**ADITYA YUVARAJ KSHIRSAGAR**

**ID 24240142**

ms5105 Assignment 01

In submitting this work, I\_confirm that it is entirely my own. I\_acknowledge that I\_may be invited to online interview if there is any concern in relation to the integrity of my submission, and I\_am aware that any breach will be subject to the University's\_Procedures for dealing with breaches of Exam \_Regulations. I am aware of what the University of Galway plagiarism policy entails.

# Q1) Does age influence how people perceive stress, and can it help predict their stress levels?

**Statistical test**: We are using Regression Analysis as we wish to examine the effect of one continuous variable on the another.

H0: Age is not related to perception of stress.

H1: Age is related to perception of stress

**Normality test:** Before we run a regression test, we will check if the data follows a normal distribution. To do this, we will look at histogram, normal QQ plots, box plots, and the Kolmogorov-Smirnov test. We'll also review the mean and 5% trimmed mean of total perceived stress. If most indicators show normal distribution, we can say the variable is normally distributed. You can find the tables and graphs related to this normality check in the output file.

A screenshot of a computer

Description automatically generated

**Results of normality test:** The Descriptive table shows that the mean and 5% trimmed mean are very close (26.73 and 26.64), suggesting that the data is normally distributed.

A graph of a stress

Description automatically generated

The histogram shows a roughly symmetrical curve, suggesting that the data is close to a normal distribution.

A graph with blue dots

Description automatically generated

The normal Q-Q plot shows that most data points fall along or close to the diagonal line, with only a few outliers, indicating normal distribution. Although the Kolmogorov-Smirnov test is not satisfied, the tables and graphs above suggest the data is normally distributed. Therefore, for this report, we'll assume all other continuous variables too are normally distributed.A screenshot of a computer

Description automatically generated

**Regression Result:** The above screenshot shows the model is test significance i.e. p=0.008< 0.05 & F (1,431) =7.015, so we reject the Null Hypothesis. The collinearity statistics indicate no multicollinearity between total perceived stress and age, as the tolerance is 1 (> 0.1) and the VIF is 1 (< 10).

In the model summary, the adjusted R-square is 0.014

A table of stress

Description automatically generated

After observing correlations table, we can see that age has a small negative relationship with perceived stress (β = -0.127, p = 0.008).

A table with numbers and a number of squares

Description automatically generated

Our regression analysis and observing the ANOVA table show that age groups significantly impact perceived stress, supported by a p-value of 0.008, which is much lower than the 0.05 threshold for a 95% confidence interval. This indicates that differences in stress perception across age groups are significant. The P-P plot of the regression also shows that total perceived stress and age align closely with the diagonal line, satisfying the linearity.

A graph of a normal p-p plot

Description automatically generated

Therefore, we can conclude that the age is related to perceived stress.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Q2) Do smokers and non-smokers differ in their overall life satisfaction?

**Statistical test:** We will be choosing T test as we want to explore relation between one categorical independent variable and continuous dependent variable.

H0: Total life satisfaction does not depend on smoking   
H1: Total life satisfaction depends on smoking

A graph with numbers and letters

Description automatically generated

**Results:** The independent sample T-Test results suggest there’s no significant difference in overall life satisfaction between smokers and non-smokers, leading us to accept the Null hypothesis and reject the alternative. Levene’s Test for Equality of Variances shows the p-value of 0.211 when equal variances are assumed & 0.219 when they aren’t, both of which are higher than the standard alpha level of 0.05 for a 95% confidence interval. This means our hypothesis holds true: life satisfaction doesn’t seem to depend on whether someone is a smoker or not.

A screenshot of a table

Description automatically generated

Additionally, the average life satisfaction scores between smokers (µ = 21.55, SD =6.91) and non-smokers (µ= 22.58 , SD = 6.75) are very close, further suggesting no significant difference in life satisfaction between the two groups.

While non-smokers show slightly higher satisfaction, this difference between them is not statistically significant, indicating no real connection between smoking status and life satisfaction.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Q3) Does a person's marital status affect how they perceive stress?

**Statistical test:** Here we chose to use a One-Way ANOVA test because we want to analyze the differences in stress level among individuals with different martial statuses. (level>2)

H0: satisfaction in life is not related to gender and age group

A table with numbers and a few squares

Description automatically generatedH1: satisfaction in life is related to gender and age group

Subjects are divided into 8 categories: Single, in steady relationship, living with partner, married first time, remarried, separated, divorced, widowed.

**Results:** The test significance value is 0.008, which is less than 0.05. This allows us to reject the Null Hypothesis and accept the Alternative Hypothesis.

According to ANOVA test F (7,425) =2.749, p-value of 0.008, which is well below the standard alpha level of 0.05 for a 95% confidence interval, we conclude that there is a meaningful difference in stress perception across different marital statuses. Also, the effect size, measured by eta squared, was small at 0.043, suggesting that the differences in average scores between the groups were minor. This result is significant enough to consider it thus rejecting the Null Hypothesis.

A graph with a line and a line

Description automatically generated

According to the Graph too we can observe that people who are separated tend to experience higher levels of stress, while those who are widowed seem to have lower stress levels.

This suggests that there is a connection between a person’s marital status and the total perceived stress.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Q4) Are older men generally more satisfied with life than older women?

**Statistical test:** We are using a Two-Way ANOVA to determine if life satisfaction depends on both age group and sex. Here, age group and sex are categorical independent variables, while life satisfaction is a continuous dependent variable.

H0: satisfaction in life is not related to gender and age group

H1: satisfaction in life is related to gender and age group

A graph with lines and numbers

Description automatically generated

**Results:** Firstly, we check with Levene’s Test of equity of error Variances,

The p-value from Levene's Test is 0.774, which is insignificant as it’s above the standard alpha level of 0.05 for a 95% confidence interval. This means we can proceed with the analysis without needing additional tests.

A screenshot of a test results

Description automatically generated

We then examined the Tests of Between-Subjects Effects to analyze interactions between the groups.

The two-way interaction between gender and age group was not statistically significant, with a small effect size (p = 0.681), meaning that gender did not noticeably impact life satisfaction differences across age groups.

A screenshot of a graph

Description automatically generated

Additionally, post-hoc comparisons using Tukey’s HSD test indicated that the mean life satisfaction score for the 18-29 years group (M = 22.63, SD = 6.583) did not differ significantly from the 30-44 years age group (M = 21.63, SD = 6.858) or the 45+ group (M = 22.95, SD = 6.842).

A screenshot of a table

Description automatically generated

Looking at the sex\*agegp3 interaction, we see a p-value of 0.681, which is above 0.05, indicating that the interaction between age and gender on life satisfaction is insignificant.

When examining age group and sex separately, their p-values are also not significant (0.296 for age group and 0.062 for sex). Therefore, we accept the Null hypothesis, concluding that the life satisfaction is not related to either age group or gender.

# Q5) How are optimism and life satisfaction related?

**Statistical test:** Since optimism and life satisfaction are continuous variables, we use Pearson’s R Correlation Coefficient test.

H0: Optimism is not related to life satisfaction

H1: Optimism is related to life satisfaction

**Results**: There is a strong positive correlation between optimism and life satisfaction, as Pearson’s product -moment correlation coefficient r is 0.483. This means that as one of these variables increases, the other will tend to increase as well. Changes in one will likely lead to changes in the other.

A screenshot of a graph

Description automatically generated

Based on the correlations table, with p = 0.001 (<0.05) & N = 435, there is a statistically significant positive correlation between age and self-esteem. Therefore, we are rejecting the null hypothesis and accepting the alternative, confirming that there is a relationship between optimism and life satisfaction. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_