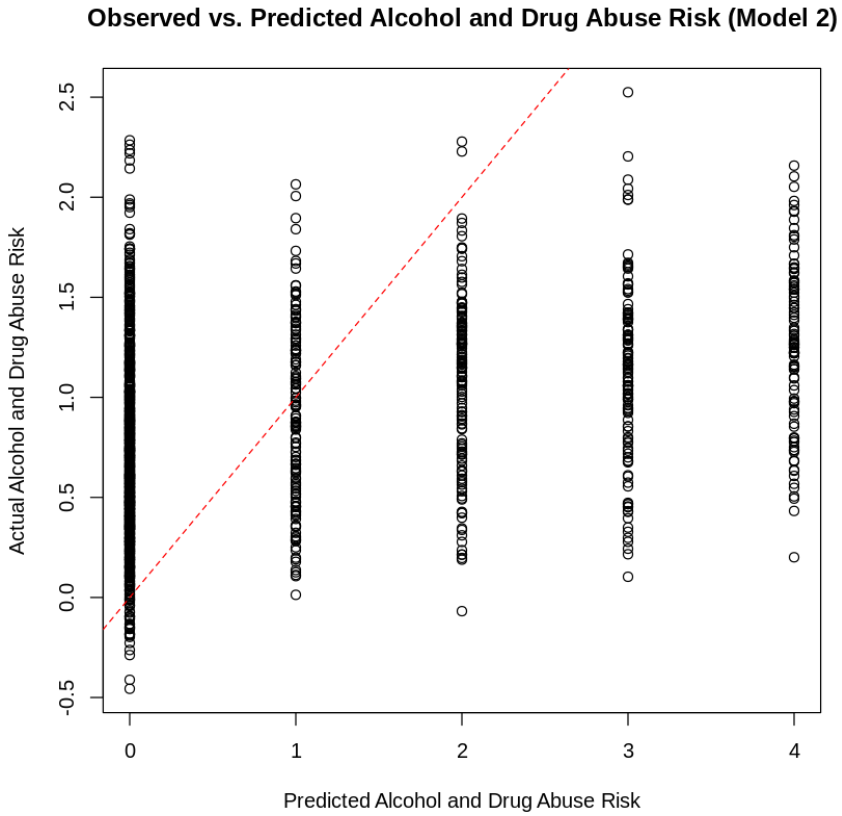
e = error term

Coefficients[a]

Model 2 (Reduced model from saturated Regression to include only those with statistical significance in model 1)		Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	3.3580	.01921	17.480	
	Calling and Purpose				
	Community Engagement				
	Help-Seeking Behavior	0.036	0.008	4.614	<0.001
	Military Calling				
	Quality of Life Score	-0.014	0.003	-4.894	<0.001
	Public Service Motivation				
	Overall Wellness	-0.015	0.003	-5.782	<0.001

a. Dependent Variable: Alcohol and Drug Abuse

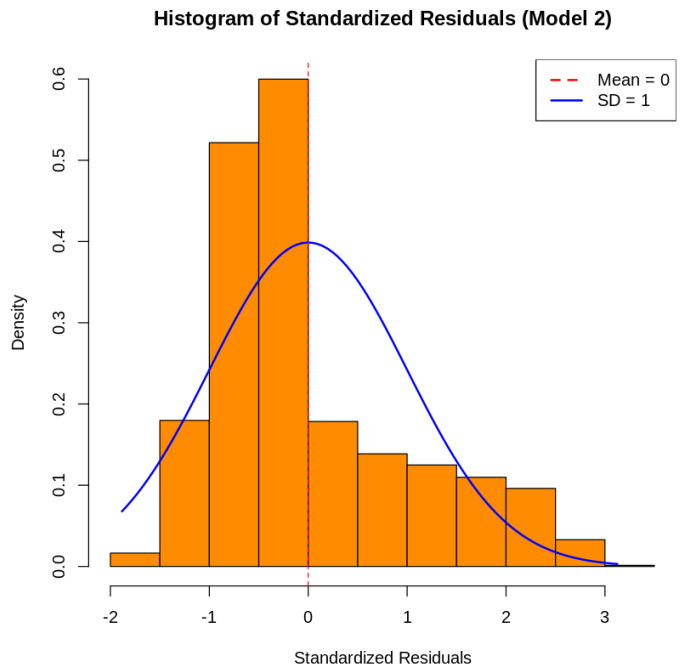
MULITPLE LINEAR REGRESSION
REGRESSION DIAGNOSTICS
Y versus Y –estimate Scatterplot?



Interpretation Statement

There is no strong positive linear pattern. Hence, this model is NOT a good predictor of Y.

MULITPLE LINEAR REGRESSION
REGRESSION DIAGNOSTICS
Standardized Error Terms Histogram



Interpretation Statement

Error terms are small. The mean is close to 0, with most values are between -2 and 2. The histogram for the STDE is not bell-shaped and symmetric. Therefore, this model is NOT a good predictor of Y.

MULITPLE LOGISTIC REGRESSION Summary Tables

TABLE 1: Descriptive Statistics and Bivariate Associations between Alcohol Abuse Risk and Risk Factors* among Veterans in The 2022 Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

	Overall		Alcohol Abuse Risk				
			No Risk		At Risk		
	N	Mean (SD) Freq (%)	N	Mean (SD) Freq (%)	N	Mean (SD) Freq (%)	test and p-value
Alcohol Abuse RIsk	1,495						
No Risk		1,104 (71.8%)					
At Risk		391 (26.2%)					
Calling and Purpose (scale)	1,495	20.2 (3.2)		20.3 (3.1)		20.1 (3.4)	Mann-Whitney p-value = 0.587
Community Engagement (scale)	1,495	26.6 (5.2)		27.3 (5.0)		24.9 (5.2)	Mann-Whitney p-value <0.001**
Help-Seeking Behavior (scale)	1,495	13.0 (4.3)		13.0 (4.3)		12.9 (4.4)	Mann-Whitney p-value = 0.906
Military Calling (scale)	1,495	17.4 (3.7)		17.5 (3.6)		17.0 (3.8)	Mann-Whitney p-value = 0.002**
Quality of Life	1,495						Pearson Chi-Square test p-value <0.001*
Very Poor		19 (1.3%)		11 (0.7%)		8 (0.5%)	
Poor		90 (6.0%)		36 (2.4%)		54 (3.6%)	
Neither poor or good		226 (15.1%)		130 (8.7%)		96 (6.4%)	
Good		762 (51.0%)		588 (39.3%)		174 (11.6%)	
Very Good		398 (26.6%)		339 (22.7%)		59 (3.9%)	
Public Service Motivation (scale)	1,495	20.0 (3.4)		20.0 (3.4)		19.9 (3.4)	Mann-Whitney p-value = 0.838
Wellness (scale)	1,495	19.0 (3.5)		19.7 (3.4)		17.2 (3.1)	Mann-Whitney p-value <0.001**

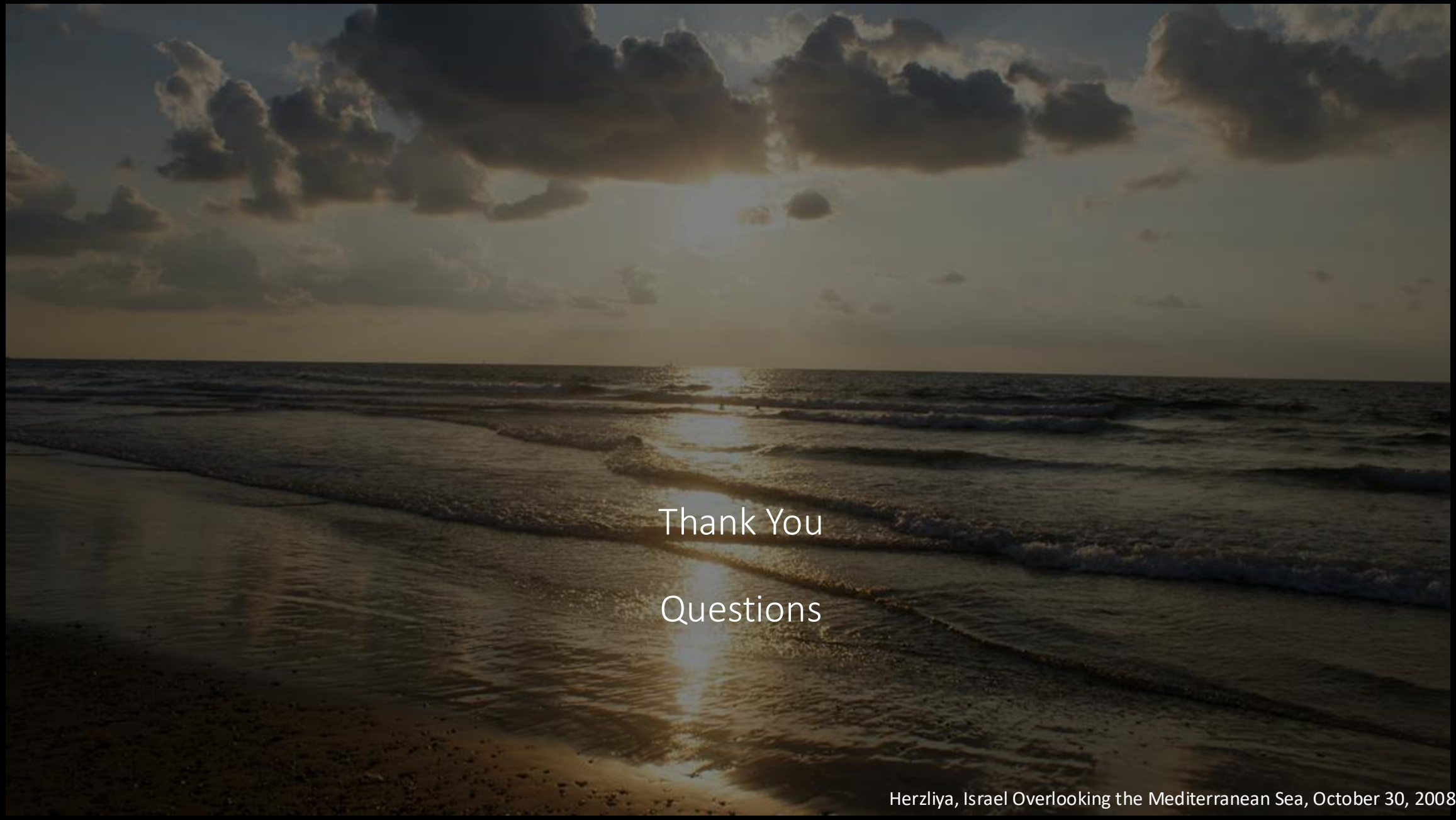
****Denote p value < 0.5**

*Combat Exposure, Daily Stress Status, Loneliness Level, Degree of Moral Injury, Self-Stigmatization Level, Suicide Risk Status, and History of Traumatic Brain Injury

MULITPLE LOGISTIC REGRESSION Summary Tables

TABLE 2: Risk Factors Independently Associated with Alcohol Abuse Risk using Multiple Logistic Regression among veterans in 2022 The Military Health and Well-Being Project from ICPSR Michigan (N=1,495)

Measures	ß	p-value		
Constant	-2.810		**% correctly predicted:**	
			Overall p-value <	0.175
Combat Exposure	0.187	0.167		
Daily Stress Status	0.562	0.157		
Loneliness				
Military Calling	-0.046	0.021*		
Quality of Life				
Very poor	ref			
Poor	0.805	0.525		
Neither poor nor good	0.346	0.500		
Good	-0.138	0.495		
Very good	-0.181	0.523		
Public Service Motivation	0.042	0.027*		
Wellness	-0.214	0.297		



Herzliya, Israel Overlooking the Mediterranean Sea, October 30, 2008