Critical Thinking on Issues of Environmental and Public Health
ENVR E-160
Mon. 5:30-7:30  Sever Hall 210
http://courses.dce.harvard.edu/~environment/e160/_home.html

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What this course is about:

Imagine you are a new reporter. You are working on a story about, say, pesticides. Despite what you already think and what you already believe, as a journalist you have to keep an open mind. You can’t let your biases and emotions get in the way of objectively considering all the facts. You have to thoroughly seek out and consider all perspectives. You must be skeptical of information. You have to test it, and its sources, to see if the information is reliable. You have to be curious and dig for more information and ask “the next question”. You can’t just take the first easy explanation or description of things. You can’t just decide what information to go after, and what information to include in your story, based on what feels right.

These are general rules that guide a journalist’s approach to gathering and reporting information. They are guidelines for anyone who wants to become honestly informed on any issue. Yet most of us usually don’t follow these guidelines for our own critical thinking. So the opinions and views we develop, and the behaviors and choices that result, are not as informed as they might be. That, in turn, can lead to dangerous personal behaviors, and public policies that don’t maximize public and environmental health.

This course will try to help you learn how to think about environmental and health issues more rigorously, so your views and perspectives will be better informed, and your choices will be healthier for you and your family, or for the policies you might contribute to as a professional.
General Comments on Grading

Unlike some of your other courses, your work in this one will be graded by the instructor, not the teaching assistant. I apply my own critical thinking as I review your work.

At the least, you must meet the objectives of the assignment. A brilliant paper that fails to meet the objective of the assignment will fail. If you don’t clearly understand those objectives, it is your responsibility to clarify things before handing in your work. We will discuss each upcoming assignment at the end of the class one week before it’s due. I can be reached online for additional clarification.

If you receive a grade you think is unfair, I will be glad to talk with you about why you received that grade. I very rarely change grades. I think about them carefully before awarding them. Lots of people want A’s. You will only get an A if your work is exemplary. If your work is good it gets a B. C is average. D is poor. F is unsatisfactory.

Graduate Students:
A final grade of C or lower means your credit for the course won’t count toward your degree or certificate.

10% of your grade will be based on attendance. This is intended to encourage class participation. A lot of this course will be presented in class. Being there matters. Participating in discussion matters. You must attend at least 12 of our 15 meetings. It is your responsibility to sign the attendance sheet for each class. You will be expected to actively participate in class discussion.

Grading for Undergraduates:

Attendance and class participation (see notes above) = 10%

Papers: This is the most important way you will demonstrate critical thinking. You will be expected to demonstrate progress in your critical thinking skills through these assignments as the course progresses

#1 Risk perception = 10%
#2 News coverage of risk = 10% of grade
#3 Cost-Benefit Analysis = 10% of grade
#4 Midterm paper on Precautionary Principle = 20% of grade
#5 Climate Change = 10% of grade

2 Final papers = 30% of grade

Grading for Graduate Students:

Attendance and class participation (see notes above) = 10%

Papers (see notes above)
A few words about writing style:

There is a good deal of writing for this course. The good news is, the papers you will have to write are purposefully designed to be short. The bad news is, it’s hard to concisely say all you want to say in just a couple pages. This imposed brevity will force you to think carefully about the core of what you want to say. So be clear. Be direct. Don’t worry about being fancy or erudite. You are not being graded on your writing style. These papers need to demonstrate that you are thinking about the topic carefully.

Do NOT write these like normal papers for a class. DO write them as if you were a reporter, presenting your material in a conversational voice using understandable language, as if it was going to be read by the general public.

Critical thinking includes a challenging consideration of the sources on which you rely. To let the reader know you have done that, you have to attribute what you’ve learned to the sources from whom you’ve learned it. And identify them well; who they are and why they are a source on whom you (and your reader) should rely.

To encourage you to write in an accessible style, I suggest you cite your sources directly, in journalistic style, with quotation marks and a full identification of the source (“Global warming is a bunch of hooey” according to climatologist William Everythingiswonderful, Professor of Earth Science at So and So U., who has studied the issue for 15 years). Or you can use the journalistic style of paraphrasing and citing (Recent findings suggest climate change may be causing the worst mass extinction of life on earth in the history of the planet, according to biologist Susan Theskyisfalling, a member of the International Panel on Climate Change.)

If you prefer, you can use academic notation to acknowledge your sources. If you do, please include the notation in parentheses right after the fact you are attributing, rather than with footnotes that are then listed at the bottom of the page or at the end of the paper. Here’s an example: “Global warming is expected to raise ocean levels by as much as 7 feet by 2050. (IPCC Summary Report, 2001).”

Finally, failure to cite sources is a serious flaw. Think of yourself as a prosecutor collecting information with which to make your case, reliable information from credible witnesses that has to stand up in court. Identify your expert witnesses. Don’t claim a thought, or a statement, or a fact, that isn’t yours.

A few words on cheating:
DON’T! Plagiarism – taking somebody else’s words and/or ideas and claiming them for your own – is not only lazy, and fails to demonstrate critical thinking, it’s cheating, and the punishments for it are severe.

(There is more on proper academic citation of sources at http://www.fas.harvard.edu/~expos/sources)

(For general help with writing, the school has a Writing Center through which you can work with tutors. See p. 239 of the Extension School catalog for more.)

Deadlines:

As would be the case for any work assignment in the “real world”, the deadline for submitting your homework at the beginning of the class when it’s due is ABSOLUTE. You are being given a clear set of deadlines for submission of your assignments. You may submit your work early via email, or by email if you must miss class, but

IF YOU SUBMIT YOUR WORK LATE, IT FAILS!

(If extraordinary circumstances keep you from meeting these deadlines, you must explain those circumstances in advance to the Instructor or TA and get approval for an extension. If you have any questions about deadlines, ask.)

COURSE SCHEDULE

SESSION 1, 1/26 – OVERVIEW. RISK RANKING EXERCISE. CONSIDERATION OF NUCLEAR POWER

- Introduction of Instructor and TA.
- A risk ranking exercise on a list of environmental and public health issues. Discuss where those beliefs come from.
- Discussion of nuclear power to test beliefs, and the knowledge on which those beliefs are based.

Assignment: Read Introduction and any three chapters of “RISK!!!”

Assignment: to prepare for next week's class read “How risky is flying?”
http://www.pbs.org/wgbh/nova/planecrash/risky.html

SESSION 2, 2/2 - JUST WHAT IS “RISK?” TOWARD MORE CRITICAL THINKING ABOUT THE ELEMENTS THAT MAKE SOMETHING A THREAT.
Risk is more than a number. We will break down the concept of risk into its component parts, learn how governments do the risk assessments on which safety standards are based, and understand the formula; Risk = Hazard X Exposure.

Assignment: to prepare for next week’s class, read “Be Afraid of Being Very Afraid” (to be distributed)

Assignment: Start reading “Silent Spring”, excerpts from “Junk Science Judo” (distributed in class)

SESSION 3, 2/9 - RISK PERCEPTION – HOW WE JUDGE WHAT TO BE AFRAID OF AND HOW AFRAID WE SHOULD BE.

The biology and psychology of how humans perceive risk. The explanation for “The Perception Gap” between our fears and the facts. The dangers that arise when we are more afraid of things than we need to be, or less afraid of them than we should be. We will consider examples of the risks we face when we do not apply critical thinking to environmental and public health issues.

Assignment: Write a 2 page paper describing one example of how specific risk perception factors led to a Perception Gap in yourself, a friend or family member, or in society. Identify which of the perception factors we discussed in class contributed to the gap, and how those factors made the fear greater, or lesser, than the facts of the risk seemed to suggest would be appropriate. Due no later than class next week.

Assignment: Finish reading “Silent Spring”. We will discuss it in the next class and there is a graduate student paper due on it in two weeks.

No Class on Monday 2/16, Presidents’ Day Holiday

SESSION 4, 2/23 – ADVOCACY – THE POWER OF SPIN.

We will discuss Silent Spring and Junk Science Judo. We will also hear a debate on a current issue from advocates of both sides of that issue, discuss the issue with those advocates, and challenge them with critical thinking.
Graduate students: Write a 2-3 page paper commenting on “Silent Spring”, reviewing it as advocacy, unbiased fact, or both. Due no later than class next week.

SESSION 5, 3/2 – NEWS COVERAGE OF RISK.

How the news media cover risk. Through examples of print and TV news, we will examine the ways in which the new media sometimes plays up the negative, controversial, or frightening aspects of risk stories. We will explore the motivations of journalists, including the role of risk perception in news decision making. We will be joined by a reporter from a local news organization who reports on public health and environmental issues.


SESSION 6, 3/9 – WHERE DO “THE FACTS” COME FROM? – 1, TOXICOLOGY, WHAT IT CAN TELL US, WHAT IT CAN’T.

Toxicology is the study of poisons. It is the science by which risk regulators try to think critically and gauge what levels of exposure, to which agents, are safe. But toxicology, on which much of our safety relies, is fraught with limitations. We will learn the basics of how animal testing is done, and what those tests (and sometimes tests on humans) can tell us, and what they can’t. We will also learn about the theory of non-linearity (also known as hormesis) which suggests that the way toxicologists have considered the evidence from animal tests so far, is incomplete.


SESSION 7, 3/16 – WHERE DO “THE FACTS” COME FROM? – 2, EPIDEMIOLOGY, WHAT IT CAN TELL US, WHAT IT CAN’T

Epidemiology is the study of patterns of health in groups of people to try and discern what might be causing health problems. Like toxicology, it is an important tool for risk managers as they make public health policy. But like toxicology, epidemiology also faces many limitations. We will hear from an expert in the field about what epidemiology
is, how it is done, how to think critically when you hear “A new study says XXX causes YYY”, and what epidemiology can and can’t say about threats to our health.

Assignment: Read chapters 1-5 “Risk and Reason”, Cass Sunstein.

No Class on Monday 3/23, Spring Break

SESSION 8, 3/30 – RISK ANALYSIS. A REASONED, FACT-BASED, COMPREHENSIVE WAY OF UNDERSTANDING RISK AND MAKING POLICY CHOICES.

More and more, risk policy makers are turning to risk analysis to identify regulations and other control strategies that maximize human and environmental health with the most efficient use of limited financial resources. One main approach is Cost-Benefit Analysis – figuring out whether the costs of a policy are greater or less than the benefits.

Joshua Cohen, who has done influential analyses of issues from Mad Cow disease to cell phones and driving to mercury in fish, will discuss his work, and the value of a risk analytic approach to critical thinking about environmental and public health issues.

Assignment: Write a 3-4 pp paper reviewing Risk and Reason by Cass Sunstein, taking a position on the use of Cost Benefit Analysis; For it? Against it? If it should be used, in what ways or under what circumstances? Why? Due no later than class next week.

Assignment: In preparation for class discussion next week, read two position papers on the Precautionary Principle (to be distributed).

SESSION 9, 4/6 - THE PRECAUTIONARY PRINCIPLE

Risk management policy makers struggle with what to do about risks when all the facts aren’t in. Should we ban substances or processes before we know what they might do to us or the environment? Or does banning them unnecessarily deny us the benefits of those products or processes? How sure do we need to be before allowing a potential risk genie out of the bottle? We know this as “Better Safe Than Sorry”. In legal and economic arenas, particularly on the international level, this is known as The Precautionary Principle (PP), an attempt to embed “Better Safe Than Sorry” into law.

We will listen to a proponent and opponent of the PP discuss the issue, and discuss it with them.
Assignment: Mid-term. A paper taking a position on the Precautionary Principle. 5 pp max. for undergraduates, 10 pp max. for graduate students. Due no later than class next week.

Assignment. Readings on climate change (to be distributed.)

SESSION 10, 4/13 CRITICAL THINKING IN CONDITIONS OF UNCERTAINTY

How do we think critically about a risk when all the facts aren’t in yet, and uncertainty remains? We will consider the issue of Climate Change. We will be joined by an expert who will present what is known, what is not known, and how sure or unsure we are about various aspects of this complex issue, and what to do about it.

Assignment: Write a 2-3 page paper that proposes how we should respond to climate change. Support your ideas with careful arguments. Due no later than class next week.

SESSION 11, 4/20 – PUBLIC HEALTH – THE PUBLIC’S LACK OF CRITICAL THINKING ABOUT THE BIG THREATS.

Heart Disease. Motor Vehicle crashes. Flu (“normal vs. H5N1”). Food poisoning. The big risks often don’t evoke the same degree of concern. We will discuss why that is so, and the role of public health agencies in keeping us safe and healthy.

Graduate students must submit a one page summary of the topic they will write about for the third paper they have to write as part of the final assignment.

SESSION 12, 4/27 – RISK POLICY MAKING. ETHICS AND VALUES vs. TECHNOCRACY AND “SOUND SCIENCE”.

Should critical thinking about environmental and public health issues be limited to “the facts”, as best science can identify them, or should there be room in policy making for our feelings, our ethics, our instincts...even when they fly in the face of the facts? While many argue that pure rationality is neither possible nor desirable, others argue we should rely only on “sound science”, even though there are limits on what science knows and how certain that knowledge is.

Some who favor this view argue that government technocrats should decide what is safe and what is not, and how to regulate public health, based on the scientific facts alone, and that people are “irrational” and “wrong” about many risks. Their opponents reply that
the invocation of “sound science” is sometimes a cover for those who oppose certain regulations, and who know that the science on the issue they care about won’t support the regulation they oppose.

Two experts, with different views, will lead us in a discussion of these two different ways of thinking about environmental and public health issues.

Assignment: Students will commit to their topics for the final assignment. These assignments will be due no later than the last class session, May 18

(The first two papers below are for undergraduates. Graduate students will do all three, and give a 5-10 minute presentation on the third paper in the final two class meetings.)

1. A paper, 4 pp max., on a risk issue of your choice, arguing in favor of the position you are comfortable with.

2. A paper, 4 pp max. describing the same risk, arguing the opposite position.

3. A book chapter in the form of a chapter from Risk!!!, written to educate the general public in a comprehensive, neutral, reliable way on an issue you know little about.

SESSION 13, 5/4 – NANOTECHNOLOGY. MAKING SENSE OF NEW RISKS, APPLYING WHAT WE’VE LEARNED.

Nanoscience is the ability to manipulate matter at the atomic scale. It offers immense opportunity for progress, but also presents risks that haven't even been understood, much less fully studied. We will consider this newly emerging area of risk and try to apply the lessons we’ve learned about careful, critical thinking.

SESSION 14, 5/11 – CLASS PRESENTATIONS BY GRADUATE STUDENTS

SESSION 15, 5/18 – CLASS PRESENTATIONS BY GRADUATE STUDENTS

READING

Books to buy, available at the Harvard COOP:

RISK!!! - Ropeik and Gray

Risk and Reason – Sunstein

Silent Spring – Carson
Readings that will be handed out in class:

Session Two – 'Be Afraid of Being Very Afraid”, Excerpts from “Junk Science Judo”,
Session Eight – two papers on the Precautionary Principle
Session Nine – readings on climate change

Reserve room readings:

The Emotional Brain, Ledoux. On the neuroscience of emotion.
Judgment and Uncertainty, Biases and Hueristics, Kahneman, Tversky, Slovic. A classic about the roots of “irrational” decision making.
Risk Perception, Slovic. The seminal papers in the field of risk perception Psychology.

For updates, information on assignments, and supplemental material:
http://courses.dce.harvard.edu/~environment/e160/_home.html

For technical help with Internet resources, email Peter Zevitas:
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