

Warren Writing 10B: The Demarcation Problem

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Required materials

- AS Course Reader
- Manila file folder
- Approximately \$10 to cover photocopying

Course websites

- Course Website: <http://pseudoscience.thehangedman.com>
- Course Mailing List: <http://lists.thehangedman.com/mailman/listinfo/pseudoscience>
- Warren Writing: http://warren.ucsd.edu/academiclife/warren_writing/
- Purdue Online Writing Lab (OWL): <http://owl.english.purdue.edu/>

Course description

SCIENCE plays an enormously influential role in our society. As a social institution, it commands enormous respect and social influence, as well as vast sums of funding. It produces results that are greatly sought after, for both good and ill. At the same time, science generates great controversy when it collides with various religious, economic, and educational agendas. The adjective “scientific” garners almost immediate respectability to whatever it applies to, and, in some circles, it is a prerequisite for being taken seriously. Yet to many it also bespeaks alienation, abstraction, and a void of meaning.

What pursuits deserve the title? What does it take to achieve the status “scientific?” What is it that qualifies a project to be included among the elite institutions of science? Are astrology or parapsychology sciences that ought to get a shot at scientific funding? Should Marxism be considered a scientific theory, or a pseudoscientific ideology? Does educational *science* really deserve the respect of a proper science? Can creation-science legitimately be taught as a scientific theory? These questions call out for a solution to the demarcation problem.

This writing course looks at attempts to demarcate science from pseudo-science or non-science as a scientific, philosophical, and social problem. We will look at various attempts to define science or to draw the boundaries around it, we will look at the role such attempts play in a variety of legal contexts, and we will attempt to apply these ideas to the cases of a few controversial sciences.

By looking at these issues in several domains of discourse, we will start to examine the differing warrants and standards of justification that underlie different ways of approaching the problem. This will give us the grounds to begin to critically compare different approaches and views; by recognizing differing methods of argumentative support, we can critically evaluate the argumentative support of particular texts.

Course policies and requirements

Attendance: Since class participation is the essence of this course, consistent attendance is crucial. In accordance with Warren Writing Program policy, no more than two absences are permitted; more than that will place you in jeopardy of failing the course. Program policy also dictates that missing a scheduled conference is considered an absence, and that being more than 10 minutes late twice is equal to one absence. You must bring the readings and assignments for the day in order to be counted present.

Website and Email: You must sign up for the class email list. You must check your email daily for announcements. You should also check the course website regularly, preferably daily, but at least twice a week (the day before class). I strongly encourage you to contact me by e-mail if any problems or questions arise during the quarter or if you have questions about anything related to the course. Please use appropriate e-mail etiquette when composing your responses.

Workshops: Everything you write in this course is subject to peer review in whole-class or small-group writing workshops. On workshop days, you should come to class on time with multiple copies of your written text for distribution to your classmates (the exact number of copies needed will be announced as the quarter proceeds).

Paper format: All writing assignments, including drafts, must be stapled, typed, and double-spaced, on 8½" x 11" white paper. Use a non-decorative 12-point font, such as Times New Roman, printed in black ink, and provide 1" margins around all sides of the page. Do not include title pages. Do not print on both sides of the page. Include your name, section number, instructor name, assignment number, and the date on the first page of your paper, and page numbers on all pages. Papers that do not meet these requirements will not be accepted. Use the MLA website or a current MLA style guide for style, grammar, format, and citation questions.

Late papers: No late papers will be accepted, including drafts and revisions, unless you make special arrangements with the instructor ahead of time. Late papers may be subject to grade penalties, at the discretion of the instructor. Papers must be ready to turn in at the beginning of class to avoid being counted as late. You must turn in all prior assignments before the next assignment will be accepted.

Portfolios: You should keep all the work you do for this class in a manila folder. After marked papers are returned, you should place them in your folder, which will ultimately serve as your final portfolio. At the end of the quarter you'll hand in the portfolio containing all materials pertaining to your writing assignments for the course (including all drafts of papers and workshop materials). The portfolio will be used to evaluate your work for your final course grade. You are also advised to maintain a second folder with duplicates of all materials, in case any of the originals are lost or misplaced. Your portfolios will be ready to return to you at the beginning of the next quarter.

Classroom environment: You're expected to respond respectfully to your classmates and instructor at all times, in adherence to the UCSD Principles of Community. Any comments or actions that instigate or contribute to a hostile environment in the classroom are unacceptable. NOTE: Cell phones and pagers must be turned off in classroom buildings.

Contact: You're encouraged to make use of office hours to talk about your writing or any other aspect of the course. Appointments at times outside of regular office hours can be arranged with advance notice.

UCSD Statement of Academic Integrity: Students are responsible for producing their own original written work in this class. Representing someone else's work as your own will not be tolerated, as outlined in the UCSD Policy on Academic Integrity published in the UCSD General Catalog: Cheating will not be tolerated, and any student who engages in suspicious conduct will be confronted and subjected to the disciplinary process. Cheaters will receive a failing grade on the assignment or the exam and/or in the entire course. They may also be suspended from UCSD. Academic misconduct includes but is not limited to:

- *Cheating*, such as using "crib notes" or copying answers from another student during the exam, modifying a graded exam and returning it for a new grade, or submitting the same paper or assignment for two or more different courses unless authorized by the instructors concerned.
- *Plagiarism*, such as using the writings or ideas of another person, either in whole or in part, without proper attribution to the author of the source.
- *Collusion*, such as engaging in unauthorized collaboration on homework assignments or take home exams, completing for another student any part or the whole of an assignment or an exam, or procuring, providing or accepting materials that contain questions or answers to an exam or assignment to be given at a subsequent time.

Grading Policy

- Assignments 2E, 3C, and 4E will receive a letter grade. These grades will be used to determine your course grade.
- To be eligible to receive a grade on each of the above assignments, you must complete (on time) all preceding assignments (for example, to receive a grade on 4E, you must do 4A, 4B, 4C, and 4D).

Evaluation of Papers

The following questions will be considered when papers are evaluated and graded:

- Does the paper respond to the various parts of the prompt?
- Does the paper make an argument?
- Is the claim clear and plausible? Is it stated and contextualized effectively?
- Is there sufficient and relevant evidence to ground the claim?
- Does the paper effectively select and use material from the course readings to support and validate the analysis? Does it summarize, paraphrase, and quote effectively?
- Does the paper use all relevant details from the readings both to support the claim and to provide a context for the case being made? Does it ignore material that should be taken into account?
- Does the paper demonstrate an awareness of how the argument being proposed fits into the larger set of claims made about the topic in our course readings?
- Does the paper work through the complexities of the material (as opposed to oversimplifying or over-generalizing)?
- Is the paper well organized?
- Does it cite material from the sources using MLA documentation style?
- Are there sentence structure problems or grammatical errors that interfere with the meaning?

Evaluation Standards at Warren Writing

- An 'A' essay demonstrates excellent work. It has something to say and says it well. It develops its argument clearly and consistently, demonstrating a complex understanding of the assignment, and does so using varied sentence structure. It often rises above other essays with particular instances of creative or analytical sophistication. There may be only minor and/or occasional grammatical errors.
- A 'B' essay demonstrates good work. It establishes a clear claim and pursues it consistently, demonstrating a good understanding of the assignment. There may be some mechanical difficulties, but not so many as to impair the clear development of the main argument. While a 'B' essay is in many ways successful, it lacks the originality and/or sophistication of an 'A' essay.
- A 'C' essay demonstrates adequate work. It establishes an adequate grasp of the assignment and argues a central claim. In addition, the argument may rely on unsupported generalizations or insufficiently developed ideas. It may also contain grammatical errors.
- That work which deserves a grade of less than 'C' will be characterized by some of the following problems: it fails to demonstrate an adequate understanding of the assignment; it fails to articulate an adequate argument; and/or it contains significant grammatical problems.

Course schedule

Week 1: Introduction: What is the Demarcation Problem?

January 8

In Class: Go over syllabus and course schedule, introductions.

Assignment: Read Richard Feynman's article, "Cargo Cult Science," review "About Argumentation," "Making Summaries of Academic Arguments," and "The Toulmin Model of Argumentation" on the WCWP webpage. Write 1A.

January 10

Due: 1A

In Class: Review Toulmin model of argumentation and how to write summaries of arguments, discuss Feynman's article.

Assignment: Write 1B, 4 people to bring 15 copies to class for large-group workshop, all others bring 1 to turn in.

Week 2: A Scientist on the Demarcation Problem

January 15

No class

January 17 **Due:** 1B

In Class: Large-group workshops 1B.

Assignment: Read Karl Popper, "Science: Conjectures and Refutations," write 2A, bring 1 copy to turn in.

Week 3: The Demarcation Problem: Philosophical Perspectives

January 22

Due: 2A

In Class: Discuss Popper's article based on 2A

Assignment: Read Lakatos, "Science and Pseudoscience" and Feyerabend, "How to defend society against science." Write 2B, bring 1 copy.

January 24

Due: 2B

In Class: Discuss Lakatos and Feyerabend.

Assignment: Re-read Lakatos, "Science and Pseudoscience" and Feyerabend, "How to defend society against science."

Week 4: Philosophical Perspectives

January 29

In Class: Discuss Lakatos and Feyerabend.

Assignment: Write 2D

January 31

Due: 2C

In Class: Claims workshop in class.

Week 5: Conference Week

Feb 5-7

Due: 2D

Conferences Begin: Discuss 2D drafts.

Assignment: Write 2E, Read Blackmun's opinion in *Daubert v. Merrell Dow Pharmaceuticals* and *McLean v. Arkansas Board of Education*, section IV(C)

Week 6: The Demarcation Problem as a Legal Problem

Feb 12

Due: 2E (to be graded)

In Class: Introduction to legal cases, discuss legal definitions in class.

Assignment: Read Haack's response to *Daubert v. Merrell Dow* and the Ruse-Laudan debate over *McLean v. Arkansas*, write 3B (bring 4 copies).

Feb 14

Due: 3B

In Class: Small-group workshops.

Assignment: 3C, 1 copy to turn in

Week 7: Some Sciences that Might be Pseudo-

Feb 19

No class

Feb 21

In Class: In-class activity.

Assignment: Read Bok et. al. and 1 article each of your choice on astrology (Feyerabend, Seymour, Thagard, Dawkins) and parapsychology (Churchland, Mousseau, Blackmore, Shermer). Write 4A.

Friday, Feb 23

Due by 4pm in my Mailbox: 3C (to be graded)

Week 8: Application: The Cases of Astrology & Parapsychology

Feb 26

Due: 4A

In Class: Group discussion about astrology and parapsychology, based on 4A. At the end of class, assign 2 groups, one for each case.

Assignment: Read another article in your area. Write 4B, 1 copy.

Feb 28

Due: 4B

In Class: Discuss your ideas from 4B with your groups. Choose sides on the scientific status of your case (try to get roughly equal groups). Prepare for debate.

Assignment: Read remaining articles in your area. Write 4C, prepare for debate.

Week 9: The Strange Cases of Astrology & Parapsychology

March 5

Due: 4C

In Class: In class debates over the status of each borderline case, based on 4C.

Assignment: Write 4D, 3 students to bring enough copies for large-group workshops.

March 7

Due: 4D

In Class: Large-group workshops

Assignment: Revise 4D, bring 4 copies for small group workshops.

Week 10: The Strange Cases of Astrology & Parapsychology

March 12

Due: 4D

In Class: Small-group workshops

Assignment: Write 4E

March 14

Due: 4E (to be graded)

In Class: Wrap-up!

Writing Assignments

Assignment 1: Identifying the Problem

- 1A:** Write a 1 paragraph problem statement for Feynman's article that illustrates how he attempts to express the difficulty that motivates his article. Explain both Feynman's definition of the problem and how he motivates it as a significant difficulty.
- 1B:** Write a 2-3 page summary of Feynman's article. Focus on attempting to communicate the difficulty which Feynman is attempting to express, how he characterizes that difficulty as a problem, and how he attempts to solve the problem. What grounds does he rely on, and how do they warrant his claims?

Assignment 2: Proposing a Solution

- 2A:** Write a 1 page summary of Popper's article. Identify his claim and any sub-claims, explain the ways in which he grounds his claim(s), and examine the warrants that appear to underlie his argument.
- 2B:** Write 1 page summaries each of Lakatos's and Feyerabend's articles.
- 2C:** Come up with a claim that takes a position on the demarcation problem. Your claim should be a synthesis of the work of the authors you have read. It should go beyond mere summary, interpretation, and comparison of work that you've read. It should try to find a position that is more sensitive to the complex landscape of the demarcation problem than looking at only one author would give you, qualified in the appropriate ways based on issues raised by each author. Make sure your claim is adequately qualified in light of the complicated nature of the issue.
- 2D:** Write a 3-4 page paper defending a position on the demarcation problem, synthesizing the work of the authors you have read. Provide and motivate a clear definition of what the demarcation problem is. Make sure your position is adequately qualified in light of the complicated nature of the issue. Respond to concrete evidence from the texts of the three philosophical articles. If you take a position near to one of your authors, you should make sure to qualify and defend it in response to the views of the others.
- 2E:** Revise **2D** (to be graded).

Assignment 3: The Problem Recontextualized

- 3A:** Write a 1-2 page summary of one of the cases in which the court attempt to define "science." What is the definition? How does the opinion argue for that definition? Does the judge qualify the definition? Does the judge's definition bear resemblance to any of the positions discussed by philosophers?
- 3B:** Write a 4-5 page critical discussion of the definition summarized in **3A**. In light of the philosophical discussion of the issue, how does the judge's argument stand up? What assumptions is the judge making that require further backing? Defend or criticize the definition on offer. If you are defending the judge's position, provide additional support for his view. If you are criticizing it, explain what the weak points of the judge's argument are and suggest ways of qualifying the view that might make it more defensible. You *must* discuss the view of at least one philosopher that we've read, and you *may* discuss the philosophical response to the court case under discussion.
- 3C:** Revise **3B** (to be graded).

Assignment 4: Application

- 4A:** Pick 1 writing each from the writings on astrology (Bok, Feyerabend, Seymour, Thagard, Dawkins) and parapsychology (Churchland, Mousseau, Blackmore, Shermer) and write a 1 page summary of each.
- 4B:** Write a 1-2 page essay discussing one of the cases from the point of view of the philosophers we've read. How would each judge the scientific status of either astrology or parapsychology.
- 4C:** Write a 1-2 page essay arguing for the status of one of the cases as science or pseudoscience. Make reference to *at least* one author on either side of the debate. Come prepared to argue for your point of view in class.
- 4D:** Write a 5-6 page essay arguing for a position on the scientific status of either astrology or parapsychology, considering both legal and philosophical perspectives. Suppose that the San Diego Astrological Society

or the American Association for Parapsychology is lobbying to start a department at UCSD in the college of sciences, but there is disagreement about whether the field is really a science, and the faculty is split on whether to include the department. What considerations are relevant? How might you qualify your position in response to reservations on the other side?

4E: Revise **4D** (to be graded).

Reading List

I. Cargo Cult Science: Why the Demarcation Problem is a Problem for Science

- Richard Feynman, “Cargo Cult Science”

II. Defining the Problem & Searching for Solutions

- Karl Popper, “Science: Conjectures and Refutations”
- Imre Lakatos, “Science and Pseudoscience”
- Paul Feyerabend, “How to defend society against science”

Recommended Reading: George A. Reisch, “Pluralism, Logical Empiricism, and the Problem of Pseudoscience” & Thomas Kuhn, “Logic of Discovery or Psychology of Research?”

III. The Problem in Practice: Legal Contexts

- *Daubert v. Merrell Dow Pharmaceuticals*
- Susan Haack, “Trial and Error: The Supreme Courts Philosophy of Science”
- *McLean v. Arkansas Board of Education*, section IV(C)
- Michael Ruse, “Creation Science is Not a Science”
- Larry Laudan, “Commentary: Science at the Bar - Causes for Concern”
- Michael Ruse, “Response to the Commentary: Pro Justice”

Recommended Reading: *Kitzmiller v Dover Area School District et al*, Section E.4 pp. 64-89 & Bradley Monton, “Is Intelligent Design Science? Dissecting The Dover Decision,”

IV. Demarcation in Action: The Case of Astrology (Option A)

- BJ Bok, LE Jerome, P Kurtz, “Objections to astrology: A statement of 186 leading scientists”
- Paul Feyerabend, “The Strange Case of Astrology,”
- Percy Seymour, “Science and Astronomy,” *Astrology: The Evidence of Science*
- Paul Thagard, “Why Astrology is a Pseudoscience”

Recommended Reading: Richard Dawkins, “The Real Romance in the Stars” , C.G. Jung, “An Astrological Experiment,” , & L. Watson, “Man and the Cosmos,”

IV. Demarcation in Action: The Case of Parapsychology (Option B)

- Freeman Dyson, “One in a Million”
- Michael Shermer, “Freeman Dyson, Miracles, and the Belief in the Paranormal”
- Paul Churchland, “How Parapsychology could become a science”
- Marie-Catherine Mousseau, “Parapsychology: Science or Pseudo-Science?”
- Susan Blackmore, “Why I have given up”

Recommended Reading: Susan Blackmore, “Parapsychology”