1. [5/5 Points] DETAILS ROSBIOSTAT8 11.E.031-033.S.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Hypertension

Laboratory measures of cardiovascular reactivity are receiving increasing attention. Much of the expanded interest is based on the belief that these measures, obtained under challenge from physical and psychological stressors, may yield a more biologically meaningful index of cardiovascular function than more traditional static measures. Typically, measurement of cardiovascular reactivity involves the use of an automated blood-pressure monitor to examine the changes in blood pressure before and after a stimulating experience (such as playing a video game). For this purpose, blood-pressure measurements were made with the Vita- Stat blood-pressure machine both before and after playing a video game. Similar measurements were obtained using manual methods for measuring blood pressure. A person was classified as a "reactor" if his or her DBP increased by 10 mm Hg or more after playing the game and as a nonreactor otherwise. The results are given in the table below.

Classification of cardiovascular reactivity using an automated and a manual sphygmomanometer

	DBP, manual	
ΔDBP, automated	< 10	≥10
< 10	50	6
≥ 10	14	7

Another method for relating measures of reactivity for the automated and manual blood pressures is the correlation coefficient. Suppose the correlation coefficient relating these two measures of reactivity is 0.21, based on 77 people having reactivity measured by each type of blood-pressure monitor.

You can use the Distribution Calculators page in SALT to find critical values and/or *p*-values to answer parts of this question.

(a) What is the appropriate procedure to test if there is a relationship between reactivity as measured by the automated and manual monitors?

- (●) one-sample *t* test for a correlation coefficient
- ( ) *t* test for simple linear regression
- ( ) *F* test for simple linear regression
- ( ) Fisher's *z* test for comparing two correlation coefficients
- ( ) one-sample *z* test for a correlation coefficient

(b) Conduct the test procedure in part (a), and report a *p*-value. (Use $\alpha = 0.05$.)

State the null and alternative hypotheses. (Enter != for ≠ as needed.)

H_0: $\rho = 0$

H_1: $\rho != 0$

Calculate the test statistic. (Round your answer to two decimal places.)

1.86

Use technology to find the *p*-value. (Round your answer to four decimal places.)

p-value = 0.0668

State your conclusion.

- ( ) Fail to reject H_0. There is sufficient evidence to conclude there is a relationship between reactivity as

- ○ Fail to reject H_0. There is sufficient evidence to conclude there is a relationship between reactivity as measured by the automated and manual monitors.
- ○ Reject H_0. There is sufficient evidence to conclude there is a relationship between reactivity as measured by the automated and manual monitors.
- ● Fail to reject H_0. There is insufficient evidence to conclude there is a relationship between reactivity as measured by the automated and manual monitors.
- ○ Reject H_0. There is insufficient evidence to conclude there is a relationship between reactivity as measured by the automated and manual monitors.

✔

What do the results mean, in words?

- ○ There is a trend towards statistical significance, meaning the relationship between measures of reactivity for the automated and manual monitors is likely very strong.
- ● There is a trend towards statistical significance, but any relationship between measures of reactivity for the automated and manual monitors is very weak.
- ○ The results are not statistically significant or trending toward statistical significance, with the relationship between measures of reactivity for the automated and manual monitors being nonexistent.
- ○ The results are statistically significant, but any relationship between measures of reactivity for the automated and manual monitors is very weak.
- ○ The results are statistically significant, meaning the relationship between measures of reactivity for the automated and manual monitors is likely very strong.

✔

(c) Provide a 95% confidence interval for the correlation coefficient between these two measures of reactivity. (Enter your answer using interval notation. Round your numerical values to three decimal places.)

$(-0.015, 0.414)$ ✔

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2. [5/5 Points] DETAILS ROSBIOSTAT8 11.E.034-035.S.

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Nutrition

Data Set VALID.DAT is available here.

The food-frequency questionnaire (FFQ) is an instrument often used in dietary epidemiology to assess consumption of specific foods. A person is asked to write down the number of servings per day typically eaten in the past year of over 100 individual food items. A food-composition table is then used to compute nutrient intakes (protein, fat, etc.) based on aggregating responses for individual foods. The FFQ is inexpensive to administer but is considered less accurate than the diet record (DR) (the gold standard of dietary epidemiology). For the DR, a participant writes down the amount of each specific food eaten over the past week in a food diary and a nutritionist using a special computer program computes nutrient intakes from the food diaries. This is a much more expensive method of dietary recording. To validate the FFQ, 173 nurses participating in the Nurses' Health Study completed 4 weeks of diet recording about equally spaced over a 12-month period and an FFQ at the end of diet recording.† Data are presented in data set VALID.DAT for saturated fat, total fat, total alcohol consumption, and total caloric intake for both the DR and FFQ. For the DR, average nutrient intakes were computed over the 4 weeks of diet recording. The following table shows the format of this file.

Format of VALID Data

Variable	Description/Code
Id	ID number

sfat_dr	Saturated fat - DR
sfat_ffq	Saturated fat - FFQ
tfat_dr	Total fat - DR
tfat_ffq	Total fat - FFQ
alco_dr	Alcohol consumption - DR
alco_ffq	Alcohol consumption - FFQ
cal_dr	Total calories - DR
cal_ffq	Total calories - FFQ

USE SALT

(a) Assess the agreement between the food-frequency questionnaire and the dietary record with regard to total fat intake, saturated fat intake, alcohol intake, and total caloric intake.

(i) Quantify the level of agreement by representing the dietary intake in the original continuous scale. (Round your correlation coefficients to four decimal places and your *p*-values to four decimal places.)

	Correlation Coefficient	*p*-value
Total Fat Intake	0.3697 ✔	0.0000 ✔
Saturated Fat Intake	0.4034 ✔	0.0000 ✔
Alcohol Intake	0.8499 ✔	0.0000 ✔
Total Caloric Intake	0.3560 ✔	0.0000 ✔

Which dietary intakes have a significant correlation between correlation between the FFQ and dietary record? (Use $\alpha = 0.05$. Select all that apply.)

- [x] total fat intake
- [x] saturated fat intake
- [x] alcohol intake
- [x] total caloric intake

✔

(ii) Quantify the level of agreement by representing the dietary intake on a quintile scale. (Round your Kappa statistics to four decimal places and your *p*-values to four decimal places.)

	Kappa	*p*-value
Total Fat Intake		
Saturated Fat Intake		
Alcohol Intake		
Total Caloric Intake		

Which dietary intakes have a significant correlation between correlation between the FFQ and dietary record? (Use $\alpha = 0.05$. Select all that apply.)

- [ ] total fat intake

(b) Provide 95% confidence limits for each of your estimates. (Enter your answers using interval notation. Round your numerical values to three decimal places.)

	Correlation Coefficient Interval	Kappa Interval
Total Fat Intake	$(0.233,0.492)$ ✔	
Saturated Fat Intake	$(0.271,0.521)$ ✔	
Alcohol Intake		
Total Caloric Intake		

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