

國立成功大學

111學年度碩士班招生考試試題

編 號：316

系 所：公共衛生研究所

科 目：生物統計學與流行病學

日 期：0220

節 次：第 2 節

備 註：可使用計算機

※ 考生請注意：本試題可使用計算機，可使用中文或英文作答。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

簡答題：(100 分，每大題 25 分)

1. Suppose researchers are interested in investigating the relationship between second-hand cigarette smoke inhalation and performance below the norm on standardized tests in adolescents. Researchers conduct a preliminary analysis and determine that socio-economic status may play a critical role in the ascertainment of the relationship. Suppose the following table summarizes the odds ratios for the outcome due to the exposure when stratifying by socio-economic status dichotomized at above and below the federal poverty line.

	Odds Ratio
Below Federal Poverty Line	16.5
Above Federal Poverty Line	3.2
Combined	4.7

- (1). Describe why socio-economic status may be considered as a potential confounder. (10%)
- (2). Please comment on the role of socio-economic status as a potential “*confounder*”, “*effect-modifier*”, or “*mediator*” on the relationship between exposure and outcome. (15%)
2. Researchers are interested in the association between depression (i.e., dependent variable) and average hours of sleep received each night (i.e., independent variable) among a group of participants in an observational study aged 25-40. Now researchers are planning a linear regression analysis with two options: (1) categorizing average hours of sleep received each night into a variable based on tertiles with the 1st tertile (i.e., the least number of sleep hour) as the reference group; and (2) treating average hours of sleep received each night as a continuous variable in the regression model. Please comment on the Pros and Cons of each option. (25%)
3. Suppose researchers at a prenatal clinic are interested in the relationship between maternal depression (outcome variable) and alcohol intake during pregnancy (exposure variable). In order to test this relationship, the researchers gathered information about a simple random sample of participants and included information regarding maternal age and BMI as potential confounders in the regression model. The following represents a computerized output testing the significance of the model.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	2.89530	0.96510	6.64	0.0002
Error	655	95.25341	0.14543		
Corrected Total	658	98.14871			

Root MSE	0.38135	R-Square	0.0295
Dependent Mean	0.18209	Adj R-Sq	0.0251
Coeff Var	209.42272		

- (1). What can we say about the relationship between alcohol intake during pregnancy and maternal depression after adjusting for maternal age and BMI ? (5%)
 - (2). Write out your null and alternative hypotheses for the ANOVA procedure. (10%)
 - (3). Interpret the R-Square statistic in this example. (10%)
4. Please briefly answer each of the following questions:
- (1). Suppose that in a population of 100 people, 30 die. The risk of death can be calculated as 30/100. What is missing from this measure? (5%)
 - (2). Can we calculate a rate for the data in question 4-1? If so, what is it? If not, why not? (5%)
 - (3). Eventually, all people die. Why should we not state that the mortality rate for any population is always 100%? (5%)
 - (4). If incidence rates remain constant with time and if exposure causes disease, which will be greater, the risk ratio or the rate ratio? and why? (5%)
 - (5). Why is it incorrect to describe a rate ratio of 10 as indicating a high risk of disease among the exposed? (5%)