

**Linguistics 507**  
**Statistical Analysis for Linguists**  
 Spring 2018

Professor: Natasha Warner

**Class meets:**

2:00-3:15 PM, Tuesday/Thursday, Harvill 452

**Class website:** <http://d2l.arizona.edu>

**Office hours:** TBA. Location: Douglass 320

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**Books/materials:**

Keppel, Geoffrey, and Wickens, Thomas. 2004. *Design and Analysis: A Researcher's Handbook*. 4<sup>th</sup> ed. Prentice Hall.

Readings on correlation and regression from the SPSS manual (may possibly be replaced by other readings):

Norušis, Marija J. 2000. *SPSS 10.0 Guide to Data Analysis*. Chapter 19: Linear regression and correlation. pp. 373-406. Prentice Hall.

Norušis, Marija J. 2000. *SPSS 10.0 Guide to Data Analysis*. Chapter 22: Building multiple regression models. pp. 455-488.

**Other readings:**

Barr, D. J., Levy, R., Scheepers, C., & Tily, H. J. (2013). Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of memory and language*, 68(3), 255-278.

Clopper, C. G. (2013, June). Modeling multi-level factors using linear mixed effects. In *Proceedings of Meetings on Acoustics* (Vol. 19, No. 1, p. 060028). Acoustical Society of America.

Raaijmakers, J.G.W., Schrijnemakers, J.M.C., and Gremmen, F. 1999. How to deal with "The language as fixed effect fallacy": Common misconceptions and alternative solutions. *Journal of Memory and Language*, 41:416-426.

Sedlmeier, P. and Gigerenzer, G. 1989. Do studies of statistical power have an effect on the power of studies? *Psychological Bulletin*, 105:309-316.

Keppel is in the bookstore, and the other readings are or will be on the course d2l site ([d2l.arizona.edu](http://d2l.arizona.edu)).

**Optional books you might like:**

Takahashi, Shin. 2009. *The Manga Guide to Statistics*. San Francisco: No Starch Press / Ohmsha.

Johnson, Keith. 2008. *Quantitative Methods in Linguistics*. Wiley.

Baayen, R. H. 2008. *Analyzing Linguistic Data. A Practical Introduction to Statistics Using R*. Cambridge University Press.

Eddington, David. 2015. *Statistics for Linguists: A Step by Step Guide for Novices*. Cambridge Scholars Publishing.

**General organization of the course:**

This course will focus on statistical methods that are used in linguistic research, with the most attention given to analysis of variance (ANOVA) and Linear Mixed Effects Modeling. While a large part of the class will be spent on basics of how to analyze quantitative data, another goal of the class is to examine the statistical analyses which appear in actual published linguistic literature, and to discuss how students' current and future research might be analyzed statistically.

There will be three homework assignments, a midterm exam, an online "presentation," and a short final paper (**due Wed. May 10**). The presentation will be on the statistical analyses used in some published paper. This presentation will be in written form on d2l, and you will also be required to read and comment on others' presentations. The final paper will be on design and analysis of some piece of your own research (either already completed, currently in progress, or hypothetical future research). You will also turn in a proposal of the topics for your presentation and paper.

**Prerequisites:**

The only math you will need will be addition, subtraction, multiplication, and division (just a whole lot of them!). No previous training in statistics is required. The only assumption about background is that you are currently or plan to eventually be involved with quantitative data in some linguistically related field. At this point, you may only be reading literature which uses statistical analyses, or you may already be collecting your own data and need to analyze it.

**Requirements/grading:**

Homework assignments: 30% (10% each) (turn in as hard copy unless otherwise specified)  
 Midterm exam: 25% (in-class exam, hard copy)  
 Topic proposal: 5% (turn in to d2l dropbox)  
 d2l Presentation: 10% (post to d2l discussion site, includes commenting on others')  
 Term paper: 30% (turn in to d2l dropbox)

**Late policy:** 10% reduction of the possible grade per day late, except for very serious excuses.

**Tentative schedule:**

<b>Date</b>	<b>Topic</b>	<b>Readings/requirements</b>
Week 1 (Jan. 11-16)	Introduction, why do experiments, why use statistics, areas of linguistics that use statistics, hypothesis testing, 1 factor ANOVA with 2 levels	Read Keppel Ch. 1-2
Week 2 (Jan. 18-23)	1-factor ANOVA with 3+ levels, planned comparisons, correction for family-wise error, assumptions of ANOVA	Read Keppel Ch. 3, 4, 6, 7
Week 3 (Jan. 25-30) <b>Lab Day one of these days</b>	Lab day, catch-up	Read Keppel Ch. 8
Week 4 (Feb. 1-6)	power, 2 factor ANOVA, interaction	Read Keppel Ch. 10-11, Sedlmeier and Gigerenzer <b>Assignment 1 due Feb 6</b>
Week 5 (Feb. 8-13)	follow-up tests, 3 factor ANOVA	Read Keppel Ch. 12 and 21-22,

Week 6 (Feb. 15-20)	higher designs, unequal sample sizes	Read Keppel Ch. 14
Week 7 (Feb. 22-27)	review, <b>midterm exam (Feb 27)</b>	
Week 8 (Mar. 2-13)	within-subjects designs, interaction, follow-up tests	Read Keppel Ch. 16-18 (Spring break in here)
Week 9 (Mar. 15-20) <b>Lab Day Mar. 15</b>	mixed designs	Read Keppel Ch. 19-20, 23
Week 10 (Mar. 22-27)	random factors, counterbalancing	Read Keppel Ch. 24, 26 <b>Assignment 2 due Mar. 27</b>
Week 11 (Mar. 29 - Apr 3)	by subjects and by items tests, correlation and regression	Read Raaijmakers et al, read SPSS chapters, <b>Topic proposal due Apr. 3</b>
Week 12 (Apr. 5-10)	Linear Mixed Effects, multi-level logistic regression	read Clopper (2013) and Barr et al. (2013)
Week 13 (Apr. 12-17)	LME & multi-level logistic regression continued	
Week 14 (Apr. 19-24) <b>Lab Day Apr. 19</b>	LME & multi-level logistic regression continued	<b>Student presentations posted on d2l by Apr. 19; Comments due on others' presentations on d2l Apr. 24</b>
Week 15 (Apr. 26 - May 1)	non-parametric tests, catch-up	<b>Assignment 3 due May 4</b>
Wed. May 9, by <b>11:59 PM</b>		<b>Paper due (d2l DropBox)</b>

### **Various statements:**

#### Students with Disabilities:

If you anticipate issues related to the format or requirements of this course, please meet with me. I would like us to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with Disability Resources (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

#### Academic misconduct:

The university's policies about plagiarism, academic honesty, and academic conduct are at <http://dos.web.arizona.edu/uapolicies/>. The library's website also provides extensive help with learning what constitutes plagiarism and how to avoid it. It is particularly important when doing the d2l presentation on a published paper to avoid using the exact words of the paper, except for technical statistical terms. **Study groups (especially for homework) are strongly encouraged in this class, but you are NOT allowed to write up your homework together or share files in the writing process.** If you work with a study group, you should make a note on the top of your homework stating who you studied with. Furthermore, if you obtain copies of notes or other materials from students who took this class in past years, you are required to remove any homework or test answer keys from those materials, and to avoid reading them. **Do NOT cheat. Do NOT represent answers as your own if they are not.**

Potentially offensive/objectionable content:

The material in this course is primarily not political, but there may be some discussion of endangered languages, use of human subjects in research, dialects associated with various social groups, attitudes toward dialects, etc.

Conduct in class:

Please turn off cell phones when in class. Please do not use electronic devices in class other than for class-related purposes or emergencies. Everyone is required to treat others in class with respect. Disruptive behavior is prohibited.