Research Design & Analysis I — Spring 2015

W. Jeffrey Wilson
Psychology Department
Albion College

Contact Information

OFFICE: Olin 322
OFFICE HOURS: M, W: 10:30 - 11:30; R 2:00 - 3:00
& by appointment
Office phone: 629-0393; Home phone: 269-789-9169
wjwilson@albion.edu
campus.albion.edu/wjwilson

Books

- Gravetter, F. J., & Wallnau, L. B. (2013). *Statistics for the behavioral sciences* (9th ed.). Belmont, CA: Thomson Wadsworth.
- Schweigert, W. A. (2012). *Research methods in psychology* (3rd ed.). Long Grove, IL: Waveland Press.
- American Psychological Association (2009). *Publication manual* (6th ed.). Washington, DC: APA.
- (Recommended) Gravetter, F. J., & Wallnau, L. B. (2013). *Study guide for Gravetter/Wallnau's statistics for the behavioral sciences* (9th ed.). Belmont, CA: Thomson Wadsworth.

Required Materials:

You will need to bring a calculator to every class and lab meeting. The calculator must be able to perform basic arithmetic functions (incl. squaring, taking square roots), but ***you will not be allowed to use a graphic calculator on any quiz or exam***. If the calculator has keys labelled "Σ" or "Σ*x*," or "r" or "corr" it might make your life easier.

Course Description

Course is housed in a Social Science department.

Class meets in Olin 218 for "lecture" on M, W, & F 11:45 AM – 12:35 PM and in Olin 347 for Laboratory F 1:00 – 3:00 PM.

"Final Exam" time: Tuesday May 5, 8:00 – 10:00 AM. *You must attend!*

Some material in this syllabus has been taken verbatim or nearly so from the syllabi of my colleagues.

Prerequisite: Psychology 101 (grade of 2.0 or greater) or permission of instructor.

Course Objectives

In order to understand behavior and mental processes, psychologists conduct empirical research. In order for that research to yield meaningful information, studies have to be carefully designed and conducted, and the data gathered have to be analyzed in appropriate ways. We will therefore discuss different methodologies with an emphasis on descriptive designs, such as observational and survey methodology, as well as a variety of statistical procedures we can use to make sense of the data we gather (e.g., descriptive statistics, probability, Chi-square, z-scores, correlation). The four main course objectives are for you to learn (1) how to conduct your own psychological research; (2) how to analyze your own research data; (3) how to present your research to others both in writing and in speech; and (4) how to critically examine the research published by others.

At the conclusion of the course, the student will be able to
- Explain the concept of an operational definition.
- Describe the four different sorts of scales of measurement.
- Explain measures of central tendency and of variability (and explain which measures should/can be used for each scale of measurement).
- Explain the difference between correlational studies and experiments.
- Explain the concept of sampling error.
- Explain the difference between an alpha (Type I) and beta (Type II) error, and why we are concerned about these errors.
- Discuss the concept of null-hypothesis statistical inferential testing.
- Recognize ethical issues that must be considered in conducting research, and prepare a proposal that will indicate that the ethical concerns have been addressed.
- Design a correlational study that will elucidate a behavioral relationship.
- Collect, organize, and summarize behavioral data.
- Understand and construct graphs that illustrate correlations.
- Describe the meaning of *r*, the correlation coefficient, and understand how to calculate *r*.

Week	Topic	Reading	Assignment
1	Operational definitions	(GW: Ch 1; S: Ch 3)	
1	Scales of measurement	(GW: Ch 1; S: Ch 5)	
1–10	Ethical issues; IRB proposal	(S: Ch 2)	
2	Frequency distributions	(GW: Ch 2)	
2	Measures of central tendency	(GW: Ch 3; S: Ch 5, App A)	
3	Measures of variability	(GW: Ch 4; S: Ch 5, App A)	
3	Literature reviews	(S: Ch 4)	
3	z-scores	(GW: Ch 5)	EXAM 1
3–15	APA style for research papers	(APA Manual)	
4	Probability	(GW: Ch 6)	
4	Sampling error		
5	Central Limit Theorem	(GW: Ch 7)	
5	Correlation, experiments	(S: Ch 6)	LAB QUIZ 1
5–6	Correlational study	(GW: Ch 15, 16; S: Ch 5)	
6	Surveys & Observational Studies	(S: Ch 10, 11)	
7	Scatterplots	(GW: Ch 15, 16; S: Ch 5)	EXAM 2 DRAFT PAPER 1
8	Spring break!!!		
9	Hypothesis testing (α & β errors)	(GW: Ch 8; S: Ch 3)	PAPER 1 DUE Presentations!
9–10	r, correlation coefficient	(GW: Ch 15, 16; S: App A)	
10–11	χ-squared tests	(GW: Ch 17; S: App A)	IRB Proposal Due
11–15	Preparing and presenting a poster		
12	t-test	(GW: Ch 9, 10, 11; S: App A)	
13	Binomial and Sign tests	(GW: Ch 18)	EXAM 3 LAB QUIZ 2 Final Paper DRAFT
Exam	TUES May 5, 8-10 AM		Poster Presentation FINAL PAPER DUE

Table 1

Tentative schedule (This might change)

- Describe the meaning of *chi-squared* as it relates to both the test of independence and the test of relationship, and understand how to calculate *chi-squared*.
- Describe the meaning of the *t* statistic testing the difference between two means, and understand how to calculate it.
- Write a research paper in the style specified by the American Psychological Association.
- Prepare and present a poster describing a scientific study.
- Recognize both appropriate and inappropriate uses of statistical tests.

Grading

Your grade for this course consists of the following six components:

1. **3 in-class exams (200 points each)**

There will be 3 in-class exams during the course of the semester. Exams will be a mix of multiple choice, short-answer, and computation sections. Due to the nature of statistics, exams will be cumulative, although the bulk of each exam will focus on material during the immediately preceding section of the course. Exams will cover material from the texts, lecture, labs, and additional readings. Each student must take all three exams to pass the course. Make-up exams will only be given if the reason is beyond the student's control (e.g., illness) and can be documented (e.g., note from treating physician). A make-up exam has to be taken within one week after the original exam date; moreover, each student can only make up one exam during the semester—after that, each missed exam will receive a grade of zero.

2. **2 Lab quizzes (100 points each)**

Part of learning to analyze research data involves learning to use statistical software. The lab exams will assess your knowledge of how to enter, graph, and analyze data using SPSS. The lab quizzes will also cover other course material from lab, such as APA formatting, etc.

3. **4 Homework assignments (50 points each)**
Graded homework assignments will cover material covered in class. Each late day incurs a 5 point penalty. Late homework will not be accepted if it is handed in more than 2 days after the due date.

4. **4 Papers (400 points total)** You will be required to write two full papers in this class using APA format. Each full paper will require you to hand in a first (graded) draft along the way. Both papers will focus on your own research projects, the first of which will be a group observational study, the second of which will be an individually completed survey project. Each late day incurs a 10% penalty.

5. **2 Presentations (50 points each)** You will present each of the two research projects mentioned above with an oral and/or poster presentation.

6. **1 IRB Proposal (100 points)**
You will be required to get your individual survey research plan approved by Albion's Institutional Review Board (IRB) by submitting a research proposal. You will not be able to collect any data before you get IRB approval for your project. Your IRB grade will in large part be based on getting the IRB proposal completed and submitted on time.

Electronic Submission of Papers

The papers (rough drafts and final copies) must be turned in *both* as a printed copy and electronically. Submission of a printed copy ensures that the paper that I grade is formatted the way that you intend. There is no guarantee that formatting of an electronic version will look like what you expect (different versions of Word format things differently, for example). The printed copy must be turned in by the deadline. You can email the electronic version to me up to a day later, but its content must be the same as the printed version. Electronic files should be in LaTeX, text, or word-processing (e.g., Word) format. If you want to use a different format please talk to me about it ahead of time.

Please be aware that in the event of questions about academic honesty the e-paper might be submitted to an online service that checks for plagiarism, or portions of it might be used for Google searches. This should pose no problem for anyone unless you have plagiarized portions of the paper. Please do not do so.

Course Grade

Your grade will be based on the sum of the points that you earn on all of the assignments. This sum will be divided by the total number of points available (1600) to determine a weighted average. Then your grade for the course will be determined as indicated in the table.

Wghtd Ave	Grade	Wghtd Ave	Grade
90–100	4.0	70–73.33	2.0
86.67–89.99	3.7	66.67–69.99	1.7
83.33–86.66	3.3	63.33–66.66	1.3
80–83.33	3.0	60–63.33	1.0
76.67–79.99	2.7	< 60	0
73.33–76.66	2.3		

Disability Statement

If you have a disability and may require accommodations or modifications in class instruction or course-related activities, please contact the Learning Support Center (LSC) staff who can arrange for reasonable accommodations for students who provide documentation of their disability/condition. If you are presently registered with the LSC and have requested accommodations through the LSC for this semester, please plan to meet with me as early as possible to discuss the best way to implement these accommodations in this class. The LSC is located on the third floor of the Seeley Mudd library or call 517-629-0825.

Attendance

Attendance at class is expected. We will work through many examples in class; if you are not present to do this oyu will struggle on the exams. As you will learn from the first exam, material presented in class is important, and material presented in class will not always appear in the readings. If you miss class, it is your responsibility to find out what you missed, both in terms of content and announcements about exams, assignments, etc.

Attendance at the laboratory sessions is mandatory. You can not easily make up the laboratory experience, so your grade will suffer if you are not present. Laboratory sessions will expose you to material not presented in the lectures, and will be an opportunity to gain extensive experience (with guidance from me and from the Laboratory Assistant). Without the tools that you gain in the laboratory you will have great difficulty completing your reports on the two studies that you will conduct.

Albion College policy on attendance: "Regular attendance in all classes is expected. Every absence from class is inevitably a loss — usually one which can never be made up. A student has the responsibility to inform his or her faculty member, whenever possible in advance, of an absence due to serious or prolonged illness, and verification of absences due to emergency reasons, may be obtained from the Office of Residential Life."

Academic Integrity

Albion College policy, endorsed by you professor: "As an academic community, Albion College is firmly committed to honor and integrity in the pursuit of knowledge. Therefore, as a member of this academic community, each student acknowledges responsibility for his or her actions and commits to the highest standards of integrity. In doing so, each student makes a covenant with the college not to engage in any form of academic dishonesty, fraud, cheating, or theft. "

Academic Skills Center

THE ACADEMIC SKILLS CENTER, located in the Seeley Mudd Building of the Library, supports student success at Albion College through the Learning Support Center, the Quantitative Skills Center, and the Writing Center. The ASC also coordinates academic peer tutoring services and educational technologies for enhancing student learning. For information, visit the ASC website at http://www.albion.edu/asc.

Courtesy

Please realize that you are not the only person in the classroom. You and your classmates are here to learn, and there are ways of behaving that will facilitate this (and ways that will interfere). Please keep these suggestions in mind:

1. Arrive on time. If you arrive late please enter quietly and take a seat near the door.

2. Plan to remain attentive and seated until I dismiss you. If you know that you will have to leave early sit near the door and leave quietly.

3. **Cell phones should be off or silent during class. Texting or playing games takes your attention away from the material that you are learning; if you are using your phone I will ask you to put it away.**

4. You may use a computer in lecture for note-taking. In the laboratory you will use college computers for data entry and analysis. Facebook or other web sites are not necessary for note-taking; I suggest that you disconnect from the network while in class.

5. Talking (even quietly) with people near you distracts them and others nearby. Do not interfere with the opportunity for others to learn.

6. You do not have to be in class if there is somewhere that you would rather be. I am here to help you learn, and you and your classmates are here to learn. If your behavior interferes with this I will ask you to leave.

7. Please refer to my blog comments related to Staying on a Professor's Good Side (actual title relates to Graduate School, but it is all related) at campus.albion.edu/wjwilson/2012/10/10/thoughts-on-grad-school-admission/

A Final Note

If you find that you need assistance with the material presented in this course, or if you just want to talk about it, please see me. My office hours are listed above, but if you cannot meet with me at those times please make an appointment with me. I am on campus every day, often including weekends, and will find time to meet with you.