Explaining Explanation
OIDD 9530/CIS 7980/COMM 8980
Spring 2024
Instructor: Duncan J. Watts

Course Overview

Description
In the social sciences we often use the word “explanation” as if (a) we know what we mean by it, and (b) we mean the same thing that other people do. In this course we will critically examine these assumptions and their consequences for scientific progress. In part 1 of the course we will examine how, in practice, researchers invoke at least three logically and conceptually distinct meanings of “explanation:” identification of causal mechanisms; ability to predict (account for variance in) some outcome; and ability to make subjective sense of something. In part 2 we will examine how and when these different meanings are invoked across a variety of domains, focusing on social science, history, business, and machine learning, and will explore how conflation of these distinct concepts may have created confusion about the goals of science and how we evaluate its progress. Finally, in part 3 we will discuss some related topics such as null hypothesis testing and the replication crisis. We will also discuss specific practices that could help researchers clarify exactly what they mean when they claim to have “explained” something, and how adoption of such practices may help social science be more useful and relevant to society.

Structure of the course
Class will be discussion based and will meet once per week for 3 hours. Students will be expected to have read all the mandatory readings for each week prior to attending class and will be required to submit weekly “reading reports” prior to each class.
Evaluation

30% Class attendance and presentations.
30% Weekly reading reports (to be submitted prior to class)
40% Project (see below).

Class attendance and presentations.
This course, by its nature, is dealing with an imprecisely defined topic with blurry boundaries and ambiguous connections among numerous other topics. For this reason, it is essential for students to engage actively with the readings and, via in-class discussions, with each other. Students are therefore expected to attend all classes where exceptions will be made for medical illness (all other absences should be approved in advance by the instructor). Each week, each reading will be introduced by a student nominated by the instructor. Introductions will comprise a 15 min presentation covering the main argument and highlighting potential points for discussion. The schedule of presentations is here. Please let me know about any conflicts and we can reassign as necessary. Please also keep an eye on the schedule as it may change.

Reading reports
To ensure that students come to class prepared, a weekly reading report that briefly summarizes the main arguments of the required readings. Reports should be uploaded to the Course Canvas Site prior to each week’s class.

Project: (15-20 pages double spaced, excluding references)
Choose a domain (e.g. your research area, a literature review of a field, something else that catches your interest such as history or contemporary events) and analyze how explanations in that domain are deployed in both clarifying and misleading ways. Your approach may be quantitative or qualitative, broad or narrow, and may focus on any of the subtopics of the class. The objective is to demonstrate understanding of the material and an ability to apply it “in the wild.”

Books.
Most of the readings are papers that are available via the Penn Library or via the course Canvas site under “Files.” For the books that are assigned, I have tried to make them available on the course Canvas page under “Course Materials;” however, Also, Mazi (2012) is not available and will have to be purchased.

PART 1

Week 1: Introduction

Week 2: Explanation as Causality


Optional


Week 3: Explanation as Prediction


Optional


Week 4: Explanation as Sensemaking


Optional


PART 2: Examples

Week 5: Explanations in Social Science

Optional

Week 6: Explanations in History
Optional


Week 7: Spring Break (no class)

Week 8: Explanations in Business


Optional


Week 9: Explanations in Machine Learning

Optional


Week 10: No Class
PART 3: Improving Scientific Explanations

Week 11. Statistical (In)Significance and Researcher Degrees of Freedom


Optional

publication bottleneck but undermine science. *Perspectives on Psychological Science*, 7(6), 562-571.


**Week 12. Reproducibility and Replication**


**Optional**

Week 13: Generalizability and Incommensurability


Optional


Week 14. Causal Density and the Difficulty of Explanation in Social Science


Optional

Week 15. Some Possible Ways Forward


Optional