## **EXPERIMENTAL DESIGN**

True Experiment  Independent Variable	
Independent Variable	
Independent Variable	
Task (Variable) Manipulation	
Tubk (Variable) Manipulation	
Instructional (Variable)	
Manipulation	
Situational (Variable)	
Manipulation	
Manipulation Checking	
	• • • • • •
•••••••	• • • • • • •
Dependant Variable	
1	
Control Condition	
Between Subject Designs	

Randomized, Posttest only, Control Group Design

<u>wnat causes wnat?</u>	
Randomized, Pretest-Posttest, Control Group Design	
Simple Subject Assignment Strategies	
Simple Random Assignment	
	• • • • • • • • • • • • • • • • • • • •
Matched Random Assignment	
Natural Pairs	
Within Subject Designs	
Simple Repeated Measures	
Shirple Repeated Wedsures	
Countarbalancina	
Counterbalancing	•••••
	• • • • • • • • • • • • • • • • • • • •
	•••••
Partial Counterbalancing	
Randomized Blocks	
Order Effects	
Practice (Transfer) Effect	
Practice (Transfer) Effect	
Fatigue Effect	

PSY 767 Research Methods

PSY 767 Research Methods What causes what?	
Carry-Over Effect	
Sensitization Effect	
Sensitization Effect	
Adaptation Effect	
Factorial Designs	
Factors	
ractors	
Main Effect	
Interaction	

## **Concepts You Should Master.**

1. How does the concept of validity apply to the manipulation of the independent variable?

2. How does the concept of reliability apply to the manipulation of the independent variable?

3. How does the concept of demand characteristic relate to the placebo effect?

- 4. How might the concept of sampling apply to the choice of levels of an independent variable?
- 5. What are the benefits of using multiple stimuli to operationally define the independent variable? How **might** multiple stimuli offset the possibility of stimulus confounding?

6. How might an extraneous variable confound an experiment?

7.	How would a factorial design help to identify the influence of a moderator variable?
8.	What is the benefit of repeated measures designs? Why would you use them? What are the drawbacks?
9.	Be prepared to identify situations in which each of the confounding problems may have contaminated the interpretation of an experiment.
10.	Be able to identify the possible existence of a main effect or interaction effect when given a graph or data from a factorial design.
11.	Be able to identify and describe a factorial design given a verbal description of the design.

- 12. For each of the following 1) Identify what type of study was done and 2) critically evaluate it in terms of overall design and possibility for confounding, and 3) how could the study be strengthened.
  - a. Nick L. Beer is interested in the reinforcing level of various types of cheese on mice. Nick randomly divided the mice into three groups. One morning Nick took group A into the lab and evaluated the time it took the mice to learn a maze using American cheese as a reinforcer. In the afternoon Nick conducted the same analysis with group B using Swiss cheese, and concluded the study with Roquefort cheese in the evening. Nick found that the mice learned faster with the Roquefort cheese.
    - i. Design
    - ii. Evaluation
    - iii. Recommendations for strengthening
  - b. A. C. Gull was studying equilibrium in sea birds with a specific focus on terns. He thought that giving measured doses of THC (from, of course, marijuana) and observing their flight patterns would give some insight to the problems of equilibrium in three dimensional space. He filled out mountains of forms, set up a lab with a ready supply of terns, and proceeded with the study. After a year of diligent work, groveling monthly before the thesis committee to get his stipend, and living with drugged terns, A. C. completed the study.

Gull delivered the 247-page report, complete with charts and graphs, to the thesis committee. This august body peruses his study, asking penetrating questions and reducing our student to jell-o. Finally, the committee chair rose. The light reflects off her steel rimmed glasses as she stared down at our student.

"There is a lot of good work here," she said. "But we can't accept this report. You have detailed marvelously the effects of THC on terns but you forgot one essential step. What did she say?<sup>1</sup>

<sup>&</sup>lt;sup>1</sup>The answer can be found on the bottom of the next page.

- c. Pam D. Monium got a contract to study the influence of sound on motor skills of people assembling computers. Pam had a group of volunteers to listen to three five minute music excerpts in this order: punk rock, elevator music, and classical music. After listening to the music the participant was asked to assemble a dummy computer. Pam measured both the assembly time and the number of mistakes. Pam found that the number of mistakes and assembly time was significantly lower after people heard the classical music.
  - i. Design
  - ii. Evaluation
  - iii. Recommendations for strengthening

13. Frank N. Stein has come to you with an idea for evaluating the 'fright factor' in Halloween masks. Stein's idea is that people are more shocked by mutilated or deformed human-looking faces than they are by bizarre non-human faces. He has designed a study in which subjects are seated in a small darkened room facing a window. At five second intervals a person wearing one of three masks is illuminated on the other side of the window. The masks, illuminated in the following order, are: Snow White, a maimed human face with maggots wiggling from the nose and blood dripping from one empty eye socket, and the alien from E.T. The dependent variable is the person's heart rate as measured by an electronic heart monitor placed on the subject's chest.

What recommendations do you have for improving this study?

<sup>&</sup>quot;You have no control group." Our student turns pale and says, "You don't mean..." "Yes" she said, "I'm afraid so. You left no tern unstoned."

## **Application**

- 1. The following questions refer to Morris & Sarll's article *Drinking Glucose Improves Listening Span in Students Who Miss Breakfast*. (Patten Article 16)
  - a. Introduction.
    - i. What is the major research question being studied here?
    - ii. What is the research hypothesis? Is this a directional or non-directional hypothesis?
  - b. Method.
    - i. What kind of design is this?
    - ii. Is this a field or laboratory study?
    - iii. How was the independent variable manipulated?
    - iv. What was the dependent variable?
    - v. Why were all participants led to believe that they might have to give blood samples?
    - vi. Why do you think that the *Listening Span Test* was administered via tape recorder?
    - vii. What did the authors do to ensure that the participants attended to the sentences in the *Listening Span Test*?
  - c. Results.
    - i. What were the major findings?
  - d. Discussion
    - i. How did the authors interpret the results?
    - ii. On the basis of this article, would you recommend that students eat Life Savers while studying/cramming for a test?

- 2. The following questions related to Fitzgerald, Jordan, & Hart's article *Preliminary Evaluation of* an Abstinence-Based Program for 7<sup>th</sup>-Grade Students from a Small Rural School District (Patten Article 21).
  - a. What is/are the research hypothesis/hypotheses?
  - b. Method.
    - i. What kind of study is this?
    - ii. Was this a field or laboratory study?
    - iii. What was the independent variable?
    - iv. What was the dependent variable?
    - v. The authors call this a 'pre-experimental design'.
      - (1) What kind of design did they use?
      - (2) What was missing that kept this from being a true experimental design?
      - (3) How might this missing element affect the conclusions that could be made?
  - c. Results.
    - i. What statistical analysis was used to assess the second hypothesis? What was the conclusion?

- d. Conclusions.
  - i. Comment on the internal validity of this study.
  - ii. Comment on the external validity of this study.
  - iii. How would you redesign this study?