Students with Disabilities

This syllabus is available in alternative formats upon request. In addition, if you may need an accommodation based on the impact of a disability, you should contact the instructor immediately. Students with special needs should contact the Office of Disability Services (ODS) at 292-3307 for certification if they have not already done so. Upon such certification, the ODS and the instructor will make every effort to accommodate special needs. However, to ensure that evaluation of student performance in the course is conducted in a manner that is fair to all students, special accommodations will not be granted in the absence of ODS certification.

Academic Misconduct

All students at the Ohio State University are bound by the Code of Student Conduct (see http://studentaffairs.osu.edu/resource_csc.asp). Suspected violations of the code in this class will be dealt with according to the procedures detailed in that code. Specifically, any alleged cases of misconduct will be referred to the Committee on Academic Misconduct.

Overview of the course

People commonly believe in many extraordinary things. For example, NBC airs the program Medium, which they claim is based on the “real life” experiences of Alison Dubois, a “psychic detective.” Many people believe that John Edward and Sylvia Browne can speak to their dead loved ones and psychologist Dr. Gary E. Schwartz claims to have evidence showing that Edward and Dubois really can contact the dead. Toxicologist Edward Calabrese claims that a little nuclear radiation not only won’t hurt you, it will make you healthier. The United States Psychotronics Association holds their national convention in Columbus, Ohio every summer, where psychics, dowsers, and free-energy aficionados come together to learn about remote viewing, healing energies, telekinesis, and so forth. John Lott says that scientific research shows that crime rates go down as the number of guns in society goes up. Dr. Andrew Weil argues that we can think ourselves well.
If correct, some of these ideas may have great value. But if they are wrong, some can do equally great harm. So how can a person discriminate between bunkum and fact, between valuable innovation and wacky waste of time? Moreover, why do so many people continue to believe in ideas that have no apparent basis in reality? How do people come to believe in extraordinary things? This course is intended to provide answers to such questions and more generally, to provide the skills and knowledge necessary to evaluate extraordinary claims and beliefs. You might find yourself having to question beliefs that you have held as factual for a long time. Some topics that we will cover include alternative medicine, psychic phenomena, hypnosis and the nature of the brain. Many of the topics and controversies that we’ll consider reflect the influence of an uncritical perspective, fallacious reasoning, and flawed research methodology. These are the hallmarks of pseudoscience. In this course, you will learn to distinguish between science and pseudoscience, to evaluate arguments and sources of evidence.

Examinations and Quizzes

There will be two examinations in the course and two shorter quizzes. Extra credit will be made available throughout the quarter. Each exam is worth 35% of the total points available in the course and each quiz is worth 15%. The final exam is cumulative only in the sense that skills and concepts discussed in the first half of the course will be applied to topics considered in the second half. Items on the exams and quizzes will be a mix of formats. However, typically at least half of the items are short essay format. Other formats, such as multiple choice and fill in the blank, will also be used where appropriate. Questions will generally require you to show that you understand the scientific principles and critical thinking skills that will be discussed in the first half of the course and that you can apply them to understand and critique the various sides of the controversial issues discussed in the remaining portion of the course. This amounts to more than simply memorizing principles or facts. Instead, it requires flexible understanding of those principles and the ability to apply them. Sample exam questions will be provided in the first few days of class to give you a better idea of what exams and quizzes will be like. Exams and quizzes are designed to draw on material covered in lecture, readings, and videos.

Policy on missing exams and quizzes

You must get approval prior to missing an examination or quiz except in the case of a true emergency. In the event of a last-minute emergency, you MUST call me or my secretary, Angie Mercer (2-4131), ON THE SAME DAY AS THE EXAM, preferably before the exam begins. Acceptable excuses for missing an exam are a death in your family, personal illness or the illness of your child or spouse, and unforeseen accidents like your car breaking down or getting stuck in an elevator on the way to the exam. I will need documented proof of these events should they occur, so get a funeral card, a note from your physician (on letterhead or a form designed for this purpose), and/or an invoice from the towing company with the date on it. Makeup exams will only be given in cases of documented emergency or when prior approval has been given to miss an exam. Note that if you aren’t sick enough to go to the doctor, you aren’t sick enough to miss the exam.

Grading

For a variety of reasons, I do not grade on a curve. For example, when a curve is used, no matter how well everyone in the class does on an exam, only a small percentage of students can receive an A. Instead, I prefer to give everyone a chance to get an A. Therefore, I apply the following preset cutpoints:

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Exams are designed to reflect what I think is an appropriate level of mastery of the material covered. So if everyone gets an A, that’s great! I’ll assume such performance reflects your hard work and intelligence (and, of course, my excellent teaching). If everyone does poorly, I’ll assume it was my fault, and define an A by the top scores on the test: 100% will be given as the second highest test score. So, if the top two scores were 67% and 62%, and you scored 54%, your test grade would be 54 points out of 62, or 87%.
Books (Required texts are marked with asterisks)


Gilovich, an expert in human judgment and decision making, presents many, many examples of faulty reasoning in this book. He ties each one to the ways that human decision-making processes fail us in everyday life.


Robert Park has been following pseudoscience and its consequences in our society for many years, in his role as the director of the American Physical Society. This book chronicles his experiences as a "professional skeptic" and gives a unique perspective on how our society and our government often facilitates the proliferation of "voodoo science."


This book is an excellent introduction to the tools of critical thinking and provides explanations of how extraordinary beliefs persist. The author does a very good job of explaining difficult and slippery concepts and there is no doubt that this book will hone your ability to think critically - about psychology and about life in general.


Carl Sagan’s legacy will probably be this book, of all his publications. As a popularizer of science, he did more to help nonscientists to understand the scientific method than perhaps any other person in the 20th century. This book describes not only how pseudoscience differs from science, using many common examples, but also captures the sheer joy of discovery that (true) scientists experience. Do we risk losing our technological advances to ignorance and superstition?


In this book, Shermer not only presents several examples of bizarre belief, he discusses why such beliefs are held and provides point-by-point counter-arguments. Reading this book is a great way to gear up for an argument with your neighbor about her abduction by aliens.


A more typical psychology textbook, devoted specifically to reasoning, logical fallacies, good and bad arguments, and the interpretation of probabilities and statistics. It is entirely atypical in that these concepts are introduced in the context of ESP, alien visitations, fairies, and so on. An excellent book.


Perhaps more than other sciences, social sciences in particular, psychology suffers from a lot of pseudoscience traveling under its umbrella. This book attempts to distinguish scientific from pseudoscientific psychology, and along the way presents a number of concepts important for the critical thinker.


Much of what we observe in bizarre belief systems can be described as "magical thinking," leading to superstitious behavior. As Vyse shows, superstitious behavior is entirely natural and normal. Vyse shows how superstitious beliefs are acquired and maintained, and discusses how critical thinking provides an alternative way of dealing with life’s uncertainties.
Additional Readings: Some readings come from sources other than these books. These are available at the class website at Carmen. I have also provided the references to them so that you can find them on your own if you wish.

Class Schedule

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<th>Week</th>
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<th>Topics, Readings and Videos</th>
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| 1    | Sep 22 | *Introduction to the Course*  
Why do we need a course like this? A brief guided tour of some popular but extraordinary beliefs.  
Explore some of the following web sites. While surfing, try and answer for yourself some of the following questions: What are these people selling? How do they benefit from maintaining their bizarre beliefs? What are their qualifications, e.g., are they doctors or Ph.Ds? Where is their data coming from? How could you test their ideas? Can you find other web sites that give an opposing or critical view?  
http://www.daniken.com: The site of Erich von Daniken, who claims that ancient archeological sites contain evidence of early human contact with extraterrestrial beings.  
http://www.lovely.clara.net: A crop circle information site. Crop circles, sometimes elaborate circular patterns appearing in fields of grain crops, have been attributed to pranksters, landing extraterrestrial spacecraft, conjunctions of force field meridians, and secret laser technology from orbiting satellites.  
http://nostradamususa.com: Nostradamus was a 16th century physician who wrote a large number of prophetic "quatrains" that many believe have predicted some of the major events of the 20th (and 21st?) centuries.  
http://iufomrc.org: The International UFO Museum and Research Center site, which is devoted to investigating a famous crash of a UFO in Roswell, New Mexico. Many of our technological advances have been attributed to reverse engineering from the crash debris, which is purportedly held (along with the bodies of the alien pilots) at Area 51, a top-secret air base in Nevada.  
http://www.angelfire.com/stars3/breathe_light/breatharianism.html: A Breatharian web site. Breatharians claim that the human body was designed to subsist on light alone, and that the need for food and drink is simply an addiction, similar to an addiction to cocaine or heroin.  

Section I: The Scientific Toolbox

2    | Sep 27 | *Hallmarks of Science and Pseudoscience*  
What makes a claim "scientific"? What is science and what does it do for us? What distinguishes science from pseudoscience? We will discuss several features that distinguish scientific from pseudoscientific thinking. We will also explore the distinction between science and scientism.  

- Required Readings:  
  - Ruscio, Preface. [6 pp.]  
  - Ruscio, Chapter 1. Introduction: Pseudoscience and the Need for Clear Thinking [13 pp.]  
  - Ruscio, Chapter 2. Science: Evaluating Claims to Knowledge [16 pp.]  

- Supplementary Readings:  
  - Sagan, Chapter 12. The Fine Art of Baloney Detection  
  - Schick and Vaughn, Chapter 7. Science and Its Pretenders  
  - Shermer, Chapter 2. The Most Precious Thing We Have
Week 2  Sep  29  Falsifiability and Plausibility
One of the surest ways to ferret out pseudoscience is by examining whether or not a claim is falsifiable. Also, many bizarre beliefs are, on their face, implausible. What does "plausibility" really mean? At what point does a belief become "magical" or superstitious?

- Required Readings:
  - Ruscio, Chapter 7. Plausibility: All Beliefs Are Not Created Equal. [16 pp.]
  - Stanovich, Chapter 2. Falsifiability: How to Foil Little Green Men in the Head [15 pp.]

- Supplementary Readings:
  - Park, Chapter 3. Placebos Have Side Effects
  - Sagan, Chapter 10. The Dragon in My Garage

- Video:
  - Segment from NOVA (1993) "Secrets of the Psychics."
  - Segment from Scientific American Frontiers (1997) "Beyond Science: Healing Touch"

Week 3  Oct  4  The Psychology of Persuasion: Evaluating Sources of Information
If it appears in print, it must be true, right? How do we know when a publication is reputable? How do we know whether someone is an expert? What does it mean for a study to have been "peer reviewed"? Is peer review important? How strong is a testimonial?

- Required Readings:
  - Ruscio, Evaluating Sources Whether in Print or on the World Wide Web (pp. xxiii-xxix) [7 pp.]
  - Ruscio, Chapter 6. Experience: The Limitations of Testimonials as Evidence [13 pp.]

- Supplementary reading: Park, Chapter 7. Currents of Fear: In Which Power Lines are Suspected of Causing Cancer
Week 3 Oct 6 Case Study: Deepak Chopra
Think yourself well.

- Required Readings:

- Supplementary Readings:

- Video: Segment from Deepak Chopra’s "Quantum Healing"

Week 4 Oct 11 Self-deception: How Scientists Fool Themselves
Even experts can fool themselves, sometimes with embarrassing or devastating consequences.

- Required Readings:
  - Ruscio, Chapter 10. Belief: Confirmation Bias, Post-Hockey, and Over-confidence [14 pp]
  - Shermer, Chapter 3. How Thinking Goes Wrong [17 pp]

- Supplementary Readings:

- Video: Segment from NOVA (1993) "Secrets of the Psychics."

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- **Supplementary Readings:**

- **Video:** Segment from NOVA (1993) "Secrets of the Psychics."
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| 4    | Oct 13 | Quiz 1: Science and the Scientific Method  
Case Study: Gary Schwartz and John Edward  
**Required Readings:**  
**Supplementary Readings:**  
- Marks, D. & Kamman, R.. (1980). Kreskin’s Riddle (Ch. 4) and Solving Kreskin’s Riddle (Ch. 5). In *The Psychology of the Psychic* (pp. 42-72). Buffalo, New York: Prometheus Books.  
**Video:** James Van Praagh on 20/20  
| 5    | Oct 18 | Section II: Facts and Misconceptions about the Brain and Behavior  
Neural processes  
How does the brain really work? What are the functions of the brain that produce hallucinations? What is a near-death experience and can it be explained as a natural result of neural processing?  
**Required Readings:**  
**Supplementary Readings:**  
- Shermer, Chapter 5. Through the Invisible: Near Death Experiences and the Quest for Immortality  
**Video:** Segment from John Stossel’s The Power of Belief |
Perceptual Illusions
Seeing is believing. It is hard to be objective about the things we see. But our perceptual system can be easily fooled. Today we talk about visual perception and the way it works. These workings can lead to interesting visual illusions, some small and some large.

- Required Readings:

- Supplementary Readings:

Memory
Why is it that some memories seem so strong, and others are so hard to reconstruct? Is memory like a video recorder, storing all of our experiences in a wet, gray filing cabinet, or is it something else? How reliable are our memories, anyway?


- Supplementary Readings:
  - Sagan, Chapter 9: Therapy

Exam I (in class), material through Week 5
7 Nov 1  
*Judgment and Decision Making*

Sometimes people make stupid choices, even very smart people. Why does this happen, and how can our decision-making mechanisms reinforce bizarre beliefs?

- **Required Readings:**
  - Ruscio, Chapter 13. Assessment: Classical Decision Theory [20 pp]
  - Schick and Vaughn, Chapter 6: Evidence and Interference [25 pp]

- **Supplementary Readings:**
  - Park, Chapter 8: Judgment Day: In Which the Courts Confront Junk Science

7 Nov 3  
*Learning: Superstition*

What we have learned, past experiences, have strong effects on our decision-making processes. Often, superstitious behavior can result from past experiences. Today we discuss the development of superstition and how it relates to judgment.


- **Supplementary Readings:**
  - Required Reading: Vyse, Chapter 3. Superstition and Coincidence [34 pp]

8 Nov 8  
*Quiz 2: Brain and Cognition*

*Case Study: Alien Abductions*

Why do extraterrestrials need to kidnap certain people and subject them to humiliating physical examinations aboard their spacecraft? If these little gray folk are trying to be discrete, why kidnap prominent authors and artists, who seem to make lots of money writing books and selling alien portraits?

- **Required Readings:**
  - Sagan, Chapter 6: Hallucinations [12 pp]
  - Shermer, Chapter 6: Abducted! [11 pp]

- **Supplementary Readings:**

- **Video:** NOVA "Kidnapped by UFOs?"
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<td><strong>Section III: Social Influence</strong></td>
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<td>8 Nov 10</td>
<td>Hypnosis</td>
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<td>Skilled hypnotists can put a person in a trance. In this trance-like state, a person will commit crimes, remember license plate numbers, revert to a past life, demonstrate superhuman strength or resistance to pain, or act like a chicken, all at the request of the hypnotist. Or maybe not.</td>
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<td>9 Nov 15</td>
<td>Group Dynamics</td>
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<td>Being part of a group can form an important part of a person’s identity. For example, some people define themselves as devout Catholics. Others belong to gangs, militias, or the Masonic Lodge. How does group membership foster bizarre beliefs?</td>
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<td>– Heaven’s Representatives (1996). Do’s Intro: Our Purpose –</td>
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| 9    | Nov 17 | The Role of the Media  
Larry King is a notable, respected television journalist. His program, "Larry King Live," routinely hosts self-proclaimed psychic Sylvia Browne, during which she takes calls from the television audience and provides personalized psychic readings. Does the fact that a major news network (CNN) "endorses" these programs have any implications for the way people perceive Sylvia Browne? You betcha...  
- Required Readings:  
  - Park, Chapter 1. It’s Not News, It’s Entertainment: In Which the Media Cover Voodoo Science. [24 pp]  
  - Ruscio, Chapter 9. Risk: Biased Perceptions and the Media Paradox. [9 pp]  
- Supplementary Readings:  
| 10   | Nov 22 | Class cancelled |
| 10   | Nov 24 | Thanksgiving Day |
| 11   | Nov 29 | Conspiracy Theories  
The CIA murdered John F. Kennedy. No Jews were murdered in the terrorist attacks on the World Trade Center because they were all warned to stay home. HIV was engineered to achieve the genocide of African people. Conspiracies are all around us, evident in the most mundane of everyday events. What is the appeal of such theories and how are they perpetuated? Do they actually serve a purpose?  
- Required Readings:  
  - Sagan, Chapter 5. Spoofing and Secrecy [18 pp]  
- Supplementary Readings:  
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| 11   | Dec  | *Case Study: Satanic Ritual Abuse*

Some victims of sexual abuse claim that their abusers forced them to take part in grotesque rituals. They testify that they were forced to bear the children of their abusers, and then forced to murder and cannibalize their own babies. The Satanic Cult conspiracy is vast and sophisticated, involving law enforcement, day care, teachers, big business, and funeral directors (who dispose of the incriminating remains).

- **Required Readings:**

- **Supplementary Readings:**
  - Smith, M. (1981). In *Michelle Remembers*. Pocket Books. *(Warning: The material in this reading is sexually explicit and violent. Don’t read it if you don’t want to.)*

- **Video:** Frontline’s ”The Search for Satan”

*Exam II (during Finals Week), material from Week 6 through Week 11*