

Psychology 208
Fall 2000
Tuesday/Thursday, 1:10 - 2:25
103 Wilson Hall

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Course Overview: We live in an expanding ocean of information, and scientific research is one source of that expansion. Knowledge acquired through research is bounded by the conditions under which the research is carried out. Consequently, informed consumers of information must understand how research is carried out, in order to decide what to believe. This course provides an introduction to theory and research methods in psychological science. Topics include philosophy of science, measurement, ethical issues in psychological science, experimental design and data interpretation. Students will develop an appreciation for the methods involved in carrying out research on issues in psychology and, hopefully, will become critical consumers of scientific results, learning to distinguish sound conclusions from those based on faulty reasoning or flawed experiments.

Classes will start promptly at 1:10, and students should be in their seats by that time.

Computer accounts/electronic classroom: Students need to have email accounts and must know how to access the World Wide Web (WWW). Students must know how to access electronically the files posted in the 208 folder on the Electronic Classroom file server, including the homework drop folders. There is a webpage specifically for this course, and you will be visiting it frequently for homework assignments and readings:

<http://www.psy.vanderbilt.edu/courses/psy208/208/208.html>

Students will spend time in Room 120 Wilson Hall, the electronic classroom (EC) with Macintosh workstations. Throughout the semester demonstrations, exercises and homework assignments will be posted on those workstations for students enrolled in 208.

The EC is open for your use during times posted outside that classroom. Plan to attend one of the tutorial sessions offered by the EC staff; these are offered during the first week of class. During open times, there is an assistant in the classroom who can answer questions about the facility (e.g., logging on to the computer, printing material).

You also should consult the Vanderbilt Academic Calendar for important dates including drop/add, fall break and exam period:

http://registrar.vanderbilt.edu/calendars/2000-2001_calendar.asp

GUIDING PRINCIPLES FOR THIS COURSE

- Education would not be necessary if things were as they seem (Parker Palmer)
- Everything should be made as simple as possible, but not simpler (Albert Einstein)
 - Anything worth doing is worth doing slowly (Gypsy Rose Lee)
- The more the teacher teaches, the less the student learns (anonymous)

REQUIRED READINGS

The Double Helix, by J.D. Watson

Doing Psychology Experiments, D. Martin (DPE)

How to Think Straight About Psychology, K.E. Stanovich

Selected articles on reserve in the Central Library or posted on website

COURSE OVERVIEW

Week 1 (8/31)

Introductory comments, course aims, description of syllabus, and an overview of what you know at this point in the course and what will you know by the end. Introduction to the concept of “consumers of information.” Skepticism vs cynicism. Students should attend the workshops sponsored by the computer center on: i) using e-mail, and ii) working in the electronic classroom with Macintosh computers. **Readings:** Chapt 1 DPE, Chapters 1 & 12 Stanovich. **Homework assignment 1:** Navigate to the 208 folder on the file server in the EC, locate the file named “Homework 1”, copy it to your computer, open that file and follow the instructions - this homework assignment must be turned in by Wednesday, 9/6, no later than 5 PM.

Week 2 (9/5 - 9/7)

Historical overview of the field of psychology: Roots of modern experimental psychology in philosophy and in medicine; development of psychology as a “hybrid” science; recurrent themes and central problems in psychology. **Readings:** *The Double Helix* by Watson. You should begin compiling examples of the use of “scientific evidence” to argue a point or persuade people to act (described in more detail later in this handout). This “evidence diary” will be turned in as **Homework Assignment 5** on 10/10. Also, you should begin your daily log of oral temperature (each student is provided a thermometer) and of mood rating (use a 1 - 10 scale, where 1= awful, 5 = average and 10 = super). This log will be turned in as **Homework Assignment 6** on 10/9. **NOTE:** Wednesday (9/6) is the last day for drop/add.

Weeks 3 & 4 (9/11 - 9/21)

The nature of beliefs: What does it mean “to believe” something, and how do we acquire our beliefs? Domains of understanding: art, theology, philosophy, mathematics, literature, science. What are the essentials of science? Levels of understanding within science; reductionism. Cause-and-effect as a limiting principle in science (and its implications for “free will”); Is there a “scientific” method? Interplay between theory and observation in science. Role of falsification in scientific investigation. What are theories and how are they tested? Science advances when ideas compete; does science advance when scientist compete? Do scientists cheat, and if so why? Role of expectation in hypothesis testing. **Readings:** Chaps 5 & 6 DPE, Chapters 2 & 4 Stanovich; “Strong inference” Platt (Library) . **Homework assignment 2:** Write a short, thoughtful essay on the origins of your beliefs, to be turned in during class on Thursday 9/21. **Learning objective:** understand the nature and limitations of science as a method for the acquisition of knowledge

- Week 5 (9/26 - 9/28) Measurement - from assertion to evidence. What does it mean to measure something? The use (and misuse) of numbers. Operational definitions: linking psychological concepts to observable events. Methods of measurement in psychology. Telling what you know - the validity of self-report; unobtrusive measures, indirect measures, physiological measures. **Readings: Readings:** Chapter 7 DPE, Chapter 3 Stanovich. **Homework Assignment 3:** Operational definitions of psychological concepts, to be turned in 9/28. **Learning objective:** understand how concepts such as “anxiety” or “insight” can be studied by means other than introspection. Exam 1 on Thursday September 28
- Week 6 (10/3 - 10/5) Scaling, direct and indirect; construction of psychological inventories, rating scales, multidimensional scaling. Validity and reliability. **Homework Assignment 4:** Measurement of Müller/Lyer illusion in EC, to be turned in 10/05.
- Week 7 (10/10 - 10/12) Primer in statistics, descriptive and inferential; graphical presentation of data; the importance of sampling. **Readings:** Chapter 12 and Appendix A DPE Chapter 10 Stanovich; **Homework Assignment 5:** Turn in “evidence diary” on 10/10. **Homework assignment 6:** turn in oral temperature and mood data on 10/12, in a tab-delimited electronic format.
- Week 8 (10/17 - 10/19) Variance, the focus of interest and the source of confusion. “It is very unlikely for unlikely events not to occur.” Logic of decision making in the face of uncertainty. **Homework assignment 7:** compute summary statistics for temperature data available on the file server. Due 10/19. Midterm deficiency reports turned in to University Registrar.

- Week 9 (10/24 - 10/26) The “experiment” as a bounded set of observations. Decisions made when conducting a study. Where do ideas for experiments come from? Real vs quasi experiments; internal vs external validity; within- vs between-subject designs **Readings:** Chapters 6 -10 DPE; Chapters 5, 6 Stanovich. **Learning objective:** discover the logic of experimental design, with particular emphasis on the factors that can contaminate results from an experiment. By the end of this series of classes you should be able to decide whether a conclusion from a study is, in fact, warranted.
- Week 10 (10/31 - 11/02) Randomization, counterbalancing; Null results (the file-drawer category), and the difficulty of publishing them; interpreting “bad” data; role of replication in scientific research; external validity (“artificiality”). **Readings:** Chapter 13 DPE; Chapter 7 Stanovich; “Science and ethics in conducting, analyzing and reporting psychological research” Rosenthal (Library). **Homework Assignment 8:** Select one of the papers on posted on the course website, study it and then write an abstract and title for the paper. Due 11/02 **Learning objective:** understand what Einstein meant when he said “Never accept the truth of a fact until it has been confirmed by theory”; learn the ingredients of a well-written experimental report; evaluate the “it’s not real life” criticism. Exam 2 on Tuesday Oct. 31
- Week 11 (11/07 - 11/09) Ethical issues in psychological and neurobiological research on humans and on animals. Deception in research. Are some psychological questions off limits? **Homework Assignment 9:** Evaluating Research Protocols. Due 11/14 **Readings:** Chapter 4 DPE; “Are animals people too?” by Wright (Library). **Learning objective:** develop appreciation for the importance of informed consent and for the strict maintenance of humane techniques for the treatment of research animals **Video. Deadline for approval of topic for Homework Assignment 10 is 11/09.**
- Week 12 (11/14 - 11/16) Cross-cultural psychology: to what extent is knowledge acquired in research applicable to people of different cultural backgrounds? The science and politics of gender

research; the IQ controversy. **Learning objective:** Explore the ethical implications of asking questions about individuals and/or groups.

Week 13 (11/18 - 11/26)

Fall Break!!

Week 14 (11/28 - 11/30)

Research strategies for the study of contemporary issues: behavioral genetics, cognitive science, neuroscience, clinical science. **Readings:** Chapter 11 Stanovich; **Video in class**

Week 15 (12/05 - 12/07)

Research strategies (cont.); **Homework Assignment 10:** Summarize status of experimental evidence on one of the following topics: subliminal perception, effect of television on violent behavior, inheritance of intelligence, brain mechanisms of pain, repressed memories, or topic selected by you and approved by instructor or TA; due 12/05. **Exam 3 on Thursday Dec. 07**

Week 16 (12/12)

Summary and overview

Week 17 (12/10)

No Final Exam

EXAM SCHEDULE

- Exam 1 To be administered in class on Thursday, September 28, with the entire period devoted to the exam. The exam will cover readings, lecture and discussion material from Weeks 1 - 5.
- Exam 2 To be administered in class on Thursday October 31, with the entire period devoted to the exam. Material from Weeks 6 - 9.
- Exam 3 To be administered in class on Thursday December 07, with the entire period devoted to the exam. Material from Weeks weeks 10 - 15.

VANDERBILT'S HONOR CODE GOVERNS ALL WORK IN THIS COURSE

All examinations will cover material from lectures, demonstrations, videos and the required readings. Please note that the lectures are designed to complement, not repeat, material in the text chapters; just because something isn't mentioned in class does not mean it's unimportant. The exams will consist of multiple choice items, phrases/concepts requiring brief definitions and a few short problems requiring essay answers.

ASSIGNMENT OF GRADES

Your final grade will be based on total points accumulated on the three exams and the ten homework assignments. Each exam, including the final, is worth 45 points; homework assignments 1 - 9 are worth 5 points each, and homework assignment 10 is worth 20 points. (This last homework assignment involves more background research, and the material turned in should reflect this.) No credit will be received for homework assignments turned in late. The final grade will be based on total points, according to the distribution shown below:

A:	185 or greater
A-:	184-180
B+:	179-175
B:	174-165
B-:	164-160
C+:	159-155
C:	154-145
C-:	144-140
D+:	139-135
D:	134-125
D-:	125-120
F:	119-000

Prior to each exam, an optional review session will be held, with date, time and room number to be announced in class. At that time, the TAs and/or instructor will be available to answer questions about material for the upcoming exam. **Make-up exams will only be given in documented cases involving family or medical emergency.**

Homework assignment 1: Navigate to the 208 folder on the file server in the EC, locate the file named "Homework 1", copy it to your computer, open that file and follow the instructions - this homework assignment must be turned in by Wednesday, 9/6, no later than 5 PM.

Homework assignment 2: Write a short, thoughtful essay on the origins of your beliefs, to be turned in during class on Thursday 9/21

Homework Assignment 3: Operational definitions of psychological concepts, to be turned in 9/28.

Homework Assignment 4: Measurement of Müller/Lyer illusion in EC, to be turned in 10/05.

Homework Assignment 5: Turn in “evidence diary” on 10/10.

Homework assignment 6: turn in oral temperature and mood data on 10/12, in a tab-delimited electronic format.

Homework assignment 7: compute summary statistics for temperature data available on the file server. Due 10/19.

Homework Assignment 8: Select one of the papers on posted on the course website, study it and then write and abstract and title for the paper. Due 11/02

Homework Assignment 9: Evaluating Research Protocols.

Homework Assignment 10: Summarize status of experimental evidence on one of the following topics: subliminal perception, effect of television on violent behavior, inheritance of intelligence, brain mechanisms of pain, repressed memories, or topic selected by you and approved by instructor or TA. The topic for this assignment must be approved by a TA or the instructor no later than 11/09, and the assignment itself must be turned in by 12/05.

Enrollment in this course represents your acknowledgement and acceptance of these non-negotiable grading policies

EXPLORING METHODOLOGY OUTSIDE OF CLASS

“A properly conducted experiment is a thing of beauty. It is an adventure , an expedition, a conquest. it commences with an act of faith, faith that the world is real, that our senses generally can be trusted, that effects have causes, and that we can discover meaning by reason.” From *To Know A Fly*, by Vincent Dethier.

“A properly conducted experiment operates like a well-constructed trap, in which a captured conclusion has no escape from the evidence.” R. Blake, driving to work one morning.

One rich source of insight for understanding methodology is provided by your own, everyday encounters with your world. This course encourages you to discover strategies of knowing that, in a sense, you already use. Learn to pay attention to how you solve problems, how you interpret events, how you form opinions and how you reach conclusions. To give a just a few examples:

- Think about how you’d discover the reason your car isn’t running well.
- Enumerate the characteristics that form your first impressions of someone you’ve just met.
- Listen to commercial advertisements, paying particular attention to their use of “evidence” to influence your purchasing behavior.
- Pay attention to the ways in which “statistics” are employed in newspaper stories, to buttress an argument.
- Notice what tactic your roommate uses to convince you to do something, or not to do something.
- Keep a tally of the number of times you read or hear the phrase, “Scientific evidence shows
- Ask you physician how she/he arrives at a diagnosis.

To encourage you to think about “evidence” Homework assignment 5 requires you to compile an "Evidence Diary." In this diary you should record examples of how “evidence” - particularly scientific evidence - is used to influence your thinking. Your diary should include at least six documented examples drawn from multiple sources (such as media, other classes, social interactions, church). Each example should explain the source of the evidence, the motives of the source, the validity of the evidence and your reaction(s) to it.

ADDITIONAL (BUT NOT REQUIRED) READINGS & RESOURCES

General methods

- Campbell, D.T. & Stanley, J.C. (1963) *Experimental and quasi-experimental designs for research*. Chicago: Rand-McNally Press. Classic analysis of threats to internal and external validity.
- Ericson, K.A. & Simon, H.A.(1993) *Protocol Analysis: Verbal Reports as Data*. Cambridge, MA: MIT Press. Pioneers in psychological research argue for the validity of verbal reports as psychological data.
- Wilson, T. (1994) The proper protocol: Validity and completeness of verbal reports. *Psychological Science*, 5, 249-252. A skeptical review of the utility of protocol analysis.
- Recent issues of *Journal of Experimental Psychology* or *Psychological Science* (Main) Articles in these journals provide first-hand exposure to contemporary psychological research.

Critical thinking

- Paulos, J.A. (1988) *Innumeracy:mathematical illiteracy and its consequences*. New York: Vintage Books. A classic showing how our ability to think rationally is limited by our confusion about probability and by the illusion of large numbers.
- Gray, W.D. (1991) *Thinking critically about new age ideas*. Belmont CA: Wadsworth. Fallacies in evidence supporting paranormal phenomena.
- Radner, D & Radner M (1982) *Science and unreason*.Belmont CA: Wadsworth. Differences between pseudoscience and genuine science.
- Shermer, M (1997) *Why people believe weird things*. New York: Freeman & Co.Human reasons why we believe in the supernatural.

Cultural relativism

- Matsumoto, D. (1993) *People: Psychology from a multicultural perspective*. Pacific Grove, CA: Brooks/Cole.
- Matsumoto, David (1994) *Cultural influences on research emthods and statistics*, Pacific Grove, CA: Brooks/Cole. Description of the ways culture affects the conduct of research and the analyses of data.
- Triandis, H.C. (1994) *Culture and social behavior*. New York: McGraw Hill.

Philosophy/history of Science

- Kuhn, T.S. (1970) *Structure of Scientific Revolutions*. 2nd Edition. CHicago: University of Chicago Press.
- Toulmin, S. (1960) *The Philosophy of Science: An Introduction*. New York: Harper & Row.
- Medawar, P. (1984) *The Limits of Science*. New York: Harper & Row.

Ethics in Science

- Broad, W. & Wade, N. (1982) *Betrayers of the truth*. New York: Touchstone. An examination of the various ways fraud in science is committed and detected.
- Sarasohn, J. (1993) *Science on trial*. New York: St. Martin's Press. Account of the contentious, exhausting investigation of a recent, infamous case of scientific fraud involving a Nobel Prize winner.

Intelligence Testing (IQ Debate)

- Gould, S.J. (1981). *The mismeasure of man*. New York: W.W. Norton.
- Gould, S.J. (1994). Curveball. *The New Yorker*. (pp. 139-149).
- Herrnstein, R.J., & Murray, C. (1994). *The bell curve*. Free Press.
- Murray, C., & Herrnstein, R.J. (1994). Race, genes, and IQ - An apologia. *The New Republic*. (pp. 27-37).
- Jacoby, R., & Glaubergerman, N. (1995). *The bell curve debate*. New York: Random House.
- Jensen, A.R. (1972). *Genetics and education*. New York: Harper & Row.

Cognitive Neuroscience

- Tranel, D., & Damasio, A.R. (1985). Knowledge without awareness. *Science*, 228, 1454-1455.
- Raichle, M.E. (1994). Visualizing the mind. *Scientific American*, 58-64.

Sample Listing of WorldWideWeb Sites on Topics of Relevance to Students in Psychology 208

Astrology

- <http://www.vianet.on.ca:80/pages/mcnenlyb/>
<http://www.teleport.com/~ronl/horo.html>

Philosophy of science

- <http://www.emory.edu/EDUCATION/mfp/Kuhn.html> [summary notes of Kuhn's book]
<http://www.philosophers.co.uk/current/science.htm> [synopsis of Kuhn]
<http://www.brint.com/papers/science.htm> [an essay on philosophy of science]
<http://www.pitt.edu/~pittctr/>

Science and Society

- <http://www.sciencemag.org/feature/data/150essay.shl> [nice collection of essays]

Experimental Design

- <http://server.bmod.athabascau.ca/html/Validity/index.shtml>
<http://gateway1.gmcc.ab.ca/~digdonn/psych104/think.htm>

Statistics (somewhat advanced)

<http://www.graphpad.com/articles/interpret/tableaofacontents.htm>
<http://www.graphpad.com/www/Book/Choose.htm>

Ethics

<http://helix.nih.gov:8001/ohsr/guidelines.phtml> [guidelines for use of humans in research]
<http://www.apa.org/ethics/code.html> [ethics in psychological training and research]
<http://www.apa.org/science/animal2.html> [guide for treatment of animals in research]

Parapsychology

<http://www.mdani.demon.co.uk/para/paralink.htm>
<http://www.princeton.edu/~pear/>
<http://www.physics.wisc.edu/~shalizi/hyper-weird/fringe.html>
<http://www.csicop.org/si/> (a journal devoted to debunking bad science)
<http://www.mdani.demon.co.uk/para/esp2.htm> [on-line esp test]

Bad Science

<http://www.junkscience.com/>
<http://www.improb.com> (the Mad Magazine of science)
<http://www.csicop.org/si/> (a journal devoted to debunking bad science)

On-line Psychology Experiments (but beware of broken links)

<http://epsych.msstate.edu/index.html>
<http://kahuna.psych.uiuc.edu/ipl/>

Psychology Journals/organizations on the Web

<http://www.apa.org/sitemap.html> [largest professional organization of psychologists]
<http://www.psychologicalscience.org/> [research-oriented professional organization, with access to *Psychological Science* and to *Current Directions in Psychological Science*]
<http://psych.AnnualReviews.org/>
<http://www.rhine.org/jp1.html> [flagship journal in parapsychology]
<http://www.wisc.edu/writing/Handbook/DocAPA.html> [style manual for the APA]

History of Psychology

<http://serendip.brynmawr.edu/Mind/Table.html>