# PSY 610: RESEARCH METHODS Winter 2015, M/W 10:00 to 11:50 AM, 383 Straub

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# **Description**

This course will cover methodological and philosophical perspectives on how to conduct and interpret scientific research in psychology. We will take a broad, concept-based approach, covering issues relevant to all areas of psychology. Topics include philosophy of science; design of experimental, quasi-experimental, and observational studies; issues in causal inference, including mediation; measurement; power, effect estimation, and meta-analysis; data visualization; and meta-science.

#### Approach

Thoughtful engagement with research methods is essential to being an effective scientist. That kind of engagement is not a set of static lessons that you commit to memory; it is an ongoing process that should permeate your scientific thinking. The primary goal of this class is to get you started (or help you further along) with that process. We will grapple with a number of fundamental problems in research methods. How do we create, evaluate, and improve theories? How should we think about the relationship between theoretical concepts and empirical measurements? How can we draw sound inferences about cause and effect? How do institutions and incentives affect scientific progress, and how can we improve them?

Therefore, you should not approach this class simply looking for a bag of tricks to solve the methodological problems you'll face in your work. There is no way our coverage could do that for you: methods will evolve during your career, and scientific innovations will generate novel challenges. To be sure, you will learn some practical things in this class – both because they will be useful to many of you, and because diving into applications and particulars is a great counterpoint and anchor to the broad ideas. My hope is that as you learn the specifics, you will also reflect on how they do (and do not) relate to the conceptual problems they are intended to solve, and that you will find them useful without feeling bound by them.

### Grading and requirements

- 30% Participation, reading reactions, and exercises (in-class and homework)
- 40% Quizzes
- 30% Final project

*Participation, reading reactions, exercises.* Much of the educational value of this course will come from class discussions. I expect your active participation in these discussions, and this will require that you have read and thought about the course readings prior to each class meeting. To facilitate discussions, you will generate and post discussion questions based on the readings (3 questions, with at least 1 based on each reading). We will use these discussion questions to guide our discussion. These questions should be posted to Blackboard the night before each class meeting.

From time to time I will assign exercises in class or as homework. These exercises will be announced in class and/or on Blackboard.

You will be permitted 1 unexcused absence; further unexcused absences will count against your grade. Excused absences (for illness, professional conflicts, etc.) must be discussed with me as soon as possible, in advance whenever you can.

*Quizzes*. There will be 3 quizzes given in class. Each one will be worth 10% of your grade, with the best one doubled. They will be a short- and medium-answer format.

*Final project.* The final project will be a critique/analysis of a line of empirical research. It will be done in groups of 2-3 students. You will pick a focused research question, hypothesis, effect, etc. on which there is a small number of published empirical papers (aim for 5 to 20). You will prepare a 30-minute presentation in which you will draw on concepts from this class to discuss and critique the research. You will then present your own followup analyses to further probe how well the data support the original conclusions and/or address novel questions (this may be a meta-analysis, secondary analysis of published data, re-analysis of primary data if available, etc.). More details will be given in class.

## Accessibility

If aspects of this course will create disability-related barriers to your learning, please talk to me as soon as possible. I also encourage you to contact the Accessible Education Center (http://aec.uoregon.edu or uoaec@uoregon.edu.). If you will need adjustments to exams or other assignments, please notify me within the first week of classes and provide a letter from the AEC describing the necessary adjustments.

# Changes

Topics, readings, course requirements, or other aspects of this course may be changed at the instructor's discretion at any time. Changes will be announced in class or on the course website.

# SCHEDULE AND READINGS

### Two important notes about the readings:

1. Always complete readings before the class meeting where we cover a topic.

2. A few of the readings may change from what is listed below – for example, if I discover a better reading on a given topic. My assumption is that students typically read for the next class and occasionally 1 beyond that. If you are going to get a jump on things and read even further ahead (which is great!), please check with me first.

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Jan 5: Introduction and overview

No assigned readings.

#### Jan 7: What shall we study?

McGuire, W. J. (1997). Creative hypothesis generating in psychology: Some useful heuristics. *Annual Review of Psychology*, 48, 1-30.

Rozin, P. (2001). Social psychology and science: Some lessons from Solomon Asch. *Personality* and Social Psychology Review, 5, 2-14.

Schwartz, M. A. (2008). The importance of stupidity in scientific research. *Journal of Cell Science*, *121*, 1771.

## Jan 12: Evaluating theories

Meehl, P. E. (1990). Appraising and amending theories: The strategy of Lakatosian defense and two principles that warrant it. *Psychological Inquiry*, *1*, 108-141.

Platt, J. R. (1964). Strong inference. Science, 146, 347-353.

#### Jan 14: Theoretical constructs

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, *52*, 281-302.

Strauss, M. E., & Smith, G. T. (2009). Construct validity: Advances in theory and methodology. *Annual Review of Clinical Psychology*, *5*, 1-25.

#### Jan 19: Martin Luther King, Jr. Day

No class today.

#### Jan 21: Reliability and validity: Practical issues

John, O. P., & Soto, C. J. (2007). The importance of being valid: Reliability and the process of construct validation. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of Research Methods in Personality Psychology* (pp. 461-494). New York: Guilford.

Furr, R. M., & Funder, D. C. (2007). Behavioral observation. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of Research Methods in Personality Psychology* (pp. 273-291). New York: Guilford.

## Jan 26: Neuroimaging methods / Guest speaker Elliot Berkman

Readings TBA

#### Jan 28: Hormone assessment / Guest speaker Pranj Mehta

Nelson, R. J. (2005). Chapter 2: The endocrine system. *An Introduction to Behavioral Endocrinology (3rd edition)*. Sinauer: MA.

Schultheiss, O. C. & Stanton, S. J. (2009). Assessment of salivary hormones. *Methods in Social Neuroscience*. Guilford: NY.

### Feb 2: Power, precision, and estimation

## \*\*\* **QUIZ 1 TODAY**\*\*\*

Cohen, J. (1992). A power primer. Psychological Bulletin, 112, 155-159.

Cumming, G. (2014). The new statistics: Why and how. Psychological Science, 25, 7-29.

Schönbrodt, F. D., & Perugini, M. (2013). At what sample size do correlations stabilize? *Journal of Research in Personality*, 47, 609-612.

### Feb 4: Meta-analysis

Rosenthal, R., & DiMatteo, M. R. (2001). Meta-analysis: Recent developments in quantitative methods for literature reviews. *Annual Review of Psychology*, *52*, 59-82.

Chapter 7 from: Cumming, G. (2012). Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis. Routledge.

### Feb 9: Causal inference

Holland, P. W. (1986). Statistics and causal inference. *Journal of the American statistical Association*, *81*, 945-960.

West, S. G., & Thoemmes, F. (2010). Campbell's and Rubin's perspectives on causal inference. *Psychological Methods*, *15*, 18-37.

## Feb 11: Mediation

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879-891.

Bullock, J. G., Green, D. P., & Ha, S. E. (2010). Yes, but what's the mechanism? (Don't expect an easy answer). *Journal of Personality and Social Psychology*, *98*, 550-558.

#### Feb 16: Missing data and selection bias

Enders, C. K. (2013). Dealing with missing data in developmental research. *Child Development Perspectives*, 7, 27-31.

West, S. G., & Sagarin, B. J. (2000). Participant selection and loss in randomized experiments. *Research Design: Donald Campbell's Legacy*, *2*, 117-154.

Winship, C., & Elwert, F. (2014). Endogenous selection bias. *Annual Review of Sociology*, 40, 31-53.

# Feb 18: Exploratory data analysis

## \*\*\* QUIZ 2 TODAY\*\*\*

Behrens, J. T. (1997). Principles and procedures of exploratory data analysis. *Psychological Methods*, *2*, 131-160.

Hyndman, R. K. (2010). Why every statistician should know about cross-validation. http://robjhyndman.com/hyndsight/crossvalidation/

# Feb 23: Visualizing data

Excerpts from: Cleveland, W. S. (1985). *The elements of graphing data*. Monterey, CA: Wadsworth Advanced Books and Software.

### Feb 25: Researcher flexibility

Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological science*, *22*, 1359-1366.

Gelman, A., & Loken, E. (2013). The garden of forking paths: Why multiple comparisons can be a problem, even when there is no "fishing expedition" or "p-hacking" and the research hypothesis was posited ahead of time.

# Mar 2: Self-report methods / Guest speaker Gerard Saucier

Readings TBA

# Mar 4: Publication bias

Schimmack, U. (2012). The ironic effect of significant results on the credibility of multiple-study articles. *Psychological Methods*, *17*, 551-566.

Brandt, M. J., IJzerman, H., Dijksterhuis, A., Farach, F. J., Geller, J., Giner-Sorolla, R., et al. (2014). The replication recipe: What makes for a convincing replication? *Journal of Experimental Social Psychology*, *50*, 217-224.

# Mar 9: Quiz and presentations

# \*\*\* **QUIZ 3 TODAY**\*\*\*

No assigned readings.

# Mar 11: Presentations

No assigned readings.