ANTH630: Quantification and Statistics in Applied Anthropology

Spring 2017

Monday 5:00-7:40pm

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University of Maryland

/\/\/*** SYLLABUS SUBJECT TO REVISION ***/\/\/\

Note (1/15/2017): This is the syllabus from 2016, which I am posting for your reference. The assignment dates will be adjusted for 2017 shortly.

Class Location: Woods Hall Seminar Room

Office Hours: Woods Hall 0113a, Monday 11:00-12:00 (or by appointment)

Office Telephone: 301-405-1427

Email: Please use ELMS messaging for course-related questions.

Overview

The main goal of this course is to give anthropology graduate students from all subfields and those in related social sciences the ability to conduct basic quantitative and statistical analyses. It is also my hope that I might convince anyone who is unfamiliar or even fearful of this approach to research that statistics are not 'rubbish' and worth learning about. I hope you will find that learning 'statistics' is quite different than 'math' and you don't have to know much more than basic algebra to be able to understand and use basic statistics. This is especially true now that computers do most of the heavy lifting, and this is good because it allows anthropologists to do what we do best -- ask interesting questions about the world and try to answer them, in this case using numbers.

Whether you are a budding academic or an applied social scientist some aptitude with statistics will make reading academic literature more accessible and increase your job prospects. If you are pursuing a Ph.D. in sociocultural anthropology conducting simple households surveys and collecting descriptive statistics can be an invaluable way to learn the 'lay of the land' upon entering the field and a way to begin building rapport in small communities before researching

sensitive topics. Archaeology and paleoanthropology abound with numerical data, and for those interested in public policy, robust statistical analyses are strong arguments for change. As you progress from graduate school to jobs in academics, government, or the non-profit world, data abound and qualified analysts are in demand. This course will provide you with a basic foundation in quantitative and statistical analysis.

The course combines lectures, a hands-on laboratory to learn how to conduct analyses, and homework assignments to help students learn the concepts and methods underlying the use of quantitative and statistical approaches in anthropology. Additional readings and datasets will become available throughout the semester on the course website.

Laboratory and Optional Readings

Labs will be taught with "R" the most powerful and popular open-source (read: free) software program for statistical analysis. After each in-class lab session, you are expected to submit your results via ELMS. These will be graded for completion and working on them during Lab is part of "class participation." Basic computer skills are important but there are no computational or mathematical prerequisites for the course. All necessary computer hardware and software to complete the course will be available in the LeFrak computer lab, and also the Anthropology computer Lab (Rm. 0100); however students are also encouraged to configure their personal computers or laptops with the course software. For those who are interested in a deeper appreciation of R, I suggest purchasing the optional book (Gardner) and if there is interest, I will suggest optional readings in it throughout the semester.

A final note

Finally, I would like to acknowledge that for graduate students in the Anthropology Department this is a required course and not everyone will take it with a burning desire to learn statistics. Some may even fear it. Don't! My goal is to make statistics accessible and useful and I will do my best to help you, whatever your aptitude at the beginning. If you find yourself frustrated with the computer or the basic arithmetic and algebra, please come to my office hours and I will try to help you through it. But it is critical that you put in the effort to keep up…falling behind in a cumulative course such as this is a recipe for trouble.

Textbook(s)

Gardner, Mark. (2012) Beginning R. Indianapolis, Indiana: John Wiler & Sons, Inc. **("G", Optional)**

Moore, D. S., W. I. Notz, and M. A. Fligner. (2012) The Basic Practice of Statistics. New York: W.H. Freeman and Company. 6th Edition. **("MNF"; Required)**

A note on the 6th Edition - while the UMD bookstore would not allow me to order the

6th edition, it appears to be available on Amazon or www.abebooks.com for as little as $20.

NOTE: You do not need the CD.

https://www.amazon.com/Basic-Practice-Statistics-Book-CD/dp/1464102546/ref=sr_1_1?ie=UTF8&qid=1452948219&sr=8-1&keywords=basic+practice+of+statistics+6th+edition

Given that the math behind most of these statistics has not changed in the last fifty years, I see no reason to ask you by a $140 book, so please try to get a copy of the SIXTH EDITION. This is the version I will link the syllabus with. Also, email the Anthgrad list and perhaps there is a student who lend or sell you their copy from 2016.

I have a copy of the 7th Edition and unfortunately, the Chapter order is different than the in 6th Edition, though I expect the content to be largely the same. But if you choose to use the 7th Edition you are responsible for figuring out which readings are appropriate.

Please let me know if you have trouble finding a copy of the 6th edition.

Grades

Grades will be based on the following:

Weekly Labs	40%
Research Project	30%
Project drafts (three)	10%
Presentation	10%
Participation	10%

Class Schedule

Lecture No. and Dates

Part 1: The role of statistics in Anthropology; working with quantitative data; R

Week 1 - Introduction and course overview, quantitative analysis and statistics in Anth.
Reading: Statistical Thinking (Preface, pp. xxviii-xxix)

Lab: Install R and R-Commander software on your own laptop (Note, this is not required. You are welcome to use the lab for but if you want to have the software on your own laptop, make sure you bring it to this class so we can install it.)

Lecture: Week 1 - Introduction.pdf (John Snow video link)

Week 2 - Displaying distributions with figures, Using R-Commander

Reading: MNF Chap. 1; Fox, J. (2012) Getting started with R-Commander. ⬛ 📄; NY Times (1/7/2009), "R, the Software, Finds Fans in Data Analysts 📄 ⬛"
Optional: G Chapters 1, 2 (26-29), 7(232-239, 245-262)

Lab: Week 2 - Displaying Quantitative Information

Lecture: Week 2 - Displaying Quantitative Information.2.pdf

Week 3 - Describing describing distributions with numbers (summary statistics); The "Normal" Distributions

Reading: MNF Chaps. 2-3.

Optional readings: G, Chap. 5 pp. 158-173; Chap. 7 pp. 215-221;

Lab: Week 3 - Describing Data with Numbers & The Normal Curve

Lecture: Week 3 - Basic Descriptive Statistics and the Normal Distribution 3.pdf

Week 4 - Scatterplots, correlation

Reading: MNF Chaps. 4

Optional: G 196-198

Homework due: Proposal for final project topic

Lab: Week 4 - Scatterplots and Correlation

Lecture: Week 4 - Scatter Plots and Correlation.pdf

Week 5 - Least-squares regression, multiple regression

Reading: MNF Chap. 5; Chapter 28 pp. 1-15 (book supplement available for download ⬛ 📄).

Optional: G Ch. 8 (formula notation on pp. 263-268); Ch. 10 (regression, pp. 327-341)

Lab: Week 5 - Regression

Lecture: Week 5 - Regression and Multiple Regression.pdf

Week 6 - Categorical data & more R-Commander Survival skills

Reading: MNF Chap. 6.; Bernard 2006* Ch. 10-11 ⬀ 📄 (Start reading Bernard this week, finish for Week #7)

Lab: Week 6 - Categorical Data and R Skills

Homework due: Draft of Methods, Materials, and Approach

Lab: Week 6 - Peer Review Workshop (as discussed in class, please do this on your own; Provide your MMA papers to 2 classmates for feedback. Peer reviews due before the first class after Spring Break)

Lecture:Week 6 - Categorical Data and R Survival Skills.pdf

March 16 - Spring Break

Week 7 - Quantitative Research Design in Anthropology

Readings: MNF Chap. 8; (MNF Chap. 9 is recommended but not required); Bernard 2006* Ch. 10-11⬀📄

Lecture: Week 7 - Producing Data.2.pdf

Part 2: Basic probability; Inference; Relationships between variables; Stating and testing hypotheses

Week 8 - Introduction to Probability

Reading: MNF Chaps. 10-11.

Lab: Week 8 - Introduction to Probability

Lecture: Week 8 - Probability Theory.pdf

Week 9 - Confidence Intervals and Tests of Significance

Reading: MNF Chaps. 14-15.

Lab: Week 9 - Confidence Intervals and Tests of Significance

Lecture: Week 9 - CIs and P values.pdf

Week 10 - Inference - T-statistic and 2-sample T-test

Reading: MNF Chaps. 18 & 19 (16 Optional)

Lab: Week 10 - Inference - T-statistic and 2-sample T-test

Lecture: Week 10 - The T Statistic and T-Tests.pdf

Week 11 - Non-parametric Statistics (Wilcoxon Rank Sum Test and Chi-Square)

Reading: MNF Chaps. 23 & Supplemental Chap. 26-3 through 26-19 (Not in book, download).

Lab: Week 11 - Chi Square

Lecture: Week 11 - Chi-Square.pdf

Week 12 - One-way ANOVA & Tukey's Post hoc test

Reading: MNF 25 and Chap 29 (Online only, Download 🔲🗗)

Lab: Week 12 - One-way ANOVA & Tukey's Post hoc test

Lecture: Week 12 - ANOVA I.pdf

Homework due: Draft of preliminary results from two statistical tests.

Week 13 - Two-way ANOVA, Kruskal-Wallis Test, & Logistic regression

Supplemental Chap 26-27 to 26-31 (same download as week 11, above)

Lab: Week 13 - 2-Way ANOVA and Kruskal Wallis Test

Lecture: Week 12 - ANOVA II.pdf

Week 14 - Project workshop (CANCELLED BECAUSE OF SNOW DAY)

In-class workshop for you to work on your project and consult with your classmates and me.

Week 15 - Student Presentations

Presentation Grading Rubric.docx

 Presentation order:

Week 16 - Exam Week - Research Projects Due

Submit Final Research Projects here.

* Online readings provided in accord with the University of Maryland Fair Use policy.

Research Project

The final project will involve identifying an anthropological dataset suitable for quantitative analysis. Please read 1. Proposal for final project topicfor guidance in selecting your dataset and please choose very, very, (very) carefully. The quality of your data and the suitability for statistical analysis will play a large role in successfully completing this research project. Datasets with known statistical patterns (i.e., published datasets) are ideal for this reason. Exploratory analyses are possible but will likely be much harder. Projects requiring any kind of data entry by hand are strongly discouraged. You will likely find that a certain amount of time-consuming manual (hand) recoding will be necessary even when using online datasets.

Once you have identified your dataset, you will use _at least five quantitative methods_ (graphs, histograms, descriptive statistics tables, probability tests, etc.) using a variety of the methods we have covered during the semester. For full credit you must appropriately use graphs, summary statistics, and probability tests at least once in your final paper. Thus, it is important to choose a dataset that contains sufficient information for several different kinds of analyses.

You will then compose a research report describing the data and your chosen analyses. Please

provide a cohesive analysis; in other words, I strongly recommend running *more than* five tests and then selecting the ones that complement each other in a compelling way. The focus of this project should be the quantitative methods, not the narrative, so you must need to write concisely, if not tersely. To this end, all tables and figures should be included at the end of the report (no page limit), and referenced in the text (which is limited to five [5] single-spaced pages). Here is a general outline:

1. *Introduction/Background* -- describe the research question(s) and brief theoretical background.
2. *Materials and methods* -- describe the data and how it was collected (by you or the original researcher if you are using a published dataset); why are these data appropriate for your research questions(s)? It is appropriate to include descriptive statistics, plot distributions, and justify data transformations in this section.
3. *Approach* -- Outline in general terms the analysis in the next section. For each research question (from #1) you should provide a problem statement, hypothesis and null hypothesis, and prediction (E.g., "*If theory X is correct, the data will show pattern Y…*"). Your statistical results will then 'test' your prediction(s). If you have multiple research questions, please use subsections to separate them.
4. *Results* -- E.g., "*The results of a one-way ANOVA are presented in Table 1…*" In this section present the results of each statistical analysis, in some detail and with clarification. Help the reader (me in this case) understand the analysis by explaining the statistics you are including (this is where you prove you understand the material).
5. *Interpretation* -- Interpret what the statistical results suggest about the main research question(s). Can you reject the null hypothesis?
6. *Conclusion* -- What have we learned from your analysis? (It's ok to have negative results).

To help you develop your projects in a timely manner (and end-of-semester freak-outs), I would like to see evidence of progress throughout the semester. By the following dates I require brief (~1-2 pp) assignments to be submitted.

1. Proposal for final project topic - Research question(s), one or more possible datasets, and the variables to be analyzed.

2. Draft of Methods, Materials, and Approach - Final dataset, overall statistical approach, and five appropriate statistical tests.

3. Draft of preliminary results from two quantitative analyses - Preliminary results from at least two quantitative analyses.

Each student will make a formal presentation of your statistical analyses.

The final quantitative analysis paper, including results from all five tests, is due at the end of our assigned Final Exam period.

Please use a widely used format for your bibliography (E.g., APA, MLA) but be sure to apply it carefully.

Proper Citation and plagiarism

Plagiarism of any kind will not be tolerated and will result in a failing grade for the course. Provide citations for everything. Credit directly quoted and paraphrased words of others as well as sources of information. This includes internet sources as well.

If you have any questions about proper citation, please refer to the library help page or ask me:

http://www.lib.umd.edu/ues/guides/citation-tools

The UMD Code of Academic Integrity can be viewed online

http://www.president.umd.edu/policies/iii100a.html

In-completes

In-completes should be reserved for extreme emergencies that prevent the completion of course assignments toward the end of a school semester. It is very difficult to make up course assignments from a previous semester once a new semester begins, and students are often not able to prevent an Incomplete grade from lapsing into an F before the assigned deadline. If you think it is necessary to apply for an Incomplete grade due to an end of semester emergency, please contact the instructor immediately to arrange for a new submission date for the incomplete work and to fill out the proper paperwork. The instructor reserves the right to refuse an Incomplete grade to any student.

Late assignments

Late assignments will only be accepted under extreme circumstances, and if accepted, points may be deducted depending on the circumstances. Always alert the instructor ahead of time if you think that you may not be able to submit an assignment on time.

Special Needs

If any student has any special study or test-taking needs (e.g., test anxiety, dyslexia, poor vision or hearing, special seating requirements, etc.), please let me know as soon as possible so that we can make your participation in this course a rewarding one. In addition, I will make students aware of special services/facilities on this campus that might be of assistance in the course of your studies here at UMCP including Disability Support Services (http://www.counseling.umd.edu/DSS/) and the University Counseling Center (http://counseling.umd.edu).

Religious Observance

Effort will be made to avoid scheduling assignments with major religious holidays. However, it is the student's responsibility to inform the instructor of any intended absences for religious observances other than those listed on the UMD website in advance (http://www.faculty.umd.edu/teach/attend_student.html#religious). Prior notification is especially important in connection with final examinations.

Copyright

All course materials (presentations, exams, handouts, labs, etc. in digital or paper format) are subject to copyright protection and may only be used for personal use. Course materials not be distributed without permission of the instructor.

Grading Scheme

At the end of the semester your numeric grade will be converted to a letter grade using the following scheme:

A	100%	to 94%
A-	< 94%	to 90%
B+	< 90%	to 87%
B	< 87%	to 84%
B-	< 84%	to 80%
C+	< 80%	to 77%
C	< 77%	to 74%
C-	< 74%	to 70%
D+	< 70%	to 67%
D	< 67%	to 64%
D-	< 64%	to 61%
F	< 61%	to 0%