

Philosophy and Neuroscience

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(sometimes aided by Jackie Sullivan)

The Required texts I have ordered are

Howard Eichenbaum, (2002) *The Cognitive Neuroscience of Memory: An Introduction*, Oxford

Martin A Conway, (1997) *Cognitive Models of Memory*, MIT

Daniel Schacter et al. (2000) *Memory, Brain and Belief*, Harvard

The Recommended texts are

Johan J Bolhuis, (2001) *Brain, Perception and Memory: Advances in Cognitive Neuroscience*, Oxford

\*Peter Machamer, Rick Grush and Peter McLaughlin, eds. (2001)  
*Theory and Method in the Neurosciences*, University of  
Pittsburgh Press (hereafter MGM)

(\*I will order this book directly from the Press for those who wish a copy;  
otherwise relevant articles will be put on reserve and maybe copied for personal  
use.)

Except for the Eichenbaum text, you need not buy any of these. The  
relevant essays will be put in reserve in 1017CL

Topics

I. Nature of Theories in Neuroscience (Jan. 15 & 22)

1. Carl Craver, "Structures of Scientific Theories" in Machamer and Silberstein, eds., *Guide to Philosophy of Science*, Blackwell, pps. 55-79
2. Antti Revonsuo, "On the Nature of Explanation in the Neurosciences" in MGM
3. Stephan Hartmann, "Mechanism, Coherence and the Place of Psychology: Commentary on Revonsuo" in MGM
4. Woo-kyoung Ahn and Charles W. Kalish, "The Role of Mechanism Belief in Causal Reasoning" in Frank C. Keil and Robert Wilson, eds. [2000] *Explanation and Cognition*, MIT
5. Example from a memory text: Eichenbaum, *The Cognitive Neuroscience of Memory: An Introduction*

You may wish to have read MACHAMER, DARDEN AND CRAVER (2000), "Thinking About Mechanisms" *Philosophy of Science*, if you have not. It will not be discussed *per se*.

II. Reduction (Jan. 29 & Feb. 5)

1. Classical: Kenneth Schaffner, (1993) *Discovery and Explanations in Biology and Medicine*. Chicago: University of Chicago Press.
2. Richardson, R. (1999) "Cognitive Science and Neuroscience: New-Wave Reductionism." *Philosophical Psychology* 12(3): 297-307.
3. Newer: John Bickel has a new book; I need to see if he has a newer edition than the one sent to me last fall.

Background:

Lawrence Sklar, (1999) "The reduction (?) of Thermodynamics to Statistical mechanics" *Phil. Studies* 95, 187-202.

Some of the papers by Patricia and Paul Churchland, singularly and together, maybe on interest on this topic since they still hold (some sort of) a strong reductionist program. But it would be also useful

to look at essays by scientists in which the word "reduction" is used for they use it seemingly differently and less precisely than philosophers.

III. Neurobiology and Cognitive Neuroscience & Problems with Reduction (Feb. 12 & 19 & 26)

1. Peter Machamer and Jacqueline Sullivan, "Leveling Reduction" draft of a paper
2. William Bechtel, "Cognitive Neuroscience: Relating Neural Mechanisms and Cognition" in MGM
3. V.S. Ramachandran, "Memory and Brain: new lessons from old syndromes" in Schacter and Scarry
4. Endel Tulving & Martin Lepage, "Where in the Brain is the Awareness of One's Past?" in Schacter and Scarry
5. John Duncan, "Visual Attention in Mind and Brain" in Bolhuis
6. Michael S.A. Graziano, Mary E. Wheeler and Charles G. Grosz, "From Vision to Action: How the primate brain encodes and remembers visuomotor space" in Bolhuis
7. William Bechtel (1994) "Levels of Description and Explanation in Cognitive Science" *Mind and Machines* 4, 1-25  
Comments by Jay Rosenberg, 27-37
8. Wimsatt, W. (1994), "The Ontology of Complex Systems: Levels of Organization, Perspectives and Causal Thickets", *Canadian Journal of Philosophy of Science Supplementary* Volume 20:207-274.

IV. Memory Models (March 12 & 19 & March 26 )

What is the distinction, if any, between theories and models? What the problems with thinking about models and what models model.

1. Martin A. Conway, "Introduction; Models and Data" in Conway
2. Raymond J. Dolan, "Functional Neuroimaging and Memory Systems" in Bolhuis

3. Larry R. Squire, (1996) "Structure and function of declarative and non declarative memory systems" *Proc. Nat. Acad. Sci. USA* 93, 13515-13522
4. Neal J. Cohen, Jennifer Ryan, Caroline Hunt, Lorene Romine, Tracey Wszalek and Courtney Nash (1999) "Hippocampal System and Declarative (Relational) Memory: Summarizing the Data From Functional Neuroimaging Studies" *Hippocampus* 9:83-98
5. Randall C. O'Reilly and Yuko Munakata, (2000) *Computational Explorations in Cognitive Neuroscience*, MIT, see II. 9 "Memory", pps. 275-322
6. Michael E Haselmo and James L McClelland, "Neural models of Memory" (1999) *Current opinion in Neurobiology* 9 92) pps. 184-188

We need current review articles that describe recent work on the different memory systems.

#### V. Memory and Knowledge (April 2 & April 9 & April 16)

1. Chris Westbury and Daniel C. Dennett. "Mining the Past to Construct the Future: Memory and Belief as Forms of Knowledge" in Schacter and Scarry
2. Howard Eichenbaum and J. Alexander Bodkin, "Belief and Knowledge as Distinct Forms of Memory' In Schacter and scarry
3. Marcia K. Johnson and Carol R. Raye, "Cognitive and Brain Mechanisms of False Memories and Beliefs" in Schacter and Scarry

Other papers about reliability theories, and some criticisms of reliability theories; do they apply to questions about reliability of knowledge or reliability of memory? What are the criteria for reliable knowledge?

#### **Requirements:**

1. A seminar presentation. The details of the topic to be decided in consultation with me. An outline of the presentation must be provided for all seminar participants at the time of presentation.

2. (a) A term paper, due April 21

Or

(b) 3 small papers (5 pages or so) dealing some aspect of three of the topics

3. Optional, an analysis of the method section of a scientific essay that discusses how [the selection of] the experimental paradigm and associated method are typical or exemplary of the memory system which they are being used to investigate.