Middle East Technical University
Department of Statistics

STAT 365
SURVEY SAMPLING TECHNIQUES
TERM PROJECT
2021-2022 FALL

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Abstract

One of the economic problems of society is the youth unemployment rate. TURKSTAT July 2020 statistics show that at least one out of every four people (25.9%) in the 15-24 age group is unemployed (TUIK, 2020). This problem causes the anxiety of finding a job in university students, called the Z generation. In addition, other factors cause job anxiety. This study aims to understand the factors affecting the job anxiety of students studying at Middle East Technical University (METU). For this purpose, a questionnaire was applied to 135 students studying at METU. As a result of the survey, it was seen that students had found job anxiety. Moreover, there is no significant difference in terms of CGPA, Faculty and, families' countries perception of unemployment anxiety. In addition, a statistically significant relationship was found in terms of job anxiety level and whether the student has looked for an internship or not, and whether the student can find an internship or not. Also, in this survey, population parameters were estimated.

.**Keywords**

Finding Job Anxiety Level, Unemployment, University Students

1. INTRODUCTION

In this study, the main research objective is to understand the factors that affect/do not affect job anxiety among university students. The name of the data used to understand reasons of the level of finding job anxiety is STAT365 which is encoded as "mydata". To draw a meaningful conclusion from the data, Survey-Weighted Linear Model, Box-Cox transformation, Rao&Scott Adjustment, Kruskal-Wallis test, GGPLOT, and Mosaic Plot are used. Also, the data set was collected by the owners by using Google Forms.

Data

The data set was collected by the owners by using Google Forms. Also, this project consists of 136 participants and 20 questions. Out of one hundred thirty-five (135) respondents, sixty-four (64) were female, seventy (70) were male, and one (1) person stated their gender as the other. In other words, the survey represents almost 47.3% of females, 52% of males, and 0.7% of other. It illustrates that the study has practically a balanced range of gender. This survey focused on the students at METU; therefore, the participants were between 19 and 28 years old. While more than half (54.2%) of the participants are from Faculty from Engineering, this rate is followed by the Faculty of Arts and Sciences with almost thirty percent (30.4%), while eleven percent (11%) of the participants are from the Faculty of Economic and Administrative Sciences, and four point four percent (4.4%) are from the Faculty of Architecture. In addition, the majority of the participants (92.6%) are undergraduate, and forty-eight point one (48.1%) are third-year students.

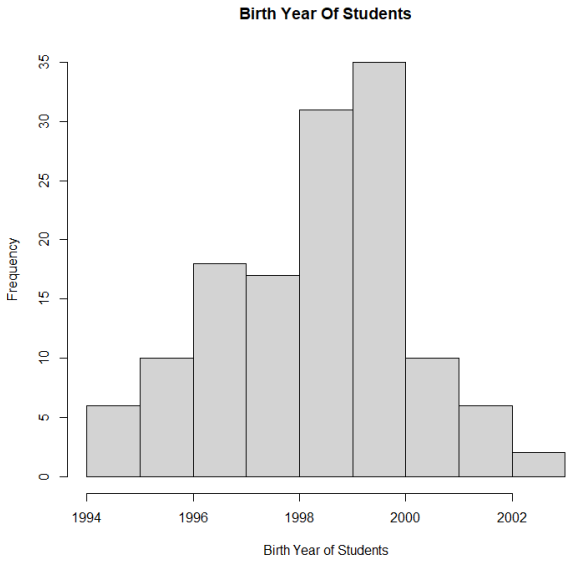

Figure 1: Histogram of Birth Year of Students

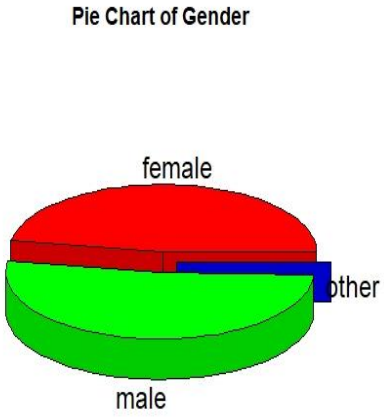

Figure 2: Pie Chart of Gender

VARIABLE	DESCRIPTION
Q1	Gender
Q2	Birth Year
Q3	The city where the student's family lives
Q4	Faculty
Q5	Department
Q6	Starting School Year
Q7	Education Level
Q8	Students' Grade
Q9	Situation of Extension of School Year
Q10	Number of Extended Semesters of School
Q11	CGPA
Q12	Student's membership status in a student club
Q13	Job Anxiety Status
Q14	Rate finding job anxiety level
Q15	Overlooking internship/job status
Q16	Finding job/internship status
Q17	Satisfaction status from internship/job
Q18	Level of Satisfaction

2. REVIEW LITERATURE

The Youth unemployment rate is increasing day by day in Turkey. This situation causes many problems. One of them is the increase in the anxiety of finding a job among university students. There are many studies on this subject, and the reasons for the level of finding a job are discussed. As a result of the research, it has been observed anxiety is higher in the students studying in the departments where the number of graduates and the job opportunities in the sector does not increase in the same line. In addition, while no significant difference was found between the gender and marital status of the students and their anxiety levels, there was a statistically significant difference in terms of CGPA and department. (Korkmazer,2020). The findings of another study show that there was no significant difference in gender in terms of mean scores of unemployment concerns. In contrast, according to this study, CGPA has an effect on the mean scores of unemployment concerns, and the level of anxiety increased as the CGPA increased. (Şahin Kutlu, Çetinbakış, Kutlu, 2019)

3. AIMS OF RESEARCH

Main Objective

The main research purpose is to find out which variable can affect the finding job anxiety level among the METU students.

Minor Objectives

1- Do the students' hometown have effect on the level of finding job anxiety?
2- Is students' finding job anxiety level affected by CGPA?
3- Is students' finding job anxiety level affected by faculty?
4- Does finding/not finding an internship affect level of finding job anxiety?

4. SURVEY METHODOLOGY

4.1. SURVEY DESİGN

4.1.1 Sample Design

In this study, 142 responses were collected through the google questionnaire sent to individuals individually. The original population size is 26500; after some clarification, justification, and arrangement of data, the number dropped 135. In addition to that, the sample size is calculated for 95% confidence interval at 9% margin of error.

4.1.2 Data Collection

This survey has been conducted online due to access much more target group. Google form was used. Metu students was target group. Since snowball sampling has been used one respondent share another respondent our questioner.

From the answers given to the questions, it is planned to process and present the answers consisting of finding job anxiety level belonging to university students. R is used in this project.

4.2 METHODS OF ANALYSIS

Descriptive statistics and statistical tests were used as statistical methods. Graphical methods information tables showing frequency are used as belonging to the statistical method of the identifier. It can be seen that this information gives information that will make visualization and identification about it. Besides, statistical tests will be used in many methods, such as ANOVA and normality testing. In addition, modeling will be done using a linear and logistic regression method.

4.2.1 Descriptive Statistics

Frequencies

Frequency distribution is a statistical distribution or graph that indicates the frequency of different results in a survey. Each element in the dataset includes the frequency or number of properties responses within a particular group or interval. Therefore, the total number is the distribution of values in the dataset. The frequency distribution shows the precise class of data grouped into mutually exclusive groups and the number of responses in the classification.

Box Plot

A boxplot is a standardized way of displaying the distribution of data based on a five-number summary ("minimum", first quartile (Q1), median, third quartile (Q3), and "maximum"). It can tell you about your outliers and what their values are.

4.2.2 Statistical Tests

- Linear modelling normality test
- Using linear modelling we can check the parameters linear relations.
- Chi square test
- Chi square test is used to determine whether there is a statistically significant difference between the expected frequencies and the observed frequencies in one or more categories of a contingency table.
- Rao & Scott Adjustment
- We review the basic ideas underlying the Rao-Scott corrections to chi-squared tests for contingency tables

5. ANALYSIS

We conducted mean CGPA and mean finding work anxiety level of Metu then we have made two-stage cluster method, four of the five faculties has selected. Using this method, the mean value of CGPA of METU students is estimated as 2.86, and the mean value of anxiety level of METU students is estimated as 3.13.

5.1 Descriptive Statistics

Birth Year of METU students:

Minimum	1st Quantile	Median	Mean	3rd Quantile	Maximum
1994	1998	1999	1999	2000	2003

Table 1: *Descriptive statistics of birth year of METU students*

While the minimum age of METU students is 19, the maximum is 28. Also, the median of METU students' age is 23.

METU Students' satisfaction level with the internship:

Minimum	1st Quantile	Median	Mean	3rd Quantile	Maximum
1.00	2.50	4.00	3.35	4.00	5.00

Table 2: *Descriptive statistics of METU students' satisfaction level with internship*

The minimum satisfaction level is 1 and the maximum is 5. While median of the satisfaction level of students for internship is 4, the mean is 3.35. (A 5-point Likert Scale was used in this question).

METU Students' finding job anxiety level:

Minimum	1st Quantile	Median	Mean	3rd Quantile	Maximum
1.00	2.00	3.00	3.13	4.00	5.00

Table 3: *Descriptive statistics of METU students' finding job anxiety level*

The minimum anxiety level is 1 and the maximum is 5. While median of the anxiety level of students for finding job is 3.00, the mean is 3.13. (A 5-point Likert Scale was used in this question.)

5.2 The relationship between students' hometown and finding job anxiety level.

The inference obtained from the data collected at the end of the research is as follows: boxplot is used to visualize the data.

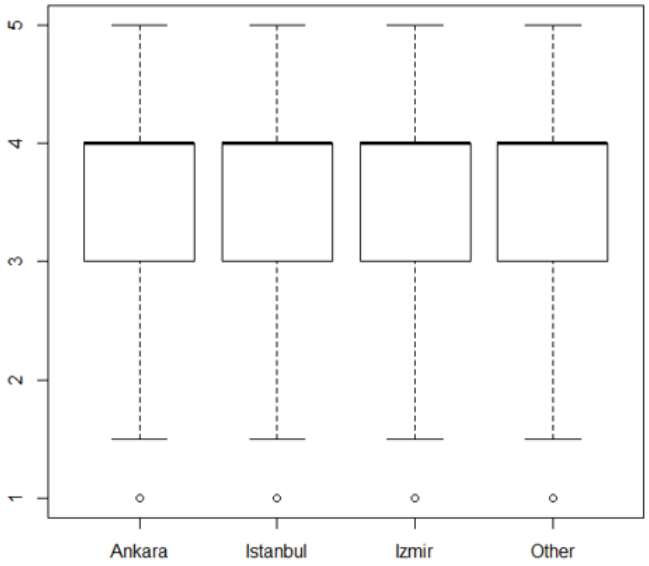

Figure 3: Stress Level and Hometown of Population Box Plot

As it can be concluded that there is no difference in anxiety levels depending on hometowns because median values and distributions from the boxplot for hometowns around the finding work anxiety level are the same for each hometown.

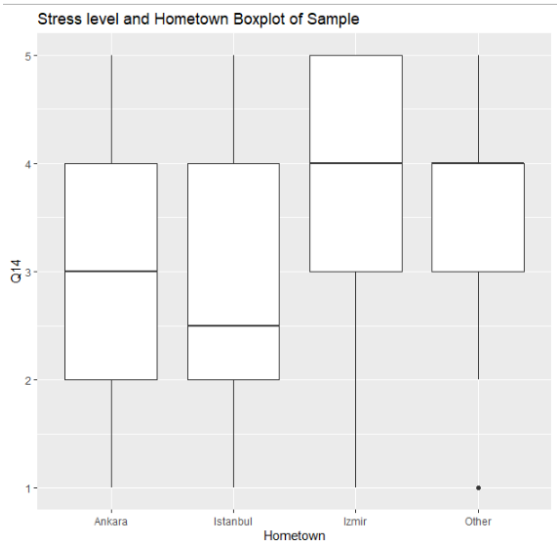

Figure 4: Anxiety Level and Hometown Boxplot

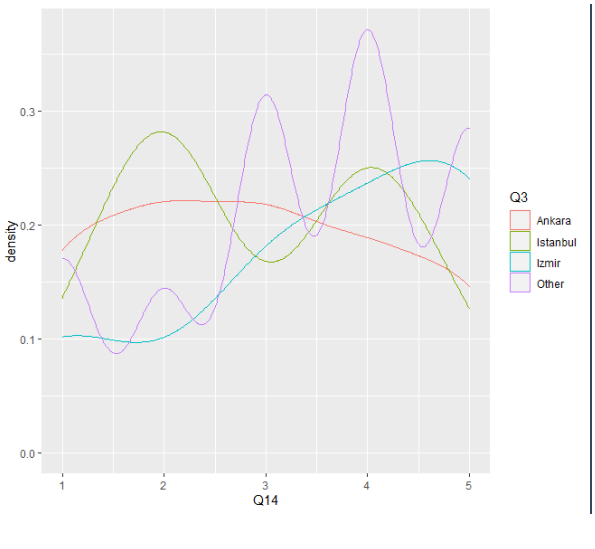

Figure 5: Density Plot of Each Countries for Anxiety Level

However, when the sample is analyzed, there are different distributions, and median values are different from each other. İzmir has the most significant median values and most extended lower tail but centered median, while İstanbul has the lowest median value and size of quartiles.

5.3 The Relationship between CGPA and Finding Job Anxiety Level

The relationship between job anxiety level and CGPA of METU students is visualized by using a mosaic plot, but this plot did not give enough information. The linear model is used to find whether there is a relationship between finding job anxiety and CGPA or not. After that p-value is checked, it can be concluded that there is no significant relationship between CGPA and anxiety level. Also, it can be seen that all median values are the same at the exact same CGPA value for each anxiety level.

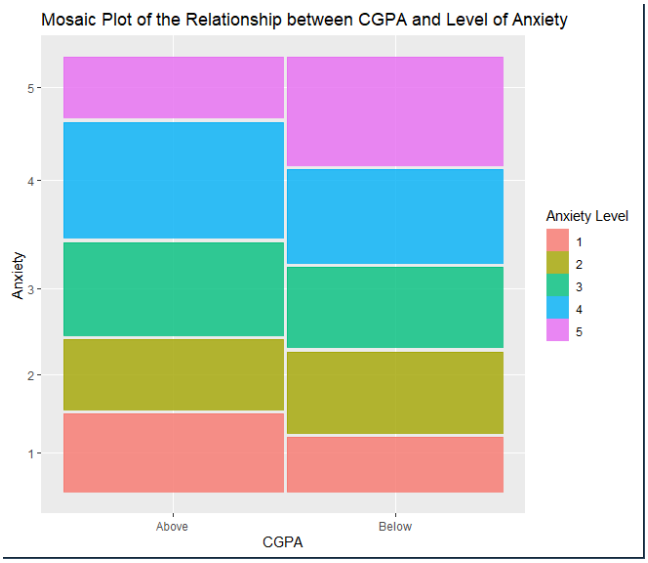

Figure 6: Mosaic Plot of CGPA and Anxiety

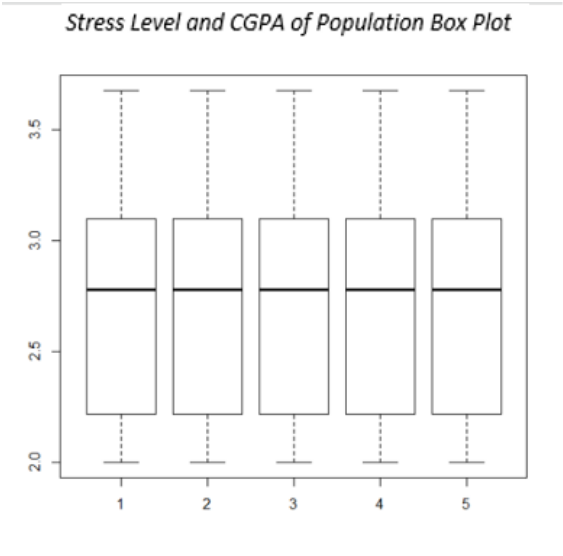

Figure 7: Box Plots of Anxiety Level and CGPA

H_o: CGPA and Stress Level has no relation.

H_1: CGPA and Stress Level has relation

	Estimate	Standard Error	t value	P value
Intercept	3.17490	0.21970	14.45	0.00475
CGPA	-0.01453	0.07654	-0.19	0.86697

Table 4: *Stress level and CGPA Survey Weighted Linear Regression Summary*

Also, it can be seen that from the survey weighted regression summary, since the p value is greater than 0.05, there is no relationship between CGPA and job anxiety level.

5.4 The Relationship between Faculty and Finding Job Anxiety Level

H_o: Faculty and Stress Level has no relation.

H_1: Faculty and Stress Level has relation.

F	ndf	ddf	p-value
3.3319	1	3	0.1654

Table 5: *Faculty and Stress Level Chi Square Test Result*

Faculty	Stress Level	se
Faculty of Architecture	3.500000	8.012345e-18
Faculty of Arts and Sciences	3.023256	3.605555e-17
Faculty of Economic and Administrative Sciences	3.214286	1.442222e-16
Faculty of Engineering	3.152778	8.212653e-17

Table 6: *Survey Statistics on Subsets Based on Faculties*

Chi-square test is used to understand whether there is a significant relationship between students' faculties and anxiety level. When the p-value is checked, it can be concluded that there is no meaningful relationship between students' faculties and anxiety level. At the same time, it can be seen that from the survey statistics on the subsets table, the mean stress level can change little, but that change is not significant.

5.5 Are there difference between search and find internship and search and could not find internship group's finding job anxiety level?

H_o: Whether student looked for an internship or not and finding job anxiety level has no relation.

H_1: Whether student looked for an internship or not and finding job anxiety level has relation.

F	ndf	ddf	p-value
11.535	1.88	5.64	0.01058

Table 7: *Chi square test of Searched internship Group of Population*

Since p value is smaller than 0.05, there is a relationship which means internship seeking affect anxiety level significantly.

H_o: Whether student could find an internship or not and finding job anxiety level has no relation.

H_1: Whether student could find an internship or not, and finding job anxiety level has relation.

F	ndf	ddf	p-value
11.535	2.3275	6.9826	0.03313

Table 8: *Chi square test of Searched and could not found internship Group of Population*

Since p value is smaller than 0.05, there is a relationship which means finding an internship or not affects the stress level significantly.

H_o: True difference in mean rank score of looking for an internship based on anxiety level is equal to 0

H_1: True difference in mean rank score of looking for an internship based on anxiety level is not equal to 0

t-value	Df	p-value
5.6237	2	0.03019

Table 9: *Design-based Kruskal Wallis Test*

Finally, Kruskal Wallis test is used to see whether there is a difference in mean rank score of looking for an internship based on anxiety level, and it can be concluded that there is a significant relationship between them because p value is smaller than 0.05.

6. RESULT AND FINDINGS

The mean CGPA of the Metu students is estimated as 2.8614 among five faculties (Faculty of Architecture, Faculty of Arts and Sciences, Faculty of Economic and Administrative Sciences, Faculty of Education, Faculty of Engineering) by applying two-stage clustering. 4 faculty which are Faculty of Architecture, Faculty of Arts and Sciences, Faculty of Economic and Administrative Sciences, Faculty of Engineering, are chosen from 5 faculties. The mean anxiety level of the Metu students is estimated as 3.1333 from 5 level scale. For Metu students' job anxiety, median values and distributions are the same based on their families' countries, while there are different medians and distributions in the sample. When CGPA is divided into two parts as above the median and below the median of CGPA, a definite relationship does not seem from the sample. After obtaining a survey-weighted linear model and box plot for the population, there is no relationship between CGPA and job anxiety level. The relationship between job anxiety level and students' faculty is analyzed and concluded that there is no significant relationship between them. However, when the internship situation is examined, it can be concluded that there is a significant relationship between job anxiety level and whether the student has looked for an internship or not, and also whether a student can find an internship or not, and also mean values of answers for the question "Have you ever looked for an internship?" is different.

7. CONCLUSION

It can be said that there was one variable that can affect the job anxiety from analysis in this report. The goal of this project was to understand what can affect METU students' job anxiety. Therefore, a survey is done among METU students. To conclude the research questions, population estimations, population and sample boxplots, mosaic plots for sample, survey-weighted linear model Rao & Scott Adjustment, Kruskal-Wallis test are used in this project. As a result, there is no relationship between job anxiety and the country that students' families live, CGPA, faculty, but there is a relationship between job anxiety and internship. In addition to that, anxiety levels based on countries are analyzed, and it is concluded that median values and distributions are the same for İstanbul, İzmir, Ankara, and other countries. It is also concluded that students who looked for an internship and who do not have different mean values.

All in all, there is no significant relationship between job anxiety level and questions that are asked in the survey except the internship situation of students.

8. REFERENCES

Korkmazer, F. (2020). *Üniversite öğrencilerinin işsizlik Kaygisi Algilarinin ...* Retrieved from https://dergipark.org.tr/en/download/article-file/1405597

Şahin Kutlu, Ş., Çetinbakış, M., & Kutlu, M. (2019). *ÜNİVERSİTE SON SINIF ÖĞRENCİLERİNDE İŞSİZLİK…* Retrieved from http://www.ekevakademi.org/Makaleler/1876568821_28%20Seyma%20SAHIN%20KUTLU-Melike%20CETINBAKIS-Muhammet%20KUTLU.pdf

TUIK (2021). *İş Gücü İstatistikleri* Retrieved from https://data.tuik.gov.tr/Bulten/Index?p=Isgucu-Istatistikleri-Ocak-2021-37486#:~:text=Yeni%20d%C3%BCzenlemelere%20ili%C5%9Fkin%20ayr%C4%B1nt%C4%B1l%C4%B1%20bilgiye%20ekteki%20metodolojik%20dok%C3%BCmandan%20ula%C5%9F%C4%B1labilir.&text=T%C3%BCrkiye%20genelinde%2015%20ve%20daha,%12%2C2%20seviyesinde%20ger%C3%A7ekle%C5%9Fti.

8.APPENDIX

```
library(ggplot2)

library(dplyr)

library(ggmosaic)

library(xlsx)

library(survey)

library(readxlsx)

library(plotrix)

getwd()

setwd("C:/Users/90507/Desktop")

mydata <- read.xlsx("STAT365.xlsx", sheetName = "sayfa1")

names(mydata)<-
c("Q1","Q2","Q3","Q4","Q5","Q6","Q7","Q8","Q9","Q10","Q11EK","Q11","Q12","Q13","Q14
","Q15","Q16","Q17","Q18","Q19","Q20")

mydata$Q14F <- as.factor(mydata$Q14)

#two stages cluster

fpc <- data.frame(Q4=c("Faculty of Arts and Sciences","Faculty of Engineering",

                       "Faculty of Economic and Administrative Sciences", "Faculty of Architecture"),

                  fpc1=c(6,6,6,6),fpc2=c(43,72,14,6), weight=c((6/4)*4423/43,

                                                               (6/4)*9294/72,
```

```
(6/4)*2162/14,

(6/4)*1412/6))

table(mydata$Q1)

tbl <- c(64,70,1)

pielbl <- c("female","male","other")

pie3D(tbl,labels=pielbl,explode=0.1, main="Pie Chart of Gender")

hist(mydata$Q2,xlab = "Birth Year of Students",main="Birth Year Of Students")

summary(mydata$Q2)

summary(mydata$Q18)

summary(mydata)

summary(mydata$Q14)

mydata <- left_join(mydata, fpc)

mydata$ID <- 1:nrow(mydata)

mydata$Q11 <- as.numeric(mydata$Q11)

design <- svydesign(ids = ~Q4+ID, fpc = ~fpc1+fpc2, data = mydata)

svymean(~Q11, design)

#Mean CGPA among METU students is estimated. two stage cluster is applied, and 4 faculties are
choosen from 5 faculties.

svymean(~Q14, design)

#Mean anxiety level is estimated.

svymean(~Q13, design)
```

```
#Mean values of whether students have job anxiety or not.


#RESEARCH QUESTION 1.(COUNTRY VS JOB ANXYETY LEVEL)

svyboxplot(Q14~Q3, design)

#There is no difference in median values and distributions of anxiety level based on countries of students' families.

ggplot(mydata, aes(x=Q3, y=Q14))+
  geom_boxplot()

ggplot(mydata, aes(x=Q14, color=Q3))+
  geom_density()

#RESEARCH QUESTION 2.

cgpa<-as.factor(ifelse(mydata$Q11>median(mydata$Q11),"Above","Below"))

anxiety<-as.factor(mydata$Q14)

ggplot(mydata) +
  geom_mosaic(aes(weight = weight, x = product(anxiety, cgpa), fill=anxiety, color = "black"))+
  labs(title="Mosaic Plot of the Relationship between CGPA and Level of Anxiety", x = "CGPA",
       y = "Anxiety", fill = "Anxiety Level")

model <- svyglm(Q14~Q11, design)

summary(model)

svyboxplot(Q11~Q14F, design)

#There is no significant relationship between CGPA and job anxiety level.
```

```
#RESEARCH 3.(Does ANXIETY LEVEL CHANGE ACCORDING TO FACULTY)

Q11 <- as.numeric(mydata$Q11)

Q14 <- mydata$Q14

svychisq(~Q14F+Q4, design)

svyby(~Q14,~Q4, svymean, design = design)

#RESEARCH QUESTION 4.

svychisq(~Q14F+Q15, design)

svychisq(~Q14F+Q16, design)

svyranktest(Q14~Q15, design,test = "KruskalWallis")

#Mean values of answers for question "Have you ever looked for an internship?" is different.
```

Questionnaire

Finding Job Anxiety Among METU Students

This research is carried out by 3rd grade students for the STAT365 Sampling and Survey Technique course. The aim of this research is to determine the reasons for the anxiety of finding a job in METU students. Your answers will be used for academic purposes only. Thank you for your participation.

Q1) Gender

A) Male
B) Female
C) Other

D) Prefer not to say

Q2) What is your birth year? (ex. 1998,1999..)

Q3) Where does your family currently live?

A) İstanbul
B) Ankara
C) İzmir
D) Other

Q4) What is your faculty?

A) Faculty of Architecture
B) Faculty of Arts and Sciences
C) Faculty of Economic and Administrative Sciences
D) Faculty of Education
E) Faculty of Engineering

Q5) What is your department ? (ex. STAT, CENG)

Q6) What is your school start year?

Q7) What is your currently education level?

A) Undergraduate
B) Master
C) PhD.

Q8) Which grade are you in?

A) Preparatory class
B) First grade
C) Second grade
D) Third grade
E) Fourth grade
F) MSC

G) PHD

Q9) Did you extend the normal university period?

A) Yes
B) No

Q10) If you answered yes, how many years did you extend university? (Please use dots for half numbers ex: 1.5)

Q11) What is your CGPA? (ex. 2.00)

Q12) Is there a student club that you are active ?

A) Yes
B) No

Q13) Have you got finding job anxiety?

A) Yes
B) No

Q14) Can you rate your finding job anxiety level:

Low Anxiety 1 2 3 4 5 High Anxiety

Q15) Have you ever looked for an internship/job?

A) Yes
B) No

Q16) If you answered yes, did you find any internship/job?

A) Yes
B) No

Q17) If you answered yes, have you been satisfied from your internship/job?

A) Yes

B) No

Q18) Can you indicate your level of satisfaction?

Low Anxiety 1 2 3 4 5 High Anxiety