

# COGNITIVE NEUROSCIENCE I (PSYCH3BN3) Course Outline - Fall 2011

**NOTE: Please consult the online version of this course outline, and always hit the refresh button, as this page will be updated frequently with links to readings, lecture outlines (pdf of powerpoint slides) and student presentations, at <http://www.science.mcmaster.ca/psychology/psych3bn3>**

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## Instructor

Professor Sue Becker, *becker at mcmaster dot ca*  
Office hours: by appointment.

## Course Assistance - TAs:

Malcolm Pilgrim, *pilgrim at mcmaster dot ca*  
Xue Han, *hanx3 at mcmaster dot ca*

## Schedule

Mondays 9:30-10:20, Thursdays 9:30-11:20, PC-335

## Course Objectives

This course will survey findings in several major areas of cognitive neuroscience, using a range of methods including brain imaging, neural network modelling, and behavioural testing of neuropsychological patients, toward an understanding of the neural mechanisms underlying cognition. Lectures will cover both textbook chapters and 24 selected readings from the current literature. Students are expected to develop an appreciation for the range of techniques used by cognitive neuroscientists, when they are applicable, and what they tell us about a range of cognitive and brain functions, as well as an ability to evaluate critically the scientific literature.

During the first two weeks, introductory material will be covered in a traditional lecture format. In subsequent weeks, for each of the 6 major topic areas, there will be a one-hour introductory lecture given by the instructor followed by four hours of paper presentations and discussions, with the papers presented by students, and the instructor and TA's directing and facilitating the discussions.

## Materials and Fees

**1. Course text:** Cognitive Neuroscience: The Biology of the Mind, 3rd Edition, By M.S. Gazzaniga, R.B. Ivry and G.R. Mangun, NY: W.W. Norton & Company, 2009.

**2. 24 articles from the recent literature** (see online version of syllabus).

To promote a high quality of in-class discussion, students are expected to have at least skimmed every paper before class, and to have read in great detail the 3 or more papers for which they are writing critiques.

The readings are freely available electronically from the McMaster library web pages (accessible from any on-campus computer). For your convenience, links to these online resources are included below.

## Overview and Assessment

In extreme cases such as after an unanticipated university closure it may be necessary to revise the assessment scheme detailed below. The instructor reserves the right to modify elements of the assessment scheme as required and will provide students with as much prior notification and consultation as possible, both in class and on the course website.

Participation	10%
At least three 2-page critiques of papers (best 3 count)	30%
One 20-30 minute oral presentation	20%
One final take-home exam	40%

## Participation

Marks for participation are based on 1) providing feedback to other students on their presentations, by filling out a very brief evaluation form at the end of each presentation, and 2) contributing to the class discussions of the 24 papers. The participation mark will be calculated as follows:

- Attendance at all presentations and Feedback presenters: 1 mark for submitting 1-5 feedback forms with informative and helpful feedback, 2 marks for 6-10 forms, 3 marks for 11-15, 4 marks for 16-20, and 5 marks for 21 or more.
- Contribution to discussions: 1 mark for contributing in a substantial way (not just asking clarification type questions) to 1 paper discussion, 2 marks for 2-3, 3 marks for 4-7, 4 marks for 8-11, 5 marks for 12 or more.

## Critiques

Students will each be randomly assigned 6 papers covering all 6 topic areas. Of those, they can choose at least 3 papers to critique, but the first critique (Learning and Memory topic) is NON-OPTIONAL. No matter how many critiques are turned in, only the best 3 scores will be counted. Critiques are due at the start of class on the day the paper is being presented. Hard-copy only.

**Late critiques submitted after the paper has been presented in class will not be accepted under any circumstances.**

Please read the **guidelines and marking scheme for critiques** on [this link](#).

An example of a well written critique by a student who previously took Psych3BN3 can be found on [this link \(pdf file\)](#).

## Presentations

Each student will be assigned a paper to be presented. Depending on course enrolment, each presentation will be either given individually or by a pair of students. Students' requests to present individually or to for a specific partner will be accommodated whenever possible. In either case, you (as an individual or pair of presenters) must meet with your instructor at least 1 week prior to your presentation date. Your outline is due at the time of this meeting and should include a point-form summary of what you consider to be the most important points in the article (intro, methods, results and

discussion). For pair presentations, your outlines can either be written individually, each covering their own section, or jointly covering both students' parts of the presentation and will be marked as an individual or joint piece of work accordingly.

Please read the **guidelines and marking scheme for presentations** on [this link](#).

The **assignment of critiques and paper presentation dates** can be found at [this link](#).

### Final exam

The final exam will be distributed during the regular final exam period. It is expected to take no more than one day to complete, but students will be given 1 week in order to fit this in around their other exams. There will be 6 exam questions, one per major topic area covered in the course, and students will be asked to provide (max 2 pages each, double-spaced) answers to 4 of the 6 questions.

Sample final exam questions from previous years can be found on [this link](#).

### Lecture topics, readings, and links to lecture outlines

(outlines to be added at least 24 hours before each lecture. Readings to be finalized within the next few days.) At certain points in the course it may make good sense to modify the schedule outlined below. The instructor reserves the right to modify elements of the course and will notify students accordingly, both in class and by posting any changes to the course website.

#### Introductory Lectures

Sept 8, 12, 15, 19: Introduction to the nervous system, and cognitive neuroscience methods.

Links to lecture outlines:

Lecture 1, Sept 8, ([pdf file](#))

Lecture 2, Sept 8, hour 2, ([pdf file](#))

Lecture 3, Sept 12, ([pdf file](#))

Lecture 4, chapter 4, part I, Sept 15, [pdf](#)

Lecture 5, chapter 4, part II, Sept 15, [pdf](#)

Lecture 6, chapter 4, part III, Sept 19, [pdf](#)

**Readings:** Chapters 1-4 in Gazzaniga textbook.

#### Topic 1: Learning and memory

Link to lecture outline: [pdf file](#)

**Readings:**

- **Sept 22 (lecture)**

Chapter 8 in Gazzaniga book.

- **LM1 Sept 22**

Polyn, SM, et al. "Category-specific cortical activity precedes retrieval during memory search." *Science* 310.5756 (2005):1963-1966. [Link to article in McMaster e-resources](#)

Link to James and Morgan's presentation: [Colour pdf](#), [Greyscale pdf](#)

- **LM2 Sept 26**

Kuhl, Brice A, et al. "Fidelity of neural reactivation reveals competition between memories." *Proceedings of the National Academy of Sciences of the United States of*

America 108.14 (2011):5903-5908. [Link to article in McMaster e-resources](#)

Link to Krista and Gillian's presentation: [pdf](#)

- **LM3 Oct 3**

**NOTE CHANGE OF DATE**

Hoscheidt, Siobhan M, et al. "Hippocampal activation during retrieval of spatial context from episodic and semantic memory." Behavioural brain research 212.2 (2010):121-132. [Link to article in McMaster e-resources](#)

Link to Kate and Christina's presentation: [pdf](#)

- **LM4 Sept 29**

Kikuchi, Hirokazu, et al. "Memory Repression: Brain Mechanisms underlying Dissociative Amnesia." Journal of cognitive neuroscience 22.3 (2010):602-613. [Link to article in McMaster e-resources](#)

Link to Tammy and Ben's presentation: [pdf](#)

## Topic 2: Cerebral lateralization

Link to lecture outline: [pdf file](#)

**Readings:**

- **October 6 (lecture)**

Chapter 11, Gazzaniga

- **CL1 Oct 6**

(NOTE: Those presenting or critiquing CL1 should cover BOTH the Roberts & Ivry and the Hsiao et al CL1 articles)

1. Robertson, L.C. & Ivry, R.B. (2000). Hemispheric asymmetries: Attention to visual and auditory primitives. Current Directions in Psychological Science, 9, 59-63. [Link to article on Ivry's website \(off-campus link\)](#)

2. Hsiao, Janet H, Danke XShieh, and Garrison WCottrell. "Convergence of the Visual Field Split: Hemispheric Modeling of Face and Object Recognition." Journal of cognitive neuroscience 20.12 (2008):2298-2307. [Link to article in McMaster e-resources](#)

Link to Kieran and Cailin's presentation: [pdf](#)

- **CL2 Oct 13**

Landis, Theodor. "Emotional words: What's so different from just words?." Cortex 42.6 (2006):823-830. [Link to article in McMaster e-resources](#)

Link to Atara and Perri's presentation: [pdf](#)

- **CL3 Oct 13** Peng, Gang. "Hemisphere lateralization is influenced by bilingual status and composition of words." Neuropsychologia 49.7 (2011):1981-1986. [Link to article in McMaster e-resources](#)

Link to Ranya and Ibrahim's presentation: [pdf](#)

- **CL4 Oct 17**

Vanlancker Sidtis, D. "When only the right hemisphere is left: Studies in language and communication." Brain and language 91.2 (2004):199-211. [link to article in McMaster e-resources](#)

Link to Suja and So-Hyun's presentation: [pdf](#)

## Topic 3: Emotion

Link to lecture outline: [pdf file](#)

**Readings:**

- **Oct 20 (Lecture)**

Chapter 9 in Gazzaniga textbook

- **EM1 Oct 20:**  
Funayama, ES, et al. "A double dissociation in the affective modulation of startle in humans: Effects of unilateral temporal lobectomy." Journal of cognitive neuroscience 13.6 (2001):721-729. [link to article in McMaster e-resources](#) **NOTE: Click on the 2nd link "Full text Online Publisher's Website" rather than the first link "Full text available from E-Journals - Scholars Portal" as the first seems to require a uid and password**  
Link to Devina and Usman's presentation: [pdf](#)
- **EM2 Oct 24** Phelps, EA, et al. "Performance on indirect measures of race evaluation predicts amygdala activation." Journal of cognitive neuroscience 12.5 (2000):729-738. [link to article in McMaster e-resources](#)  
Link to Lora and Gabriella's presentation: [pdf](#)
- **EM3 Oct 27**  
Siegle, Greg J, et al. "Increased amygdala and decreased dorsolateral prefrontal BOLD responses in unipolar depression: Related and independent features." Biological psychiatry 61.2 (2007):198-209. [link to article in McMaster e-resources](#)  
Link to Stefanie and Kristen's presentation: [pdf](#)
- **EM4 Oct 27**  
Sommer, Monika, et al. "In psychopathic patients emotion attribution modulates activity in outcome-related brain areas." Psychiatry research. Neuroimaging 182.2 (2010):88-95. [link to article in McMaster e-resources](#)  
Link to Bianca and Marcella's presentation: [pdf](#)

#### Topic 4: Attention and Consciousness

Link to lecture outline: [pdf file](#)

##### Readings:

- **Oct 31** (lecture):  
Chapter 12 in Gazzaniga book
- **AC1 Nov 3:**  
Wieser, Matthias J, Lisa MMcTeague, and AndreasKeil. "Sustained Preferential Processing of Social Threat Cues: Bias without Competition?." Journal of cognitive neuroscience 23.8 (2011):1973-1986. [link to article in McMaster e-resources](#)  
Link to Ivana and Olivia's presentation: [pdf](#)
- **AC2 Nov 3**  
Hsieh, Po-Jang, Jaron TColas, and NancyKanwisher. "Pop-Out Without Awareness: Unseen Feature Singletons Capture Attention Only When Top-Down Attention Is Available." Psychological science 22.9 (2011):1220-1226. [link to article in McMaster e-resources](#)  
Link to Augustina's presentation: [pdf](#)
- **AC3 Nov 7**  
Del Cul, A, et al. "Causal role of prefrontal cortex in the threshold for access to consciousness." Brain 132(2009):2531-2540. [link to article in McMaster e-resources](#)  
Link to Collins and Justin's presentation: [pdf](#)
- **AC4 Nov 10:**  
Hesselmann, Guido, MartinHebart, and RafaelMalach. "Differential BOLD Activity Associated with Subjective and Objective Reports during "Blindsight" in Normal Observers." The Journal of neuroscience 31.36 (2011):12936-12944. [link to article in McMaster e-resources](#)  
Link to Jana and Adrian's presentation: [pdf](#)

## Topic 5: Reward, decision-making and cognitive control

Link to lecture outline: [pdf file](#)

### Readings:

- **Nov 10**(lecture)  
Chapter 13 in Gazzaniga textbook; see also the section of the 'Social Cognition' chapter on orbitofrontal cortex and social decision-making
- **RD1 Nov 14:** Cikara, Mina, Matthew MBotvinick, and Susan TFiske. "Us Versus Them: Social Identity Shapes Neural Responses to Intergroup Competition and Harm." *Psychological science* 22.3 (2011):306-313. [link to article in McMaster e-resources](#)  
Link to Vlad's presentation: [pdf](#)
- **RD2 Nov 17**  
Spreng, R.N. Stevens, W.D., Chamberlain, J.P., Gilmore, A.W. and Schacter, D.L. (2010), Default network activity, coupled with the frontoparietal control network, supports goal-directed cognition, *Neuroimage* 53 (1):303-317 [link to article in McMaster e-resources](#)  
Link to Laura and Amanda's presentation: [pdf](#)
- **RD3 Nov 17**  
O'Doherty, JP, et al. "Temporal difference models and reward-related learning in the human brain." *Neuron* 38.2 (2003):329-337. [link to article in McMaster e-resources](#)  
Link to Simrin and Arundev's presentation: [pdf](#)
- **RD4 Nov 21:**  
Talmi, Deborah, et al. "How Humans Integrate the Prospects of Pain and Reward during Choice." *The Journal of neuroscience* 29.46 (2009):14617-14626. [link to article in McMaster e-resources](#)

## Topic 6: Language

Link to lecture outline: [pdf file](#)

### Readings:

- **Nov 24** (lecture)  
Chapter 10 in Gazzaniga textbook
- **LA1 Nov 24:** (those critiqueing/presenting LA1 should do both of the following articles:)
  1. Corballis, Michael C. "Mirror neurons and the evolution of language." *Brain and Language* 112(1):25-35 [link to article in McMaster e-resources](#)
  2. Iverson, J.M. and Goldin-Meadow, S. (2005), Gesture paves the way for language development, *Psychological Science* 16(5):367-371 [link to article in McMaster e-resources](#)  
Link to Onyeka and Sierra's presentation: [pdf](#)
- **LA2 Nov 28:**  
Courtin, Cyril, et al. "A common neural system is activated in hearing non-signers to process French Sign language and spoken French." *Brain research bulletin* 84.1 (2011):75-87. [link to article in McMaster e-resources](#)  
Link to Madison's presentation: [pdf](#)
- **LA3 Dec 1:**  
Davoli, Christopher C, et al. "When meaning matters, look but don't touch: The effects of posture on reading." *Memory & cognition* 38.5 (2010):555-562. [link to article in McMaster e-resources \(Note: Use the "Springer" link rather than the "ProQuest" link to get the article pdf from here](#)

Link to Lisa and Courtney's presentation: [pdf](#)

- **LA4 Dec 1:** Richardson, DC, et al. "Spatial representations activated during real-time comprehension of verbs." *Cognitive science* 27.5 (2003):767-780. [link to article in McMaster e-resources](#)

Link to Maji and Atif's presentation: [pdf](#)

## Missed Presentations

If a student must miss a presentation due to illness, then as per McMaster's Policy For Absence from School Due to Illness or Compassionate Reasons "... you must bring appropriate documentation to the Office of the Associate Dean of Science (Studies) within one week of the original date of the missed work, and fill out the Request for Accommodation of Missed Academic Work form . For further details see

<http://www.science.mcmaster.ca/~associatedean/forms/missedwork.html>.

In such cases, the student will be required to schedule an individual appointment with the instructors at an alternative time to give his/her presentation.

In addition, the student is asked to email the instructor *and* the teaching assistant with as much advance notice as possible, because one of them will have to cover the student's missed presentation during the originally scheduled class time so that other students may still take part in the paper discussion.

## Calculator requirement:

Calculators will not be required during tests.

## Calendar Description

See <http://registrar.mcmaster.ca/CALENDAR/current/pg1837.html#19326>.

## Academic integrity:

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: .Grade of F assigned for academic dishonesty.), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at <http://www.mcmaster.ca/academicintegrity>

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

## Notice of changes to course structure:

The university reserves the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes."

The professor reserves the right to change any and all course requirements if the need should arise. Any change in the course requirements will be posted on the webpage and emailed to the class, and the details will be announced in class. Any concerns about announced changes should be addressed with the professor as soon as the changes are announced.

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### **Related courses taught by Sue Becker**

Psych 4BN3 - Cognitive Neuroscience II

[Psych 734 - Neural network models of cognition and perception \(graduate course\)](#)

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*Outline Last Revised: Sept 7, 2011.*