

PSYC 520: Research Design and Inference I, Fall 2009
Syllabus

Lecture: Wednesday, 6:00 pm to 9:00 pm
Instructor: Dr. Jonathan Pettibone **Email:** jpettib@siue.edu **Phone:** 650-3346
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Office Hours: Monday & Wednesday, 11:00 am to Noon

T.A.: Lisa Pellegrin **Email:** lpelleg@siue.edu
Office: AH 0319 **Office Hours:** Monday 9:00 am to Noon; Thursday 1:00 pm to 4:00 pm

Required Materials:

Gravetter, F. J., & Wallnau, L. B. (2009). *Statistics for the behavioral sciences (8th ed.)*. Pacific Grove, CA: Wadsworth-Thompson Learning.

Stern, L. D. (2009). *A visual approach to SPSS for windows: A guide to SPSS 17.0 (2nd ed.)*. Allyn & Bacon.
Inexpensive hand calculator & USB Memory Key.

General Course Sequence Overview & Teaching Philosophy: Psychology is equal parts theory and practice, with both elements built upon a strong empirical philosophy. Before we implement a new therapy, develop a new program to reduce delinquency in young children, determine the best way to evaluate employees, or state a new theory of cognitive functioning, we test it. If we do not do the actual research ourselves, we read about what others have done. No matter what type of psychology you will pursue, the understanding of this empirical basis will be of great use, as it is the core that lies at the heart of our discipline.

The intent of this sequence of courses is to teach you this empirical philosophy, and to give you the tools you need in order to explore human behavior. What this sequence is not intended to do is to force you to do all of the statistical procedures we will cover by hand, nor make you memorize a large amount of complex and befuddling formulas (insert big sigh of relief here!). There is never a moment in which, as a psychologist, you will not have access to a textbook containing instruction or a computer program to assist your calculations. Instead, I wish to focus on teaching theory and understanding of science and inferential statistics. Armed with this, you should be able to tackle most problems, and quickly learn those that are new to you.

Semester Breakdown: Empirical research in psychology has traditionally taken one of two forms: observational and experimental. Observational methods are those that seek to understand behavior by observing the relationships between variables in their natural environment. Experimental methods are those that directly manipulate a feature of the environment or organism and measure the results in the search for causality. Likewise, statistics have also traditionally been broken down by this division. Analysis of Variance based procedures are most often associated with an experimental approach, and regression/correlation procedures are associated with observational, despite the fact that they are based on the same underlying model. The first semester (520) will focus on methods and statistics normally associated with the experimental approach. The second semester (521) will focus methods and statistics normally associated with the observational approach, as well as additional advanced techniques of interest to both.

Lab/Lecture: Our three hour class will normally be broken up into two parts: A lecture section and a computer lab section. During the lecture section we will cover the theory behind and the explanation of the inferential statistics you need to understand the results of psychological research studies. There will be some hand calculation (more so the first semester), so you need your textbook and your calculator every day. There will also be near weekly homework to help reinforce the topics covered. Lab sections will follow lecture after a 10 to 15 min. break and will focus on the use of SPSS 17.0 to calculate the statistics used in class. There will be separate homework for the lab portion of the class.

Learning Objectives:

1. Learn the strengths and weaknesses of different quantitative research designs.
2. Learn how to calculate and choose the appropriate descriptive and inferential statistics for your quantitative research design.
3. Learn how to interpret and draw conclusions from the results of your research.
4. Develop the ability to critique the research produced by yourself and others.
5. Become proficient in the use of SPSS for the computer aided calculation of descriptive and inferential statistics.

Grading	
Type	Points
Exams (3 @ 100 pts. Each)	300
Class Homework (7 @ 10 pts. Each)	70
Lab Homework (4 @ 10 pts. Each)	40
Research Article Critique	30
Total	440

Final Grade: Your final grade will be decided as follows...

A: 440 to 396 points
 B: 395 to 352 points
 C: 351 to 308 points
 D: 307 to 264 points
 F: < 264 points

These cutoffs are absolute- there will be no rounding of final grades.

Exams: There will be three equally weighted exams. Exams will cover primarily lecture material and will involve both computational and conceptual sections. The conceptual section will be closed note/closed book and will primarily be multiple choice. The computational section will be open note/open book. It will focus on the computation AND the interpretation of statistics.

Class Homework: Homework for the class will focus on reinforcing the concepts and computational techniques that we learn in lecture. There will be a total of 8 homework assignments, and they are due at the beginning of class. Homework turned in after the first 10 min. of class will be considered one day late. I will drop your lowest HW grade (including a 0). If you do all assignments, you will receive EC in the amount of half of the credit of your lowest graded homework. These homework assignments may be done by hand.

These assignments will be graded primarily based on effort, rather than accuracy. This is intended to reward you for trying hard to master an anxiety-producing subject. However, all problems must be attempted, and a solution given to receive full credit. Full credit will still be received if your solution is incorrect, but incomplete answers will receive partial credit. For this system to work, all work must be shown.

Lab Homework: There are a total of 5 lab homework assignments, and they require the use of SPSS. These assignments will be graded on accuracy and are also due at the beginning of class. In general, your answers will follow APA format whenever possible. All output that was used in the creation of your answers should be provided. We will attempt to turn in your work over Blackboard to save you printing cost. Your assignment should typed in Microsoft Word Format.

Research Article Critique: As you progress thru the semester, I want you to be on the look out for a peer reviewed, quantitative research article that used some of the methods and inferential statistics we cover in this class. At the end of the semester, you will turn in a one to two page guided review of the article that summarizes its results **in your own words** and critiques the validity of the research. Articles may be related to the topics you are covering in your other classes, but should not be assigned reading in them. They should be from journals that are found in PsycInfo. Further, this is an independent project- you may not work with other students or share articles. Feel free to come to your TA or myself with the article before you start your critique to make sure it is appropriate. You must turn in a copy of your article with your critique to receive credit, and your critique should follow APA format as much as possible.

Class Policies

Attendance Policy: As this class moves at a fast pace by necessity, missed classes will be very damaging to your success in learning the material. I consider your attendance in class to be mandatory- however, I will not take attendance. You are all adults, and I do not need to know when you miss class. If you need to miss class, go ahead, but take responsibility for your actions. Do not expect your professor to teach you everything you missed.

Late Work/Make up Exams: If any part of an assignment is turned in after the due date (beginning of class) without a pre-approved excuse, the grade for the entire assignment will be reduced by 25% for each solar day that it is late. To get preapproval for turning in an assignment late, tell your professor before the due date if, for example, you have surgery scheduled. You are responsible for computer failures, just as you would be if you were a working professional. It is your responsibility to back up all of your work so that none of it is lost, to store your files in safe places, to print things well before they are due, and turn things in on time. Computers and printers let everyone down at inconvenient times, so if you want to be successful, anticipate and prepare for these problems so you're not caught off guard.

Missed exams can be made up during the final exam period, where you will take both the third exam and the one that you missed. There are no exceptions to this policy.

Academic Courtesy: Be courteous during class. Be quiet when your classmates or I am speaking, and we will be quiet when you are speaking. Please do not engage in any behaviors during class that you would not want to see if you were teaching. The nature of a class like this entails that all students will be board at times and frustrated at times. Please do not let that interfere with your classmates. When you are board, others will be frustrated, so please show them the respect you would expect if you were the one who was frustrated. If you have any issues with the class, please come to my office to speak to me. I often do not know there is a problem unless you tell me.

Academic Honesty: Although I encourage collaboration on homework, your final product must be written alone. Please get together to work out problems but write the answers yourself. You may not share any written product or computer file with other students. It is **never** appropriate to turn in a photocopy of another students work as your own.

Plagiarism: Plagiarism includes either presenting someone else's words without quotation marks (even if you cite the source) or presenting someone else's ideas without citing that source. Sources may include published research articles, but they also include other students in the class. If you plagiarize, your instructor cannot evaluate your understanding of the topic. When paraphrasing from another source, at the very least the student should change the wording, sentence syntax, and order of ideas presented in the paper. Ideally, the student will integrate ideas from multiple sources while providing critical commentary on the topic in a way that clearly identifies whether words and ideas are those of the student or are from another source. University policy states that "Normally a student who plagiarizes shall receive a grade of F in the course in which the act occurs. The offense shall also be reported to the Provost."

(<http://www.siu.edu/POLICIES/1i6.html>). The University policy discusses additional academic sanctions including suspension and expulsion from the University. To insure that you understand how to avoid plagiarism, we encourage you to review the information on plagiarism provided on the Department of Psychology web page at <http://www.siu.edu/PSYCHOLOGY/plagiarism.htm>.

Cell Phone Policy: Cell phones are not allowed in class because of the distractions that they cause, as well as the potential for cheating. Please note that this includes "texting" as well as all other uses. Texting implies that you have something else more important to do, or somewhere else that you would rather be. This may very well be the case- this is a statistics class after all. If this is true, please leave the class to use your phone, and accept that you are responsible for any material missed. Otherwise, please turn all cell phones off at the beginning of class. Even phones on "vibrate" can disturb other students. If you must have your phone on for emergency reasons, no problem, but please notify me before class. **If your cell phone rings or vibrates during an exam you will fail it, no questions asked.**

Laptop Policy: Laptops may be used in class if their sole purpose is for note taking or for running SPSS during labs. If you are found to be using a laptop for any other purpose, the entire class will loose laptop privileges for the remainder of the semester. Once again, if there is somewhere else you would rather be, go to it. I would rather you enjoy that activity than be stuck in class doing both things poorly. Honestly, both this and the cell phone policy should be common sense in an academic environment, and I apologize for the need to even mention them. I know that the majority of students use both products responsibly.

General Note: There are exceptions to every rule, but they are fare more likely to be made if you notify me in advance (a priori) rather than after the fact (post hoc).

Departmental policy on Incomplete grades, pass-no pass option, and withdrawal: It is the student's responsibility to officially withdraw from a course by the dates set by the University if the student is not intending to complete the course. Students who do not withdraw and have not completed the course will receive an Unauthorized Withdrawal (UW). Only under special circumstances a faculty member may agree to give a student an Incomplete (INC) grade in order to allow the student to complete the remaining work for the course not later than the end of the following semester. An INC is never automatic but must be approved by the instructor. If an instructor agrees to give a student an INC grade, the instructor and the student will fill out a form (Memorandum of Incomplete Grade) indicating why an INC is being given. One copy of the completed form will be given to the student, one copy will be given to the instructor, and one copy will be kept by the Department of Psychology secretary. If the work is not completed by the time specified on the Memorandum of Incomplete Grade form, the grade will be changed from INC to F.

Statement on Disabilities SIUE offers a range of resources to support students with disabilities. At SIUE every effort has been made to eliminate barriers to learning and help you reach your educational goals. If you are a student with a disability and wish to request accommodations, please contact Disability Support Services located in Rendleman Hall, Room 1218 (phone: 650-3726).

Tentative Schedule

Week	Class Topic	Reading	Lab Topic
Week 1	Intro to Graduate Statistics/Methods Review	Ch. 1	Intro to Graduate Statistics/Methods Review
Week 2	Descriptive Statistics	Ch. 2, 3, & 4	SPSS Basics, Entering & Saving Data, Modifying Data, & Defining Variables
Week 3	Z-Scores, Probability, & Sampling Distributions	Ch. 5, 6, & 7, 8	Statistics Viewer, Data Transformation, & <i>Frequencies</i> procedure
Week 4	Hypothesis Testing: Z test		Review
Week 5	Exam #1		
Week 6	Independent Measures t-test	Ch. 10	<i>Frequencies, Descriptives</i> and <i>Explore</i> procedures
Week 7	One-Way ANOVA	Ch. 13	ANOVA Cont.
Week 8	Post-Hoc tests & Planned Comparisons		<i>Independent Samples t-test</i>
Week 9	Effect Size & Statistical Power		<i>One-Way Independent Measures ANOVA</i>
Week 10	Advanced ANOVA: Assumptions & Dealing with their Violations		Review
Week 11	Exam #2		
Week 12	Related Samples t-test	Ch. 11	<i>Related Samples t-test</i>
Week 13	Repeated Measures One-Way ANOVA	Ch. 14	<i>One-way Repeated Measures ANOVA</i>
Week 14	<i>Thanksgiving Break- No Class</i>		
Week 15	Two-Factor Independent Measures ANOVA	Ch. 15	<i>Two-Way Independent Measures ANOVA</i>
Week 16	Two-Way ANOVA cont.		Review Research Critique Due
	Final Exam		

Class HW Assignments (Gravetter & Wallnau)

Due Date	Chapter	Problems
Week 3	2	16
	3	1, 2, 3, & 4
	4	5, 10 (Population), 24 (Sample)
Week 4	5	5
	6	8 & 20
	7	1, 4, 10, 22
Week 7	10	1, 3, 4, 5, 18 (two-tailed), 20
Week 8	13	2, 3, 4, 8, 9, 20
Week 10	13	19 (do Tukey's HSD & η^2), 26
	10	19
Week 13	11	1, 2, 4, 10, 12
Week 14	14	1, 2, 10, 18, 23
Week 16	15	1, 4, 5, 8, 14, 16, 21

Lab HW Assignments (Stern)

Due Date	Chapter	Problems
Week 5	4	4.1
	5	5.2
	7	7.1 & 7.3
Week 9	8	8.1 & 8.2
	9	9.2 & 9.3
	13	13.1 & 13.2
Week 10	14	14.1
Week 14	13	13.4 (1, 2, & 4)
	16	16.1
Week 16	15	15.4
	6	6.1, 6.2 & 6.5

Note: To be considered complete, all computer based homework must be submitted on Blackboard and contain all relevant files to the assignment (i.e. data, output, and a word file with your answers). Data files should be saved with your E-ID in the name, and output files should have a text box added to them with your name also.

Unless otherwise noted, your answers should be written up in APA style- simply providing output will not receive credit.

Date for these assignments may be found on BB or at http://wps.ablongman.com/ab_stern_visualapproach_2/

Guidelines for Experimental Research Critique (30 pts.)

Your review needs to have the following sections:

Introduction

In a paragraph or two, summarize the introduction of the article. Do not just copy the abstract- think about the type of information you would need to give as background if you were using this article in your thesis. End with a description of the author's main hypothesis.

Design & Measurement

In paragraph format, summarize the design of the study by including the following details:

1. Indicate the total number of participants in the study.
2. How many independent variables were there?
3. For each IV...
 - a. What was the construct that was measured?
 - b. Was it experimental or quasi-experimental?
 - c. How many levels (conditions) did each variable have?
 - d. How were the levels manipulated (experiment) or created (quasi)?
 - e. Were participants assigned to the conditions between-subjects or within-subjects?
4. How many dependent variables were there?
5. For each DV...
 - a. What was the construct that was measured?
 - b. How was the DV operationalized? (i.e. score on a survey, reaction time, blood pressure, ect.)
6. Based on their research design, do you feel that the internal validity of the study is strong? If so, say why. If not, say why.
7. Based on their research design, do you feel that the external validity of the study is acceptable? If so, say why. If not, say why.

Analysis

In paragraph format, summarize the analysis of the study by including the following details:

1. What was the inferential statistic(s) that was(were) used?
2. Were there any violations of statistical assumptions mentioned?
3. Do you suspect any violations that they did not discuss? If so, what?
4. Do you think they used the best possible inferential statistic? If not, what would you suggest?
5. How did they explore the nature of the effect? (i.e. what post hoc tests were used?)
6. How did they identify the strength of the effect? (i.e. what effect size measures were used?)
7. Based on the statistics used and the number of participants in the study, do you think the study had good statistical power?

After providing these details, summarize the nature of the effects of the study without using any actual data in your description.

Discussion

Interpret the validity of the researchers conclusions based on their results. Do their data convince you that their conclusions stated in the discussion are accurate? If not, state why. If so, state why.