



## Psychology 203: Introduction to Statistics for Psychology

Bard College, Fall 2016

Tuesday, Thursday 10:10-11:30 Hegeman 204

Tuesday LABS: A: 1:30-3:30; B:30-5:30 (RKC 107)

Instructor: Kristin Lane – [lane@bard.edu](mailto:lane@bard.edu) – 7224 – Preston 106

Office Hours: Wednesday 11-1, and by appointment

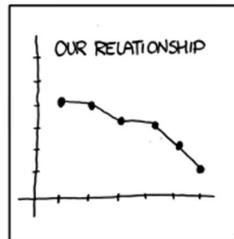
**[S]TATISTICAL THINKING WILL ONE DAY BE AS NECESSARY FOR EFFICIENT CITIZENSHIP AS THE ABILITY TO READ OR WRITE. – H. G. Wells, circa 1930**

Have we arrived at the moment when being able to think statistically is a requirement to be a good citizen? Perhaps; perhaps not. 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.

By the end of the semester you should:

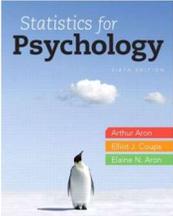
1. Understand how we use the concepts of uncertainty and variability to draw inferences about samples.
2. Grasp the logic, strengths, and limitations of the null hypothesis significance testing approach to using statistics to answer psychological questions.
3. Understand the relationship among statistical significance, power, and effect size.
4. When presented with a research design:
  - a. Identify and conduct the correct statistical analysis in the SPSS software package;
  - b. Interpret SPSS output in order to draw a conclusion about research questions; and
  - c. Report the results of statistical analyses in colloquial language and in a manner appropriate for scientific publication.
5. Have a greater understanding of the role of statistics in public discourse.

You may be starting the semester with the belief that this class will be about numbers and computations. To be sure, there will be some of that. At heart, statistics are a tool for answering questions, and they are the most powerful tool in the psychologist's toolbox. We will try not to lose sight of the fact that statistics in psychology are fundamentally a way of answering questions about the mind and behavior, and those questions should remain at the forefront of your mind throughout the course.





### What do you need?



Aron, A., Aron, E., & Coups, E. J. (2012). *Statistics for psychology* (6th ed.). Upper Saddle River, NJ: Pearson/Prentice-Hall.

ISBN Number: 9780205258154

(This edition is quite different than older ones, so you should get this edition.)

Complete each reading in preparation for class, as listed below on the schedule.



We will use Moodle extensively in this class. Sign up for the course at <http://moodle2.bard.edu>. The enrollment key is **stats2016**



We will provide you with a basic calculator that you have to return at the end of the semester, but you are free to use your own. If you use your own calculator, it should be able to add, subtract, multiply, divide, and should have 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.**

### Tips for Success

- **Work with others!** This might mean forming study groups, or seeing me or the course assistants. Former students have found it really useful to work on their homework in Preston during the course assistants' office hours, so that they can ask questions as they go along. Work with your classmates, me, and course assistants to see if you understand the material well enough to explain it to someone else.
- **Stay up-to-date.** The material is cumulative, so if a concept challenges you (especially early in the semester), address that right away. The rest of your semester will be so much better for that.
- **Do problems.** As many problems as you can – in addition to homework problems, take on the textbook problems (answers to odd-numbered questions are in the back of the book), or ask me for more problems. As you complete the reading, pause and solve the problems along the way and see if you can answer the in-text questions.
- **Use outside resources.** There are a *lot* of stats resources on the web. Make use of them. I like the videos on Khan Academy. They use slightly different notation than our textbook, so I don't assign them, but if you are OK with that, they might be quite helpful.

## What do I expect?

**Attendance.** Because of the nature of the material, absences will likely incur a *de facto* penalty come exam time because it is difficult not to attend class and do well on the tests. We will move at a rapid pace; material that is missed due to absence will not be repeated in class or office hours. Late arrivals are disruptive to the class. Consistent patterns of lateness may lower your grade. Be on time.

**Plagiarism.** Exams and the written paper are to be completed independently. Homework assignments may be worked on with peers. Study groups are an excellent way to learn material, but take care to ensure that you can respond to the

questions independently. You are responsible for knowing the College policy on academic integrity. Violations of the guidelines of academic integrity will result at a minimum in loss of credit for the assignment, and may result in failure in the course.

**Cell Phones and Laptops.** Turn off cell phones before class; no laptop computers are allowed in the larger group sessions. If you text or access non-course materials during our class time, you are mentally absent from class, which will be treated just as a physical absence.

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

## What will you do?

**Midterm exams (2 midterm exams, 20% each).**

**Final exam (25%).**

Each exam will have an in class-written portion (closed book) that presents an opportunity to show mastery of the underlying concepts and theories, and a lab exam that allows you to demonstrate your ability to perform and interpret statistics. Lab exams are open-everything-but-another-person. You may bring a 4"x6" index card with notes to midterms and an 8 ½ x 11" sheet of paper with notes to the final.

Makeup exams will be offered only in the case of unanticipated emergencies with documentation from the Dean of Students.

**Moodle Quizzes. (15%).** There will be quizzes on Moodle for each chapter. Your three lowest scores will be dropped. Quizzes must be taken within 24 hours of completion of the material marked with \*\* below. They are open-book and comprised of questions randomly selected from a larger set of

*Alternate grading scheme: To award improvement over the course of the semester, I will also calculate your grade weighting the final exam as 35%, and each individual midterm as 15%. You will receive whichever grade is higher.*

questions (so each student will have a different quiz).

**Final paper (10%).** You will use your new analytical skills in the final by analyzing the results section of a published paper. Details are below.

**Homework (10%).** Homework for each chapter will be due at the class after we complete a particular topic. Homework will only be accepted in class, in hard copy, and stapled.

**Final grades.** Grades will be assigned according to the schedule below (pluses and minuses will be assigned at the top and bottom of each range). 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.

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

## 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; M= posted on Moodle**

Date	Topic	Reading (to be completed <u>before class</u> )
Tuesday	August 30	Introduction to the Course
Tuesday (Lab)	August 30	NO LAB
Thursday	September 01	Basic Concepts** AAC Chapter 1; pp. 84-89
Tuesday	September 06	Measures of Central Tendency AAC Chapter 2 (pp. 34-43)
Tuesday (Lab)	September 06	Introduction to SPSS M Lamberth (Driving While Black)
Thursday	September 08	Variability** AAC Finish Chapter 2
Tuesday	September 13	z-scores and probability** AAC Chapter 3
Tuesday (Lab)	September 13	Central Tendency and Variability in SPSS
Thursday	September 15	Hypothesis Testing AAC Chapter 4 (pp. 108 - 119)
Tuesday	September 20	Hypothesis Testing** AAC Finish Chapter 4
Tuesday (Lab)	September 20	z-scores in SPSS
Thursday	September 22	Testing Hypotheses with Means of Samples AAC Chapter 5 (pp. 139 - 148)
Tuesday	September 27	Testing Hypotheses with Means of Samples** AAC Chapter 5 (pp. 148 - 163)
Tuesday (Lab)	September 27	Displaying Data M Nolan & Heinzen
Thursday	September 29	Catch up/ Exam review
Tuesday	October 04	EXAM 1
Tuesday (Lab)	October 04	LAB EXAM 1
Thursday	October 06	t-test for a single sample AAC Chapter 7 (pp. 226 - 240)
Tuesday	October 11	NO CLASS - FALL BREAK
Tuesday (Lab)	October 11	NO LAB
Thursday	October 13	t-tests for dependent means** AAC 240-251; 256-end.
Tuesday	October 18	t-test for independent means AAC Chapter 8 (pp. 275 - 282)
Tuesday (Lab)	October 18	t-test for a single sample and dependent means in SPSS
Thursday	October 20	t-test for independent means** AAC Chapter 8 (pp. 282-293; 297-299)

Tuesday	October 25	Type I and Type II errors	AAC Chapter 6 (pp. 177 - 188)
Tuesday (Lab)	October 25	t-test for independent means in SPSS	
Thursday	October 27	Power and Effect Size**	AAC Chapter 6 (pp. 188-216)
Tuesday	November 01	One-way ANOVA	AAC Chapter 9 (pp. 316 - 337)
Tuesday (Lab)	November 01	Academic Writing	M Harvard Guide to Writing with Sources
Thursday	November 03	One-way ANOVA**	AAC Chapter 9 (pp. 337 - 351)
Tuesday	November 08	Factorial ANOVA and interactions**	M: Graziano & Raulin (Factorial Designs)
Tuesday (Lab)	November 08	One-way ANOVA in SPSS	
Thursday	November 10	Catch up/ Exam review	
Tuesday	November 15	EXAM 2	
Tuesday (Lab)	November 15	LAB EXAM 2	
Thursday	November 17	Correlation**	AAC Chapter 11
Tuesday	November 22	Regression**	M: Jackson (Correlational Methods and Statistics; pp. 125-end)
Tuesday (Lab)	November 22	Correlation in SPSS	
Thursday	November 24	NO CLASS - THANKSGIVING	
Tuesday	November 29	Chi-Square Goodness of Fit	AAC Chapter 13 (pp. 542 - 553)
Tuesday (Lab)	November 29	SPSS Practice for Final Exam	
Thursday	December 01	Chi-Square test of Independence**	AAC Finish Chapter 13 (Skip box on "Controversy: The Minimum Expected Frequency")
Tuesday	December 06	Catch up/ Exam review	
Tuesday (Lab)	December 06	FINAL LAB EXAM	
Thursday	December 08	NO CLASS - BOARD DAY	
Tuesday	December 13	NO CLASS - COMPLETION DAYS	
Tuesday (Lab)	December 13	FINAL WRITTEN EXAM	
Thursday	December 15	NO CLASS - COMPLETION DAYS	
Friday	December 16	Final Paper Due	

## Paper Review Assignment

In your final paper, you will analyze the data analysis reported in a published psychology journal article. This assignment has three primary goals.

**Be a Consumer!** Class and exams provide the opportunity to show you understand and can use statistics. In reading published articles, it is crucial to understand and evaluate how the conclusions were derived, and to evaluate independently whether you accept the claims. In this assignment, you will be an active reader, and provide your analysis of the report of the data analysis and presentation.

**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 meets high standards. Typically, a paper is submitted, and an editor solicits expert reviews that assess the paper's strengths and weaknesses. This assignment will give you a flavor for how this process works.

**Prepare you for Moderation.** Psychology moderators write a paper that summarizes and evaluates a psychology journal article. 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 thus prepare you for Moderation Saturday.

Your analysis will focus on the results section. In 3-4 pages, you should:

- **Briefly** (1-2 paragraphs) summarize the research goals and method. Assume the reader is a psychologist unfamiliar with the paper.
- Summarize the analyses conducted. Be sure to state the null hypothesis (or hypotheses) even if the paper does not do so explicitly.
- 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:

**Analyses.** Were the analyses appropriate – given their data, would you have conducted different analyses on these data?

**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?

**Inferences.** Are the conclusions drawn from the analyses reasonable?

### Other Guidelines

The paper should be 3-4 double-spaced pages, and clearly written. You can 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 you should include a Reference list. You must work independently on the paper, but are free to consult with me. You may refer to any sources that you find useful (be sure to cite them).

### Suggestions

In the past, the strongest papers have focused on two or three areas in the analysis section, and fully developed and explained them. One “danger zone” is the temptation to analyze research methods rather than data analysis and statistics. Focus on the stats – you’ll have plenty of time to think about methods next semester in PSY 204.