



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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MAIN EXAMINATION

MAY – JULY 2018 TRIMESTER

FACULTY OF EDUCATION

DEPARTMENT OF POSTGRADUATE STUDIES IN EDUCATION

REGULAR PROGRAMME

ED 813: QUANTITATIVE METHODS OF DATA ANALYSIS IN EDUCATION

Date: JULY 2018

Duration: 3 Hours

INSTRUCTIONS: Answer ANY FOUR Questions

- Q1. A researcher hypothesized that people who smoke tend to smoke more during periods of stress. He recorded the number of cigarettes ordinarily smoked during a 24-hour period by a group of 18 randomly selected smoking university students and the number of cigarettes they smoked during the 24-hour prior to a final examination. The data are displayed below.

Student ID	Ordinary no. of cigarettes smoked	No. of cigarettes smoked prior to final exam
1	23	38
2	15	13
3	22	24
4	11	13
5	28	32
6	8	14
7	13	9
8	21	25
9	10	13
10	13	12
11	7	13
12	11	13
13	10	17
14	2	1
15	10	11

16	16	19
17	27	33
18	9	12

- Prepare and enter the given dataset into SPSS
- Formulate a suitable research question that the researcher wanted to answer
- State, in words, the null and alternative hypotheses for the study.
- Using an alpha level of .05, conduct a paired t-test to test the null hypothesis. State your conclusion regarding the results from this test in language that a friend of yours with no knowledge of statistics could understand.

Q2. An educationist conducted an experiment to check whether instructions given to the participants significantly affected their level of recall of words. Twenty participants were given a list of 20 words to process. The 20 participants were randomly assigned to one of two treatment conditions. Half were instructed to count the number of vowels in each word (shallow processing). Half were instructed to judge whether the object described by each word would be useful if one were stranded on a desert island (deep processing). After a brief distractor task, all subjects were given a surprise free recall task. The number of words correctly recalled was recorded for each subject. Here are the data:

Shallow Processing group	13	12	11	9	11	13	14	14	14	15
Deep Processing group	12	15	14	14	13	12	15	14	16	17

- Prepare and enter the data into SPSS
- Formulate a suitable research question that the researcher wanted to answer
- State, in words, the null and alternative hypotheses for the study.
- Did the instructions given to the participants significantly affect their level of recall (alpha = .05)? State your conclusion regarding the results from this test in language that a friend of yours with no knowledge of statistics could understand.

Q3. A study was done to predict job performance from all other variables by means of a multiple regression analysis. In this study, Job Performance is our criterion (or dependent variable) while IQ, motivation and social support are the predictors (or independent variables). A basic rule of thumb is that we need at least 15 independent observations for each predictor in our model. With three predictors, we need at least (3 x 15 =) 45 respondents. A sample of 60 respondents was selected for the study and the data obtained was analyzed using SPSS and the results are as shown below:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	① .809 ^a	② .654	③ .636	4.844

a. Predictors: (Constant), Outcome of social support test, Outcome of IQ test, Outcome of job motivation test

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	18.131	6.346		2.857	.006
	Outcome of IQ test	.265	.044	.472	5.965	.000
	Outcome of job motivation test	① .308	.050	③ .522	6.163	② .000
	Outcome of social support test	.164	.056	.251	2.953	.005

a. Dependent Variable: Outcome of job performance test

- Formulate a suitable research question that the researcher wanted to answer.
- State both the null and alternative hypotheses in words for this study.
- Comment on the results given in the model summary table above.
- Based on the results, complete the regression equation and comment on the results.
- Provide the decision rule for rejecting the null hypothesis.
- Using an alpha level of .05, please test the null hypothesis. State the conclusion you are entitled to draw as a result of this test.

Q4. The theory of assortative mating states that the height of a husband is related to the height of the wife. Loise et al compared the heights of 12 picked couples and the results were as shown below:

Serial no. of couple	Height of wife(X) in cm	Height of Husband(Y) in cm
1	162	154
2	171	159
3	175	156
4	162	172
5	165	159
6	171	172
7	176	186
8	162	159
9	174	179
10	170	156
11	168	176
12	165	159

- Prepare and enter the data into SPSS
- Formulate a suitable research question that the researcher wanted to answer.
- State, in words, the null and alternative hypotheses for the study.
- Draw a scatter plot for the data and comment on the results.

- e) Find the Pearson Correlation Coefficient, r and comment on the relationship between X and Y .
- f) Conduct a regression analysis and comment on the results. Determine the regression equation.
- g) Determine whether the height of husbands had effect on the height of wives ($\alpha=0.05$)? State your conclusion regarding the results from this test in language that a friend of yours with no knowledge of statistics could understand.

Q5. The World Database of Happiness is an online registry of scientific research on the subjective appreciation of life. Among other things, the “average happiness” score is presented for various nations ($n=72$). This average is based on individual responses from numerous general population surveys to general life satisfaction question. The happiness score ranges from 0 to 10, where 0=dissatisfied and 10=satisfied. Can be regarded as equidistant and can therefore be used as a numeric variable. The following variables are also presented for each nation:
 X_1 = degree of inequality among levels of income (GINI) (higher scores denote more inequality)
 X_2 = life expectancy (years)
 X_3 = degree of corruption (higher scores denote less corruption in government)
 The relationship between happiness and the independent variables can be described by a linear regression model, $Y = a + b_1X_1 + b_2X_2 + b_3X_3$
 Use the output provided to answer questions below:

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,879 ^a	,773	,763	,6222

a. Predictors: (Constant), Corruption, GINI, LifeExpectancy

b. Dependent Variable: Happiness

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	89,505	3	29,835	77,056	,000 ^b
	Residual	26,329	68	,387		
	Total	115,833	71			

a. Dependent Variable: Happiness

b. Predictors: (Constant), Corruption, GINI, LifeExpectancy

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-2,744	,861		-3,187	,002		
	GINI	,038	,009	,261	4,096	,000	,822	1,216
	LifeExpectancy	,091	,011	,646	8,283	,000	,550	1,819
	Corruption	,204	,040	,399	5,107	,000	,549	1,822

a. Dependent Variable: Happiness

- a) Formulate a suitable research question that the researcher wanted to answer.
- b) State both the null and alternative hypotheses in words for this study.
- c) Comment on the results given in the model summary and ANOVA tables above.
- d) Based on the results, complete the regression equation and comment on the results.
- e) Provide the decision rule for rejecting the null hypothesis.
- f) Using an alpha level of .05, please test the null hypothesis.
- g) State the conclusion you are entitled to draw as a result of this test.

END