COURSE SYLLABUS
PSYC 504
RESEARCH DESIGN & METHODS in PSYCHOLOGY

Spring 2013
Tuesdays & Thursdays, 10:00 – 11:50 am
SOS Building, Room B43

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Office Hours: Tuesday 12-2, or email to schedule an appointment

Course Objectives:
Participants will learn about the methodologies used in psychological research, including design, measurement and interpretation. The goals are for participants to improve their ability to design their own research and to evaluate research findings. Many of the examples used will be from clinical research, but the designs and methods are applicable to a broad range of questions in psychological and behavioral research. The course emphasizes individual-differences – addressing questions about why people behave differently from each other.

Conceptual issues to be covered include: formulating hypotheses, importance vs significance, threats to internal and external validity, construct validity, statistical inference, understanding mechanisms (causal attributions, mediators, moderators), and exploratory vs hypothesis-driven research.

Measurement issues include variable characteristics, reliability and validity of measurement, internal consistency, bias associated with sampling and measurement, methods of data collection, selecting constructs and measures, use of measures for classification, and measurement with special populations. We will cover qualitative methods as they apply to measure development.

Designs to be covered include: experimental, quasi-experimental (clinical trials, prevention and intervention studies), observational, and issues related to prospective and other longitudinal designs. We will also have brief treatments of case studies and other single-subject approaches.

We will cover some practical issues in conducting research including: power analysis, meta analysis, preparing research proposals, the publication and review process, and giving effective presentations.

We will consider a variety of ethical issues related to research, including reporting of research findings and conducting research with human subjects.

Course Prerequisites: The material covered in the course assumes that you have a working knowledge of undergraduate-level statistics, including distributions, measures of central tendency, correlation, regression, analysis of variance, and hypothesis testing. If you haven't had a statistics course recently, I recommend you review your undergraduate textbook or read the Freedman, Pisano & Purves book (see Recommended Readings).

USC Statement for Students with Disabilities: Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the instructor as early in the semester as possible. DSP (in STU 301) is open 8:30 a.m.–5:00 p.m., M-F. The phone number for DSP is (213) 740-0776. See http://www.usc.edu/student-affairs/asn/dsp/index.htm for more information.

USC Statement on Academic Integrity: USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. SCAMPUS, the Student Guidebook, contains the Student Conduct Code in Section 11.00, and the recommended sanctions are located in Appendix A: http://www.usc.edu/dept/publications/SCAMPUS/gov/

Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/

Course Requirements and Evaluation: Grades will be based on an accumulation of points across the semester. 500 points are possible.

1. Class Participation (20%).   You should come to class prepared to discuss the readings.   Depending on your participation you will receive a score of 1-4 points for each class that you attend. The quality of your comments is more important than the quantity. The default score is 3; thoughtful, insightful comments will earn a 4; lack of participation or being unprepared will receive a 1 or 2. Missed classes will be given scores of 0. If you miss class due to illness or another valid reason, you may make up participation points for these classes with a written assignment based on the readings for those dates. (Contact me for details). The lowest three scores for the semester will be dropped. (4 pts x 25* classes = 100 points) [* 2 exam days won't be counted; 3 others are dropped]

2. Wrritten Assignments (25%). There will be 5 short papers on design and methodology topics. Descriptions appear below; details will be provided in class. (25 pts x 5 papers = 125 points)

3. Human Subjects Training (5%). All students should take the online CITI course on conducting Human Subjects research. This is a pass/fail assignment. Full credit will be given for passing by the due date. Submit a copy of your certificate via Blackboard. You may submit an old certificate if you have passed the course within the past 2 years, but it's a good idea to review the content as some of the material will be included on exams. (25 points)

     information about the course:
     http://www.citiprogram.org/citidocuments/forms/Human%20Subjects%20Research%20(HSR)%20Catalog.pdf
     Register as a new user and take the module for Social & Behavioral Research that is part of Human Subjects Research.
     https://www.citiprogram.org/Default.asp

4. Project Write-Up and Presentation (20%).   At the end of the semester, each student will submit a write-up and present the methodology for a psychology-related research project. It is expected that there will be overlap between this project and the other written assignments submitted during the semester. Presentations will occur in class and should be 10-12 minutes. Write-ups will be due during the exam period. Grades will be assigned based on the written material (~12-15 double-spaced pages plus reference list) and the presentation materials (abstract and ~10 slides). You will receive feedback on your presentation style but it will not contribute to your grade. More details about content and format will be provided in class. (100 points; 50 points for the write-up, 50 for the presentation)

5. Exams (30%). There will be two exams administered in class. The format is short answer, the content will emphasize big picture concepts. (75 pts x 2 exams = 150 points)

Letter grades for the course will be assigned based on the final distribution of points, using the following scale:
A+ = over 98% (491-500 points); A= 92-98% (460-490); A- 90-91% (450-459); B+ 88-89% (440-449); B 82-87% (410-439); B- 80-81% (400-409); etc.
A curve may be applied to exam scores. Curves will not be disadvantageous. It is possible (and in my view desirable!) for all class members to earn As.

Written Assignments
Brief descriptions are provided below; more details will be given in class 2-3 weeks prior to the deadline. Content will be weighted more heavily than writing style, but you will be marked down for lack of clarity. A suggested length is 5 double-spaced pages plus references. I am happy to give feedback on outlines if I receive them at least 4 days before the due date. **Assignments are due by noon on the date specified.** Assignments should be submitted via Blackboard. Be creative! This is the fun part of science.

1. Validity. Specify a research hypothesis and construct a nomological network for testing it. The network should take into account internal, external, convergent, discriminant, and predictive validity. The hypothesis should be at the level of constructs and these should be operationalized in terms of observed variables. Depict the network as a diagram with explanatory text. The text should also describe: how the hypothesis can be refuted and implications for inferring causality. Note: you are not expected to include details of procedures, specific measures (e.g., "sensation-seeking self-report questionnaire" is fine), sample sizes, subjects (unless your hypothesis is about group differences), or analysis methods. The goal is to link observed variables to theoretical constructs in a way that would test a research hypothesis.

2. Measurement. Research a well-known measure in your area. Describe how it was developed and validated. Summarize and critique what is known about its psychometric properties. Is it reliable? Is it valid? *(Note: these are trick questions).* What further research is needed? What would you recommend for improving it? (If this is too broad a question, give suggestions for improving it for use in specific contexts and populations).

3. Mechanisms for Individual Differences.   Specify a research question that deals with individual differences associated with a demographic variable (e.g., age, gender, ethnicity). Design a research study for uncovering the mechanisms underlying these group differences. I.e., how can we learn what the process is that happens at the individual level to create the observed differences between the groups?

4. <u>Design.</u> Briefly describe the research question in a study you are conducting or have conducted. What are the limitations this design places on the inferences you can make? Plan a study for testing the same question using an entirely different design. E.g., if you are using an observational design, come up with an experimental approach; if you are using a between-subjects design, try within subjects. Try to design the new study to address the limitations of the original design. For the new study, describe the design type, subjects (type & source), measures (be specific), and procedures. What limitations remain in the inferences you would be able to make?

5. <u>Power Analysis.</u> Conduct a power analysis for a research study you are conducting or for one of the ones you've written about for a prior assignment. Organize the write-up in these sections: 1) Background: Research question and hypotheses to be tested. 2) Methods: study design and type of analysis, rationale for your assumptions about effect sizes, any fixed values (e.g., known N). 3) Results: Provide a table <u>and</u> graph depicting the power for a range of effect sizes and sample sizes. 4) Discussion: Describe for what tests your power is expected to be adequate and insufficient. Discuss limitations -- how could the power be increased by changing the study design?

<u>Overlap of Class Assignments and Your Ongoing Research</u>:   The goal of the assignments and project is for you to apply the course concepts to aspects of planning a research study. The projects you turn in can be on topics that overlap with research you are conducting, but you should not submit the same text you are using in other contexts (including first year project proposals or master's thesis). We'll discuss the distinction in class. If you are unsure, please discuss with me <u>before </u>submitting your assignment.

Assignments are due by noon on the date specified.

Readings
<u>Required Texts</u>:
Kazdin, A. E. (2003). *Research Design in Clinical Psychology, 4ᵗʰ Ed*. Boston, MA: Allyn & Bacon. **[RDCP]**

Baltes, P., Reese, H.W., & Nesselroade, J.R. (1977). *Life-Span Developmental Psychology: Introduction to Research Methods.* Oxford, England: Brookes/Cole. **[BR&N] Assigned chapters will be posted on Blackboard.**

<u>Recommended</u>:
Freedman, D., Pisano, R., Purves, R.   *Statistics, 4ᵗʰ Ed.*   New York, NY: W.W. Norton, 2007.
Locke, L.F., Spirduso, W.W., Silverman, S.S. (2007). *Proposals That Work: A Guide for Planning Dissertations and Grant Proposals, 5ᵗʰ Ed*. Newbury Park, CA: SAGE, 2007 **[LS&S]**

Other chapters and journal articles will be posted on Blackboard.

Class Outline (Dates & Topics subject to change)

Date	#	Session Topics and Readings	Assignments & Due Dates
INTRODUCTION			
Jan 15	1	**Course Overview; Research Ideas** - Developing ideas for psychological research Funder, D.C. (2009). Naïve and obvious questions. *Perspectives on Psychological Science*, *4*, 340-344. RDCP, Chapter 1	
Jan 17	2	**What's the Question? Theory & Models** - Specifying testable research questions - Matching the study design to the question - Ethical issues in conducting psychological research RDCP, Chapter 5 BR&N, pp 14-36 Greenwald, A.G. (2012). There is nothing so theoretical as a good method. *Perspectives on Psychological Science, 7*, 99-108.	*Human Subjects Training – Due Jan 28*
Jan 22	3	**Design, Internal & External Validity** - Influence of design on internal & external validity - Threats to validity - Balancing external validity versus theory testing RDCP, Chapter 2 BR&N, pp 37-57. Mook, D.G. (1983). In defense of external invalidity. *American Psychologist, 38,* 379-387.	
Jan 24	4	**Construct Validity** - Placing research questions in a larger context - Building nomological networks - Relation of construct validity to design & to other types of validity RDCP, Chapter 3 (**skim pp 66-76**) Cronbach L.J., Meehl, P.E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52*, 281-302. TBA	**#1 Validity – Due: Mon, Feb 4**
Jan 29	5	**Perspectives: Studying Individual and Group Differences; Ethics in Research, Part 1** - Organismic vs Individual Differences Perspectives - Ethical & methodological issues in studying differences - Historical influences on research participation Cronbach, L.J., (1957). The two disciplines of scientific psychology. *American Psychologist, 12*, 671-684. Helms, J.E., Jernigan, M., & Mascher J. (2005). The meaning of race in psychology and how to change it: A methodological perspective. *American Psychologist, 60*, 27-36. RDCP, Chapter 17, pp. 497-527 American Psychological Association (2010). *Ethical Principles of Psychologists and Code of Conduct*. http://www.apa.org/ethics/code/principles.pdf (**can skim sections 5-7, 9-10**).	

METHODS				
Jan 31	6	**Procedures & Subjects: Reducing Bias** - Procedural threats to validity - Influences of sampling strategies on internal & external validity RDCP, Chapter 4 & Chapter 6 pp 148-161	
Feb 5	7	**Measurement: What are we measuring? Invariance & Validity** - Types of measures - Method bias & threats to validity RDCP, Chapter 13 Campbell, D.T. & Fiske, D.W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56,* 81-105. Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*, 539.	
Feb 7	8	**Measurement: Test theory, Items & Scales; Reliability** - Psychometrics overview - Types of reliability and relation to true score theory - Measurement invariance and equivalence - Item Response Theory - Evaluating items - Evaluating scales BR&N, pp 58-74 Bartko JJ, Carpenter WT (1976). On the methods and theory of reliability. *Journal of Nervous and Mental Disease, 163*, 307-317. TBA	**#2 Measurement – Fri, Feb 22**
Feb 12	9	**Measurement: Classification, Rater & Measure Agreement** - Categorical vs continuous measures - Predicting categorical membership - Specificity, Sensitivity, Predictive value & the Base Rate Problem - Assessing agreement among measures or raters Dawes, R.M. (1962). A note on base rates and psychometric efficiency. *Journal of Consulting Psychology, 26*, 422-424. Kleinmuntz (1990). Why we still use our heads instead of formulas: Towards an integrative approach. *Psychological Bulletin, 107*, 296-310. TBA	
Feb 14	10	**Measurement: Qualitative methods (Guest lecturer: Dr. Donna Spruijt-Metz)** - Applications of qualitative research for measure development - Designing a qualitative study - Focus Group Methods - Analyzing data from qualitative studies Readings: TBA	

Feb 19	11	**Measure Development** - Adapting existing measures: content, administration - New measures: item creation & selection - Scale Validation **Required:** Clark, L.A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7*, 309-319. Dawis, R.V. (1987). Scale construction. *Journal of Consulting Psychology, 34,* 481-489. Schwartz, N. (1999). Self-reports: How the questions shape the answers. *American Psychologist, 54*, 93-105. **Recommended:** Breakwell G, Hammond SM, Fife-Schaw C, Smith JA. (2006). Research Methods in Psychology, Chapters 11 (Questionnaire design) & 12 (Interviewing)	**#3 Individual Differences / Diversity – Mon, Mar 11**
Feb 21	12	**Measurement: New Technologies. (Guest lecturer: Dr. Susan Luczak)** - Do new technologies give better answers to our questions? - Adaptive testing - Social media - Real-time assessment - "Big data" – imaging, genetics, GIS Wilson, R.E., Gosling, S.D. & Graham, L.T. (2012). A review of Facebook research in the social sciences. *Perspectives on Psychological Science, 7*, 203-220. TBA	
Feb 26	13	**EXAM #1 – covers content & readings from Sessions 1-12**	
DESIGN & ANALYSES			
Feb 28	14	**Experimental Design** - Advantages for inference & validity - Practical constraints & limitations on external validity - Application: Clinical Trials RDCP, Chapter 6 Spencer, S.J., Zanna, M.P., & Fong, G.T. (2005). Establishing a causal chain: Why experiments are more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology, 89*, 845-851. TBA	
Mar 5	15	**Quasi-Experimental Design** - Distinctions vs Experimental designs - Application: Prevention Research RDCP, Chapter 7 TBA	
Mar 7	16	**Intervention & Prevention Research** - Threats to validity - Drop-out and Intent to Treat analysis - Understanding how an intervention works - Efficacy and Effectiveness TBA	

Mar 12	17	**Significance Testing; Replication**
		   - Null Hypothesis Significance Testing (NHST)
		   - Type I and Type II errors of Inference
		   - Alternatives to NHST
		RDCP, Chapter 4 pp 66-76; Chapter 15
		Wilkinson L., APA Task Force (1999). Statistical methods in psychology journals. Guidelines and explanations. *American Psychologist, 54,* 594-604	

Mar 14	18	**Power Analysis - Part I**
		   - Steps in conducting a power analysis
		   - Matching the power analysis to the research question
		Cohen J. (1992). A Power Primer. *Psychological Bulletin, 112,* 155-159.
		Prentice, D.A., Miller, D.T. (1992). When small effects are impressive. *Psychological Bulletin, 112,* 160-164.
			**#4 Design –
			Mon, Apr 8**

Mar 19, 21		**(No Class – Spring Break)**	

Mar 26	19	**Observational Research: Within-Group Designs**
		   - Implications for statistical power
		   - Implications for causal inference
		RDCP, Chapter 9
		TBA	

Mar 28	20	**Observational Research: Between-Group Designs**
		   - Limitations on inference
		   - Using cross-sectional research to make longitudinal inferences
		TBA	

Apr 2	21	**Longitudinal Research**
		   - Sampling and attrition issues
		   - Inference implications
		   - Practical issues in conducting longitudinal studies
		McArdle, J.J. (2009). Latent variable modeling of differences and changes with longitudinal data. *Annual Review of Psychology, 60,* 577-605
		TBA	

Apr 4	22	**Family and other Clustered Designs / TBA** TBA	**#5 Power Analysis – Mon, Apr 22**
Apr 9	23	**Power Analysis - Part 2** - Designing power analyses for more complex research designs Review: Cohen J. (1992). A Power Primer. *Psychological Bulletin, 112,* 155-159. TBA	

Apr 11	24	**Evaluating Mechanisms & Causality**
		   - Limits of interaction
		   - Mediation & Moderation
		RDCP, Chapter 8
		Platt, J.R. (1964). Strong inference. *Science, 146,* 347-353.
		TBA	

Apr 16	25	**Synthesizing Results across studies; Publication Bias**	
		- Qualitative Reviews	
		- Quantitative Reviews – meta & mega – analysis	
		- Critiques of meta-analysis	
		Chan, M.E. & Arvey, R.D. (2012). Meta-analysis and the development of knowledge. *Perspectives on Psychological Science, 7,* 79-92.	
		Ferguson, C. J., & Brannick, M. T. (2012). Publication bias in psychological science: Prevalence, methods for identifying and controlling, and implications for the use of meta-analyses. *Psychological Methods, 17,* 120-128. doi: 10.1037/a0024445	
		Rothstein, H. R., & Bushman, B. J. (2012). Publication bias in psychological science: Comment on Ferguson and Brannick (2012). *Psychological Methods, 17,* 129-136. doi: 10.1037/a0027128	
DISCUSSION			
Apr 18	26	**Limitations, Inference & Replication**	
		- Design constraints on inference & validity	
		- Replication and science	
		Kerr, N. L. (1998). HARKing: Hypothesizing after the results are known. Personality and Social Psychology Review, 2, 196-217.	
		BR&N, pp 75-81	
		RDCP, Chapter 16	
Apr 23	27	**Publishing; Research Ethics Part 2**	**Project Write Up – Fri, May 10**
		Bem, D.J. (2003). Writing the empirical journal article. In: Darley, J.M., Zanna, M.P., & Roediger III, H.L. (Eds), *The Compleat Academic: A Practical Guide for the Beginning Social Scientist, 2nd Edition.* Washington DC: American Psychological Association.	
		Fine, M.A. & Kurdek, L.A. (1993). Reflections on determining authorship credit and authorship order on faculty-student collaborations. *American Psychologist, 48,* 1141-1147.	
		Roediger, H.L. (2007). Twelve tips for authors. *APS Observer, 20,* 39-41.	
		Rosenthal, R. (1994). Science and ethics in conducting, analyzing, and reporting psychological research. *Psychological Science*, *5,* 127-134.	
		RDCP, Chapter 17, pp. 527-544	
Apr 25	28	**EXAM #2 -** covers content & readings from Sessions 14-27	
		Presenting Research Findings	
Apr 30	29	**Project Presentations**	
May 2	30	**Project Presentations**	

*Assignments are due by noon on the date specified