

**Psychology 203: Introduction to Statistics for Psychology
Bard College, Fall 2009**

LECTURE: Tuesday, Thursday 10.30-11.50 *Olin LC 115*

LAB SECTIONS

Attend your assigned lab section in Old
Henderson 101A

Section A: Monday 9:30-11:30

Section B: Monday 1:00-3:00

Section C: Monday 3:00-5:00

Instructor: Kristin Lane

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Office Hours: Tuesday 1.00-2.00; Wednesday

9.00-10.00, or by appointment

Course Assistants:

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TBA

Course Overview

From the course catalogue: This course provides an introduction to the concepts and methods of statistics and is aimed at helping the student to gain a fundamental understanding of the tools needed to understand and conduct research in psychology. Topics to be covered include frequency distributions and probability, descriptive statistics, simple correlation and regression, sampling distributions, t-tests and basic analysis of variance. The course will focus on the interpretation and communication of statistics, and we will work with the SPSS software package to analyze data. This course is the first of a two-course sequence in statistics and research methods that is required of all prospective psychology majors. The course is ordinarily taken in the first semester of the sophomore year, and the student should have at least one previous psychology course. Students must register for the lecture and one lab section, and plan to attend that lab section.

Lengthier description.

[S]TATISTICAL THINKING WILL ONE DAY BE AS NECESSARY FOR EFFICIENT CITIZENSHIP AS THE ABILITY TO READ OR WRITE.

– H. G. Wells, *circa* 1930

Have we arrived at the moment in time at which being able to think statistically is a requirement to be a good citizen? Perhaps; perhaps not. But we have almost certainly arrived at a point when being educated in the use (and, yes, misuse) of statistics is an advantage in navigating a data-rich world. Statistics are fundamentally a tool for answering questions, and they are the most powerful tool in the psychologist's toolbox. A fundamental grasp of statistics is essential to understanding the research you will encounter in your Upper College coursework, and to conducting your own independent research.

In this class, we will cover the conceptual and mathematical ideas underlying inferential statistics (those from which we can draw, as the name suggests, inferences). The course is intended to be a blend of both the theoretical (you should understand how statistical analyses work and why different ones are appropriate in different situations) and the practical (we will have practice conducting analyses in SPSS, a popular software package). In all cases, we will try not to lose sight of the fact that statistics in psychology are fundamentally a way of answering questions, and those questions should remain at the forefront of your mind throughout the course.

Materials

Aron, A., Aron, E., & Coups, E. J. (2009). *Statistics for psychology* (5th ed.). Upper Saddle River, NJ: Pearson/Prentice-Hall. (A, A & C below).

If you choose to use an older version of the textbook, page numbers will differ from those on the syllabus. Please check with a classmate to ensure you are reading the correct material for each session.

Approaching the reading: My suggestion for reading for this class is quite different from how you may be used to preparing for classes. I think it is most useful to skim the relevant material before lecture and to become acquainted with the big ideas. After the material is presented in class, I suggest then going back to read the chapter in close detail, stopping to work out the problems interspersed throughout the chapter.

Kirkpatrick, L.A., & Feeney, B.C. (2009). *A Simple Guide to SPSS, Version 16.0*. Belmont, CA: Wadsworth. (**K & F** below)

A calculator that can: add, subtract, multiply, divide, has an eight digit display, memory, and a key for $\sqrt{\quad}$ (X^2 is nice but not necessary). Graphing calculators and cell phone calculators are not permitted for exams. Be sure that you have a functioning calculator before the first exam!

Course packet. A course packet is available at the Bookstore. You should get a binder in which to keep all these materials, along with any additional handouts that are distributed in class or lab. You should bring the binder to each class. The binder will include:

- Additional readings (see schedule)
- Worksheets and handouts for lab sections
- Formulae and important tables
- A template of the material I will present in class. I suggest that you take notes on these sheets, which will have some information already included (such as the data that we're working on) and will leave you free to digest the material and take thoughtful notes rather than scrambling to get all of the numbers or figures copied down.

Lecture slides. Templates of my slides will be included in the course packet. Approximately one week prior to each exam I will post the full set of slides that are relevant to the material on the upcoming test to Moodle.

Moodle. We will use a Moodle course site to share information and thoughts. Make sure you add the class on Moodle – we'll sign up together in lab during the first class.

Policies

Attendance. Attendance will be noted but your grade will not be formally penalized for missing class. However, because of the nature of the material, it is highly likely that absences will incur a *de facto* penalty come exam time, because it is difficult not to attend class and do well on the tests. This class moves at a rapid pace and material that is missed due to absence will not be repeated in lecture. Similarly, office hours will not be used to replicate the class lecture.

We are in a very crowded space: Late arrivals are disruptive to the class as they come in, look for a seat, and make their way to it. Consistent patterns of lateness will be addressed and potentially penalized. Please be on time.

Plagiarism. Exams and the written paper are to be completed independently. The optional homework assignments may be worked on with peers. Study groups are an excellent way to learn material, but take care to ensure that by the end of your group sessions, you can respond to the homework questions independently.

Cell Phones. Please turn off all cell phones before class.

Late Assignments. Late assignments will immediately lose 10% of their grade, and another 5% for every additional day late.

Submissions. You will submit your paper **and some of the lab exam results** via Moodle. Please make sure you are comfortable submitting something before the first midterm – you'll be under enough cognitive load to be encountering it for the first time.

Assessment

N.B. If you need a special accommodation for the exams or any other aspects of the course, please speak with me after the first class.

Midterm exams (3 midterm exams, 19% each). Non-cumulative

Final exam (23%). Cumulative

Each exam will be comprised of two parts: an in class-written exam that will present an opportunity to show mastery of the underlying concepts and theories, and a practical exam that will allow you to demonstrate your ability to perform and interpret the statistics we have discussed. Written exams are closed-book; lab exams are open-book, open-note, open-everything-but-another-person. For the three mid-term exams, you may bring *one* 4"x6" index card with notes. For the final exam, you may bring *one* 8 ½ x 11" sheet of paper with notes.

I want to leave room to reward improvement over the course of the semester, and to lessen the unfortunate effect of a bad day; at semester's end I will calculate your grades in the following alternate way:

- Drop your lowest midterm
- Count the final as 42% of your final grade (the final *plus* a midterm)
- You will receive the higher of the two grades
- If you miss a midterm, your grade will be calculated in the alternate fashion: that is, there are no make-up exams for the mid-terms
- You don't need to actively take this option – I'll do the calculation both ways at semester's end and will use whichever calculation is more favorable to you

NOTE: THE FINAL EXAM IS THREE HOURS ON A SATURDAY. PLEASE PUT IT IN YOUR CALENDAR RIGHT NOW AND LET ME KNOW IF YOU HAVE A CONFLICT

Final paper (10%).

The final paper is your opportunity to put the analytical skills that this class is designed to develop to use: In this paper, you will critique the results section of a published paper. More details are below.

Group project (10%).

You will complete a small group presentation. Details are at the end of the syllabus.

Problem sets (Self-assessment).

I will provide problem sets for each chapter: these will not be graded, but will be an opportunity for you to assess your mastery of the material. The textbook has many, many more questions with answers in the back. You should do as many as it takes to feel comfortable, and feel free to ask me for even more!

Grade Distributions

I reserve the right to change the grading scale ONLY in a way that will help you – that is, the cut-off for the A-range could drop to (for example) a 88%, and other cutoffs would change accordingly. I will never change the grading scale in a way that would make it more difficult to get a higher grade. Plusses and minuses will be assigned at the top and bottom of each range.

A-range	90-100%
B-range	80-90%
C-range	70-80%
D-range	65-70%
F	Below 65%

Schedule

(N.B. It is more important to cover material thoroughly and make sure the majority of the class understands it before proceeding to the next session. The schedule maybe adjusted to move more quickly or slowly as needed, but it is unlikely that exam dates will change.) AAC = Aron, Aron & Coups; K&F = Kirkpatrick & Feeney; R = in reader

Date	Topic	Reading	
31-Aug	Monday	Introduction to the course, SPSS, and Excel	None
1-Sep	Tuesday	Introduction; Basic concepts	AAC:Chapter 1 AAC: pp. 83-88; SKIM bottom p. 94-95
3-Sep	Thursday	Central tendency and variability	AAC:Chapter 2 R:The Median is not the Message
7-Sep	Monday	Descriptive statistics in SPSS; Displaying data	KF:Chapters 1-6 R: <i>Driving While Black: A Statistician Proves that Prejudice Still Rules the Road</i>
8-Sep	Tuesday	z-scores and probability	AAC:pp. 67-83
10-Sep	Thursday	z-scores and probability	AAC:pp. 82-93
14-Sep	Monday	z-scores in SPSS; More on Graphing; probability lab	R: <i>The Bell Curve: What Happens When Patients Find out How Good Their Doctors Really Are</i>
15-Sep	Tuesday	Introduction to Hypothesis Testing	AAC:Chapter 4 through p. 118
17-Sep	Thursday	Introduction to Hypothesis Testing	AAC:p. 119-128
21-Sep	Monday	LAB EXAM 1	
22-Sep	Tuesday	EXAM 1	
24-Sep	Thursday	Testing Hypotheses with Means of Samples	AAC:Chapter 5
28-Sep	Monday	More on Hypothesis Testing; Group Projects	
29-Sep	Tuesday	Testing Hypotheses with Means of Samples	
1-Oct	Thursday	Type I and Type II Errors	AAC:Chapter 6
5-Oct	Monday	Group Projects	
6-Oct	Tuesday	Power and effect size	
8-Oct	Thursday	Introduction to t-tests : t-tests for a single sample	AAC:Chapter 7
12-Oct	Monday	NO CLASS - FALL BREAK	
13-Oct	Tuesday	NO CLASS - FALL BREAK	
15-Oct	Thursday	Introduction to t-tests: t-tests for dependent means	
19-Oct	Monday	t-tests for a single sample and dependent measures in SPSS	KF: Chapters 7 & 9

20-Oct	Tuesday	t-test for independent means	AAC:Chapter 8
22-Oct	Thursday	t-test for independent means	
26-Oct	Monday	t-test for independent means in SPSS	KF: Chapter 8
27-Oct	Tuesday	Review/ Catch up	
29-Oct	Thursday	EXAM 2	
2-Nov	Monday	LAB EXAM 2	
3-Nov	Tuesday	One-way ANOVA	AAC:Chapter 9
5-Nov	Thursday	One-way ANOVA	
9-Nov	Monday	One-way ANOVA in SPSS	KF: Chapter 10
10-Nov	Tuesday	Factorial ANOVA	AAC:Chapter 10
12-Nov	Thursday	Factorial ANOVA	
16-Nov	Monday	Understanding Interactions; Factorial ANOVA in SPSS	
17-Nov	Tuesday	Chi-Square Goodness of Fit	AAC:Chapter 13
19-Nov	Thursday	Chi-Square Test of Independence	
23-Nov	Monday	Chi-Square in SPSS	KF: Chapter 17
24-Nov	Tuesday	Correlation	R:Correlational Methods and Statistics up to p. 125
26-Nov	Thursday	THANKSGIVING - NO CLASS	
30-Nov	Monday	LAB EXAM 3	
1-Dec	Tuesday	EXAM 3 (NOTE: THIS EXAM WILL NOT INCLUDE CORRELATION)	
3-Dec	Thursday	Regression	R:Finish Correlational Methods and Statistics; "Advanced Correlational Techniques: Regression Analysis"
7-Dec	Monday	Correlation and Regression in SPSS	KF: Chapters 14 & 15
8-Dec	Tuesday	Regression	
10-Dec	Thursday	Review/ Catch up	
12-Dec	Saturday	FINAL WRITTEN EXAM	
14-Dec	Monday	FINAL LAB EXAM	
15-Dec	Tuesday	No class	
17-Dec	Thursday	No class	

Paper Review Assignment

In your final paper, you will analyze the data analysis reported in a published paper posted on Moodle. You will use your statistical skills to analyze the presentation and analysis in a published paper. This assignment has three primary goals.

1. *Be a Consumer!* In class and on exams, you have the opportunity to show that you understand statistics (on the written tests) and can use this knowledge on primary data sets (on the lab tests). Most often, however, you (and most psychologists) will be a consumer of statistic who reads reports of others' research. In reading these articles, it is crucial to understand and evaluate how the conclusions were derived, and be able to evaluate independently whether you accept their claims. On this assignment, you will be an active (and somewhat skeptical) reader, and communicate what the reader attending to the data with a critical eye would say about the paper.
2. *Simulate the Peer Review Process.* Peer review is the primary mechanism by which papers in Psychology are published. It is the 'gatekeeper' of the academic world, and aims to ensure that published work is consistent with the accepted standards of psychological research. In the typical case, a paper is submitted to a journal. One of the journal's editors solicits reviews (usually anonymous) of the paper from experts in the field, and asks for a recommendation about whether or not the paper ought to be published. In addition to this recommendation, the goal of a review is to help improve the paper – either for final inclusion in that journal, or to strengthen it for submission to another outlet. This process is a crucial responsibility of the professional researcher, and this assignment will give you a flavor for how this process works.
3. *Prepare you for Moderation.* Psychology moderators write a paper that offers "a summary and critical evaluation of an article taken from a psychology journal." Part of your analysis should focus on the appropriateness of the analyses given: 1. the hypothesis being tested, 2. the study design, and 3. features of the data set. This assignment will prepare you for Moderation Saturday!

Assignment

You will critique the article in your reader: the analysis will focus on the results section and reporting of the results. In 3-4 pages, you should:

1. **Briefly** (one paragraph) summarize the research goals and method. Assume the reader is a psychologist unfamiliar with the paper.
2. Summarize analyses conducted. Be sure to state the null hypothesis (or hypotheses) even if the paper does not do so explicitly.
3. The bulk of the paper will be spent on your critique. What you choose to focus on is up to you, but some suggested directions are:
 - a. *Analyses.* Were the analyses appropriate – given their data, would you have conducted different analyses on these data?
 - b. *Presentation.* Was the presentation of the results clear? Could the paper have benefited from other – or different – tables or figures that would have made the findings more clear? Were any figures or tables accurate representations of the findings?
 - c. *Inferences.* Are the conclusions drawn from the analyses reasonable?

Other Guidelines

The paper should be between 3-4 double-spaced pages, and written in clear language. You can choose to organize your argument however you wish, but there should be a logical order to the paper. Be sure to include an introduction and conclusion to your main argument.

Citations should be in APA format, and the paper should include a Reference list. You must work independently on the paper, but you are welcome to consult with me and/ or the Course Assistants as you work on it. You are free to refer to any sources that you find useful. Be sure to cite any sources that you use.

Small Group Project: Analysis of a Media Summary of a Research Report

Goals: Any psychology student ought to be able to read reports of scientific research with a critical eye – a successful psychology student should be able to provide a careful analysis of both original research reports and secondary reports of those findings (which are common, and, somewhat frequently, inaccurate). This assignment is designed to build on those skills. This assignment also provides an opportunity for practice in communicating your analytical findings orally, and to work in a collaborative setting.

Overview: In pairs or triplets, you will find a newspaper or magazine article that reports some social science finding that is of interest to you. You should then locate the primary source of the report.

Finding an article. The results of psychology and other social science studies are frequently reported in the media. You should find one such recent article. You can start with the Science section on the *New York Times* or recent editions of popular newsmagazines such as *Newsweek* or *Time*. You will look for the article in your groups in lab and must have them approved by me before you leave. You should make sure that you have access to the original source article as well. No group will report on the same article.

Work time. We will begin this project in lab on September 28; your presentations will be the following week during lab. You will need to meet with your group members outside of lab time to finish the assignment.

The oral report. In pairs, you will have 15 minutes during lab to provide an oral report of the media report and original source article. (You will be stopped after 15 minutes even if you have covered all of your intended material.) You should be sure to cover the following points during your presentation. The key to a good presentation is to practice it. I strongly suggest each group convene between the lab sessions to ensure that the presentation is organized and engaging. You may (and are encouraged) to bring handouts or use visual displays for your presentation. If you choose to use a multimedia source such as Powerpoint, you must upload it to Moodle by 10pm on Sunday evening.

Questions to be addressed in the oral report

- Provide a synopsis of the research study – be sure to identify the main research question, to briefly summarize the methods, and to state the main result. Be sure to explain, as clearly as you can, the procedures that the authors used to test their questions.
- You should also address the following specific questions in your report
 - How accurately does the title of the media report reflect the findings of the study? If you were the writer, what title would you use? (Remember that a newspaper or magazine's goal is to attract readers, so it should be catchy as well as accurate.)
 - How accurately does the media report overall reflect the findings of the study?
 - If you could change one sentence in the article, which would you change, and what would be your reasons for changing it?
 - What information would add to the media report if you were reporting on the scientific finding? Explain your reasons for including this information.
 - Comment on the figures included in the media report. Are there more compelling ways to display the data?
- You should submit the following via Moodle (only one person in your group needs to hand it in):
 - A summary Word document that includes the name of your group members, and the reference for the media report and original article that you used. Below the reference, you should copy and paste the text of the media report