

**Knowledge, Brain, and Culture
Psychology 276
Spring 2003**

**Tuesday/Thursday
1:10-2:25
Wilson 316**

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WWW	http://www.vanderbilt.edu/AnS/psychology/cogsci/palmeri/home.html
Course WWW	http://www.psy.vanderbilt.edu/faculty/palmeri/p276/syllabus.html

COURSE OVERVIEW

Human conceptual knowledge arises from an interaction of mind, brain, and culture. To understand the nature of conceptual knowledge, we will be examining a variety of findings from psychology (mind), neuroscience (brain), and anthropology (culture). We will examine how conceptual knowledge is organized in the human mind, whether some kinds of knowledge might be innate and some kinds of knowledge might be learned, how conceptual knowledge might be acquired from the world around us, how knowledge is acquired by children, how conceptual knowledge is similar and how it varies across cultures, and how knowledge is processed and represented by the human brain.

This course will be structured as a seminar, with some of the time devoted to class discussion of original research papers and some of the time devoted to lectures on related materials.

COURSE WEB SITE

I have created a web site for this course:

<http://www.psy.vanderbilt.edu/faculty/palmeri/p276/syllabus.html>

On the web site, you will find the course syllabus, copies of all assignments and handouts, PowerPoint slides from lectures, links to downloadable required readings in PDF format, links to downloadable presentation readings in PDF format, and links to other readings in PDF format.

For various reasons, the PowerPoint slides from lectures and the PDF files have to be password protected. When asked to supply a user name and password, the login name is p276 and the password is p276. Please do not try to use your VUNET ID.

COURSE REQUIREMENTS

- **Three short reaction papers (51%)** : *Papers due February 12, March 18, and April 22*

Three times during the semester you will be required to write a short paper (around 5-6 double-spaced pages) related to the readings from the previous few weeks. Each paper is worth 17% of your final grade. You will have the opportunity to revise and resubmit papers to try to improve your grade; I will average the original grade with the revised grade. These papers should not be mere summaries of the readings. Rather, I would like you to go beyond the readings in some interesting way. I will hand out a list of potential topics a week or so before each paper is due. However, you are free to write about other things as well. I encourage you to discuss your plans with me first if you are unsure about what to write about.

I will be looking for well-written, insightful paper. Although these papers have a limit of only around 5-6 pages (about 2000-2500 words), with careful writing and rewriting you should be able to say quite a lot. I

strongly recommend that you finish a first draft of the paper a day or two before it is due. Then spend some time carefully revising the paper. In determining the final course grade, I will take into consideration improvement on these papers throughout the semester.

- **Research paper and presentation (24%)** : *Presentations April 27 or 29, Paper due May 6*

As a final project, you will be responsible for a research paper (12-15 double-spaced pages) on a topic of your choosing. For this paper, you should plan on discussing at least three or four papers that we did not read for class. You will need to integrate what you learned from reading these papers with things that were discussed in class and in the assigned readings. One avenue for selecting a research topic would be to expand upon a topic we discussed in class (the course web page will list some additional readings). Another possibility would be to examine a topic that we did not cover. Some possible topics will be included on the web page, along with a list of some possible readings. Each class member will give a 10-15 minute presentation of their research. Presentations are scheduled for the last three days of class. The research paper is due Thursday May 6 at 9:00am.

You will need to decide the topic for your research topic mid-way through the semester (Thursday March 4). A tentative list of readings is due a few weeks later (Tuesday March 23).

- **Class Presentation (5%)**

Everyone will be responsible for one 15 minute presentation of a paper that will not be assigned to the rest of the class. These papers are given in [bracketed italics] below and are on reserve in the library or available from the web page. Your grade will depend on the organization, depth, and clarity of presentation. Because the details of an entire paper cannot be presented in just 15 minutes, the presenter will need to determine which parts of the paper are most important, most interesting, and most relevant. The presenter will need to discuss the motivation for the paper, how it relates to other material in the class, what the experimental methods were, what the results were, and what implications those results have. The presenter should also pose questions raised by the paper. The presenter should plan to meet with me some time before class to discuss their presentation and how best to integrate it with the rest of the material for that day's class.

- **Class Participation, Comments, and Questions (20%)**

Given the seminar format, we all need to come to class having completed the readings. To facilitate discussion, I also expect everyone to bring one page of hand written comments on the assigned readings to class. Jot down your thoughts, comments, reactions, and questions about the readings. I will hand out a short list of thought questions to get you started thinking about each set of readings. My hope is that this assignment will help you come to class prepared to ask probing questions, raise criticisms, and generally contribute to a meaningful discussion. Your page with comments must be turned in at the end of class. I will not be grading these, but I will use them in assigning a class participation grade for each class session.

READINGS

Some of the course readings are on reserve in the main library (noted by RESERVE). I have reserved two copies of these papers. Please make sure you give yourself enough time before class to check a paper out to read or to photocopy.

The rest of the papers are available as PDF files on the web (noted by DOWNLOAD). Links are provided on the course web page. You can read these papers online or print out a copy of them for yourself.

SCHEDULE OF TOPICS

This schedule of topics will almost certainly change throughout the semester. Please consult the course web page for an up-to-date syllabus. While the topics may change, the due dates for the reaction papers will not change.

Introduction

Week 1 : Thu 1/15 *Introduction to the course.*

Week 2 : Tue 1/20 *Color categories as an example domain.*
DOWNLOAD Davidoff, J., Davies, I., & Roberson, D. (1999). Colour categories in a stone-age tribe. *Nature*, 398, 203-204.

At What Level of Abstraction do we Categorize the World?

Week 2 : Thu 1/22 *Is there a basic level of categorization?*
RESERVE Rosch, E. (1978). Principles of categorization. In E. Rosch & B. Lloyd (Eds.), *Cognition and Categorization*, Erlbaum. (pp. 190-196)
RESERVE Murphy, G.L., & Lassaline, M.E. (1997). Hierarchical structure in concepts and the basic level of categorization. In K. Lamberts & D. Shanks (Eds.), *Knowledge, Concepts, and Categories*, MIT Press.

Week 3 : Tue 1/27 *Do experts have a different basic level?*
RESERVE Tanaka, J.W., & Taylor, M. (1991). Object categories and expertise: Is the basic level in the eye of the beholder? *Cognitive Psychology*, 23, 457-482.
RESERVE [Johnson, K.E., & Mervis, C.B. (1997). *Effects of varying levels of expertise on the basic level of categorization. Journal of Experimental Psychology: General*, 126, 248-277.]

Week 3 : Thu 1/29 *Is the basic level really basic developmentally?*
RESERVE Mandler, J.M., Bauer, P.J., & McDonough, L. (1991). Separating the sheep from the goats: Differentiating global categories. *Cognitive Psychology*, 23, 263-298.
DOWNLOAD [Johnson, K.E., & Eilers, A.T. (1998). *Effects of knowledge and development on subordinate level categorization. Cognitive Development*, 13, 515-545.]

The Relationship Between Concepts, Percepts, and Thought

Week 4 : Tue 2/3 *Can the concepts we form constrain the kinds of thoughts we have?*
RESERVE Whorf, B.L. (1956). Science and linguistics. In J.B. Carroll (Ed.), *Language, thought, and reality: Selected writings of Benjamin Lee Whorf* (pp. 207-219). Cambridge, MA: MIT Press.
DOWNLOAD [Brysbaert, M., Fias, W., & Noel, M.-P. (1998). *The Whorfian hypothesis and numerical cognition: Is 'twenty-four' processed in the same way as 'four-and-twenty'*? *Cognition*, 66, 51-77]

Week 4 : Thu 2/5

Can the concepts we form constrain the kinds of perceptions we have?

RESERVE Goldstone, R.L. (1995). Effects of categorization on color perception. *Psychological Science*, 6, 298-304.

DOWNLOAD [Archambault, A., O'Donnel, C., & Schyns, P.G. (1999). *Blind to object changes: When learning the same object at different levels of categorization modifies its perception. Psychological Science*, 10, 249-255.]

Conceptual Knowledge and Cultures

Week 5 : Tue 2/10

How does conceptual knowledge differ across cultural groups?

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

DOWNLOAD [Coley, J.D., Medin, D.L., & Atran, S. (1997). *Does rank have its privilege? Inductive inferences within folkbiological taxonomies. Cognition*, 64, 73-112.]

Reaction Paper One Due Thursday February 12

Week 5 : Thu 2/12

Are there fundamental differences in object categories across different languages?.

DOWNLOAD Malt, B.C., Sloman, S.A., Gennari, S., Shi, M., & Wang, Y. (1999). Knowing versus naming: Similarity and the linguistic categorization of artifacts. *Journal of Memory and Language*, 40, 230-262.

DOWNLOAD [Medin, D.L., Ross, N., Atran, S., et al. (in press). *Folkbiology of freshwater fish. Cognition.*]

How is Conceptual Knowledge Mentally Represented?

Week 6 : Tue 2/17

Prototypes and family resemblance.

RESERVE Rosch, E. (1978). Principles of categorization. In E. Rosch & B. Lloyd (Eds.), *Cognition and Categorization*, Erlbaum. (pp. 196-205)

RESERVE Lakoff, G. (1987). Cognitive models and prototype theory. In U. Neisser (Ed.), *Concepts and Conceptual Development: Ecological and Intellectual Factors in Categorization*, Cambridge University Press.

Week 6 : Thu 2/19

Reactions to prototype theory.

RESERVE Armstrong, S.E., Gleitman, L.R., & Gleitman, H. (1983). What some concepts might not be. *Cognition*, 13, 263-308.

RESERVE [Barsalou, L.W. (1983). *Ad hoc categories. Memory & Cognition*, 11, 211-227.]

Week 7 : Tue 2/24

Representations of natural kind and artifact concepts.

DOWNLOAD Malt, B.C. (1994). Water is not H₂O. *Cognitive Psychology*, 27, 41-70.

DOWNLOAD Bloom, P. (1996). Intention, history, and artifact concepts. *Cognition*, 60, 1-29.

DOWNLOAD [Ahn, W. (1998). *Why are different features central for natural kinds and artifacts? The role of causal status in determining feature centrality. Cognition*, 69, 135-178.]

Week 7 : Thu 2/26

Are concepts abstract or are they grounded in perception?

DOWNLOAD Wu, L.L., & Barsalou, L.W. (2003). Grounding concepts in perceptual simulation: I. Evidence from property generation. *Under review. (Read by people with last names A-H.)*

DOWNLOAD Solomon, K.O., & Barsalou, L.W. (2003). Grounding concepts in perceptual simulation: II. Evidence from property verification. *Under review. (Read by people with last names I-Z.)*

DOWNLOAD [Solomon, K.O., & Barsalou, L.W. (2003). *Representing properties locally. Under review.*]

Week 8 : Tue 3/2

How do we comprehend complex concepts?

RESERVE Murphy, G.L. (1988). Comprehending complex concepts. *Cognitive Science*, 12, 529-562.

RESERVE [Medin, D.L., & Shoben, E.J. (1988). *Context and structure in conceptual combination. Cognitive Psychology*, 20, 158-190.]

How do Children Acquire Conceptual Knowledge?

Research Topic Due Thursday March 4

Week 8 : Thu 3/4

How do children learn the meaning of words?

RESERVE Landau, B., Smith, L.B., & Jones, S.S. (1988). The importance of shape in early lexical learning. *Cognitive Development*, 3, 229-321.

RESERVE [Jones, S.S., Smith, L.B., Landau, B. (1991). *Object properties and knowledge in early lexical learning. Child Development*, 62, 499-516.]

Spring Break

Week 9 : Tue 3/16

Do children learn all categories in the same way?

RESERVE Soja, N.N., Carey, S., & Spelke, E.S. (1991). Ontological categories guide young children's inductions of word meaning: Object terms and substance terms. *Cognition*, 38, 179-211.

DOWNLOAD [Imai, M., & Gentner, D. (1997). *A cross-linguistic study of early word meaning: Universal ontology and linguistic influence. Cognition*, 62, 169-200.]

Reaction Paper Two Due Thursday March 18

Week 9 : Thu 3/18

Do children have the same kind of conceptual knowledge as adults?

RESERVE Keil, F.C., & Batterman, N. (1984). A characteristic-to-defining shift in the development of word meaning. *Journal of Verbal Learning and Verbal Behavior*, 23, 221-236.

DOWNLOAD [Simons, D.J., & Keil, F.C. (1995). *An abstract to concrete shift in the development of biological thought: The insides story. Cognition*, 56, 129-163.]

Speech Categories

Research Paper Reading List Due Tuesday March 23

Week 10 : Tue 3/23

Categories in speech.

RESERVE Miller, G.A. (1981). *Language and speech*. San Francisco: W.H. Freeman. Chapter 5 (pp. 49-60) and Chapter 6 (pp. 61-71).

- Week 10 : Thu 3/25 *Categorical perception.*
RESERVE Eimas, P.D. (1991). The perception of speech in early infancy. In Y.S-Y. Wang (Ed.), *The emergence of language: Development and evolution* (pp. 117-127). New York: W.H. Freeman.
RESERVE [Kuhl, P.K., & Miller, J.D. (1978). *Speech perception by the chinchilla: Identification functions for synthetic VOT stimuli. Journal of the Acoustical Society of America*, 63, 905-917.]

How does the Brain Represent Conceptual Knowledge?

- Week 11 : Tue 3/30 *Investigating patients with brain damage to study conceptual knowledge.*
RESERVE Fischbach, G.D. (September 1992). Mind and brain. *Scientific American*, 48-57.
RESERVE Sacks, O. (1990). *The Man who Mistook his Wife for a Hat*. New York: Harper Perennial. pp. 8-22.
- Week 11 : Thu 4/1 *How and where is conceptual knowledge represented in the brain?*
RESERVE Damasio, A.R., & Damasio, H. (September 1992). Brain and Language. *Scientific American*, 89-95.
RESERVE Farah, M.J., & McClelland, J.L. (1992). Neural network models and cognitive neuropsychology. *Psychiatric Annals*, 22, 148-153.
RESERVE [Warrington, E.K., & Shallice, T. (1984). *Category specific semantic impairments. Brain*, 107, 829-854.]
- Week 12 : Tue 4/6 *Are some categories special? The case of prosopagnosia.*
DOWNLOAD Farah, M.J. (1996). Is face recognition 'special'? Evidence from neuropsychology. *Behavioural Brain Research*, 76, 181-189.
DOWNLOAD Gauthier, I., Behrmann, M., & Tarr, M.J. (1999). Can face recognition really be dissociated from object recognition. *Journal of Cognitive Neuroscience*, 11, 349-370.
RESERVE [Moscovitch, M., Winocur, G., & Behrmann, M. (1997). *What is special about face recognition? Nineteen experiments on a person with visual object agnosia and dyslexia but normal face recognition. Journal of Cognitive Neuroscience*, 9, 555-604.]
- Week 12 : Thu 4/8 *Are categories represented by unique neural memory systems?*
RESERVE Knowlton, B.J., & Squire, L.R. (1993). The learning of categories: Parallel brain systems for item memory and category knowledge. *Science*, 262, 1747-1749.
DOWNLOAD Palmeri & Flanery (1999). Learning about categories in the absence of training: Profound amnesia and the relationship between perceptual categorization and recognition memory. *Psychological Science*, 10, 526-530.
DOWNLOAD [Nosofsky, R.M., & Zaki, S.R. (1998). *Dissociations between categorization and recognition in amnesic and normal individuals: An exemplar-based interpretation. Psychological Science*, 9, 247-255.]
- Week 13 : Tue 4/13 *An introduction to brain imaging techniques.*
RESERVE Posner, M.I., & Raichle, M.E. (1994). *Images of the mind*. Freeman: New York. (Skim Chapters 1 and 2; Read Chapter 3)
DOWNLOAD Menon, R.S., & Kim, S.-G. (1999). Spatial and temporal limits in cognitive neuroimaging with fMRI. *Trends in Cognitive Science*, 3, 207-216.

Week 13 : Thu 4/15 *Using functional magnetic resonance imaging to study conceptual knowledge.*
DOWNLOAD Epstein, R., & Kanwisher, N. (1998). A cortical representation of the local visual environment. *Nature*, 392, 598-601.
DOWNLOAD [Ishai, A., Ungerleider, L.G., Martin, A., Schouten, J.L., & Haxby, J.V. (1999). *Distributed representation of objects in the human ventral visual pathway. Proceedings of the National Academy of Science*, 96, 9379-9384.]

Week 14 : Tue 4/20 *How does the neural organization of knowledge change with experience?*
DOWNLOAD Gauthier, I., Skudlarski, P., Gore, J.C., & Anderson, A.W. (2000). Expertise for cars and birds recruits brain areas involved in face recognition. *Nature Neuroscience*, 3, 191-197.
DOWNLOAD [Gauthier, I., Tarr, M.J., Anderson A.W., Skudlarski, P., & Gore, J. C. (1999). *Activation of the middle fusiform "face area" increases with expertise in recognizing novel objects. Nature Neuroscience*, 2, 568-573.]

Reaction Paper Three Due Thursday April 22

Week 14 : Thu 4/22 *Single-unit Studies of Categorization in the Primate Brain.*
DOWNLOAD Sigala, N. & Logothetis, N.K. (2002). Visual categorization shapes feature selectivity in the primate temporal cortex. *Nature*, 415, 318-320.
DOWNLOAD Freedman, D.J., Riesenhuber, M., Poggio, T., Miller, E.K. (2001). Categorical representation of visual stimuli in the primate prefrontal cortex. *Science*, 291, 312-316.
DOWNLOAD [Wallis, J.D., & Miller, E.K. (2003). *From rule to response: Neuronal processes in the premotor and prefrontal cortex. Journal of Neurophysiology*, 90, 1790-1806.]

Presentations

Week 15 : Tue 4/27 *Presentations of Research Papers.*

Week 15 : Thu 4/29 *Presentations of Research Papers.*

Final Research Paper Due Thursday May 6 at 9:00am

Vanderbilt's Honor Code Governs All Work in this Course