050.101 Cognition
Spring 2003

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Where and When

050.101 will meet in 101 Remsen Hall on Mondays and Wednesdays from 3:00 to 4:15. During the term, the TAs will hold a number of discussion sessions outside of class time. The times for these meetings will be announced during the term.

Course Requirements

Your responsibilities for the course are to attend class lectures regularly and to complete readings *prior* to the class in which they are discussed. There will be three exams, two in-class exams on February 24th and April 2nd, and a cumulative final (with emphasis on the final section of the course) during finals period. Each of these exams will be weighted equally.

Reading

There is no textbook for the course. Instead we will make use of a number of readings drawn from a variety of sources. These readings will be available both at the reserve desk in the library and in the cognitive science department in 230 Krieger Hall. We expect that at least some of the readings will also be made available on the web in PDF format. See the library's web site http://reserves.library.jhu.edu/ for more information.

Web Page

Information about the course will be posted throughout the term to the course web page at http://hebb.cog.jhu.edu/courses/101.

Course Outline

The following is a list of the topics we will be covering. The dates associated with the topics may change during the course of the term depending on our rate of progress.

Topic	Subtopic	Readings
Studying the Mind	What is cognitive science? Brains and Minds. (1/27)	P.N. Johnson-Laird, *The Computer and the Mind*, Harvard University Press, 1988, chapter 1, pp.13–27.
	Looking across disciplines: the case of grammatical categories. (1/29)	R. Brown, *Linguistic determinism and the parts of speech*, Journal of Abnormal and Social Psychology 55:1–5, 1957. A. Caramazza and A. Hillis, *Lexical organization of nouns and verbs in the brain*, Nature 349:788–790, 1991. M.K. Tanenhaus, J.M. Leiman and M.S. Seidenberg, *Evidence for multiple stages in the processing of ambiguous words in syntactic contexts*, Journal of Verbal Learning and Verbal Behavior 18:427–440, 1979.
	Brain Basics: brain organization, structure and function of neurons. (2/3)	D. Reisberg, *Cognition*, W.W. Norton, 2001, chapter 2, pp.21-49. V.S. Ramachandran and S. Blakeslee, *Phantoms in the Brain*, William Morrow, 1998, chapters 1–2, pp.1–38

A Case Study: Vision	From the eye to the brain: finding edges and depth. (2/5, 2/10)	N. Stillings, et al. (1987), *Cognitive Science: An Introduction*, MIT Press, Chapter 12, pp. 449–475. S. Pinker (1997), *How the Mind Works*, W.W. Norton, Chapter 4, pp. 211–255.
	Abstraction in the visual system: frames of reference, what vs. where. (2/12)	S. Pinker (1997), *How the Mind Works*, Chapter 4, pp. 256–267. Mishkin, Ungerleider and Macko (1983), Object vision and spatial vision: Two cortical pathways, *Trends in Neuroscience* 6:414–417. M. McCloskey et al. (1995), A developmental deficit in localizing objects from vision, *Psychological Science* 6:112-117.
	Recognizing Objects and Faces. (2/17, 2/19)	S. Pinker (1997), *How the Mind Works*, Chapter 4, pp. 268-298. M. Farah (1995) Dissociable systems for visual recognition: A cognitive neuropsychological approach, in Kosslyn and Osherson (eds.) *An Invitation to Cognitive Science, Volume 2: Visual Cognition*, MIT Press.
FIRST EXAM – February 24		
Symbols in the Mind	The computational theory of mind: levels of description, modularity. (2/26)	P. Johnson-Laird (1988) *The Computer and the Mind*, Harvard University Press, Chapter 2, Symbols and Mental Processes, and Chapter 3, Computability and Mental Processes. D. Hofstadter (1979) *Gödel, Escher, Bach: an Eternal Golden Braid*, Basic Books, Prelude (pp. 275–284) and Ant Fugue (pp. 310-336) (reprinted in D. Hofstadter and D. Dennett (eds.) *The Mind's I*, Basic Books, 1981, pp. 148–191).
	Algorithms and representations. (3/3)	

Symbolic Cognition I: Reasoning	Deductive Reasoning.(3/5, 3/17)	R.J. Sternberg and T. Ben-Zeev (2001) *Complex Cognition*, Oxford University Press, Chapter 5, Deductive Reasoning.
	Inductive Reasoning. (3/19)	R.J. Sternberg and T. Ben-Zeev (2001) *Complex Cognition*, Oxford University Press, Chapter 6, Inductive Reasoning.
Symbolic Cognition II: Language	What do we know about language? Syntax (3/24)	R. Frank (1998) Structural Analysis. In *A Companion to Cognitive Science*, W. Bechtel and G. Graham (eds.), Basil Blackwell, pp.450–462.
	Phonological categories: representation, acquisition, and brain implementation (3/26)	R. Jackendoff (1994) *Patterns in the Mind*, Basic Books, ch. 5, Phonological structure, pp.53–65. J.F. Werker (1995) Exploring developmental changes in cross-language speech perception. In *An Invitation to Cognitive Science*, L.R. Gleitman and M. Liberman (eds.), MIT Press, pp.87–106. C. Phillips, T. Pelathy, and A. Marantz et al. (2000) Phonological Feature Representations in Auditory Cortex, manuscript.
	Modularity of language and perception (3/31)	P. Li and L.R. Gleitman (2002) Turning the tables: language and spatial reasoning, Cognition 83:265-294.
SECOND EXAM – April 2		

Symbolic Cognition III: Reading	What are the problems that need to be solved by the reading system? (4/7)	A. Ellis (1993) *Reading, Writing and Dyslexia: A Cognitive Analysis*, Lawrence Erlbaum Associates, Second Edition, Chapters 2 and 3. J. Aitchison (1987) *Words in the Mind: An Introduction to the Mental Lexicon*, Basil Blackwell, Chapters 1 and 3.
	Cognitive and neural architecture of the reading system. (4/9, 4/14)	A. Hillis and A. Caramazza (1992) The reading process and its disorders. In D. Margolin (ed.) *Cognitive Neuropsychology in Clinical Practice*, Oxford University Press.
An alternative to symbolic cognition: Connectionism	Network basics: representation and learning (4/16)	P.N. Johnson-Laird, *The Computer and the Mind*, Harvard University Press, 1988, chapter 10, pp.174–194.
	Connectionist phonology: the past tense (4/21)	D. Rumelhart and J. McClelland (1986) On Learning the Past Tenses of English Verbs. In *Parallel Distributed Processing: explorations in the microstructure of cognition*, J. McClelland and D. Rumelhart (eds.) MIT Press: pp.216-223 up to "operation of the model", "summary of the structure of the model" pp.239-245, "summary and conclusion" pp.265-168. Steven Pinker (1991) Rules of Language, Science:253:530-535.
	Reading rules and reading networks (4/23)	M. Seidenberg and J. McClelland (1989) A Distributed, Developmental Model of Word Recognition and Naming, *Psychological Review* 96(4):523568. N.B. Read only pp.523529.
Prospects and Problems	Cognition in a vacuum: the Turing test, the Chinese room, symbol grounding. (4/28)	A.M. Turing (1950) Computing Machinery and Intelligence, *Mind* 59. J.R. Searle (1990) Is the Brain's Mind a Computer Program? *Scientific American*.
	Emotions and Consciousness. (4/30)	
FINAL EXAM – during finals period		