

Psychology 205:Research Methods in Psychology

Questions given in Spring, 2002 Mid Term Exam – 1

For each question, answer in the space provided. Use complete sentences but do not feel that you need to fill the page. (That is, short answers are appropriate.)  
The number of points each question is worth is indicated to the left of each question.

The first few questions reflect information discussed in class and in the text. Please answer each with short phrases or a few sentences.

**2 pts.** 1) What is a weakness of correlational research that can be overcome using experimental methods?

**2 pts.** 2) What are the two types of definitions used by researchers? Give one example of each.

**2 pts.** 3) Total variance in a set of data can be split into two main parts. List and briefly describe each:

**2 pts.** 4) A procedure used to analyze and integrate the results from a large set of individual studies is known as:

**4 pts.** 5) List the four different scales of measurement in order from simplest type of scale to the highest level of measurement

**2 pts.** 6) The reliability of a test can be described as the following ratio:

**2 pts.** 7) List three ways of increasing the reliability of behavioral measures

**2 pts.** 8) What is validity

**2 pts.** 9) To have construct validity, a measure should also have these two types of validity:

**2 pts.** 10) Researchers distinguish between these two kinds of criterion validity

**4 pts.** 11) Define independent and dependent variables. Provide an example of each.

**4 pts.** 12) List one benefit and one drawback of a within-subjects design.

**4 pts.** 13) Which is worse, confound variance or error variance? Explain

**3 pts.** 14) What is an interaction?

**4pts.** 15) Scott the auto mechanic wants to know which of two different brands of motor oil will make a car easier to start in a cold winter morning. He designs an experiment to find out, in which the number of seconds until the engine starts is the dependent measure. Scott has 1 (one) car. On each of 10 different mornings, Scott fills his car with brand A motor oil. Then he tests to see how long it takes to start. After waiting for the engine to cool completely, he empties out the brand A motor oil and fills his car with brand B motor oil, then tests it again. (This question does not require any knowledge of cars—this is a question about design).

What is wrong with this procedure?

If he has only 1 car, is it possible for him to determine which is the better motor oil? How could this be done?



**5 pts.** 16) A professor believes that taking a computer based statistics course leads to better learning than normal class room lecture techniques. Of 100 students who sign up for statistics, she randomly assigns 50 to the computer course and the other 50 to the normal lecture course. The computer course is conducted entirely over the web and students do not need to come to class except for the final exam. The class room course meets three times a week for 10 weeks and has two mid terms and a final exam. The professor compares the performance on the final exam for the two courses (she uses the same final) and finds that the scores are:

|      | Computer Course | Standard Course |
|------|-----------------|-----------------|
| N    | 45              | 30              |
| Mean | 85              | 80              |
| S.D. | 10              | 10              |

$t(74) = 2.12$   $p < .05$ . That is, the scores on the final are significantly higher for the computer course than for the standard course.

From these results the professor decided that the instruction in the computer course was better and that students learned more statistics.

a) Do these conclusions follow?

b) Can you think of another explanation of the difference between the two groups?

**5 Points** 17) An investigator does a study on proofreading for typographical errors. There are three levels of the independent variable (three conditions), distinguished by the number of errors per line. In one case there is one error per every 5 lines, in another one error per every 10 lines, and in the third one error per every 20 lines. The three typescripts are exactly the same except for the typographical errors inserted. Random groups are used and the subjects are instructed to go through the script as rapidly as possible, identifying all errors with a slash. For the dependent variable (response measure), the investigator uses the mean number of failures to detect an error. For the three levels, these values are 5.0, 4.9, and 5.1. These do not differ reliably. The investigator concludes that the error rate is independent of the number of to-be-detected errors. This is probably an inappropriate conclusion. Why?

**5 Points** 18) An investigator set about to get a definitive answer on progressive changes in learning as a function of practice (learning-to learn) for free-recall lists. He decided to study learning-to learn as a function of 2, 4, 6, 8, and 10 successive lists. Five different random groups were used, the subjects being assigned to the five conditions (2, 4, 6, 8, or 10 lists) by a block-randomized schedule. In terms of method, procedure, balancing of lists, and so on, the experiment was immaculate. However, we would have to say it was a very inefficient way to obtain the information he sought. Why?

What is a better way of doing this study?

**5 Points** 19) An investigator developed the idea that an excess of a certain chemical in the brain during infancy produced permanent mental retardation. To gather evidence germane to this notion, he used two groups of 15 newborn monkeys each. The 30 babies were assigned to the groups by a block-randomized schedule. One group, the C Group, was nursed by the mother monkeys, and it is assumed that the investigator could control the amount of milk consumed. The other group, the E Group, was fed by bottle, but the milk was of exactly the same kind and of the same amount as that received by the naturally-fed monkeys. Of course, the baby monkeys in the E Group were separated from the mothers so that they would not nurse from them and thereby get more milk than those in the C Group. The independent variable X was given to the E Group by including the chemical in the nursing bottle. Tests of mental development were made on both groups at various points in time, even far beyond the nursing period. At every point of testing the monkeys in the E Group were found to be inferior to those the C Group. Such a finding would support the idea prompting the experiment.

a) The independent variable is confounded. How?

b) Should it be concluded that X is not responsible for the observed differences?

**10 pts.** 20) As the first experiment, we replicated the 2<sup>nd</sup> study by Roediger and McDermott.

a) What were the theoretical variables of interest?

b) how were they operationalized?

c) What specific hypotheses were we testing?

d) Why did they use a between subjects test of their hypotheses?

Consider the first and second study by Roediger and McDermott. Briefly discuss what was learned from study 1 and why it was then necessary to do study 2.

**8 points.** 21) A developmental psychologist believed that happiness increases with age among married couples. She collected data from two sets of married couples: couples who were 40-50 years old and had been married for at least 15 years and couples who were 50-65 years old and had been married for at least 25 years. All couples has been married only once. She found that the older couples reported more positive affect and less negative affect than did the younger couples. She concluded from this that age does indeed lead to happiness.

a) There is a serious artifact in this study that makes the conclusions questionable. What is it?

b) Can you think of a way to get around this problem? (Yes or no is not an answer!)

**8 points:** 22) Many developmental psychopathologists claim that harsh parenting causes psychopathology in adulthood. A recent study reports evidence in favor of this hypothesis: Depressed college students report that their parents were much harsher in the way they treated them than do non-depressed students.

a) There are at least two alternative explanations for this effect that are inconsistent with the hypothesis. What are they?

b) How would you design a study to test the hypothesis appropriately?

**8 pts.** 25) A prominent pharmaceutical company wishes to test the effects of a new allergy drug, Drug X. They gather a sample of people with a certain minimal allergy level and randomly assign them to one of two conditions: 100 mg of X and a control group that was given no drug. They discovered that the subjects in the drug condition had a significant reduction in allergy symptoms but those in the control group did not. They concluded that Drug X is effective in fighting allergies and should be sold to the public.

Do the conclusions follow

How could this study be improved? Explain.

**8 pts.** 26) An experimenter wanted to test whether rats treated with Vitamin C were healthier than rats that received no Vitamin C. In order to test his hypothesis that Vitamin C would be beneficial to rats' health, he bought 40 random rats and placed them in a box. There were two conditions, a Vitamin C condition in which rats were given Vitamin C for several weeks and a control condition in which rats were not given Vitamin C. The researcher assigned rats to each condition by reaching into the box and randomly picking out rats. The first 20 rats picked from the box were assigned to the control condition, and the remaining 20 were assigned to the Vitamin C condition. After several weeks, the researcher discovered that the rats that received Vitamin C were on average healthier than the control rats. He concluded that Vitamin C was beneficial to rats' health.

Does the conclusion follow?

How could this study be improved? Explain.