P351: Object Recognition, Categorization, and Perceptual Expertise
Fall 2002
Mon/Wed 10:00-11:30
Wilson Hall 316

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COURSE OVERVIEW

This course will investigate how we recognize objects, how we place objects into learned categories, and how these abilities change as we gain expertise in recognizing and classifying objects. Until quite recently, research on object recognition, categorization, and perceptual expertise have remained largely independent lines of investigation. The goal of this graduate seminar is to attempt to bridge between these various domains both empirically and theoretically. Indeed, the motivation for this course is not simply to convey the contemporary body of knowledge in each of these areas, but also to understand why some of these issues have been studied in isolation from one another and to achieve an understanding of what may have been overlooked because of that isolation and what may be gained by considering these domains together. We hope that the group effort in this seminar will generate ideas for new empirical investigation and new theoretical integration. We will be reading a wide variety of original research articles investigating behavioral studies of normal individuals, behavioral studies of brain-damaged individuals, brain imaging studies, single-unit recordings of awake behaving primates, and formal computational models. Course requirements will focus on readings, discussion, and very short reaction papers.

REQUIREMENTS

No Final Exam. No Final Paper. Your understanding of the concepts will be evaluated through short critical thinking pieces to be prepared for every class and through discussions we have surrounding those pieces and the readings. Do not summarize the papers. Instead, critically evaluate one or two ideas from one paper, integrate similar ideas or reconcile conflicting ideas across several papers, or relate ideas in the assigned papers to something else that was not assigned or that was assigned earlier in the semester. Especially try to come up with opinions, criticisms, or interpretations that are likely to provoke discussion. Be critical. Be insightful. Be provocative. For now, the word limit is strictly set at between 250-300 words (less than one double-spaced page of text), but that limit may decrease later in the semester.
Papers need to be turned in at the end of every class. During class, we will draw from a hat to choose someone to read their paper aloud; when discussion stalls or stagnates, we may ask other people to read their papers as well. You get 2 chances to “pass” during the semester (for whatever reason, without explanation). Additional passes or undocumented class absences can have a negative impact on your final grade.

These papers serve as the starting point for most class discussions. And they serve as a way to assign grades for students taking the course for graduate credit. But more importantly, these papers serve as a vehicle for practicing how to think critically and how to translate those thoughts and ideas into a written form that can also be presented orally. Effective scientific communication requires selecting the most important ideas and communicating those ideas, with all of their inherent complexity, in as concise and as understandable a manner as possible. Many outlets impose strict limits on the length of a manuscript or a grant proposal, so it is critical that you can communicate a complex idea in a relatively small number of words. In addition, the kind of writing that is required in most college courses is too often read by only the professor, never to be seen again. Scientific communication is for public consumption. As a scientist and as an academic, we have to live with our written opinions once they are published as they become part of our official position in the field. One goal of this class is to help buttress the transition from student to academic. Your papers should be written for public consumption.

Finally, we strongly urge all graduate students either to sign up for course credit or to sign up as an auditor. Auditors and other people sitting in on the course are expected to read the assigned material and be prepared to participate in discussions. That said, we do urge postdoctoral fellows and faculty who might sit in on the course to try to restrain their enthusiasm a bit and to allow the graduate students to play a more dominant role in the class discussion whenever possible.

**COURSE READINGS**

A web-based version of this syllabus is located at:
http://www.psy.vanderbilt.edu/faculty/palmeri/p351/syllabus.html

Some of the newer readings are accessible via the web as PDF files. When you click on one of the links to the papers you will be prompted to log in:

user: p351
password: psych351

Logging in will give you access to the PDF file. You must have the free Adobe Acrobat Reader in order to open the PDF files (available at www.adobe.com).

Other readings will be available in the mail room on the third floor of Wilson Hall and will be on reserve in the main library. Please borrow these papers only to copy them and return them to their folders promptly.
Wed Aug 28th  Introduction  

Mon Sep 2nd  Background  

Further readings:  

Wed Sep 4th  Revealing Representations: MDS and Clustering  

Further readings:  

Mon Sep 9th  Theories of similarity  

Further readings:  

**Wed Sep 11**th **Shepard-mania**
Further readings:

**Mon Sep 16**th **Structural Description Theories (Behavioral Evidence)**

**Wed Sep 18**th **Structural Description Theories (Computational Models)**
Further readings:
**Mon Sep 23rd**  Image-Based Theories (Behavioral Evidence)


Further readings:


**Wed Sep 25th**  Image-Based Theories (Computational Models)


**Mon Sep 30th**  Structural Description Theories (Neural Evidence)


**Wed Oct 2nd**  
**Image-Based Theories (Neural Evidence)**


*Further Readings:*

**Mon Oct 7th**  
**Exemplar-Based Models of Categorization**


*Further readings:*


**Wed Oct 9th**  
**An Exemplar-Based Model of Category Learning**


*Further readings:*

**Mon Oct 14th**  
**Extensions of Exemplar-Based models**

Palmeri, T.J. (2001). The time course of perceptual categorization. In M. Ramscar & U. Hahn (Eds.), Similarity and Categorization, Oxford University Press.

Further Reading:

Wed Oct 16th  Exemplar-Based Models (Neural Evidence)

Mon Oct 21st  FALL BREAK

Wed Oct 23rd  Distributed Representations

Mon Oct 28th  McClelland visit

Wed Oct 30th  Distributed Representations (Neural Evidence)
Further Reading:

Mon Nov 4th  Semidistributed Representations

Further Reading:

Wed Nov 6th  Hierarchical Feature Representations

Mon Nov 11th  Representation as Representation of Similarities

Wed Nov 13th  Modularity, Dissociations, and Double Dissociations
Shallice, T. (1988). From neuropsychology to mental structure. Cambridge University Press. (Chapter 11, Delusions about dissociations?)

Further readings:
**Mon Nov 18th**  **Modularity in Neural Networks**


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**Wed Nov 20th**  **Modularity of Feature Representations?**


Further readings:


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**Mon Dec 2nd**  **Modularity of Perception and Conception?**


Further readings:


**Wed Dec 4th**  **Modularity of Memory and Knowledge?**


**Mon Dec 9th**  **Expertise in Object Recognition and Categorization**


Further readings:


**Wed Dec 11th**  **Critiques of Computational Modeling**


