

Experimental Study of Social Behavior

Professor Luke Chang, PhD

PSYC 63 Winter 2017 Room 302	MWF 11:30-12:35 x-period Tuesday 12:15-1:05
Office Hours Location: Moore Hall 357	Wed 1-3pm luke.j.chang@dartmouth.edu 603.646.2056
Teaching Assistant Jin Cheong	Office Hours: Fri 12:30-1:30 Moore 144 jin.cheong.gr@dartmouth.edu

COURSE DESCRIPTION AND OBJECTIVES

As computers become increasingly integrated with our daily lives, there is an unprecedented amount of data recording how humans interact with the world through the internet, mobile sensing, and social media. There is currently overwhelming demand for social scientists who know how to use this data to answer questions about social behavior. This course provides an introduction to data science and explores modern issues pertaining to experimental design, hypothesis testing, and data collection and analysis. Students will be expected to design, run, and analyze, and write up an experiment answering a question of their choosing. Students will learn how to use the open source Python language to process, analyze, and visualize data. This class will be useful for students planning to go on to graduate school or work in industry as a data analyst/scientist.

Goals

- 1) Learn how to think critically about psychological research
- 2) Learn about key issues in experimental design and data analysis
- 3) Learn how to answer questions using experiments and applied data analysis
- 4) Learn basics of how to use Python in psychological research

Requirements:

PSYC: 11, 23

ASSIGNMENTS

READINGS We will be reading published peer-reviewed articles and book chapters. Reading the materials before class is essential to a successful course experience. Some of the readings can be dense. Reading the materials before class will aid in being 'primed' to understand the lecture or presentation material and is essential to participating in the class discussions. The reading list and electronic PDFs (or links) will be posted on Canvas.

SMALL PROJECTS (50%)

Idea Proposals (20%). In this project you will learn what it is like to pitch an idea to your lab, supervisor, or funding agency. You will be expected to develop and propose two interesting ideas (background, idea, experimental design, potential implications). You will write a short papers developing and pitching an interesting idea and how it might be experimentally tested (1-2 pages). You will present each project to the class in a datablitz format. This entails preparing approximately a 5 minute presentation (approximately 5 slides). The class will collectively provide constructive feedback on the idea and how to potentially improve the design. You will be graded on the quality of your idea and experimental design and your participation in the discussion of every

- Paper: 10%
- Presentation: 5%
- Participation: 5%

Paper Reviews (10%). In this project you will learn what it is like to be an anonymous reviewer on a paper submitted to a journal for publication. You will be expected to select two published papers on any topic of interest to you. You will then write a short review of the paper and critique. This includes a summary of the paper, the key question tested, how it was tested, and the key findings for the author's argument. You will provide a brief critique of the paper including an opinion about whether you believe the evidence and suggestions for improvement. Paper reviews are due the day you present in class.

- Paper: 10%
- Presentation: 5%
- Participation: 5%

Data Analysis (20%). In this project you will learn how to be a data scientist through 2 separate projects. You will find an existing dataset of your choice, develop a research question, and test it. You will be expected to perform data munging/preprocessing, data analysis, and visualization. For project 1, you will write up a short paper (1-3 pages) with your idea, your methods, results, and conclusions. Be sure to describe your data, the analyses and provide some sort of visualization. For project 2, you will present your idea, methods, results, and conclusions to your peers. Papers and presentations should adhere to the following format.

- (1) Introduction: Provide a context for your question – Why is this question important? What background information is necessary to know?
 - (2) Methods: Provide a brief overview of dataset and preprocessing and analysis methods
 - (3) Results: What are your key findings?
 - (4) Discussion: What are the implications of these results for your question? Why should anyone care about this?
- Data Analysis Project 1 - Paper: 10%
 - Data Analysis Project 2 - Presentation: 10%

LAB PROJECTS (20%)

There will be several classes dedicated to learning basic laboratory computing skills. These exercises will be using Jupyter Notebooks in Python and will cover things like basic programming (<https://github.com/ljchang/psyc63>). How to load and manipulate data. How to perform different types of data analyses. Finally, there will be a few classes focused on learning basic data science skills such as how to programmatically access data via websites, how to perform basic social network analysis, and how to analyze and visualize more complicated data structures.

- Lab Project Assignment Completion: 20%

RESEARCH PROJECTS (30%)

A key component of this course is learning how to carry out an independent research project. Collaboration is a critical part of the scientific process. Students will work individually or with a small group to develop a research question and an experimental design to test it, collect data, analyze it, and write up the results. Each person will independently write a final report of the research. The final written paper should be in journal format using APA style with an abstract, intro, methods, results, discussion, and references. Format 12-20 typed double-space pages, 11pt Ariel or Times font. (bibliography not included in the page limit). Each person is expected to write their own intro and conclusion, but the group can collaborate on the methods and results sections if they want. At the end of the class each group will give a 15 minute presentation on their project (background, hypothesis, experimental design, results, analyses, conclusions)

- Paper: 15%
- Presentation: 10%
- Group participation: 5%

Paper due 6/1, but can be turned in at any point during the quarter. *Late papers are accepted, but one letter grade lower for each 24 hr period it is late. This includes lateness due to conflicts related to athletics and other coursework (plan ahead).

CLASSROOM POLICIES

HONOR CODE Students in PSYC 63 are expected to strictly adhere to the Dartmouth Academic Honor Principle. As described in the Student Handbook, fundamental to the principle of independent learning is the requirement of honesty and integrity in the performance of academic assignments, both in the classroom and outside. Dartmouth operates on the principle of academic honor. Students who submit work that is not their own or who commit other acts of academic dishonesty will forfeit the opportunity to continue at Dartmouth. If you have questions or concerns regarding this policy during the course, please contact Professor Chang.

PLAGIARISM Writing about scientific publications without just rephrasing is difficult, particularly when not everything is fully understood. Doing this properly takes time and practice, and one goal of the course is to move us in that direction. I don't expect to see a perfect scientific treatment at this stage. But I do want to see evidence of **independent thought** when considering the material and implications (rather than just regurgitating it), and some degree of creativity. When quoting, be sure appropriate citations are made.

MISSED ASSIGNMENTS A student will only be excused from an assignment by permission of the Instructor and on the basis of a written note from a dean, doctor, or supervisor of official college- sponsored events being held off-campus and requiring a students' absence. If excused, a make-up must be taken as soon as possible (usually within 1 day of the originally-scheduled exam/assignment date).

LATE ASSIGNMENTS All papers and presentations are due at the date and time specified. Scores for late papers will be reduced by 10% for every 24-hour period a paper is late. No extensions will be granted due to computer failure, roommate difficulties, printing problems, etc. According to College policy, there are no excused absences from class for participation in College-sponsored extracurricular activities.

TECHNOLOGY Computers and tablets may be used in class, but use of cell phones will not be permitted (no phone calls, ringers, or texting).

DISABILITIES Any student with a documented disability needing academic adjustments or accommodations is requested to speak with me **by the end of the second week of the term**. All discussions will remain confidential, although the Academic Skills Center may be consulted to verify the documentation of the disability.

RELIGIOUS OBSERVANCES Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance which conflicts with your participation in the course, please meet with me **by the end of the second week of the term** to discuss appropriate accommodations.

Class Type	Date	Day	Method Topic	Discussion Topic	Assignments
Lecture	1/4/2017	Wednesday	Class Introduction		
Lecture	1/6/2017	Friday	Validity	Power Poses	
Lab	1/9/2017	Monday	Introduction to Programming	Psychoinformatics	
Lecture	1/11/2017	Wednesday	Bias	Behavioral Priming	
Lecture	1/13/2017	Friday	P-Hacking	Academic Careers	Programming Lab Due
No Class	1/16/2017	Monday	No Class: MLK Day		
Lab	1/17/2017	Tuesday (x-hour)	Data Analysis I: Pandas/Plotting		Paper Review Studies Due
No Class	1/18/2017	Wednesday	No Class: Luke Away		
Lab	1/20/2017	Friday (Luke Away)	Data Analysis II: Regression		Data Analysis 1: Lab Due
Lecture	1/23/2017	Monday	Idea Proposal Presentations	Idea Proposal Presentations	Idea Proposal #1 Due
Lab	1/25/2017	Wednesday	Replicability		Data Analysis 2 Lab Due

Lecture	1/27/2017	Friday	Data Analysis III: Classification	Prediction & Cross- validation	Data Analysis #1 Paper Due
Presentations	1/30/2017	Monday	Project Proposals	Project Proposals	Project Proposal
Presentations	2/1/2017	Wednesday	Student Paper Reviews	Student Paper Reviews	Paper Reviews
Presentations	2/3/2017	Friday	Student Paper Reviews	Student Paper Reviews	Paper Reviews
Lab	2/6/2017	Monday	Data Analysis IV: Mediation & Moderation		Data Analysis 3 Lab Due
Lecture	2/8/2017	Wednesday	Power		
Lecture	2/10/2017	Friday	Social Networks		Data Analysis 4 Lab Due
Lab	2/13/2017	Monday	Stimulus Presentation: Psychopy		
Lecture	2/15/2017	Wednesday	Experience Sampling		
Lecture	2/17/2017	Friday	Mobile Sensing		Stimulus Presentation Lab Due
Presentations	2/20/2017	Monday	Data Analysis Presentations	Data Analysis Presentations	Data Analysis #2 Presentation
Presentations	2/22/2017	Wednesday	Data Analysis Presentations	Data Analysis Presentations	Data Analysis #2 Presentation
Lab	2/24/2017	Friday	Psychophysiology		
Lecture	2/27/2017	Monday	Mechanical Turk	Meteor Demonstration	Psychophysiology Lab Due
Presentations	3/1/2017	Wednesday	Idea Proposal Presentations	Idea Proposal Presentations	Idea Proposal #2 Due
Lab	3/3/2017	Friday	Project Data Analysis Lab	Project Data Analysis Lab	
Lab	3/5/2017	Monday	Project Data Analysis Lab	Project Data Analysis Lab	
Lecture	3/8/2017	Wednesday	Final Class		
Presentations	3/13/2017	Friday	Project Presentations	Project Presentations	Project Presentations/Final Paper Due

READINGS

Validity

Fiske, S.T.. (2014). Chapter 1: Scratch an itch with a brick: Why we do research. In Reis, H. T., & Judd, C. M. (Eds). Handbook of research methods in social and personality psychology. (2nd Edition). Cambridge University Press.

Brewer, M.B. & Crano, W.D. (2014). Chapter 2: Research design and issues of validity. In Reis, H. T., & Judd, C. M. (Eds). Handbook of research methods in social and personality psychology. (2nd Edition). Cambridge University Press.

Power Poses

http://www.nytimes.com/2014/09/21/fashion/amy-cuddy-takes-a-stand-TED-talk.html?_r=0

Carney, D. R., Cuddy, A. J., & Yap, A. J. (2010). Power posing brief nonverbal displays affect neuroendocrine levels and risk tolerance. *Psychological Science*, 21(10), 1363-1368.

Ranehill, E., Dreber, A., Johannesson, M., Leiberg, S., Sul, S., & Weber, R. A. (2015). Assessing the Robustness of Power Posing No Effect on Hormones and Risk Tolerance in a Large Sample of Men and Women. *Psychological science*, 0956797614553946.

Psychoinformatics

Yarkoni, T. (2012). Psychoinformatics new horizons at the interface of the psychological and computing sciences. *Current Directions in Psychological Science*, 21(6), 391-397.

Bias

Rosenthal, R., & Jacobson, L. (1968). Pygmalion in the classroom. *The Urban Review*, 3(1), 16-20.

Priming

<http://www.nytimes.com/2007/07/31/health/psychology/31subl.html>

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of personality and social psychology*, 71(2), 230.

Doyen, S., Klein, O., Pichon, C. L., & Cleeremans, A. (2012). Behavioral priming: it's all in the mind, but whose mind?. *PloS one*, 7(1), e29081.

P - Hacking

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*, 0956797611417632.

Head, M. L., Holman, L., Lanfear, R., Kahn, A. T., & Jennions, M. D. (2015). The extent and consequences of p-hacking in science. *PLoS Biol*, 13(3), e1002106.

Regression

Gelman, A., & Hill, J. (2006). Chapter 3. Linear Regression: The basics. In *Data analysis using regression and multilevel/hierarchical models*. (pp. 31-51). Cambridge University Press.

Gelman, A., & Hill, J. (2006). Chapter 4. Linear Regression: Before and after fitting the model. In *Data analysis using regression and multilevel/hierarchical models*. (pp. 55-77). Cambridge University Press.

Replication

Klein, R. A., Ratliff, K. A., Vianello, M., Adams Jr, R. B., Bahník, Š., Bernstein, M. J., ... & Cemalcilar, Z. (2014). Investigating variation in replicability. *Social Psychology*.

Open Science Collaboration. (2015). Estimating the reproducibility of psychological science. *Science*, 349(6251), aac4716.

Dreber, A., Pfeiffer, T., Almenberg, J., Isaksson, S., Wilson, B., Chen, Y., ... & Johannesson, M. (2015). Using prediction markets to estimate the reproducibility of scientific research. *Proceedings of the National Academy of Sciences*, 112(50), 15343-15347.

Prediction and Cross-Validation

Yarkoni, T. & Westfall, J. (Under Review). Choosing prediction over explanation in psychology: Lessons in machine learning.

Gelman, A., & Hill, J. (2006). Chapter 5. Logistic Regression. In *Data analysis using regression and multilevel/hierarchical models*. (pp. 79-108). Cambridge University Press.

Mediation & Moderation

Judd, C. M., Yzerbyt, V.Y. & Muller, D. (2014). Chapter 25: Mediation and moderation. In Reis, H. T., & Judd, C. M. (Eds). Handbook of research methods in social and personality psychology. (2nd Edition). Cambridge University Press.

Power

Button, K. S., Ioannidis, J. P., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S., & Munafò, M. R. (2013). Power failure: why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience*, 14(5), 365-376.

Yarkoni, T. (2009). Big correlations in little studies: Inflated fMRI correlations reflect low statistical power—Commentary on Vul et al.(2009). *Perspectives on Psychological Science*, 4(3), 294-298.

Ioannidis, J. P. (2005). Why most published research findings are false. *PLoS Med*, 2(8), e124.

Social Networks

Fowler, J. H., & Christakis, N. A. (2008). Dynamic spread of happiness in a large social network: longitudinal analysis over 20 years in the Framingham Heart Study. *Bmj*, 337, a2338.

Experience Sampling

Reis, H.T., Gable, S.L., & Maniaci, M.R. (2014). Chapter 15: Methods for studying everyday experience in its natural context. In Reis, H. T., & Judd, C. M. (Eds). Handbook of research methods in social and personality psychology. (2nd Edition). Cambridge University Press.

Heller, A. S., Fox, A. S., Wing, E. K., McQuisition, K. M., Vack, N. J., & Davidson, R. J. (2015). The neurodynamics of affect in the laboratory predicts persistence of real-world emotional responses. *The Journal of Neuroscience*, 35(29), 10503-10509.

Mobile Sensing

Mehl, M. R., & Pennebaker, J. W. (2003). The sounds of social life: a psychometric analysis of students' daily social environments and natural conversations. *Journal of personality and social psychology*, 84(4), 857.

Eagle, N., Pentland, A. S., & Lazer, D. (2009). Inferring friendship network structure by using mobile phone data. *Proceedings of the national academy of sciences*, 106(36), 15274-15278.

Psychophysiology

Blascovitch, J. (2014). Chapter 6: Using physiological indexes in social psychological research. In Reis, H. T., & Judd, C. M. (Eds). Handbook of research methods in social and personality psychology. (2nd Edition). Cambridge University Press.

Mechanical Turk

Maniaci, M.R., & Rogge, R.D. (2014). Chapter 17: Conducting research on the internet. In Reis, H. T., & Judd, C. M. (Eds). Handbook of research methods in social and personality psychology. (2nd Edition). Cambridge University Press.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk a new source of inexpensive, yet high-quality, data?. *Perspectives on psychological science*, 6(1), 3-5.

Crump, M. J., McDonnell, J. V., & Gureckis, T. M. (2013). Evaluating Amazon's Mechanical Turk as a tool for experimental behavioral research. *PloS one*, 8(3), e57410.