

**HOMEWORK #3 [20 points]**

**(HARD COPY due at the beginning of the class on Monday, 3/2)**

Name: \_\_\_\_\_

**Research Scenario:** Assume you have managed to administer a survey questionnaire regarding media consumption behavior and class performance of college students and have collected a sample of 66 randomly selected students at UM. There are five variables in the data set:

- 1) Case ID; (CaseID)
- 2) Gender (1=female, 2=male); (Gender)
- 3) Time spent on watching TV drama per day before midterm (in hours); (TVDrama\_before)
- 4) Time spent on watching TV drama per day after midterm (in hours); (TVDrama\_after)
- 5) Test score for statistics; (test\_score)

**Instructions:** Use the SPSS dataset on Blackboard (under Assignments) [HW3.sav] to run APPROPRIATE tests to answer the following questions.

**Part A. [6 points]**

Based on the research questions below, formulate a null hypothesis ( $H_0$ ) and an alternative hypothesis ( $H_a$ ) for EACH RQ. Note that we will be conducting two-tailed tests, so the alternative hypotheses should be two sided and non-directional.

**RQ1: Is there a relationship between gender of students and time spent watching TV drama per day before midterm?**

$H_0$ : There is no relationship between gender of students and time spent watching TV drama per day in terms of before midterms

$H_a$ : There is a significant relationship between gender of students and time spent watching TV drama per day in terms of before midterms

**For RQ2: Do students spend different amount of time watching TV drama per day before and after midterm?**

$H_0$ : there is no difference between students watching TV drama per day before and after midterms  $\mu=0$

$H_a$ : there is a significant difference between students watching TV drama per day before and after midterms  $\mu$  is not equal to 0

**For RQ3: Is the mean of test score for statistics significantly different from 27?**

$H_0$ : there is no (effect) difference between the mean of test score for statistics from 27

$H_1$ : there is a significant (effect) difference between the mean of test score for statistics from 27

**Part B. [9 points]**

Run three t-tests separately to answer each RQ.

For **each** RQ:

- 1) Select the appropriate type of test and run the analysis in SPSS
- 2) Paste a screenshot of the SPSS outputs that contain the key information needed
- 3) Report your conclusion

For RQ1:

- 1) Type of t-test used:

independent samples t-test

- 2) SPSS outputs (paste the tables or screenshot from SPSS output file)

- 3) Report your conclusion

For RQ2:

1) Type of t-test used:

**Dependent samples t-test**

2) SPSS outputs (paste the tables or screenshot from SPSS output file)

3) Report your conclusion

For RQ3:

1) Type of t-test used:

One Sample t-test

2) SPSS outputs (paste the tables or screenshot below from SPSS output file)

3) Report your conclusion

**Part C. [5 points]**

**Research Scenario:** A researcher wants to know if a 2-minute tutorial video about PC is effective on changing non-PC users' perceptions about PC. The researcher recruited 30 people (all non-PC users) as a sample, surveyed their perception about PC. After that, the sample (30 people) watched the tutorial video then the researcher surveyed again to measure if there is any change on participants' perceptions. The researcher conducted t-test and got t-value of 4.12 ( $p < .05$ ).

1. What would be an appropriate  $H_a$ ?
  
  
  
  
  
  
  
  
  
  
2. What would be an appropriate  $H_0$ ?
  
  
  
  
  
  
  
  
  
  
3. Among the three types of t-tests, which is appropriate for this research? Why?

**Homework 7 [20 points]**

Due digitally on Blackboard on Friday, 4/24 at 11:59am

**Let's apply our statistical learnings to our field! o/**

You decided to conduct research in your favorite area of strategic communication over the quarantine right as you are about to pass your STC103 course with honors. Even though you used all your acquired skills from the class for your statistical reasoning, you made an error in your measurement and had both validity and reliability hurt by your measurement choices. :( But fear not! You realized something was wrong and quickly brainstormed ways to get your research back on track. In the following questions, you describe everything about your research, your problems, and how you fixed them.

a) Describe your research scenario. What was being researched? [1 point]

Research Scenario: You are conducting a research about loud PlayStation (PS) sound where you randomly selected a sample of 600 PSs from a GameStop.

There are four variables in this study:

- 1) PS Serial Number
- 2) Sound Level (in decibels dB)
- 3) Type of PS (1=Slim, 2=Regular)
- 4) Country of origin (1=U.S., 2=Saudi Arabia)

RQ1: How do type of PS and country of origin influence Sound Level?

We are reasearching the type of PS and country of origin influeneng sound level

\*\*\*Another way to write it\*\*\*

Research Scenario: A researcher is studying how Type of PS (1=slim, 2=regular) and country of origin (1=U.S., 2=Saudi Arabia) impact PS Sound Level

b) What was the population? What was the sample? How did you get your sample (random/non-random; simple random, systematic, stratified, multistage cluster)? [2 points]

Population: All PSs from GameStop

Sample: 600 PSs from GameStop

Random; simple random

c) What were your variables (IVs and DVs)? What were the levels of measurement for these variables?  
Which were categorical and which were continuous? [2 points]

IV1: type of PS, IV2: country of origin

DV: sound level

There are 4 variables in this study:

1) PS Serial Number

2) Sound Level (in decibels dB)

3) Type of PS (1=Slim, 2=Regular)

4) Country of origin (1=U.S., 2=Saudi Arabia)

d) Describe the measurement(s) you used for your scenario the first time around. How did these choices hurt the validity of your research? How did they hurt the reliability? [3 points]

e) List two ways you came up with during your brainstorm session to make your research more valid. [2 points]

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

f) List two ways you came up with during your brainstorm session to make your research more reliable. [2 points]

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

Since you have fixed your measurement errors to ensure validity and reliability, you were able to conduct your research. Now the next step is to think of how you will analyze the data you gathered to draw some conclusions.

g) You entered the data into SPSS. Fill out the blank SPSS data view below for your variables. Make sure to write their names as appropriate for SPSS, label them, describe any values that must be entered, and write their levels of measurements as appropriate for SPSS. (Don't worry about filling out the columns for type, width, decimals, missing, columns, align, nor role) [4 points]

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1											
2											
3											
4											
5											

h) What test will you run to analyze your data? Why is this the most appropriate test for your research? [2 points]

Two way ANOVA  
~~Factorial ANOVA~~ IV: multiple factors with multiple levels  
 DV: continoious  
 Main Effects and interaction effects



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i) Check which of the following values you'd have to report in your conclusions for your specific test when writing your results in APA style. [2 points]

- ☐ t
- ☒ f
- ☐ R
- ☒ df (between/within)
- ☒ assumption of equal variances met/not met
- ☒ p-value
- ☐ % variance
- ☐ intercept
- ☐ slope
- ☒ DV(s)
- ☒ IV(s)
- ☐ magnitude
- ☐ direction
- ☐ other (specify): Mean   sum of squares   main and interaction effects

**HOMEWORK #8 [20 points]**

**To be completed during class time on Wednesday, May 6th**  
**Due digitally on Blackboard by the end of the class session, 1:30pm**  
**Individually or in groups up to 4 people**

**1) State the appropriate test for each of the following scenarios. Think of the variables and their characteristics to make the correct choice! If the best test is a factorial ANOVA, write the design of the test. [10 points]**

- a. Elementary school girls will weigh less than elementary school boys

Independent samples t-test

- b. Quality of sleep is analyzed considering the interactive effects of mattress quality (high, middle, low) and time spent sleeping (less than 6 hours, 6-8 hours, more than 8 hours).

Factorial ANOVA      interaction effect      factorial design 3x3

- c. Score of children's attentiveness in class improves after a teacher's intervention

Dependent samples t-test

- d. Effect of social media platform choice (Facebook, Twitter, Instagram) on attitude towards dieting

One way anova

- e. Grades on course progress report (grades range 0-100%) based on whether tutoring was used (yes, no)

Independent samples t-test

- f. Satisfaction of hair services based on gender and salon location (5 miles, 10 miles, 20 miles)

Factorial anova    2x3

- g. Association between kind of pet and happiness

Correlation

- h. Usage of social media of students during quarantine compared to 40 weekly hours

One Sample t-test

- i. Six levels of educational achievement in four different countries by two genders to look at job satisfaction

Factorial anova    6x4x2

- j. Co-relationship of pool water temperature and pool water color

Simple Linear Regression

**2) [5 points] A NGO has five types of employees: hourly workers, salaried workers, management, freelancers, and volunteers. While looking at these different categories, you suspect that type of employment is related to job satisfaction.**

a. Write a research hypothesis for the scenario.

a researcher is interested in the relationship between the type of employment variables and the job satisfaction variable.

b. Propose the appropriate statistical test to analyze the scenario.

One way anova

c. Identify the IV(s) and DV(s).

iv type of employment

job satisfaction

hourly workers, salaried workers, management, freelancers, and volunteers.

d. Once you ran your test, your results were as follows:  $F(2, 628) = 1.034, p = 0.356$ . What does this mean? Is there an association between types of employment and job satisfaction?

No the test is not significant no association

e. Should you run a post-hoc test? Why or why not?

No

ANOVA compares all mean differences simultaneously in one test, and a significant F-test indicates that at least one group mean is unequal to another group mean (there is an overall difference between groups).... But it doesn't tell us which group mean differs significantly from another! Post-hoc tests are follow-up tests done to determine which pair of means is significantly different

**3) [5 points] You started to think that maybe personal happiness and gender are also related to type of employment for this group. You decided to run another test to analyze these possibilities.**

a. Write a research hypothesis for the scenario.

a researcher is interested in the difference in the population means of the different levels of job satisfaction, with regards to personal happiness and gender

b. Propose the appropriate statistical test to analyze the scenario.

two way anova

c. Identify the IV(s) and DV(s).

iv1 personal happiness, iv2 gender

DV job satisfaction

d. Once you ran your test, you realized that the interaction effect was significant. What does this mean?

$p < .05$  meaning the test was significant

e. Should you run a post-hoc test? Why or why not?

yes,

ANOVA compares all mean differences simultaneously in one test, and a significant F-test indicates that at least one group mean is unequal to another group mean (there is an overall difference between groups).... But it doesn't tell us which group mean differs significantly from another! Post-hoc tests are follow-up tests done to determine which pair of means is significantly different

**SPSS Exercise: Simple Linear Regression**  
**EXTRA CREDIT FOR EXAM 2! [5 points]**

**Due by 11:59am on Friday, April 10th, 2020 (right before the exam; use this as a study opportunity!)**

**Turn it in through Blackboard, under “Assignments”**

(File: simple linear regression2.sav)

**Answer the questions bolded in green.**

**When to use Correlation analysis?** When you have one continuous variable as your IV and one continuous variable as your DV.

**Research Scenario:** You would like to know if the time parents spend on reading to or with their children would be a predictor for the GPA of second-graders. To answer the question, you recorded the GPA of 25 second-graders and surveyed the parents regarding the average time (in hours) per week they spend reading to or with their children. You recorded the data and set up your SPSS with two variables:

IV (predictor): Time [in hours] parents spend per week reading to or with their children

DV (outcome): GPA of second-graders

**Hypotheses: [1pt]**

- **$H_0$ :** there is no relationship between IV (Time [in hours] parents spend per week reading to or with their children) and DV (GPA of second-graders)
- **$H_1$ :** there is a significant relationship between IV (Time [in hours] parents spend per week reading to or with their children) and DV (GPA of second-graders)

**Instructions:**

1. Set up SPSS with variables. Enter and double check variable names, labels, values, and levels of measurement.
2. Run a simple linear regression.

**3. Interpret the results from the outputs using APA style. [2pts]**

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**4. Paste screenshots of your SAV and SPV outputs. [2pts]**

Collected data:

Student	Reading time	GPA
1	2	2.12
2	5	3
3	15	4
4	1	2
5	3	2.56
6	0	1.73
7	7	3.91
8	12	3.77
9	2	2.12
10	6	3.55
11	10	3.85
12	8	3.12
13	5	3.68
14	2	2.22
15	7	3.5
16	0	1.68
17	14	4
18	7	3.86
19	9	4
20	1	1.84
21	5	3.5
22	7	3.7
23	4	3.33
24	10	3.88
25	3	2.98