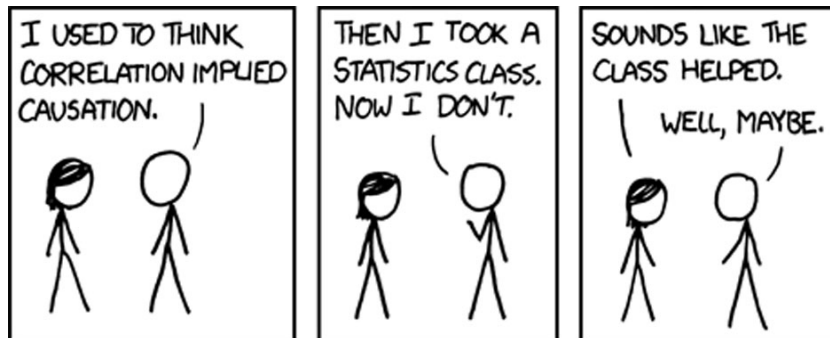


PHIL 12

SCIENTIFIC REASONING



Fall 2018

Instructor: Dr. Kerry McKenzie

kmckenzie@ucsd.edu

Office Hours: Wed 1-2pm in H&SS room 8088

TAs: Hailey Kwon and Kathleen Connelly

Office Hours:

Kathleen Connelly: Weds 2-3pm, in H&SS room 7093

Hailey Kwon: Tues 1-2pm in H&SS room 7039

SCHEDULE OF CLASSES

<u>Wk: Date</u>	<u>Topic</u>
1: 10/01	1. Introduction and Overview
1: 10/03	2. Introduction to Argument: Supporting a Conclusion
2: 10/08	3. Deductive Arguments: Validity and Soundness
2: 10/10	4. Inductive Arguments: Making Probable
3: 10/15	5. Inductive Generalization: Polling and Sampling
3: 10/17	6. Imprecision and Confidence Level
4: 10/22	7. Correlations and Statistical Significance
4: 10/24	8. Mill's Methods for Inferring Causes
5: 10/29	9. Randomized Controlled Trials: the 'Gold Standard'
5: 10/31	10. Animal Testing 1: An Argument by Analogy
6: 11/05	11. Animal Testing 2: The Scaling Hypothesis
6: 11/07	12. Food Science 1: Questioning questionnaires
7: 11/12	13. Veteran's Day – no class
7: 11/14	14. Food science 2: Assessing Atkins: high protein, high weight-loss, high risk?
8: 11/19	15. Review
8: 11/21	16. Exam
9: 11/26	17. 'Alternative medicine' and the scope of RCTS
9: 11/28	18. 'Alternative medicine' and the scope of RCTS (cont'd)
10: 12/03	19. Pregnancy and the CDC
10: 12/05	20. Envoi

SCHEDULE OF ASSESSMENT

- **Assignment 1** Concepts of Argument (10%): 10/17. Submit in lecture **or** in my mailbox by end of day (H&SS floor 7 in front of the elevators).
- **Assignment 2** Unpicking a scientific paper (15%): 10/31. Submit in lecture **or** in my mailbox by end of day.
- **Midterm exam** (35%): In class, 11/21.
- **Media assignment** Correlation, Causation, and Science Journalism (20%): 11/26. Submit in lecture **or** in my mailbox by end of day.
- **Paper** (20%): Submit a soft copy through Turnitin by end of scheduled exam period – that is, 2.29pm on 12/11 (Tuesday of exams week).

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. We will build up to an understanding of the logic of RCTs – the ‘gold standard’ of evidence in contemporary medicine – and close by considering some arguments surrounding the limits of applicability of the RCT methodology. In the course of our investigations we have a chance to reflect on what as a society we might want from science and from science journalism, and how we might try to improve both in order to better serve those ends.

First three assignments. Please submit these on paper in lecture. See below for the late policy. Your TA will give you the rough range for an A+, A etc for each assignment, which – like the course as a whole – will be determined by scaling (see below).

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 the type(s) of inductive inference appropriate to the question at hand, and (b) identify the **specific challenges** that would confront any attempt to answer the specific research question and the most promising ways to respond to them. That is, you will be given top marks to the extent that you can describe both the formal and the informal aspects of the research question at hand.

Final essay. You will a concise, high-quality newspaper-style article concerning an issue of social or normative significance raised by the course. You may wish to write about:

- the roots and implications of the paucity of females in clinical trials;
- the problems endemic to food science, and their socio-cultural implications;
- the rationale for the scaling hypothesis in animal testing;
- the applicability of RCTs to homeopathic treatments;
- the reliability of ‘food frequency questionnaires’;
- what constitutes good dietary / medical advice at the population level.
- the roots of the dramatic failures of election polling 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 *p/m* 100 words in length (no less, no more), and be written in the style of a high-quality newspaper article. Use your reflections in Assignment 3 to inform your writing. Please submit both a hard copy in class during scheduled exam period and also via Turnitin by the end of that

period. **CITE EACH AND EVERY SOURCE THAT YOU USE.** Work that plagiarizes existing newspaper articles will automatically be assigned an F.

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.

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.

Late policy. For the first three assignments late submissions will be penalized as below. Work will not be accepted more than a week after the due date. The final paper must be submitted by the end of the scheduled exam period to avoid scoring an F.

- Assignment 1: 2 marks for every day late.
- Assignment 2: 2 marks for every day late.
- Assignment 3: 3 marks for every day late.

1.2 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.

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

1.3 Disability accommodations.

Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD) which is located in University Center 202 behind Center Hall. Students are required to present their AFA letters to Faculty (please make arrangements to contact me privately) and to the OSD Liaison in the department in advance so that accommodations may be arranged.

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!