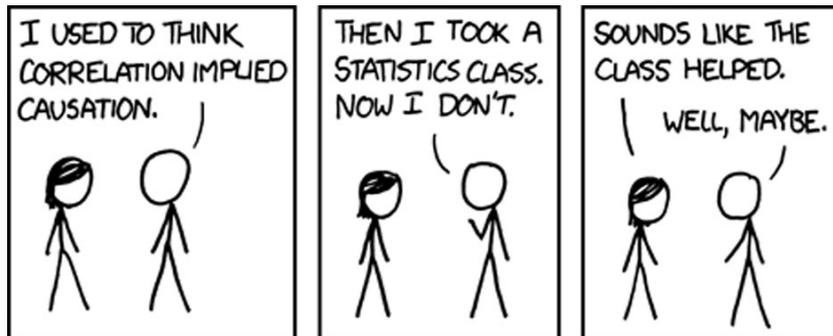


PHIL 12

SCIENTIFIC REASONING



Spring 2017

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SCHEDULE OF CLASSES

<i>Wk: Date</i>	<i>Topic</i>
1: 04/03	1. Introduction and Overview
1: 04/05	2. Introduction to Argument: Supporting a Conclusion
2: 04/10	3. Deductive Arguments: Validity and Soundness
2: 04/12	4. Inductive Arguments: Making Probable
3: 04/17	5. Inductive Generalization: Polling and Sampling
3: 04/19	6. Imprecision and Confidence Level (or: 'Brexit times 5')
4: 04/24	7. Correlations and Statistical Significance
4: 04/26	8. Introduction to Causation
5: 05/01	9. Mill's Methods for Inferring Causes
5: 05/03	10. Randomized Controlled Trials: the 'Gold Standard'
6: 05/08	11. Animal Testing 1: An Argument by Analogy
6: 05/10	12. Animal Testing 2: The Scaling Hypothesis
7: 05/15	13. Food Science 1: Questioning questionnaires
7: 05/17	14. Food science 2: Assessing Atkins: high protein, high weight-loss, high risk?
8: 05/22	15. Review
8: 05/24	16. Exam
9: 05/29	17. NO CLASS
9: 05/31	18. Revisiting the 'gold standard': 'Alternative medicine' and the scope of RCTS
10: 06/05	19. Explaining 'Repligate': the base rate fallacy
10: 06/07	20. Where now?

SCHEDULE OF ASSESSMENT

- **Assignment 1** Concepts of Argument (8%): submit in lecture, 4/17
- **Assignment 2** Unpicking a scientific paper (17%): submit in lecture, 5/01
- **Assignment 3** Correlation, Causation, and Science Journalism (21%): submit in lecture, 5/22
- **Exam** (33%): In class, 5/24.
- **Reflection paper** (21%): Submit through Turnitin by end of scheduled exam period – 2.30pm on June 15th.

1 Objectives, methods, requirements

1.1 What this course is about

This course concerns a topic of great social, philosophical, and personal significance: the nature and justification of scientific claims. In it, we will look at a range of topics, including the nature of inductive justification; how certainty, practicality and informativeness must be traded off; how the statistics describing the makeup of societies are produced; and how the safety and efficacy of diets and medicines are assessed via human and animal subjects. Towards the end, we will reflect on the quality of contemporary science reporting, and consider the standing of evidence gleaned from RCTs given the ‘repligate’ crisis and claims that RCTs are inappropriate to ‘alternative thereapies’. By doing so, we have a chance to reflect on what as a society we might want from science and science journalism, and what steps we might take to improve them to better further those ends.

A key theme running throughout the course is that, although we take science to be the paradigm of rational activity, scientific knowledge is never certain. But today many incompatible claims on how to think about the world and how to act in it compete for our attention – claims that come from folk theories, pseudosciences, and indeed the sciences themselves. As such, it seems that we must negotiate a concept of justification that is, on the one hand, relaxed enough to allow some theoretical claims to be regarded as sufficiently justified even though we are not certain about them, while on the other hand also strong enough to exclude many such claims. Thinking about how good is good enough will be a recurrent theme in what we do.

First three assignments. Please submit these in lecture. There will be a letter grade penalty for all work received between the due date and the following Friday, and a further letter grade penalty for work received the following Monday. No work will be accepted more than one week after the due date.

Exam. Ahead of time, you will be given five questions on inductive reasoning to think about, of which three will be chosen for the exam. You will write short essays on two. Exam scripts will start looking at an ‘A’ to the extent that you (a) show that you understand the **relevant general principles** involved in inductive generalization and causal inference, and (b) identify the **specific challenges** that would confront an attempt to answer the specific research question.

Final essay. You will a short reflective essay concerning an issue of normative significance raised by the course. You may write about either:

- the rationale for the scaling hypothesis in animal testing;
- the applicability of RCTs to homeopathic treatments;
- the roots and / or lessons of the replication crisis;
- or the roots and / or lessons of the failure of election prediction in the recent US and UK elections.

Alternatively, you may write on a topic of your own choice *provided I have approved the topic in advance*. This essay should be typed, double-spaced, and between 1,000 and 1,500

words in length (no less, no more), and be written in the style of a high-quality newspaper article. Please submit via Turnitin.

In grading the essays I will be looking for three things, weighted roughly equally:

Comprehension: understanding of the concepts and ideas discussed in the essay.

Clarity: presentation of the ideas and concepts in a clear and concise manner.

Engagement: independent thinking about the items under discussion.

You must submit both a hard copy of your paper as well as submit it through Turnitin.

Grading scale. Your TAs will be assigning letter grades for your exam and term paper corresponding to these marks:

$97 - 100 = A^+$	$87 - 89 = B^+$	$77 - 79 = C^+$	$67 - 69 = D^+$
$93 - 96 = A$	$83 - 86 = B$	$73 - 76 = C$	$60 - 66 = D$
$90 - 92 = A^-$	$80 - 82 = B^-$	$70 - 72 = C^-$	$< 60 = F$

The final letter grade you receive however will be ‘graded to the curve’, so that the top 25-30% of students will get a grade in the A range, the next 25-35% a grade in the B range, the next 25-30% a grade in the C range, and the remaining 5-25% a D or an F. This is the minimum I guarantee; if the class has worked well and no-one deserves a D or an F, the curve will be adjusted accordingly.

Academic Integrity.

UCSD is committed to academic integrity. According to their *Policy on Integrity of Scholarship*,¹

“Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind.”

If you are unsure in any way of what acting with integrity demands of you in this context, I’ll be happy to discuss it with you.

Set reading. You should acquire *Scientific Thinking* by Robert M. Martin. Extra readings will be put up on TED. Don’t hesitate to get in touch if you would like anything else to read!

¹For the full statement, go to <https://students.ucsd.edu/academics/academic-integrity/policy.html>