Syllabus
Biodemography: Integrating Genetics and Social Science Research
Fall 2014: Sociology 875
Instructor: Jason Fletcher
jmfletcher@wisc.edu
Course Time: 2:15-4:45 PM
Place: 8146 Social Sciences
Office Hours: Tuesday 1:45-3:30 SS 4401 or By appointment

Course Overview:
Beginning with the sequencing of the human genome in 2003, the possibilities of a new integration between genetic and social science research have increased substantially. Recently, many traditional social science research datasets have added important biospecimen collection activities, including the measurement of genetic sequence data. Examples include the Add Health, the Health and Retirement Study, Fragile Families as well as many international datasets.

The purpose of the course is twofold. First, we aim to gain an intermediate understanding of biological, evolutionary, and genetic theories and facts that then can be deployed to gain novel insights into traditional social science research questions. Ideally, students would complete the course with the tools and ideas to begin a project that combines genetic and social science data, methods, and theories into a dissertation chapter or related research activity. The second aim of the course is to collectively begin an assessment of a book proposal by Dalton Conley, Christopher Dawes, and Jason Fletcher whose aim is to create a cross-over scientific/popular book that focuses on the novel insights into the world that have come (so far) from the integration of social science and genetics, broadly construed.

The course will begin with an overview, mostly from genetics and biology, of basic concepts. We will aim to utilize both foundational academic papers and also online video lectures and research presentations throughout the course in order to foster discussions of the material. The course will then transition into reading and discussing state-of-the-art journal articles in the integration of genetics and social science research. We will discuss data resources, methodological differences across disciplines, and ideas to extend the research in this area into new directions.

Requirements: Students will make at least two presentations during the course, outlining an assigned paper and outlining a potential research project and will complete a short paper (literature review or research proposal outline, 5-10 pages) on a topic related to genetics and social science.

Pre-requisites: there are no formal prerequisites, but students who have not had prior courses in data analysis and statistical methods may struggle.
Course Objectives:

Students will be able to understand and formulate research questions that combine some aspects of genetics (or biology) and social science research
Students will gain a basic/intermediate understanding of concepts from the natural sciences that are relevant for conducting interdisciplinary work merging the natural and social sciences
Students will understand theoretical and empirical issues in current research on genetics and social science
Students will contribute to a close reading and discussion of the book project by Fletcher and colleagues.

Grades

Your grades will include of three parts

1. Class participation (30%)
   This is a seminar; you are required to attend each class prepared to discuss the assigned readings. Each student will closely read and give comments to book chapters under preparation.

2. Student Presentation (40%)
   Each student will make a short presentation on a genetics/social science paper, discussing the research question, the data, the empirical approach, the limitations, and key findings.
   Second, each student will make a presentation of his/her short paper topic.

3. Short Paper (30%)
   Each student will prepare a 5-10 page paper that either (1) surveys a specific part of the literature or (2) outlines a potential research project that integrates the biological and social sciences, discussing data, empirical approach and main hypothesis.

There is no textbook for the course

Data Opportunities

HRS
Add Health info
Fragile Families
dbGap
Nhanes
WLS

Biomarker Network
Week 1 (9/4)
Course Overview and Examples, Discussion
  Heritability studies
  Adoption Studies
  Caspi/GxE
  Student Interests
  Data

Assignment: Due 9/10 (by email), read Conley, Fletcher, and Dawes and outline at least three concepts, claims, issues, etc that you disagree with or you think are overstated (or are interested in pursuing further).

Readings

Wiki Mendel document.


Lewontin. The Analysis of Variance and the Analysis of Causes. AJHG 1974


Conley et al. Testing the key assumption of heritability estimates. AJHG. 2014

Boardman, Blaylock, and Pampel. Trends in the Genetic Influences on Smoking. JHSB 2010


**Week 2 (9/11)**
Genetics Primer; Sequence and Variation concepts, Mutations

Homework: Bring in 3 suggestions of good (and bad) parts of the two websites or videos

Videos
Coursera videos at Learn UW
Required: Broad Timeline, Genomics in Medicine
Not Required: Lab Tour, Genetics 101
Websites:
http://gslc.genetics.utah.edu
http://www.dnaftb.org/1/

Readings
Attia, J., et al. (2009) How to use an article about genetic association: A: Background concepts. JAMA, 301, 74-81

Wiki: DNA Fingerprinting and Human Genetic Variation


Not Required


**Week 3 (9/18)**
Genetic Discovery: Candidate Genes and GWAS
   False positives, Replication, Population Stratification, Power Analysis, Multiple Comparisons, GREML,

   Note: Dan Benjamin at CDE 9/23

Videos
**Student Led Reading:**


Reading


Chabris, Christopher F., Benjamin M. Hebert, Daniel J. Benjamin, Jonathan Beauchamp, David Cesarini, Matthijs van der Loos, Magnus Johannesson et al. "Most reported genetic associations with general intelligence are probably false positives." Psychological science (2012): 0956797611435528.


**Not Required**


**Week 4 (9/25)**

Race

Guest Lecture/Discussion: Dalton Conley

Videos

Coursea videos at Learn UW

Required: *Genes and Health, Moving Beyond Race*

**No Student Led Reading**

Readings

Wade Chapters 1, 4, 5


Not Required


**Week 5 (10/2)**
Approaches to Gene-Environment Interactions
Orchids and Dandelions, Diathesis-Stress Hypothesis, Gene-environment correlation

Also: James Fowler Hilldale Lecture on 10/2

**Student Led Reading**

Readings
Dobbs


Not Required


10/9: Class Cancelled: IGSS

**Week 6 (10/16)**
Genetics of Tie Formation: Spouses, Friends, and Kinship Patterns
Discussion of IGSS papers?
Student Led Readings: Discussion of IGSS papers
Student provided overview: Oxytocin

Readings


Week 7 (10/23)
Economics
Mendelian Randomization, Genoeconomics

Student Led Reading:

Readings


Not Required

Week 8 (10/30)

TBD: Biomarker Discussion?
Telomeres


TED Talk: 
http://www.ted.com/talks/paul_zak_trust_morality_and_oxytocin?language=en

Readings


Recommended

11/6: Class Cancelled APPAM

Week 9 (11/13)
Population Processes—Health, Economics, and Genetics

Videos
https://www.youtube.com/watch?v=egxe1g09XD0
https://www.youtube.com/watch?v=-EgHasXGOxY

Student Led Reading:
Justin Cook (2014) The Natural Selection of Infectious Disease Resistance and Its Effect on Contemporary Health

Readings


Not Required


Week 10 (11/20)
Politics and Crime

Student Assignment Due—critique of Fletcher "Macrogenoeconomics" Chapter

Student Led Reading:

Readings


Disgust

11/27: Class Cancelled: Thanksgiving Break

**Week 11 (12/4)**
New directions: Epigenetics and Microbiome

Video: Ghost in our Genes (PBS)
https://www.youtube.com/watch?v=fMxgkSgZoJs
Agouti Mice
https://www.youtube.com/watch?v=Xjq5eEsJlhw
https://www.youtube.com/watch?v=wFsxVkuChdU

Webinar: http://webinar.sciencemag.org/webinar/archive/promise-microbiome

http://ics.webcast.uwex.edu/Mediasite6/Catalog/Full/5e041f7db1654480a990568c000d79e121

Readings


Microbiology: Microbiome science needs a healthy dose of skepticism. Nature Commentary

Not Required

**Week 12 (12/11)**
Student Project Presentations