

## **PSYD50-07F: Current Topics in Memory and Cognition**

Class Meeting Time: Friday 10-12

Classroom: BV516

### **Contact Information for Instructor:**

Instructor: Prof. George Cree

Office: S-559

Office Phone: (416) 287-7439

Email: [george.cree@utoronto.ca](mailto:george.cree@utoronto.ca)

### **Introduction to the Course**

This course is designed to help you develop your critical thinking, research, and communication skills. We will accomplish this through a detailed study of the topic of category-specific semantic deficits, a current 'hot topic' in the field of memory and cognition.

Category-specific semantic deficits are knowledge deficits observed in people who have suffered some form of brain injury or disease, such as a closed-head injury or Herpes Simplex Encephalitis, resulting in a significant loss of knowledge in specific semantic domains (e.g., animals) while remaining relatively unimpaired in others (e.g., tools). Over 100 case studies have been reported in the literature to date.

These deficits are interesting to cognitive psychologists because the patterns of impairment observed in the patients can be used to shed light on how knowledge is stored in the brain. This will be our primary interest in the course: how is knowledge stored in the mind/brain, and what can we learn about knowledge representation from the study of patients with category-specific semantic deficits?

There are several reasons why I believe this topic is ideal for study in a course at this level. First, the deficits are fascinating, and trying to make sense of the complex patterns of impairment provides a challenging intellectual puzzle. Second, there is no universally accepted account of how or why these patterns of deficits occur. There are currently three major classes of theories, all incomplete, jockeying for position as the all-encompassing theory that will explain how knowledge is stored in the brain. We will evaluate these theories, and it will be your job to decide which one you think is closest to the truth. Third, important data and ideas have emerged from many of the fields of cognitive science, using many varied techniques, including clinical behavioral testing, functional neuroimaging, and computational modeling. We will sample broadly from all of these kinds of evidence in our survey of the literature, providing a solid foundation in modern day, inter-disciplinary research. Finally, many mistakes have been made by researchers along the way, including the use of poorly designed tests, use of questionable data analysis techniques, and pronouncement of inconsistent theoretical claims. The literature is thus replete with examples of what to do, and what not to do, when conducting research, and these will be used to illustrate a rigorous, yet appropriately skeptical, scientific approach to conducting research and developing theory.

By the end of this course you should have a deep understanding of the main issues in the field. You should also have a feel for the strengths and weaknesses of each the main approaches used to study the topic, and you should have formed strong, justified opinions about how you think knowledge is stored in the mind/brain.

## **Topics and Required Readings:**

### ***Week 01: History of the Study of Semantic Memory up to 1984 and Patient J.B.R.***

- Warrington, E. K., & Shallice, T. (1984). Category specific semantic impairments. *Brain*, 107, 829-854. (intranet)

### ***Week 02: Cognitive Neuropsychological Tools (and an Overview of the Field)***

- Forde, E. M. E., & Humphreys, G. W. (1999). Category-specific recognition impairments: A review of important case studies and influential theories. *Aphasiology*, 13(3), 169-193. (intranet)

### ***Week 03: Introduction to Key Patients***

- Capitani, E., Laiacona, M., Mahon, B., & Caramazza, A. (2003). What are the facts of semantic category-specific deficits? A critical review of the clinical evidence. *Cognitive Neuropsychology*, 20(3/4/5/6), 213-261. (intranet)

### ***Week 04: Evidence from Neuroimaging (and Review of Relevant Neuroanatomy)***

- Devlin, J. T., Russell, R. P., Davis, M. H., Price, C. J., Moss, H. E., Jalal Fadili, M., & Tyler, L. K. (2002). Is there an anatomical basis for category-specificity? Semantic memory studies in PET and fMRI. *Neuropsychologia*, 40, 54-75. (intranet)
- Gainotti, G. (2005). The influence of gender and lesion location on naming disorders for animals, plants, and artefacts. *Neuropsychologia*, 43, 1633-1644. (intranet)
- Martin, A. (2007). The representation of object concepts in the brain. *Annual Review of Psychology*, 58, 25-45. (intranet)

### ***Week 05: Evidence from Normal Populations***

- Laws, K. R. (2000). Category-specific naming errors in normal subjects: The influence of evolution and experience. *Brain and Language*, 75, 123-133. (intranet)
- Cree, G. S., & McRae, K. (2003). Analyzing the factors underlying the structure and computation of the meaning of chipmunk, cherry, chisel, cheese, and cello (and many other such concrete nouns). *Journal of Experimental Psychology: General*, 132(2), 163-201. (intranet)

### ***Week 06: Evidence from Computational Modeling***

- Rogers, T. T., & Plaut, D. C. (2002). Connectionist perspectives on category-specific deficits. In E. Forde & G. Humphreys [Eds.], *Category-specificity in Brain and Mind*. Psychology Press. (intranet)

### ***Week 07: Student Presentations***

### ***Week 08: Student Presentations***

### ***Week 09: Student Presentations***

### ***Week 10: Student Presentations***

### ***Week 11: Student Presentations***

### ***Week 12: Student Presentations***

### Other Required Reading for the Final Exam:

- Caramazza, A., & Mahon, B. Z. (2006). The organization of conceptual knowledge in the brain: The future's past and some future directions. *Cognitive Neuropsychology*, 23(1), 13-38. (intranet)
- Taylor, K. I., Moss, H. E., & Tyler, L. K. (2007). The conceptual structure account: A cognitive model of semantic memory and its neural instantiation. In J. Hart & M. Kraut (Eds.), *The neural basis of semantic memory*. Cambridge: Cambridge University Press. (intranet)
- Simmons, W. K., & Barsalou, L. W. (2003). The similarity-in-topography principle: Reconciling theories of conceptual deficits. *Cognitive Neuropsychology*, 20 (3/4/5/6), 451-486. (intranet)

### Methods of Evaluation:

Weekly Quizzes (best 4 of 5)	20%	Weeks 2-6
Class Participation	10%	Evaluated Over all 12 Weeks
Presentation and Discussion Leader	10%	To Be Scheduled in Weeks 7-12
2500 Word Term Paper	25%	Due the Last Day of Classes
Final Exam	35%	December Exam Period

### Information about Quizzes and the Final Exam

The quizzes will consist of short answer questions based on the reading(s) assigned the previous week. The final exam will consist of short and long answer essay questions. The content of the final exam will be based on the material we have discussed throughout the term, including student presentations.

### Information about the Term Paper

You must deal with two issues in your term paper. First, you must defend one of the three major classes of theories that have been proposed to account for category-specific semantic deficits: the conceptual structure account, the domain specific hypothesis, or a version of the sensory/functional theory. Second, you must point out a major flaw with the theory you have chosen to defend (e.g., data from a specific patient that can not be explained within the framework of the theory), and suggest an extension or amendment to the theory that will allow it to deal with the flaw, and yet still remain internally consistent.

**Note:** You must clear the topic for your Term Paper with Prof. Cree BEFORE the beginning of the Week 09 class. You can do this either (a) during office hours, or (b) through email. To do this, you must present, in written form, an approx. 1 page outline of your paper, in which you specify your thesis statement, and the major arguments you will use to support your thesis.

### Information about Class Participation

Students are expected to participate actively in class. Attendance in class is expected, and will not be rewarded. In other words, Class Participation marks must be earned, by contributing to the class discussion, be this by asking relevant and probing questions, answering questions posed by others, or posting relevant and interesting information, along with appropriate analysis and discussion, on the class discussion board.

### **Information about Presentations**

Presentations will be based on a set of questions that will be distributed by Prof. Cree approx. 2 weeks into the course. Students will select one of the questions, and provide an answer during their presentation. The questions will be tested on the final exam, so the onus is on the presenter to provide a clear answer to their question that can be used by other students when studying for the exam. Handouts that summarize the answer provided by the presenter, and that can be distributed to the class, are strongly encouraged. The presentation grade will be based primarily on the quality of the answer, rather than slickness of the presentation.

### **Academic Writing**

Writing assignments make-up a large component of this course. If you are not comfortable with your writing abilities, or would like a quick refresher on specific topics, then be sure to make use of the following two excellent resources:

**UTSC Writing Centre:** AC 210, <http://www.utsc.utoronto.ca/~tlswweb/TWC/index.htm>  
-- offers 20 min. drop in sessions, or 50 min. 1-1 sessions.

**U of T Advice on Academic Writing:** <http://www.utoronto.ca/writing/advice.html>  
-- a fantastic source of materials on writing.

### **Policies on missed exams and assignments.**

If you miss a class due to illness, be sure to get appropriate medical documentation. In the case of quizzes, your mark will be computed out of the remaining number of quizzes (e.g., if you miss 1 quiz, then your best 3 of 4 will make up the quiz component of your grade).

Please be aware that I cannot, by U of T policy, accept assignments after the last day of classes.

If you miss the final exam you will have to petition to be allowed to write a deferred final exam during the next exam period (up to four months away).

### **Policies on academic integrity**

Please review the UTSC Code on Academic Behaviour:

[http://www.utsc.utoronto.ca/courses/calendar/University\\_of\\_Toronto\\_Policies.html#Code\\_of\\_Behaviour\\_on\\_Academic\\_Matters](http://www.utsc.utoronto.ca/courses/calendar/University_of_Toronto_Policies.html#Code_of_Behaviour_on_Academic_Matters)

### **AccessAbility**

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. The UTSC AccessAbility Services staff (located in S302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca). The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

*The above schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances.*