Psychology 190 -- The Nature of Evidence

Fall 2018
Tuesdays 3 – 5:30
PAIS Building, Room 494

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In this class we will focus on how scientists come to know what we know, with a particular emphasis on the nature of evidence used to answer scientific questions and how this is similar to the kinds of evidence used in some other fields and how it differs from what constitutes evidence in many other disciplines. We will have a series of guest speakers throughout the course, comprising Emory scientists from a variety of disciplines, including genetics, neuroscience, and psychology, drawn both from Emory College and the Medical School, as well as from the Centers for Disease Control. Each speaker will provide an example of an important question in their field of study and how they tried to answer it, placing their own work in the broader context of other research conducted in their domain.

Goals: The primary goals for the course are to furnish students with an understanding of how scientists choose questions for study and how they become known for their work. Students will be responsible for attending all of these guest lectures, preparing a set of questions for each speaker, participating in class discussions that follow each of these talks, and giving a brief presentation on one of the scientists. Students also will be responsible for reading and discussing articles and/or chapters specific to each speaker's research topic, as well as about the nature of evidence in science in general. There also will be several oral and written assignments throughout the course. In addition to the specific topics covered by each speaker, we will have more general discussions regarding the nature of evidence in science, science versus pseudoscience, and methods for judging the impact and contributions of individual scientists. Students are expected to complete assignments on time and to participate actively in class discussion.

Course Outline

Dates:

Week 1: Tuesday 9/4: Initial getting to know one another session, take pre-tests.

Week 2 Tuesday 9/11: Scott Lilienfeld talk on "Intellectual Humility"; Discuss talk

Week 3 Tuesday 9/18:Watch "Moneyball" & begin discussing the book and movie

Week 4 Tuesday 9/25: Finish discussing "Moneyball"

Week 5 Tuesday 10/2: Rohan Palmer talk on "Genetic risk for substance abuse"

Week 6 Tuesday 10/9: Fall Break
(work on presentations on *Freakonomics* or *SuperFreakonomics* chapter)

Week 7 Tuesday 10/16: Danny Dilk's talk on "Some Tips for Critically Evaluating fMRI Studies"**;** Discuss talk

Week 8 Tuesday 10/23: **Student presentations on *Freakonomics* and *SuperFreakonomics* chapters**

Week 9 Tuesday 10/30: **Student presentations on *Freakonomics* and *SuperFreakonomics* chapters**

Week 10 Tuesday 11/6: Michael Treadway's talk on "Mood, momentum and dopamine"; discuss talk

Week 11 Tuesday 11/13: Stella Lourenco's talk on "Developmental science approaches to understand the relation between spatial reasoning and mathematical competence"; discuss talk
(Begin work on **Written *Freakonomics or SuperFreakonomics* Assignment**)

Week 12 Tuesday 11/20: No class, Thanksgiving break

Week 13 Tuesday 11/27: Jen Mulle's talk on "Chromosome, Interrupted: 3q29 deletion and risk for neuropsychiatric phenotypes"; Discuss talk

Week 14 Tuesday 12/4: Irwin Waldman talk on "The Structure and Genetics of Childhood Externalizing Disorders: Past, Present, and Future"; Discuss talk

Week 15 Tuesday 12/11: **Finish up student TED Talks; complete post tests; Turn in *Freakonomics / Super-Freakonomics* Essay Assignment**

Readings

1. Michael Lewis *Moneyball: The art of winning an unfair game*. New York: W.W. Norton & Co.
2. Steven D. Levitt and Stephen J. Dubner. *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything.* New York: William Morrow Paperbacks.
3. Steven D. Levitt and Stephen J. Dubner. *SuperFreakonomics: Global Cooling, Patriotic Prostitutes, and Why Suicide Bombers Should Buy Life Insurance*. New York: William Morrow Paperbacks.

Articles and chapters will be assigned each week and email'ed as pdf files or web links.

Dates:

Week 1: Tuesday 9/4: Prepare for Scott Lilienfeld's talk, pretests
Readings: Carl Sagan, The Burden of Skepticism, *Skeptical Inquirer*, Volume 12, Fall 1987. https://www.csicop.org/si/show/burden_of_skepticism
Frank Bruni. How to get the most out of college. *The NY Times*, August 17, 2018.

Week 2 Tuesday 9/11: Scott Lilienfeld's talk / Discuss, **Begin reading "Moneyball"**

Week 3 Tuesday 9/18: Watch "Moneyball" in class /
Continue reading "Moneyball" for class discussion

Week 4 Tuesday 9/25: Finish discussing "Moneyball" / Prepare for Rohan Palmer's talk
Readings: 1. Palmer, R.H. et al. (In press). CNR1 and FAAH Variation and Affective States Induced by Marijuana Smoking. *American Journal of Drug and Alcohol Abuse.*

Week 5 Tuesday 10/2: Discuss Rohan Palmer's talk
Readings: **Start reading and preparing presentations on *Freakonomics* or *SuperFreakonomics* chapter over Fall Break**

Week 6 Tuesday 10/9: Fall Break / Prepare for Danny Dilks' talk
Readings: 1. Kanwisher, N., McDermott, J., & Chun M.M. (1997). The Fusiform Face Area: A Module in Human Extrastriate Cortex Specialized for Face Perception. *The Journal of Neuroscience*, *17*, 4302-4311.

Week 7 10/16: Discuss Danny Dilks' talk / **Prepare for Student presentations**

Week 8 Tuesday 10/23: **Student presentations**

Week 9 Tuesday 10/30: **Student presentations** / Prepare for Michael Treadway's talk
Readings: 1. Arulpragasam AR, Cooper JA, Nuutinen MR, Treadway MT. (in press). "Cortico-insular circuits encode subjective value expectation and violation for effortful goal directed behavior". *Proceedings of the National Academy of Sciences.*

Week 10 Tuesday 11/6: Discuss Michael Treadway's talk / Prepare for Stella Lourenco's talk
Readings: 1.Lauer, J. & Lourenco, S.F. (2016). Spatial Processing in Infancy Predicts Both Spatial and Mathematical Aptitude in Childhood. *PsychologicalScience*, 1 –8.

Week 11 Tuesday 11/13: Discuss Stella Lourenco's talk /
Work on *Freakonomics* / *SuperFreakonomics* chapter essay over Thanksgiving break

Week 12 **Tuesday 11/20: No class, Thanksgiving Break;** Prepare for Jen Mulle's talk
Readings: 1.Mulle JG1, Dodd AF, McGrath JA, Wolyniec PS, Mitchell AA, Shetty AC, Sobreira NL, Valle D, Rudd MK, Satten G, Cutler DJ, Pulver AE, Warren S. (2010). Microdeletions of 3q29 confer high risk for schizophrenia. *American Journal of Human Genetics, 87,* 229-36.
2. Mulle, JG. (2015). The 3q29 deletion confers >40-fold increase in risk for schizophrenia. *Molecular Psychiatry, 20,* 1028-9.
3. Glassford MR, Rosenfeld JA, Freedman AA, Zwick ME, Mulle JG; Unique Rare Chromosome Disorder Support Group. (2016). Novel features of 3q29 deletion syndrome: Results from the 3q29 registry. *American Journal of Medical Genetics, 170,* 999-1006.

Week 13 Tuesday 11/27: Discuss Jen Mulle's talk / Prepare for Irwin Waldman's talk
Readings: 1. DeMontis, D. et al. (In press). Discovery of the first genome-wide associations for ADHD. *Nature Genetics*.
Work on *Freakonomics* / *SuperFreakonomics* chapter essay

Week 14 Tuesday 12/4: Discuss Irwin Waldman's talk / Student Presentations of TED Talks
Work on *Freakonomics* / *SuperFreakonomics* chapter essay

Week 15 Tuesday 12/11: Finish Student Presentations of TED Talks; posttests
Finish *Freakonomics* / *SuperFreakonomics* chapter essay

GRADING AND ASSIGNMENTS

There will be several assignments in this class on which your grades will be based. These are described below:

Presentation on Guest Speaker: Each student will be responsible for doing an in-class presentation on one of the guest speakers during the class session of their talk or preceding their talk. Presentations will be evaluated based on the depth and relevance of the background material on the researcher, the quality of material in and the organization of the powerpoint slides prepared, and the clarity of the presentation itself. **(worth 15% of grade)**

Methodological critique: This is an assignment that consists of two stages. In the first stage, you will be required to read a chapter in either *Freakonomics* or *SuperFreakonomics* and to give a 10-15 minute presentation describing the topic of the research and the methodology used therein. This presentation will occur around the middle of the semester, as indicated on the syllabus below. I will provide feedback on your presentation to help you with stage 2. In the second stage, for the end of the semester you will be required to write a brief essay (i.e., ~ 5 pages), describing the topic of the research and its methodology, and specifying any flaws in the research design & methods used in the studies portrayed in that chapter, & describing how you might design a better study on that topic that addresses the research questions raised. **(worth 30% of grade)**

Pretests and Posttests on Critical Thinking and Basic Scientific Concepts: Each student will complete two pre-tests and post-tests assessing critical thinking and familiarity with fundamental scientific concepts. (**these tests will count for a total of 5% of your grade)**

TED Talks: Each student will find 2 TED talks they will share with the class in which the TED speaker either embodies the effective use of evidence to make their point, or asserts their views largely or entirely devoid of evidence. **(this will count for 10% of your grade)**

Summary of and Questions on the Readings: You will be required to read the assigned readings before each class and to prepare a brief summary of, and 2 questions from, those readings prior to class and 2 questions following guest lectures and class discussions. **(worth 20% of grade)**

Class participation: You will be required to attend all class sessions and to ask questions of the speakers after their talks, as well as to participate in the class discussions more generally. Note that simply attending each class session, completing the readings, preparing the questions, paying close attention, and actively participating in class discussion will earn you full credit for these class sessions. You will get **no credit** for a class session if you miss it, fall asleep, text, email, take a phone call, make a phone call, do not participate in the discussion, or otherwise act in an unprofessional manner in that class. These guest speakers are very busy scientists who are willing to take the time to come and speak to us about their research and about science. Thus, you'll be expected to treat them with the respect they deserve. **(worth 20% of grade)**

Final Grades: Final grades will be based upon the following point system, with no curve.

Points Earned	Grade	Points Earned	Grade
93-100	A	70-72	C-
90-92	A-	67-69	D+
87-89	B+	60-66	D
83-86	B	Below 60	F
80-82	B-		
77-79	C+		
73-76	C		

Your Safety and Well-being:

Emory University cares greatly about the health and well-being of our students, staff, and faculty, and takes all sexual or gender-based violence and harassment very seriously. Emory University employees (including faculty and teaching assistants) are mandated reporters of any incidents of sexual or gender-based violence or harassment. Thus, any disclosures of sexual or gender-based violence or harassment on or off campus made to a faculty member or a TA must be forwarded to the Title IX Coordinator. The Title IX Office will then contact you regarding your rights, your option to participate in the investigation, interim safety measures and/or academic accommodations, and the need to proceed with an investigation (even if none is requested). If you have experienced sexual assault, sexual harassment, intimate partner violence, and/or stalking and want a confidential place to obtain support and information, please contact The DeKalb County Day League (formerly DeKalb Rape Crisis Center): 404-377-1428 for 24-hour confidential crisis line | 404-377-1429 for free counseling service or Georgia's 24-hour Domestic Violence Hotline: 800-334-2836.

Presentation Rubrics on Guest Speaker:

Slides:

1. **Background** — When and where was the speaker born? Where'd they grow up? Any information on their (relevant) early interests?
2. **Education** — high school (if findable)? College (where, degree, date)? Graduate school (where attended, degree, thesis title/topic, date)? Postdoctoral fellowship (if any, where, degree, date, who'd work with)?
3. **Professional positions** — Where did they work? At each place, what was their title? For how long were they there? Where are they now?
4. **Research Topics** — What is their research about? What are the topics that they study? Pick 2 topics to describe in more detail, in a short paragraph, and give several citations to representative publications.
5. **Research Metrics** — Present quantitative metrics on the amount and impact of the person's publications: How many papers have they published? What is the person's h, i-10, and number of citation classics (i.e., the number of papers cited 100 times or more). Use Google Scholar and perhaps the person's CV to get this information.
6. **Honors and Awards** — List and describe these.

Presentation Rubrics on Freakonomics/ SuperFreakonomics Chapter:

Slides:

1. **Background** — What is the topic of the chapter? What is/are the research question(s) being addressed? What are the main hypotheses?
2. **Methods** — How were the research questions studied? What methods were used to try and answer the questions? What sample(s), measures, procedures were used? How were the data generated and analyzed (if specified)?
3. **Results** — What results were obtained? How do these bear on the research questions raised? Were the hypotheses supported or rejected (or somewhere in between, or less definitive results obtained)?
4. **Discussion** — What do the authors make of the studies and results presented? What are the take away messages of the research presented? What concerns do you have about the research presented? What are the strengths and

(methodological) limitations of the research? What are some better ways to design a set of studies to answer the target research questions?

Learning Outcomes for Presentation and Final Essay on your Freakonomics or SuperFreakonomics Chapter:

Learning Outcome 1: Identifying, selecting, and gathering evidence

A. How did the authors identify, select, and gather evidence in their chapter?

B. How did you identify, select, and gather evidence on the topic beyond what the authors presented in the chapter?

Learning outcome 2: Evaluating and analyzing evidence

A. How well did the authors evaluate and analyze the evidence they presented in the chapter?

B. How did you evaluate and analyze the evidence the authors presented in the chapter, relative to other primary literature on the topic?

Learning outcome 3: Building arguments based on evidence and assessing the arguments of others

A. How well did the authors build arguments based on evidence and assess the arguments of others they presented in the chapter?

B. How well did you build arguments based on the evidence and assess the arguments the authors presented in the chapter, relative to other primary literature on the topic?