

## Cognitive Neuropsychology -- Psychology 209H Course Syllabus – Fall 2004

**Instructor:** Marilyn Hartman, Ph.D.  
**Class Meetings:** Wednesday 1- 3:45 P.M. – Davie Hall 347  
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**Office Hours:** By appointment

**Overview.** This course provides an introduction to the study of cognition from a neuropsychological perspective. The course begins with a consideration of conceptual and methodological issues raised by this type of research. Research on various forms of memory will then be used to illustrate the unique contributions of this perspective to the understanding of cognition. Readings will include studies with patients who have central nervous system dysfunction resulting from trauma or illness, as well as studies that utilize neuroimaging with healthy individuals.

**Class format and grading.** In each class, I will provide some background on the topic under consideration and help integrate the background material during discussion of assigned readings. Your final grade will be based on class participation and weekly written assignments based on the reading.

**Assigned readings.** All assigned readings will be available on the course website created with Blackboard. The first week's readings will also be in a folder on my office door (Davie 256) that you may borrow for the purpose of photocopying.

**Class preparation and written assignments.** In preparing for class, try to digest each article well enough so that you will be prepared to discuss it. Make notes and bring them with you to class, since simply reading an article (even with important parts underlined) is not always sufficient to support active discussion. In addition, there will be a written assignment based on the assigned reading due each week (except the first). The written assignments should be approximately 2 double-spaced typed pages. They are not meant to be highly developed writing samples so much as to engage you in the reading and prepare you for class discussion. I will not read more than 2 double-spaced pages per assignment, so be concise and focus on getting across the most important points.

**Class participation.** In addition to preparing for class, I encourage you all to participate fully and actively. I'm looking for thoughtful input indicating that you're trying to help yourself and others become better researchers in cognitive psychology and that you've worked on the assignments ahead of time. Brilliance and extensive background in cognitive neuropsychology are not required. If you are shy about speaking up in groups, this is the time to start working on it. If I don't hear from you frequently, I'll call on you and ask questions about readings or the topic of discussion.

**Office Hours and e-mail.** I believe in the importance of being accessible to students outside of class. For this reason I will be glad to set up appointments with you, and I will happily respond to your email messages. In general I will try to respond to email within a full day, but please don't expect me to respond on weekends or evenings. Keep in mind that if your question is a long one or would involve a long answer, it may be better to schedule an appointment.

**Honor code.** The principles of academic honesty, integrity, and responsible citizenship cover the performance of all academic work at UNC. Your acceptance of enrollment at UNC assumes a commitment to the principles embodied in the Code of Student conduct and a respect for this tradition.

### Schedule of Classes

#### October 27 Introduction to cognitive neuropsychology

##### Readings:

1. For an overview of neuroanatomy and methods in neuropsychology:  
Selected portions from Gazzaniga, M. S., Ivry, R. B., & Mangun, G. R. (1998). *Cognitive neuroscience: The biology of the mind*: pp. 44-68, 69-93, 102-118.
2. Diagrams of brain and a list of important terms. These are on the course website.

**Assignment:** Read the background material, with the goal of developing familiarity with the terms and ideas. The handout containing important terms indicates the ones to learn first. Start learning the unfamiliar terms, but I do not expect you to memorize all this information at this point. It is more important that you know some basics and have a mental framework and a place to refer to as you read articles in the area of neuropsychology.

#### November 3 Working Memory

##### I. Background and a study with neurological patients

Andrade, J. (2001). An introduction to working memory. In J. Andrade (Ed.), *Working memory in perspective* (pp. 3-30). New York: Taylor & Francis.

Belleville, S., Peretz, I., & Arguin, M. (1992). Contribution of articulatory rehearsal to short-term memory: Evidence from a case of selective disruption. *Brain and Language*, 43, 7313-746.

Baddeley, A., & Wilson, B. A. (2002). Prose recall and amnesia: Implications for the structure of working memory. *Neuropsychologia*, 40, 1737-1743.

##### II. Studies with functional neuroimaging

Sakai, K., Rowe, J. B., & Passingham, R. E. (2002). Active maintenance in prefrontal area 46 creates distractor-resistant memory. *Nature Neuroscience*, 5, 479-484.

D'Esposito, M., Detre, J. A., Alsop, D. C., Shin, R. K., Atlas, S., & Grossman, M. (1995). The neural basis of the central executive of working memory. *Nature*, 378, 279-281.

LaBar, K. S., Gitelman, D. R., Parrish, T. B., & Mesulam, M. (1999). Neuroanatomic overlap of working memory and spatial attention networks: A functional MRI comparison within subjects. *NeuroImage*, 10, 695-704.

**Assignment:** How well does Baddeley's model of working memory match data discussed in the articles on today's reading list? Consider which data support the model, which data contradict the model, and which data raise issues not fully addressed in the model.

## **November 10            Long-Term Episodic Memory – Part I**

### I. Introduction to amnesia:

Banich, M. T. (2004). Excerpt from *Cognitive neuroscience and neuropsychology* (pp. 323-362). Boston: Houghton Mifflin.

### II. Studies with neurological patients

Rempel-Clower, N. D., Zola, S. M., Squire, L. R., & Amaral, D. G. (1996). Three cases of enduring memory impairment after bilateral damage limited to the hippocampal formation. *Journal of Neuroscience*, *16*, 5233-5255.

Kopelman, M. D., Lasserson, D., Kingsley, D. R., Bello, F., Rush, C., Stanhope, N., et al. (2003). Retrograde amnesia and the volume of critical brain structures. *Hippocampus*, *13*, 879-891.

Assignment: Summarize briefly what these two patient studies teach us about the brain structures involved in memory. What questions are answered and what questions are still unanswered about the role of medial temporal structures?

## **November 17            Long-Term Episodic Memory – Part II**

Buckner, R. L. (2000). Neuroimaging of memory. In M. S. Gazzaniga (Ed.), *The new cognitive neurosciences* (2<sup>nd</sup> Ed., pp. 817-828). Cambridge, MA: MIT Press.

Schacter, D. L., Alpert, N. M., Savage, C. R., Rauch, S. L., & Albert, M. S. (1996). Conscious recollection and the human hippocampal formation: Evidence from Positron Emission Tomography. *Proceedings of the National Academy of Sciences, USA*, *93*, 321-325.

Brewer, J. B., Zhao, Z., Desmond, J. E., Glover, G. H., & Gabrieli, J. D. E. (1998). Making memories: Brain activity that predicts how well visual experience will be remembered. *Science*, *281*, 1185-1187.

Buchel, C., Coull, J. T., & Friston, K. J. (1999). The predictive value of changes in effective connectivity for human learning. *Science*, *283*, 1538-1541.

Knight, R. T. (1996). Contribution of human hippocampal region to novelty detection. *Nature*, *383*, 256-259.

Cabeza, R., Kapur, S., Craik, F. I. M., & McIntosh, A. R. (1997). Functional neuroanatomy of recall and recognition: A PET study of episodic memory. *Journal of Cognitive Neuroscience*, *9*, 254-265.

Fletcher, P. C., Shallice, T., & Dolan, R. J. (1998). The functional roles of prefrontal cortex in episodic memory. *Brain*, *121*, 1239-1248.

Assignment: Briefly summarize how well the data from neurological patients mesh with data from neuroimaging studies. Then suggest some reasons for the contradictions and indicate how you might test your ideas.

## **November 24            No Class – Beginning of Thanksgiving Holiday**

## **December 1                    Semantic and Implicit Memory**

### **I. Semantic knowledge**

Martin, A., & Chao, L. L. (2001). Semantic memory and the brain: Structure and processes. *Current Opinion in Neurobiology, 11*, 194-201.

Hillis, A. E., Tuffiash, E., Wityk, R. J., & Barker, P. B. (2002). Regions of neural dysfunction associated with impaired naming of actions and objects in acute stroke. *Cognitive Neuropsychology, 19*, 523-534.

Hodges, J. R. (2003). Semantic dementia: A disorder of semantic memory. In M. D'Esposito (Ed.), *Neurological foundations of cognitive neuroscience* (pp. 67-88), Cambridge, MA: MIT Press.

### **II. Implicit memory**

Schweinberger, S., & Stief, V. (2001). Implicit perception in patients with visual neglect: Lexical specificity in repetition priming. *Neuropsychologia, 39*, 420-429.

Dhond, R., Buckner, R. L., Dale, A. M., Marinkovic, K., & Halgren, E. (2001). Spatiotemporal maps of brain activity underling word generation and their modification during repetition priming. *Journal of Neuroscience, 21*, 3564-3571.

Assignment: (a) What is semantic memory and how is it related (neuroanatomically and conceptually) to the other forms of memory we have discussed in this course? (b) What do studies of repetition priming tell us about how information is represented in the brain?