

Boston University, Department of Psychology

**Fall 2002**

**PS 525** *Cognitive Science*

**Instructor:** Catherine Harris

**Time:** MW 10-11:30

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**website:** [courseinfo.bu.edu/courses/fallcasps525\\_a1](http://courseinfo.bu.edu/courses/fallcasps525_a1)

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**Course Description.** Cognitive scientists share a commitment to developing theories of human cognition which can integrate findings from diverse fields (psychology, philosophy, linguistics, computer science, neuroscience). Interdisciplinary research methodology, including connectionist modeling, will be reviewed and applied to questions on human decision making, consciousness, creativity, development, social behavior and psychopathology.

**Prerequisites.** Any one of the following courses: Cognitive Psychology (PS 336), Physiological Psychology (PS 231) Neuropsychology (PS 338), Minds and Machines (PH 265), Mind, Brain and Self (PH 266), Philosophy of Cognitive Science (PH 468), Artificial Intelligence. Prerequisites waived for graduate students. All students should have an understanding of basic statistical concepts (e.g., background in statistics to the level of MA 116 or PS 211). Auditors and visitors welcome.

**Course Requirements.** Four requirements:

- Paper, 8-12 pages, topic of your choice.
- Class participation. Draw on the reading and your own experience to contribute to discussion.
- Students will choose *one* of the following:

Postings to course discussion board, Fall02 PS 525 [courseinfo.bu.edu](http://courseinfo.bu.edu), Fall 02. Choose 4 topics, spread through out the class, and prepare a commentary on the topic. Format of the commentary is open (e.g., summarize and critique an article on the topic; offer an alternative point of view; help class members understand a technically difficult aspect of the article). Your commentary should be interesting and helpful to others in the class.

*or*

Course participants will assist in leading class discussion on one class meeting of their choosing.

- Read and respond to others' discussion board postings

## Readings

There are no books for this course. Most articles for weekly reading are available from [www.sciencedirect.com](http://www.sciencedirect.com). BU subscribes to this site. To download or print them you must access this website from your BU account.

### Weekly Topics and Reading

See "Assignments" on course website for an overview of articles, discussion questions and themes for the week

**Sep 6 Class introduction (Wed Sept 4, First class day)**

**Sep 9 What is cognitive science: The cognitive revolution, computational modeling, "connectionism," convergent methodology, "The Big Questions."**

Harris, C.L. 2001. Language and cognition. Available from <http://people.bu.edu/charris/encyclopedia.html>

Hinton, G.E., Plaut, D.C., Shallice, T. (1993). Simulating brain damage. *Scientific American*, October 1993. Prof. Harris will copy and distribute this short article.

## Sep 16 Decision Making and the Brain: Are We Rationale?

Rahman, S. et al. (2001). Decision making and neuropsychiatry. *Trends in Cognitive Sciences*, 5, 271-277.

Book review of *The Mind's Past* by Michael S. Gazzaniga, 1998. [www.shef.ac.uk/~phil/connex/issue04/teixeira.html](http://www.shef.ac.uk/~phil/connex/issue04/teixeira.html)

Ramachandran, V.S. (1998). The sound of one-hand clapping. Chapter from *Phantoms in the Brain*, Quill William Morrow. Copies available in Prof. Harris pickup box.

Chase, V. et al. (1998). Vision of rationality. *Trends in Cognitive Sciences*, 2, 206-214. [sciencedirect.com](http://sciencedirect.com).

Miller, G., Todd, P.M. (1998). Mate choice turns cognitive. *Trends in Cognitive Sciences*, 2, 190-198.

Gerd Gigerenzer, Peter M. Todd and the ABC Research Group. (1999). Simple Heuristics That Make Us Smart. *Behavioral and Brain Sciences* 22. Available from <http://www.bbsonline.org/Preprints/OldArchive/bbs.todd.html>

## Sep 23 Stereotypes, Social Categorizations, Perceiving and categorizing and Ethnicity

### *Papers on Implicit Attitudes*

Test your own implicit stereotypes at either of these websites (both describe Implicit attitude research):

- [http://www.tolerance.org/hidden\\_bias/tutorials/06.html](http://www.tolerance.org/hidden_bias/tutorials/06.html)
- <http://buster.cs.yale.edu/implicit/index.html>

Cunningham, W., Preacher, K.J., Banaji, M.R. (2001). Implicit attitude measures: Consistency, stability, and convergent validity. *Psychological Science*, 12, 163-170. Prof Harris will distribute.

*Supplemental:* Banaji, M. R. & Bhaskar, R. (2000). Implicit stereotypes and memory: The bounded rationality of social beliefs. In D.L. Schacter, E. Scarry, Memory, brain, and belief. pp. 139-175. Cambridge: Harvard University Press. This book is available at Mugar library. I urge a class member who is interested in this topic to check out the book and prepare a review of the article.

### *Papers on perceiving/categorizing visual features indicating race*

Nicholas Furl, P. Jonathan Phillips and Alice J. Toile. Face recognition algorithms and the other-race effect: computational mechanisms for a developmental contact hypothesis, *Cognitive Science*, In Press.

Levin, D.T. Race as a visual feature: Using visual search and perceptual discrimination tasks to understand face categories and the cross-race recognition deficit. Brief research summary. <http://www.personal.kent.edu/~dlevin/OPAMsum.html>

For additional papers on the literature of cross-race face recognition, look at the list maintained Eyewitness Identification Research Laboratory At the University of Texas at El Paso, <http://eyewitness.utep.edu/crossrace.html>.

I will show in class on Monday Sep 23 a short video on “change blindness.” Before seeing the video you may want to experience the phenomenon for yourself by visiting the website <http://coglab.wjh.harvard.edu/~netexp/>. The phenomenon of change blindness is relevant both to social categorization and next week’s topic of visual awareness

## Sep 30: Change Blindness; Conscious Awareness

O’Regan, K.J., & Noe, A. (2001). A sensorimotor account of vision and visual consciousness. *Behavioral and Brain Sciences*, 24(5). Available from: <http://www.bbsonline.org/Preprints/ORegan/> Provides an explanation for visual phenomenology: why vision feels the way it does.

Dehaene, S., Naccache, L. (2001). Towards a cognitive neuroscience of consciousness: Basic evidence

and a workspace framework. *Cognition* 79, 1-37.

Dehaene, S., Naccache, L., Le Clec, H.G., Koechlin, E., Mueller, M., Dehaene-Lambertz, G., van de Moortele, P.F., & Le Bihan, D. (1998). Imaging unconscious semantic priming. *Nature*, 395, 597-600. <http://psych.colorado.edu/~mbanich/psyc7215/Stanislas.pdf>

Kanwisher, N. (2001). Neural events and perceptual awareness. *Cognition*, 79, 89-113.

Miller, M.B., & Gazzaniga, M.S. (1998). Creating false memories for visual scenes. *Neuropsychologia*, 36, 513-520.

### **Oct 7: Sleep and Dreaming**

J.Allan Hobson and Robert Stickgold, "A Neurocognitive Approach to Dreaming" *Consciousness and Cognition* 3:1:1-15 (1994). <http://home.earthlink.net/~sleeplab/papers/cc/C-C1.html> Hobson and Stickgold's group have posted on their website a wealth of fascinating papers (children's dream reports, emotion profiles in the dreams of men and women, etc.). Please browse the site to find sleep/dreaming topics of specific interest to you.

Domhoff, G. W. (2000). The Problems with Activation-Synthesis Theory. Unpublished manuscript. [http://www.dreamresearch.net/Articles/domhoff\\_2000e.html](http://www.dreamresearch.net/Articles/domhoff_2000e.html) Critiques Hobson and Stickgold's activation-synthesis model of dreaming.

### **Oct 14: Tues is Mon sched. Primate Intelligence, Animal Cognition**

Povinelli, D.J., Bering, J.M., Giambrone, S. (2000). Toward a science of other minds: Escaping the argument by analogy. *Cognitive Science*, 24, 509-541.

Gordon G. Gallup Jr. Self-awareness and the evolution of social intelligence, *Behavioural Processes*, Volume 42, Issues 2-3, February 1998, Pages 239-247

Heyes, C. M. (1998) Theory of mind in nonhuman primates. *Behavioral and Brain Sciences*. Available from the BBS website, <http://www.bbsonline.org>

### **Oct 21: Music Cognition**

Monday: Nils et al. (2001), *The Origins of Music*. Book at Mugar reserve. Select chapters of interest to you. I recommend: Miller, Evolution of human music through sexual selection; Dissanayake, Antecedents of the temporal arts in early mother-infant interaction; Freeman, A neurobiological role of music in social bonding.

Wednesday: Individual differences. Sloboda, J.A. (2000). Individual differences in music performance. *Trends in cognitive science*, 4, 397-403.

Lewis, P. (2002). Musical minds. *Trends in cognitive science*, 6, 364-366.

### **Oct 28: Evolutionary Psychiatry**

Mealey, L. (1995). The sociobiology of sociopathy: An integrated evolutionary model. *Behavioral and Brain Sciences* 18 (3): 523-599. <http://www.bbsonline.org> Proposes that an exploitative, antisocial strategy in mating, parenting, and general interpersonal behavior was an adaptive for some of our ancestors, and continues to be adaptive today.

Abed, Riadh T and de Pauw, Karel W (1999) An Evolutionary Hypothesis for Obsessive-Compulsive Disorder: A Psychological Immune System? *Behavioural Neurology* 11:245-250. <http://cogprints.ecs.soton.ac.uk/archive/00001147/> Suggests that OCD originates from the overactivity of an adaptive mental module used to generate risk scenarios.

Abed, R.T. (1998). The sexual competition hypothesis for eating disorders. *British Journal of Medical Psychology* 71(4):525-547. <http://cogprints.ecs.soton.ac.uk/archive/00000800/> Proposes that eating disorder and pursuit of thinness are manifestations of female intrasexual competition.

Evans, Dylan (1999) From moods to modules: preliminary remarks for an evolutionary theory of mood phenomena. In *Proceedings Naturalism, Evolution and Mind*, Edinburgh. <http://cogprints.ecs.soton.ac.uk/archive/00000814/> Evolutionary look at emotions and discussion of modularity debate.

Watson, F. et al. Sex differences in the content of persecutory delusions: A reflection of hostile threats in the ancestral environment? *Evolution and Human Behavior*.

Schizophrenia as a consequence of brain evolution, *Schizophrenia Research*, Volume 30, Issue 2, 10 March 1998, Pages 143-148 P. L. Randall

*Supplementary articles (Background reading)*

Smith, E.A. et al. Controversies in the evolutionary social sciences: a guide for the perplexed, *Trends in Ecology and Evolution*. Short history of evolutionary arguments applied to social sciences.

#### **Nov 4 Conceptual Representations; Children's Conceptual Development**

Lorraine K. Tyler and Helen E. Moss. Towards a distributed account of conceptual knowledge, *Trends in Cognitive Sciences*, Volume 5, Issue 6, 1 June 2001, Pages 244-252.

Additional articles to be determined (with assistance from our Human Development classmates).

#### **Nov 11 Language**

Elman, J.L. (1999). The emergence of language: A conspiracy theory. In B. MacWhinney (Ed.) *Emergence of Language*. Erlbaum. Available from: <http://crl.ucsd.edu/~elman/> Describes connectionist models of language and ties them to a specific theory of language.

Tomasello, M. (2000). The item-based nature of children's early syntactic development. *Trends in Cognitive Sciences*, 4, 156-163. Challenges the (conventional?) view that children's early word combinations represent abstract statistical knowledge.

Bloom, P., & Markson, L. (1998). Capacities underlying word learning. *Trends in Cognitive Sciences*, 2, 67-73. It is children's understanding of adults' intentions to name objects which fuel word learning. Alternate reading is: Bloom, Paul (2001) Precipitous: How children learn the meanings of words, *Behavioural and Brain Sciences*. This is a more comprehensive, recent and technical article. Read both articles or choose the article which best fits your background and interest level.

Bates, E. (1999). Language and the infant brain. *Journal of Communication Disorders*, 32, 195-205. Studies of early (perinatal) brain lesions inform our understanding of brain areas which mediate language.

#### **Nov 25 (Monday only)**

LeDoux, J. (1998). *The emotional brain: The mysterious underpinnings of emotional life*. Chapters 1 and 9. Prof. Harris will distribute copies.

Harris, C.L., Ayçiçeği, A., & Gleason, J.B. (2001). Taboo and emotion words elicit greater autonomic reactivity in a first language than in a second language. <http://www.bu.edu/PSYCH/faculty/charris/papers/BilingualismTaboo.pdf>.

#### **Dec 2 Connectionism, Modularity, Dynamical Systems**

Farah, M.J (1994). Neuropsychological inference with an interactive brain: A critique of the "locality" assumption. *Behavioral and Brain Sciences* 17 (1): 43-104. <http://www.bbsonline.org/>

Muller, Ralph-Axel. (1996). Innateness, autonomy, universality? Neurobiological approaches to language. *Behavioral and Brain Sciences*, 19 (4): 611-675. <http://www.bbsonline.org/Preprints/OldArchive/bbs.mueller.html>

Randall D. Beer. Dynamical approaches to cognitive science, *Trends in Cognitive Sciences*, Volume 4,

Issue 3, 1 March 2000, Pages 91-99

Gerard O'Brien and Jon Opie. Radical connectionism: thinking with (not in) language, *Language & Communication*, Volume 22, Issue 3, July 2002, Pages 313-329

Seidenberg, M., & Elman, J.L. (1999). Networks are not 'hidden rules.' *Trends in Cognitive Science*, 3, 288-289.

Zenon W. Pylyshyn. Why the mind is (still) not a network, *Trends in Cognitive Sciences*, Volume 5, 1 November 2001, Page 499

Tager-Flusberg, H., & Sullivan, K. (2000). A componential view of theory of mind: Evidence from Williams syndrome. *Cognition* 76, 59-89.

### **Dec 9 Computational Models of Clinical Disorders**

Connectionist Models of Cognitive, Affective, Brain, and Behavioral Disorders. Browse this website, maintained at Carnegie-Mellon, for background, discussion, and listings of papers. <http://www.cnbc.cmu.edu/disordermodels>

Warren W. Tryon (1999). A bidirectional associative memory explanation of posttraumatic stress disorder, *Clinical Psychology Review*, Volume 19, Issue 7, November 1999, Pages 789-818

Andrew C. Olson and Glyn W. Humphreys (1997). Connectionist models of neuropsychological disorders, *Trends in Cognitive Sciences*, Volume 1, Pages 222-228.

Warren W. Tryon (1999). A bidirectional associative memory explanation of posttraumatic stress disorder, *Clinical Psychology Review*, 19, Pages 789-818.

Avi Peled and Amir B. Geva (1997). A dynamic threshold semantic neural network (DTSNN): simulations of thought disorders in schizophrenia, *Schizophrenia Research*, Volume 24, Page 135.

You may also want to browse the website, Connectionist Models of Anxiety Spectrum Disorders. <http://www.cnbc.cmu.edu/disordermodels/anxiety.html>. This contains a bibliography, but, not all papers are available on-line.