

Psychology 501
Proseminar in Cognitive Psychology
Emory University
Fall 1999

Time and Location

Wednesday 9:00 to 11:50
Psychology 302

Instructors

Instructor:	Lynne Nygaard	Stephan Hamann	Lawrence Barsalou
Office:	Psychology 320	Psychology 326	Psychology 322
Office hours:	By appointment	By appointment	By appointment
Phone:	727-0766	727-4261	727-4338
Email:	lnygaar@emory.edu	shamann@emory.edu	barsalou@emory.edu

Overview

This course aims to provide graduate students with exposure to state-of-the-art research in cognitive psychology. To accomplish this, we will read and discuss articles across the major areas of the field, including high-level perception, categorization, attention, working memory, long-term memory, knowledge, language, thought, and socio-cultural cognition. The specific readings are listed in the course schedule. Besides covering behavioral research, the readings also cover research in computational modeling and neuroscience, given how central these areas have become to cognitive psychology. In all meetings, we will follow a seminar format, where students present brief summaries of papers, followed by open discussion. To frame the readings for a given meeting, an instructor will provide brief background, and any needed tutorials, at the end of the previous meeting.

The readings by no means cover all current research in the field—no course could come close to accomplishing this. Instead, the readings aim to give students a sense of what the major issues are, and how researchers currently address them. Besides providing examples of research in the major areas, the readings illustrate the diversity of research across the field.

By focusing on state-of-the-art research, we assume that most students have already had an introductory course in cognitive psychology as an undergraduate. Students who have not had such a course are encouraged to enroll, but they may want to obtain a text on cognitive psychology and read relevant background material prior to each meeting. A list of such texts is provided later. Students who do have some background in cognitive psychology may want to acquire some of these texts as well for source references.

For each set of readings, the course schedule provides some of the central issues facing research in the respective area. These issues may motivate the research, be answered by the research, or remain unanswered. Students are to think about these issues and be prepared to discuss them at the relevant meetings.

Besides structuring the discussion meetings, these issues serve the additional purpose of structuring the exams. On the midterm, students will receive one question from each of the five previous meetings in the course; on the final, students will receive one question from each of the six meetings in the course.

A paper is not required. The course can be taken for a grade or pass-fail. Regular attendance and presentation of articles will be factored into grading.

Primary Readings

All primary readings are on electronic reserve at Woodruff Library. Students can access all readings in pdf format over the web, as long as they are logged into the library's website from an Emory account (either on or off campus). Once a reading has been opened on a computer, it can be printed locally or saved to disk.

Background Sources

All of the following background texts are available in the Emory bookstore.

Text on Cognition

Eysenck, M.W., & Keane, M.T. (1995). *Cognitive psychology: A student's handbook* (3rd edition). Mahwah, NJ: Erlbaum.

Text on Cognitive Neuroscience

Gazzaniga, M.S., Ivry, R.B., & Mangun, G.R. (1998). *Cognitive neuroscience: The biology of the mind*. New York: Norton.

Texts on Computational Modeling

Bechtel, W., & Abrahamsen, A. (1991). *Connectionism and the mind: An introduction to parallel processing in networks*. Cambridge, MA: Basil Blackwell. [an elementary text]
Anderson, J.A. (1997). *An introduction to neural networks*. Cambridge, MA: MIT Press. [a more advanced text]

Course Schedule

1. Jan. 26: Orientation Meeting
2. Feb. 2: High-Level Perception (Nygaard)

Primary Readings

- Goodale, M. A., & Milner, A. D. (1994). Separate visual pathways for perception and action. In H. Gutfreund & G. Toulouse (Eds.), *Biology and computation: A physicist's choice. Advanced series in neuroscience* (Vol. 3, 606-611). Singapore: World Scientific Publishing Co.
- Biederman, I. (1987). Recognition-by-components: A theory of human image understanding. *Psychological Review*, 94, 115-147. [read only 115-129]
- Peterson, M. A., & Gibson, B. S. (1994). Must figure-ground organization precede object recognition? *Psychological Science*, 5, 253-259.
- Samuel, A. G. (1997). Lexical activation produces potent phonemic percepts. *Cognitive Psychology*, 32, 97-127.

Background Readings (Optional)

- Eysenck & Keane, pp. 27-94
- Gazzaniga, Ivry, & Mangun, pp. 163-205
- Anderson, pp. 281-350

Issues

- Does neuroanatomical segregation inform explanations of function in the domain of visual perception?
- Is it possible to ever identify a complete set of primitive features in a modality?
- How do sensory mechanisms and top-down organizational mechanisms work together to produce a perception?

3. Feb. 9: Attention (Nygaard)

Primary Readings

- Posner, M. I. (1995). Attention in cognitive neuroscience: An overview. In M.S. Gazzaniga (Ed.), *The cognitive neurosciences* (615-624). Cambridge, MA: MIT Press.
- Treisman, A. (1993). The perception of features and objects. In A. Baddeley & L. Weiskrantz (Eds.), *Attention: selection, awareness, and control: A tribute to Donald Broadbent* (5-35). Oxford: Clarendon Press.
- Logan, G.D. (1988). Toward an instance theory of automatization. *Psychological Review*, 95, 492-527.

Background Readings (Optional)

- Eysenck & Keane, pp. 95-122
- Gazzaniga, Ivry, & Mangun, pp. 207-245

Issues

- How do neuroscience data constrain theories of attention and selection?
- Why is selective attention important in an intelligent system?
- How does an instance-based theory of automaticity relate to characterizations of selective attention?

4. Feb. 16: Categorization (Barsalou)**Primary Readings**

- McClelland, J.L., & Rumelhart, D.E. (1981). An interactive activation model of context effects in letter perception: Part 1. An account of basic findings. *Psychological Review*, 88, 375-407.
- Nosofsky, R.M. (1992). Exemplar-based approach to relating categorization, identification, and recognition. In F.G. Ashby (Ed.), *Multidimensional models of perception and cognition* (363-393). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Smith, E.E., Patalano, A.L., & Jonides, J. (1998). Alternative strategies for categorization. *Cognition*, 65, 167-196.

Background Readings (Optional)

- Eysenck & Keane, pp. 47-72, 233-256
- Gazzaniga, Ivry, & Mangun, pp. 163-206
- Bechtel & Abrahamsen, pp. 106-146

Issues

- Why is bottom-up processing alone insufficient for intelligent cognition?
- What are advantages and disadvantages of using exemplars versus rules in categorization?
- Are connectionist, exemplar, and rule-based approaches to categorization mutually exclusive or compatible? Please explain.

5. Feb. 23: Working Memory (Hamann)**Primary Readings**

- Smith, E.E., & Jonides, J. (1998). Neuroimaging analyses of human working memory. *Proceedings of the National Academy of Sciences, USA.*, 95, 12061-12068.
- Baddeley, A.D., Logie, R.H. (1999). Working memory: The multiple-component model. In: *Models of working memory: Mechanisms of active maintenance and executive control*. Akira Miyake, Ed; Priti Shah, Ed; et al. Cambridge University Press, New York, NY, USA. pp. 28-61.
- Farah, M. (1995). The neural bases of mental imagery. In M.S. Gazzaniga (Ed), *The cognitive neurosciences* (963-975). Cambridge, MA: MIT Press.
- Crammond, D.J. (1997). Motor imagery: Never in your wildest dreams. *Trends in Neuroscience*, 20, 54-57.

Background Readings (Optional)

- Eysenck & Keane, pp. 123-134, 203-231
- Gazzaniga, Ivry, & Mangun, pp. 423-438

Issues

- How are the cognitive mechanisms underlying imagery and perception similar and different? How might they be related to the mechanisms that underlie consciousness, dreaming, and psychosis?
- How do findings on imagery and working memory illustrate the interplay between cognitive science and neuroscience?
- How do measures of working memory capacity reflect the theoretical perspectives of researchers?

6. Mar. 1: Long-Term Memory (Hamann)**Primary Readings**

- Gabrieli, J.D.E. (1999). The architecture of human memory. In: *Memory: Systems, process, or function?* Jonathan K. Foster, Ed; Marko Jelicic, Ed; et al. Oxford University Press, New York, NY, US. p. 205-231.
- Wagner, A.D., Schacter, D.L. Rotte, M., Koutstaal, W. (1998). Building memories: Remembering and forgetting of verbal experiences as predicted by brain activity. *Science*, Aug, v281 (n5380):1188-1191.
- Squire, L.R., & Knowlton, B.J. (1999). The medial temporal lobe, the hippocampus, and the memory systems of the brain. In: Gazzaniga, M.S. (Ed.), *The cognitive neurosciences* (2nd ed., 765-780). Cambridge, MA: MIT Press.
- Buckner, R.L. (1999). Neuroimaging of memory. : Gazzaniga, M.S. (Ed.), *The cognitive neurosciences* (2nd ed., 817-828). Cambridge, MA: MIT Press

Background Readings (Optional)

- Eysenck & Keane, pp. 123-202
- Gazzaniga, Ivry, & Mangun, pp. 247-288
- Bechtel & Abrahamsen, pp. 66-105

Issues

- What are the basic systems of memory, and how do we decide what they are?
- Do these systems have separable neuroanatomical bases, or are they simply useful scientific constructs for categorizing memory findings?
- What are the main unresolved issues in the study of long-term memory?

7. Mar. 8: Midterm**8. Mar. 15: Spring Break**

9. Mar. 22: Language (Nygaard)**Primary Readings**

- Bock, K., Loebell, H., & Morey, R. (1992). From conceptual roles to structural relations: Bridging the syntactic cleft. *Psychological Review*, 99, 150-171.
- Tanenhaus, M.K., Spivey-Knowlton, M.J., Eberhard, K.M., & Sedivy, J.C. (1995). Integration of visual and linguistic information in spoken language comprehension. *Science*, 268, 1632-1634.
- Osterhout, L., & Holcomb, P.J. (1995). Event-related potentials and language comprehension. In M.D. Rugg & M.G.H. Coles (Eds.), *Electrophysiology of mind: Event-related potentials and cognition* (171-215). New York: Oxford University Press.
- Brennan, S. E., & Clark, H. H. (1996). Conceptual pacts and lexical choice in conversation. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, 22, 1482-1493.

Background Readings (Optional)

- Eysenck & Keane, pp. 303-329
- Gazzaniga, Ivry, & Mangun, pp. 289-320
- Anderson, pp. 473-480, 553-558

Issues

- To what extent does there appear to be an autonomous module in the brain that underlies syntactic processing?
- Do eye movement and ERP data improve on standard behavioral measures, such as choice and reaction time? Explain.
- To what extent is it necessary to understand social interaction in order to understand language use?

10. Mar. 29: Knowledge (Barsalou)**Primary Readings**

- Wisniewski, E.J. (1995). Prior knowledge and functionally relevant features in concept learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 21, 449-468
- Ross, B.H., & Murphy, G.L. (1999). Food for thought: Cross-classification and category organization in a complex real-world domain. *Cognitive Psychology*, 38, 495-553.
- Tranel, D., Damasio, H., & Damasio, A.R. (1997). A neural basis for the retrieval of conceptual knowledge. *Neuropsychologia*, 35, 1319-1327.

Background Readings (Optional)

- Eysenck & Keane, pp. 203-276
- Gazzaniga, Ivry, & Mangun, pp. 163-206
- Bechtel & Abrahamsen, pp. 147-175

Issues

- To what extent are concepts independent modular units of knowledge? Explain.
- To what extent is knowledge organized around taxonomic versus functional principles? What purposes do these serve in everyday activity?
- How are categories grounded in neural mechanisms? What functional implications might such grounding have?

11. Apr. 5: Emotional Cognition (Hamann)**Primary Readings**

- Davidson, R.J., & Irwin, W. (1999). The functional neuroanatomy of emotion and affective style. *Trends in Cognitive Sciences*, 3(1), 11-21.
- Damasio, A.R. (1994). *Descartes' error : emotion, reason, and the human brain*. New York : G.P. Putnam, Chapters 8 and 9, pp. 165-222.
- Damasio, A.R. (1999). *The feeling of what happens : body and emotion in the making of consciousness. 1st ed.* New York : Harcourt Brace, Chap. 2&3, pp. 35-106.
- Bechara, A., Damasio, H., Damasio, A.R., Lee, G.P. (1999). Different contributions of the human amygdala and ventromedial prefrontal cortex to decision-making. *Journal of Neuroscience*, Jul, v19 (n13): 5473-5481.

Background Readings (Optional)

- Damasio, A.R. (1994). *Descartes' error : emotion, reason, and the human brain*. New York : G.P. Putnam.
- Eysenck & Keane, pp. 435-462
- Gazzaniga, Ivry, & Mangun, pp. 449-453, 513-520

Issues

- What is the relationship between emotion and rational thought?
- How have findings from neuroscience (imaging and neuropsychology) influenced current models of emotional cognition?
- How is emotion defined by different researchers? What is known regarding the relation between emotion, personality, and the brain?

12. Apr. 12: Thought (Barsalou)**Primary Readings**

- Ross, B.H. (1999). Postclassification category use: The effects of learning to use categories after learning to classify. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 25, 743-757.
- Sloman, S.A. (1993). Feature-based induction. *Cognitive Psychology*, 25, 231-280.
- Medin, D.L., Lynch, E.B., & Atran, S. (1997). Categorization and reasoning among tree experts: Do all roads lead to Rome. *Cognitive Psychology*, 32, 49-96.

Background Readings (Optional)

- Eysenck & Keane, pp. 355-434
- Gazzaniga, Ivry, & Mangun, pp. 423-464
- Bechtel & Abrahamsen, pp. 210-254

Issues

- How do problem solving and expertise enter into category knowledge and category learning?
- How can inductive inferences about a category be implemented in a connectionist model?
- How are categorization and induction related? What purposes do they serve in the cognitive system individually and together?

13. Apr. 19: Socio-Cultural Cognition (Barsalou)

Primary Readings

Greenwald, A.G. & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review*, 102, 4-27.

Malt, B.C. (1995). Category coherence in cross-cultural perspective. *Cognitive Psychology*, 29, 85-148.

Peng, K., & Nisbett, R.E. (1999). Culture, dialectics, and reasoning about contradictions. *American Psychologist*, 54, 741-754.

Background Readings (Optional)

Issues

How does implicit memory enter into social processes?

To what extent is category knowledge universal across cultures?

To what extent is reasoning universal across cultures?

14. Apr. 26: Final