PSY 610: RESEARCH METHODS Winter 2019, Tu/Th 10:00 to 11:50 AM, 252 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 (1 question per assigned reading). We will use these discussion questions to guide our discussion. These questions should be posted to Canvas 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 Canvas.

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 10). 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, p-curve or other bias test, 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

Three important notes about the readings:

1. Always complete readings <u>before</u> 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, or if a class discussion suggests a different direction might be better. 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.

3. When you see "Dienes" on the reading list, it refers to a chapter from the book *Understanding psychology as a science: An introduction to scientific and statistical inference* by Zoltan Dienes. I will post PDFs; however, it's a good book and I encourage you to purchase a copy for yourself.

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Week 1

Jan 8: Introduction

No assigned readings

Jan 10: Thinking like a scientist

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

Merton, R.K. (1973)[1942]. The normative structure of science. In R.K. Merton (Ed.) The sociology of science: Theoretical and empirical investigations (pp. 267-280). Chicago, IL: University of Chicago Press.

Week 2

Jan 15: Some philosophy of science

Dienes, chapters 1-2

[WATCH] Oreskes, "Why we should trust scientists." https://www.ted.com/talks/naomi_oreskes_why_we_should_believe_in_science

Jan 17: Evaluating theories

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

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

Hall, J. A., & Mast, M. S. (2009). Five ways of being "theoretical": Applications to provider– patient communication research. *Patient Education and Counseling*, 74, 282-286. Week 3

Jan 22: Theoretical constructs

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

Flake, J. K., Pek, J., & Hehman, E. (2017). Construct validation in social and personality research: Current practice and recommendations. *Social Psychological and Personality Science*, 8(4), 370-378.

Jan 24: 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.

Week 4

Jan 29: Self-report methods

QUIZ 1 IN CLASS TODAY

Paulhus, D. L., & Vazire, S. (2007). The self-report method. *Handbook of research methods in personality psychology*, *1*, 224-239.

Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7, 309 - 319.

Jan 31: Inferences about the mind from brains and genes

Poldrack, R. A. (2010). Mapping mental function to brain structure: how can cognitive neuroimaging succeed? *Perspectives on Psychological Science*, *5*, 753-761.

Turkheimer, E. (2000). Three laws of behavior genetics and what they mean. *Current Directions in Psychological Science*, *9*, 160-164.

Chavez, R. (2018). "This is your Brain on Psychology – This is your Psychology on Brain." <u>https://thehardestscience.com/2018/11/30/this-is-your-brain-on-psychology-this-is-your-psychology-on-brain-a-guest-post-by-rob-chavez/</u>

Week 5

Feb 5: Causal inference

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

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.

Rohrer, J. M. (2018). Thinking clearly about correlations and causation: Graphical causal models for observational data. *Advances in Methods and Practices in Psychological Science*, *1*(1), 27-42.

Feb 7: No class

Week 6

Feb 12: Missing data and selection bias

Rhemtulla, M., & Little, T. D. (2012). Planned missing data designs for research in cognitive development. *Journal of Cognition and Development*, 13(4), 425-438.

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

Feb 14: Statistical hypothesis testing

Dienes, chapter 3

Button, K.S., Ioannidis, J.P.A., Mokrysz, C., Nosek, B.A., Flint, J., Robinson, E.S.J., & Munafo, M.R. (2013). Power failure: Why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience*, *14*, 365-376.

Vazire, S. (2015). "why p = .048 should be rare (and why this feels counterintuitive)." <u>https://sometimesimwrong.typepad.com/wrong/2015/06/why-p-048-should-be-rare-and-why-this-feels-counterintuitive.html</u>

Week 7

Feb 19: Effect estimation and interpretation

QUIZ 2 IN CLASS TODAY

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. 21: Visualizing data

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

Week 8

Feb 26: Ethical issues in science

Thompson, D. F. (1993). Understanding financial conflicts of interest. *New England Journal of Medicine*, *329*, 573-573.

Rosenthal, R. (1994). Science and ethics in conducting, analyzing, and reporting psychological research. *Psychological Science*, *5*, 127-134.

Bakker, M., van Dijk, A., & Wicherts, J. M. (2012). The rules of the game called psychological science. *Perspectives on Psychological Science*, *7*, 543-554.

Feb 28: Cumulative science

Zwaan, R. A., Etz, A., Lucas, R. E., & Donnellan, M. B. (2018). Making replication mainstream. *Behavioral and Brain Sciences*, *41-*.

Corker, K. S. (2018, August 10). Strengths and Weaknesses of Meta-Analyses. https://doi.org/10.31234/osf.io/6gcnm

Pashler, H., & Harris, C. R. (2012). Is the replicability crisis overblown? Three arguments examined. *Perspectives on Psychological Science*, *7*, 531-536.

Week 9

Mar 5: Preregistration

Nosek, B. A., Ebersole, C. R., DeHaven, A. C., & Mellor, D. T. (2018). The preregistration revolution. *Proceedings of the National Academy of Sciences*, 201708274.

Srivastava, S. (2018, November 21). Sound Inference in Complicated Research: A Multi-Strategy Approach. https://doi.org/10.31234/osf.io/bwr48

Mar 7: Credibility and transparency

Meyer, M. N. (2018). Practical tips for ethical data sharing. Advances in Methods and Practices in Psychological Science, 1, 131-144.

Reardon, K. W., Corker, K. S., & Tackett, J. L. (2018, August 31). The Emerging Relationship Between Clinical Psychology and the Credibility Movement. https://doi.org/10.31234/osf.io/46rk5

Week 10

Mar 12: Presentations

QUIZ 3 IN CLASS TODAY

No assigned readings

Mar 14: Presentations; wrapup

No assigned reading

Finals week

NO FINAL EXAM