

**Cognition  
Psychology 215  
Emory University  
Spring 2001**

### **Time and Location**

Tuesdays and Thursdays, 2:30—3:45 PM  
White Hall 112

### **Instructor and Teaching Assistant**

**Instructor:** **Lawrence W. Barsalou**  
**Office:** Psychology 322  
**Office hours:** Thursdays 1:30 – 2:30, or by appointment  
**Phone:** (404) 727-4338  
**Email:** barsalou@emory.edu

**Teaching assistant:** **Aimee Campbell**  
**Office:** Emory Child Studies Center (Upstairs), 1635 N. Decatur Rd.  
**Office hours:** Wednesdays 2:30 – 3:30, or by appointment  
**Phone:** (404) 727-6636  
**Email:** acampb2@emory.edu

### **Overview**

This course aims to provide students with two levels of knowledge about cognitive psychology:

- basic theoretical constructs and established empirical findings
- examples of state-of-the-art research

The following perspectives organize presented material:

- cognition can only be understood properly by grounding it in the neural mechanisms that produce it
- cognition is not detached computation but arises out of the need for embodied agents to function intelligently in concrete situations

### **Online Course Materials**

The syllabus and integrative questions can be found at:

<http://userwww.service.emory.edu/~barsalou/Courses/2001/Cognition/cognition.html>

The lecture outlines are also online and can be found at an address given below.

### **Text**

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

The text is available in the University bookstore.

### **Readings**

A set of assigned readings is available electronically from the Emory Library Reserve. Optional readings are also available on reserve electronically. All of these readings are in pdf

format, and can be read on your computer, stored on your disk, and/or printed on your printer. All articles discussed in a lecture are referenced at the end of the lecture outlines (see below). Should you be interested in looking at any of these articles, most can be found in the Emory Library (physically, not electronically).

## Lecture Outlines

Each student should download the 26 lecture outlines in pdf format from:

[http://userwww.service.emory.edu/~barsalou/Courses/Cognition/Lecture\\_Notes/lecture\\_notes.html](http://userwww.service.emory.edu/~barsalou/Courses/Cognition/Lecture_Notes/lecture_notes.html)

Students should download and bring the outlines to the lecture, given that they will enhance following the lecture and taking notes. Because the outlines contain information that would take much time and energy to copy, bringing them to class will make following the lectures easier. However, the outlines are *not* complete accounts of the lecture material. Therefore, taking additional notes is necessary to understand and fill out the outlines. We will often start a new lecture on the same day that we end a lecture, so please bring the outline for the next lecture to each class, as well as the outline for the current lecture.

## Topic Cycle

For each of 13 topics covered, it is recommended that you proceed as follows:

### 1. Prior to the first class meeting

**a. Read the three integrative essay questions.** Before the first lecture on a topic, students should study the three integrative questions that bear on the two lectures and the relevant readings. Use these questions to organize your learning of the topic material.

**b. Read any background sources.** Prior to the first of the two class meetings on a topic cycle, students should read any relevant background material from the text. This material will acquaint students with basic issues, significant theories, and relevant findings, as well as with the basic constructs and vocabulary necessary for understanding the topic.

### 2. Two lectures on current research

The two lectures on each topic will present examples of specific research in the area. We will go through many specific pieces of research to acquaint students with how research in this area is done.

### 3. Additional readings

As we cover the topic material, students should also read any additional articles that are assigned. The optional readings may also be of interest.

### 4. Prepare answers to the integrative questions

As we cover the material for the topic, formulate answers to the three questions. It will be easier to formulate answers as we cover the material than waiting until right before the exam. The best way to prepare an answer is to develop an outline of the points that you will make, and commit it to memory. Students are free to work together in developing their thoughts and arguments to the integrative questions.

## Exams

Over the course of the semester, we will have three exams, each covering approximately one third of the course. The first exam will cover topics 1 to 4; the second exam will cover topics 5 to 8; the third exam will cover topics 9 to 13. Each exam will contain one of the three

integrative questions drawn randomly for each topic covered. Thus, the first two exams will each contain 4 questions, and the third will contain 5 questions. Each exam will last a full class period, thereby allowing students 15 to 20 minutes to answer each question.

Students must answer from memory, and can use no notes, outlines, papers, etc. Typically, an answer should be about two written pages. It should show evidence of having mastered the relevant material from the relevant lectures and readings. A good answer should not only present material from these sources, it should go beyond them and show evidence of original analysis, organization, and insight. Rather than being a list of points, a good answer should take a position and provide a well-reasoned argument for it based on scientific evidence. The later section on grading will provide the specific criteria for grading answers.

## Optional Final

Within a week of completing the third exam, students will receive their grade in the course so far. If students are satisfied with this grade, they do not have to take the final. If they are not satisfied, they can take the final, which can be used to replace up to 4 of their previous scores on integrative questions.

A score on a final question can **only** replace a lower score on a question **for the same topic**. For example, a higher score on a final question for Topic 3 can only replace a lower score for an earlier question on this same topic, not on any other topic, such as Topic 4. Thus, in selecting questions on the final, each student should target the topics that he or she scored most poorly on in the earlier exams. If a student did poorly on the question for Topic 4, then he or she should select the question for Topic 4 on the final.

If a score on a final question is higher than a score on a question for the same topic, the earlier score will be replaced. If a score on a final question is lower than a score on an earlier question for the same topic, the earlier score will **not** be replaced. In other words, the final can only improve final grades, not hurt them.

Students may take the final at the time scheduled for the final exam by the College, which is Tuesday, May 8, from 12:30 to 3:00. On the final, 1 of the 3 original questions will be randomly selected for each of the 13 topics. Thus, the final will consist of 13 questions, each drawn randomly from the 3 questions for its respective topic. The question for a particular topic could be the same as the question tested earlier in the course, or it could be different. Because questions will be selected randomly for each final, students should prepare for all 3 questions on a given topic.

## Make-Up Exams

Students who experience extenuating circumstances at the time of an exam, confirmed by a reliable source, can make alternative arrangements for taking the exam. Standard College procedures will be followed in allowing and administering exams.

## Grading

Scores on answers to the integrative essay questions will constitute 100% of students' grades.

## Grading Criteria

Each answer to an integrative question will be worth from 0 to 20 points. Typically, each question will be graded on the following 4 sub-scales, each contributing 0 to 5 points towards the overall score:

**Completeness.** Did the answer address *all parts of the question*? A serious attempt to answer all parts of the question will receive full credit, even if parts of the answer are weak, incorrect, etc. Failure to address part(s) of a question will reduce credit.

**Study.** Does the answer show clear evidence of careful study of the relevant lecture and reading materials? Also does the answer attempt to integrate points and findings from most relevant parts of the lectures and readings. To the extent that an answer shows careful study (*correct* description of the findings) and broad study (*full utilization* of the findings), maximum credit will be given. To the extent that careful and broad study appears lacking, credit will be reduced.

**Coherence.** Is the answer *coherent*? A serious attempt to integrate all parts of the argument coherently will receive full credit. To the extent that an answer is a haphazard list of points, credit will be reduced. Ideally, an answer should make a coherent argument, or be coherent in some other way. It should be clear how the various sections of the answer relate, and the various sections should progress clearly and meaningfully.

**Evidence.** How well is *specific evidence* from the lectures and text used to support the main points of the coherent argument? To the extent that an answer just makes a set of general points, credit will be reduced. Neglecting to mention important and obvious findings from the lectures and readings will lower credit as well. Also, if the evidence mentioned does not really bear on a point, credit will be reduced. Typically, there will be no particular evidence that must be mentioned. Of primary importance is mentioning a *sufficient amount* of evidence at a sufficiently specific level to justify the claims made.

Some integrative questions will require creative thought, rather than relying primarily on course materials. In these cases, answers will also be graded on the following scale:

**Creativity.** Does the answer indicate *creative attempts* to develop ideas and insights not present in the course materials? Does the answer indicate an attempt to discover a *thoughtful solution* to the problem posed in the question? To the extent that an answer simply reiterates course material and goes no further, credit will be reduced.

When creativity is relevant to a question, all 5 sub-scales may be worth 4 points each, or 1 of the other 4 sub-scales may be dropped, making creativity and the remaining sub-scales each worth 5 points.

When you receive a graded essay back, the scores on each of the relevant sub-scales will be indicated. Following the first exam, examples of excellent essays will be distributed, to help students learn how to answer the integrative questions effectively. Also, the TA and the instructor will be available to help students develop good strategies for preparing answers.

## Honor Code

All students are expected to adhere to the Emory Honor Code. Prior to each exam, students will be asked to sign a sheet indicating that they agree to follow the honor code at all points in the exam process. Students suspected of violating the honor code will have their cases sent to the appropriate University committee.

## Final Grades

Final grades are not determined strictly by absolute levels of performance, nor strictly by curve. Typically, both factors are taken into account, depending on the particular group of students taking the course. If many students achieve high levels of performance, absolute grading criteria will dominate grading on the curve, such that more students receive higher grades. If few students achieve high levels of performance, absolute criteria may be relaxed, and grading on the curve may dominate to

ensure that a reasonable number of students receive high grades. These are only rules of thumb, with the particular grading policy adopted reflecting the attitudes and abilities of the students taking the course, the difficulty of the assignments, the grading standards of the instructors, and so forth.

### **Writing Requirement**

The course satisfies the writing requirement, *but only for students who fall under the old writing requirement*. Because students should prepare answers to integrative questions on a weekly basis, and because they will receive feedback on their writing, they will have the opportunity to develop their writing skills. Students typically report that their ability to handle the integrative questions develops considerably over the course. Although students initially feel a little intimidated by formulating answers to these questions, they usually become comfortable with the process quickly. Integrating material from a variety of sources to answer open-ended questions is a useful skill in many professions.

## Course Schedule

| Topic   | Date    | Sub-topic   | Required Readings  |
|---|---------|---|--|
| <b>1. Introduction</b>                                      |         |   |  |
|   | Jan. 18 | The study of cognition (history and background)<br>Cognition as embodied and situated | GIM 23-92, 102-118<br>Clark                                  |
| <b>2. Perception and action</b>                             |         |   |  |
|   |         | Perceptual systems<br>The motor system  | GIM 121-175<br>GIM 371-422                                   |
| <b>3. Attention</b>   |         |   |  |
|   |         | Selective attention<br>Divided attention and automaticity                             | GIM 207-246<br>Bargh et al.                                  |
| <b>4. Episodic memory</b>                                   |         |   |  |
|   |         | Memory systems<br>Memory processes  | GIM 247-288<br>Loftus  |
| <b>Exam #1</b>  |         | <b>Tuesday, February 13</b>   |  |
| <b>5. Categorization</b>                                    |         |   |  |
|   | Feb. 15 | Exemplars, prototypes, and rules<br>Background knowledge and agnosia                  | GIM 176-206<br>Warrington et al.                             |
| <b>6. Concepts and knowledge</b>                            |         |   |  |
|   |         | Conceptual structure<br>Conceptual processes  | Glenberg et al., Barsalou et al.<br>Vallée-Tourangeau et al. |
| <b>7. Construal effects</b>                                 |         |   |  |
|   |         | Construal in perception<br>Construal in cognition                                     | Ramachandran<br>Ross   |
| <b>8. Working memory</b>                                    |         |   |  |
|   |         | Structure and function<br>Imagery   | review GIM 247-255, 423-435<br>Farah, Jeannerod              |
| <b>Spring Break</b>   |         | <b>March 13 - 17</b>  |  |
| <b>Exam #2</b>  |         | <b>Tuesday, March 20</b>  |  |
| <b>9. Language</b>  |         |   |  |
|   | Mar. 22 | Properties of language<br>Language comprehension                                      | GIM 289-322<br>Barsalou                                      |
| <b>10. Thought</b>  |         |   |  |
|   |         | Decision making and problem solving<br>Reasoning                                      | GIM 453-464<br>Tversky & Kahneman, Cummins                   |
| <b>11. Learning and plasticity</b>                          |         |   |  |
|   |         | Learning<br>Plasticity  | GIM 465-494<br>Elman et al.                                  |
| <b>12. Social cognition</b>                                 |         |   |  |
|   |         | Emotion, individuals, and the self<br>Implicit social cognition                       | GIM 423-426, 445-453<br>Gilbert                              |
| <b>13. Cultural cognition</b>                               |         |   |  |
|   |         | Cultural universals<br>Cultural divergences   | GIM 495-526<br>Werker & Tees                                 |
| <b>Exam #3</b>  |         | <b>Tuesday, April 24</b>  |  |
| <b>Preliminary final grades available by Tuesday, May 1</b> |         |   |  |
| <b>Optional final</b>                                       |         | <b>May 8, Tuesday, 12:30—3:00 PM</b>  |  |

## Required Readings on Reserve

### 1. Introduction

Clark, A. (1997). *Being there: Putting brain, body, and world together again* (pp.1-33 required, pp. 34-69 optional). Cambridge, MA: MIT Press.

### 2. Perception and action

None.

### 3. Attention

Bargh, J.A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology*, 71, 230-244.

### 4. Episodic memory

Loftus, E.F. (1975). Leading questions and the eyewitness report. *Cognitive Psychology*, 7, 560-572.

### 5. Categorization

Warrington, E.K., & McCarthy, R.A. (1983). Category specific access dysphasia. *Brain*, 106, 859-878.

### 6. Concepts and knowledge

Glenberg, A.M., Schroeder, J.L., & Robertson, D. A. (1998). Averting the gaze disengages the environment and facilitates remembering. *Memory & Cognition*, 26, 651-658.

Barsalou, L.W., Solomon, K.O., & Wu, L.L. (1999). Perceptual simulation in conceptual tasks. In M.K. Hiraga, C. Sinha, & S. Wilcox (Eds.), *Cultural, typological, and psychological perspectives in cognitive linguistics: The proceedings of the 4th conference of the International Cognitive Linguistics Association, Vol. 3* (209-228). Amsterdam: John Benjamins.

Vallée-Tourangeau, F., Anthony, S.H., & Austin, N.G. (1998). Strategies for generating multiple instances of common and ad hoc categories. *Memory*, 6, 555-592.

### 7. Construal effects

Ramachandran, V.S. (1992). Filling in gaps in perception: Part 1. *Current Directions in Psychological Science*, 1, 199-205.

Ross, M. (1989). Relation of implicit theories to the construction of personal histories. *Psychological Review*, 96, 341-357.

### 8. Working memory

Farah, M. (2000). The neural bases of mental imagery. In M,S. Gazzaniga (Ed), *The new cognitive neurosciences* (965-974). Cambridge, MA: MIT Press.

Jeannerod, M. (1995). Mental imagery in the motor context. *Neuropsychologia*, 33, 1419-1432.

### 9. Language

Barsalou, L.W. (1999). Language comprehension: Archival memory or preparation for situated action? *Discourse Processes*, 28, 61-80

### 10. Thought

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124-1131.

Cummins, D.D. (1996) Dominance hierarchies and the evolution of human reasoning. *Minds & Machines*, 6, 463-480.

### 11. Learning and plasticity

Elman, J.L., Bates, E.A., Johnson, M.H., Karmiloff-Smith, A., Parisi, D., & Plunkett, K. (1996). *Rethinking innateness: A connectionist perspective on development*. Cambridge, MA: MIT Press. [Ch. 1, New perspectives on development, 1-46]

### 12. Social cognition

Gilbert, D.T. (1991). How mental systems believe. *American Psychologist*, 46, 107-119.

### 13. Cultural cognition

Werker, J.F., & Tees, R.C. (1984). Cross-language speech perception: Evidence for perceptual reorganization during the first year of life. *Infant Behavior and Development*, 7, 49-63.

## Optional Readings on Reserve

### 1. Introduction

- Beer, R.D., & Chiel, H.J. ((1993). Simulations of locomotion and escape. In R.D. Beer, R.E. Ritzmann, & T. McKenna (Eds.), *Biological neural networks in invertebrate neuroethology and robotics* (267-285). San Diego: Academic Press.
- Lachman, R., Lachman, J.L., & Butterfield, E.C. (1979). *Cognitive psychology and information processing: An introduction* (Ch. 1, Sciences and paradigms, pp. 1-34). Mahway, NJ: Lawrence Erlbaum Associates.
- Lachman, R., Lachman, J.L., & Butterfield, E.C. (1979). *Cognitive psychology and information processing: An introduction* (Ch. 2, Psychology's contribution to the information processing paradigm, pp. 35-59). Mahway, NJ: Lawrence Erlbaum Associates.
- Lachman, R., Lachman, J.L., & Butterfield, E.C. (1979). *Cognitive psychology and information processing: An introduction* (Ch. 3, Contributions of other disciplines to information processing psychology, pp. 36-87). Mahway, NJ: Lawrence Erlbaum Associates.
- Lachman, R., Lachman, J.L., & Butterfield, E.C. (1979). *Cognitive psychology and information processing: An introduction* (Ch. 4, The information processing paradigm, pp. 88-129). Mahway, NJ: Lawrence Erlbaum Associates.

### 2. Perception and action

- Palmer, S.E. (1999). *Vision science: From photons to phenomenology*. Cambridge, MA: MIT Press. [Ch. 3. Color vision: A microcosm of vision science, 94-142]
- Ramachandran, V.S., & Hirstein, W. (1998). The perception of phantom limbs: The D.O. Hebb lecture. *Brain*, *121*, 1603-1630.

### 3. Attention

- Barsalou, L.W. (1982). Context-independent and context-dependent information in concepts. *Memory & Cognition*, *10*, 82-93.
- Norman, D.A. (1981). Categorization of action slips. *Psychological Review*, *88*, 1-15.
- Posner, M. I., & DiGirolamo, G.J. (2000). Attention in cognitive neuroscience: An overview. In M.S. Gazzaniga (Ed.), *The new cognitive neurosciences* (2<sup>nd</sup> ed., 623-632). Cambridge, MA: MIT Press.

### 4. Episodic memory

- Schooler, J.W., & Engstler-Schooler, T.Y. (1990). Verbal overshadowing of verbal memories: Some things are better left unsaid. *Cognitive Psychology*, *17*, 36-71.
- Jacoby, L.L., Kelley, C.M., Brown, J., & Jasechko, J. (1989). Becoming famous overnight: Limits on the ability to avoid unconscious influences of the past. *Journal of Personality and Social Psychology*, *56*, 326-338.

### 5. Categorization

- Biederman, I., & Gerhardstein, P.C. (1993). Recognizing depth-rotated objects: Evidence and conditions for three-dimensional viewpoint invariance. *Journal of Experimental Psychology: Human Perception and Performance*, *19*, 1162-1182.
- Martin, A., Ungerleider, L.G., & Haxby, J.V. (2000). Category-specificity and the brain: The sensory-motor model of semantic representations of objects. In M.S. Gazzaniga (Ed.), *The new cognitive neurosciences* (2nd ed., 1023-1036). Cambridge, MA: MIT Press.

### 6. Concepts and knowledge

- Barsalou, L.W. (1999). Perceptual symbol systems. *Behavioral and Brain Sciences*, *22*, 577-609.
- Damasio, A.R. (1989). Time-locked multiregional retroactivation: A systems-level proposal for the neural substrates of recall and recognition. *Cognition*, *33*, 25-62.

### 7. Construal effects

- Bregman, A. S. (1990). *Auditory scene analysis: The perceptual organization of sound* (Ch. 1, 1-45). Cambridge, MA: MIT Press.
- Intraub, H., & Bodamer, J.L. (1993). Boundary extension: Fundamental aspect of pictorial representation or encoding artifact? *Journal of Experimental Psychology: Learning, Memory, & Cognition*, *19*, 1387-1397.

### 8. Working memory

Baddeley, A.D., Gathercole, S., & Papagno, C. (1998). The phonological loop as a language learning device. *Psychological Review*, *105*, 158-173.

Smith, E.E., & Jonides, J. (1998). Neuroimaging analyses of human working memory. *Proceedings of the National Academy of Sciences, USA.*, *95*, 12061-12068.

### **9. Language**

Donald, M. (1993). Precis of "Origins of the modern mind: Three stages in the evolution of culture and cognition." *Behavioral and Brain Sciences*, *16*, 737-748.

Bower, G.H., & Morrow, D.G. (1990). Mental models in narrative comprehension. *Science*, *247*, 44-48.

### **10. Thought**

Kahneman, D., & Tversky, A. (1982). The simulation heuristic. In D. Kahneman, P. Slovic, & A. Tversky (Eds.), *Judgment under uncertainty: Heuristics and biases* (pp. 201-210). New York: Cambridge University Press.

Ahn, W., Kalish, C.W., Medin, D.L., & Gelman, S.A. (1995). The role of covariation versus mechanism information in causal attribution. *Cognition*, *54*, 299-352.

### **11. Learning and plasticity**

Bates, E., Thal, D., Trauner, D., Fenson, J., Aram, D., Eisele, J., & Nass, R. (1997). From first words to grammar in children with focal brain injury. *Developmental Neuropsychology*, *13*, 275-343

Pascual-Leone, A., Grafman, J., & Hallett, M. (1994). Modulation of cortical motor output maps during development of implicit and explicit knowledge. *Science*, *263*, 1287-1289.

### **12. Social cognition**

Hinkley, K., & Andersen, S.M. (1996). The working self-concept in transference: Significant-other activation and self change. *Journal of Personality and Social Psychology*, *71*, 1279-1295.

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

### **13. Cultural cognition**

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

Markus, H., R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*, 224-253.

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