Psychology 354
Introduction To Course

Who is the instructor?
How is the course organized?
What is the course about?

Michael R.W. Dawson

- PhD from University of Western Ontario
- Research interests in foundations of cognitive science, artificial neural networks, embodied cognitive science
- Research methods include computer simulation and LEGO robot fabrication
- For details about my research, go to my home web page

Credentials

- Dawson has published several books on cognitive science
- He posts cognitive science material at Twitter.com/mrwdawson

Course Objectives

- To introduce the foundational assumptions of cognitive science
- To expose students to the elements of three major positions in cognitive science: classical, connectionist and embodied
- To determine whether there is one cognitive science, or many

Course WWW Support

- There is extensive web site support for this course.
  - Syllabus
  - Slide handouts
  - Textbook for 2011
  - Quiz and midterm feedback
  - Slides
  - Notices to class (on home page)
  - Links to relevant material on other sites

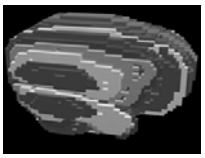
www.bcp.psych.ualberta.ca/~mike/Pearl_Street/PSYCO354/

Course Evaluation

- Midterm exam worth 30%
  - Exam format: 10 written definitions + one 3-4 page essay, with some choice
- Cumulative final exam worth 50%
  - Exam format: same as midterm, cumulative essay, definitions post-midterm
- Ten 10-minute quizzes worth 20%
  - Quiz format: Short answer essay based on required readings
- Check the syllabus for the schedule!

Required Textbook

- **Dawson, M.R.W. (under review). *The Cognitive Sciences*.**
- **Brand new manuscript, not used before**
- **Feedback on current state of the manuscript is welcome**
- **PDF files available from website with password**
- *"Dawson knows how to write charming prose and to apply his talent to unravelling hard ideas. Few people can write about cognitive science methodology in such a disarmingly easy-to-read style." Zenon Pylyshyn, Professor of Cognitive Science, Rutgers University*



Course Trajectory

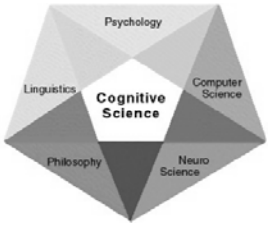
- **Is cognitive science as fractured as psychology?**
- **Interdisciplinary nature of cognitive science because of multiple levels of investigation**
- **Three 'flavors' of cognitive science: classical, connectionist, and embodied**
- **Are the three flavors distinct, or can one integrate all three to create a comprehensive approach to cognitive science?**

Discussion Topic

What is cognitive science?

Modern Cognitive Science

- **Modern cognitive science programs emphasize the need for multidisciplinary and interdisciplinary training**
- **Cognitive scientists need to be acquainted with a number of different disciplines, and with a range of methodologies that arose in one of these disciplines, but which are relevant to all**
- **To illustrate, consider some example cognitive science program descriptions for various universities**



The UCSD Definition

"The Department of Cognitive Science emphasizes three main areas of study: the brain-the understanding of neurobiological processes and phenomena; behavior-the experimental methods and findings from the study of psychology, language, and the sociocultural environment; and computation-the powers and limits of various representational formats, coupled with studies of computational mechanisms. This approach involves a multidisciplinary study of cognition with emphasis on computer science, linguistics, neuroscience, psychology, and related aspects of anthropology, biology, mathematics, philosophy, and sociology."

-- from the UCSD web site

University of California San Diego InfoPath

The Rutgers Definition

" The approach in cognitive science, in contrast with the approach taken by other investigators interested in similar issues, is essentially computational. The goal is to understand such aspects of intelligent performance as perception, language processing, planning, problem solving, reasoning, and learning, in terms of the computational processes that underwrite these skills, as well as the computational mechanisms (be they silicon hardware, or neural tissue) that may instantiate them. The pursuit is essentially multi-disciplinary and involves techniques and knowledge drawn from experimental psychology, computer science, neuroscience, philosophy, linguistics, mathematics, and engineering."

Rutgers

The Waterloo Definition

"Cognitive Science is the interdisciplinary study of mind and intelligence, embracing psychology, philosophy, linguistics, neuroscience, anthropology, computer science and engineering. The study of mind is exciting for theoretical reasons, since the attempt to investigate the nature of thinking is as challenging as anything attempted by science. […] The study of mind is inherently interdisciplinary, requiring the diverse insights and methodologies of psychologists, philosophers, computer scientists, linguists, neuroscientists, anthropologists, and other thinkers."

-- from the University of Waterloo web site

The Exeter Definition

One of the most important intellectual developments during the last four decades has been the realisation among researchers in psychology, computer science, linguistics, philosophy and neuroscience that they were asking the same questions about the nature of the human mind and its relationship to brain (`mind/brain'). The term cognitive science provides an overall framework within which researchers in one area can adopt approaches and solutions from other areas in an effort to shed light on the mind/brain question. […] `Cognitive science is the science of mind. Cognitive scientists seek to understand perceiving, thinking, remembering, understanding language, learning and other mental processes and phenomena involving awareness and cognition'

A Shared Foundation

- **The Sloan Foundation "provided grants to several universities with the condition that the funds be used to promote communication between disciplines" (Miller, 2003, p.143)**
- **Each discipline "had progressed far enough to recognize that the solution to some of its problems depended crucially on the solution of problems traditionally allocated to other disciplines" (Miller, 2003)**
- **Communication difficulties within single disciplines like psychology. How can interdisciplinary communication, required in cognitive science, be possible?**