Psychology 711
Cognitive Neuroscience of Attention and Memory
Fall 2014

In this course we will consider issues and data associated with many principles and problems that are of central importance to everyday human cognition. Each week's discussion will be grounded in a background reading, and will include discussion and critical assessment of one or more papers from the contemporary literature.

Instructor: Brad Postle, 515 Psychology, 262-4330, postle@wisc.edu
Office hours by appointment.

With the exception of time-sensitive emergencies, email is the most effective and preferred way for you to contact me.

Format and Roadmap: Each week will be devoted to a particular topic, and will begin with an informal lecture/discussion led by the instructor, organized around an assigned background reading, many of them from my in-preparation textbook, *Essentials of Cognitive Neuroscience* ("Postle (2015)"), and, when appropriate, associated "Web Clips" that will be included on the book's companion Web page. During the second portion of each class session one (or more) student(s) will lead the discussion of that days' target paper(s) from the current or recent literature. The presentation time itself will give us an opportunity to discuss and assess in detail the theory, methods, results, and interpretation associated with that particular paper. Following the presentations we will end the morning with an attempt to synthesize what we've learned about this topic, and/or to articulate the important outstanding questions associated with it. Note that everyone is expected to have read all of each week's papers prior to class.

Because the textbook won't be published until sometime during the Fall 2014 semester, readings from it will be distributed as pdfs of draft chapters. These, together with target papers, will be available on the course's Learn@UW page. Web Clips will be accessible from the textbook's 'box' directory.

Over the course of the semester, students will write two papers, each due two weeks after one of that student's in-class presentations. One paper will address an attention-related topic of her/his choice (first half of semester) and the other a memory-related topic. Students should discuss their topics with the instructor before getting started on a paper.

Grading will be based on **in-class participation** and the papers. My approach to paper grading will be to apply the same standards that I do when reviewing a manuscript for a scholarly journal (except that I tend to be even more persnickety about spelling/grammar/ style on student papers), and to assign a *provisional* letter grade that is commensurate with my critique. The gradee then has the option of revising and resubmitting for a final grade, if s/he chooses to put in the additional effort.

Because the majority of the class will address attention to and memory for visually presented information, the class will begin with a consideration of the functional organization of the visual system, and some principles of visual perception. Next, we'll consider the anatomy and function of the skeletomotor and oculomotor systems, because action and attention are closely linked, and understanding the latter requires an understanding of the systems and principles that govern the former. The class sessions devoted to attention will precede those devoted to memory to mirror the temporal dependencies of neural information processing: It is necessarily the case that a piece of information must be initially perceived, and in the process either attended or not, before it can subsequently be remembered.

General reference: You can find an extensive listing of Web-based neuroanatomy resources at: http://www-psych.stanford.edu/~dara/neuroanat.html

Class meets Wednesdays, from 3-5 pm, in room 634 Psychology

Week 1 (9/03) The visual system

Background reading: Postle (2015), Chapter 5, and Web Clips 2.1 (Birn), 3.1 and 3.2 (Postle), and 5.1 (Baker)

Target reading: Kravitz et al. (2011). A new neural framework for visuospatial processing. *Nature Reviews Neuroscience*, **12**, 217-230.

Week 2 (9/10) No class – professor out of town

Background reading: Postle (2015), Chapters 1, 2, 3

Week 3 (9/17) Spatial cognition and attention

Background reading: Postle (2015), Chapter 6

Target reading: McAlonan, Cavanaugh, and Wurtz (2008). Guarding the gateway to cortex: attention in visual thalamus

Target reading: Fiebelkorn IC, Saalmann YB, Kastner S (2013). Rhythmic sampling within and between objects despite sustained attention at cued location. *Curr. Biol*. **23**(24): 2553-2558.

presenter_____

Week 4 (9/24) Skeletomotor control and motor learning

Background reading: Postle (2015), Chapter 10, pp. 6-14; and Chapter 7

Target reading: t.b.d. presenter_____

Week 5 (10/01) Oculomotor control and the control of attention

Background reading: Postle (2015), Chapter 8

Target reading: Clark, Noudoost, Moore (2014) Persistent Spatial Information in the FEF during Object-based Short-term Memory Does Not Contribute to Task Performance. *Journal of Cognitive Neuroscience*, **26**, 1292–1299. presenter_____

Week 6 (10/01) Oscillatory synchrony for attentional control

Background reading: Buzsáki, G. (2006), Cycle 9; and Postle (2015), Chapter 4 pp 22-29, and Web Clips 9.2 (Voytek) and 14.3 (Saalmann).

Target reading: Bosman, Schoffelen, Brunet, Oostenveld, Bastos, Womelsdorf, Rubehn, Stieglitz, De Weerd, and Fries (2012). Attentional Stimulus Selection through Selective Synchronization between Monkey Visual Areas. *Neuron*, **75,** 875–888. presenter_____

Week 7 (10/07) Visual object recognition and knowledge

Background reading: Postle, B.R. (2015). Chapter 9

Target reading: Ohayon, Friewald, and Tsao (2013). What makes a cell face selective? The importance of contrast. *Neuron*, **74**, 567-581. presenter_____

Week 8 (10/22) Neural bases of long-term memory

Background reading: Postle, B.R. (2015). Chapter 10

Target reading: Xu & Südhof (2013). A neural circuit for memory specificity and generalization. *Science*, **339**, 1290-1295. presenter_____

Target reading: Gotts, Chow, & Martin (2012). Repetition priming and repetition suppression: A case for enhanced efficiency through neural synchronization. *Cognitive Neuroscience,* **3**, 227-237 presenter_____

Week 9 (11/05) Retrieval from LTM

Background reading: Postle, B.R. (2015), Chapter 11 and Web Clips 6.3 (Eichenbaum), 10.2.a and 10.2.b (Stark), 10.3 (Lisman)

Target reading: Poppenk & Norman (2014). Briefly cuing memories leads to suppression of their neural representations. *The Journal of Neuroscience*, **34**, 8010-8020. presenter_____

Target reading: Kuhl & Chun (2014). Successful remembering elicits event-specific activity patterns in lateral parietal cortex. *The Journal of Neuroscience*, **34**, 8051-8060. presenter_____

Week 10 (11/12) Control of retrival from LTM

Background reading: Postle, B.R. (2015). Chapters 14 and 15

Target reading: Warren, Jones, Duff, and Tranel (2014). False recall is reduced by damage to the ventromedial prefrontal cortex: Implications for understanding the neural correlates of schematic memory. *The Journal of Neuroscience*, **34**, 7677-7682. presenter_____

Semantic long-term memory

Background reading: Postle, B.R. (2015). Chapter 12

Target reading: t.b.d. presenter_____

Week 11 (11/19) No class – Annual meeting of the Society for Neuroscience

Week 12 (11/26) Short-term and working memory -- mechanisms

Background reading: Postle, B.R. (2015). Chapter 13

Target reading: Hyde & Strowbridge (2012). Mnemonic representations of transient stimuli and temporal sequences in the rodent hippocampus in vitro. *Nature Neuroscience*, **15**, 1430-1438. presenter_____

Target reading: Barak O, Sussillo D, Romo R, Tsodyks M, Abbott LF (2013) From fixed points to chaos: three models of delayed discrimination. *Progress in Neurobiology*, **103**:214-222. presenter_____

Week 13 (12/03) Short-term and working memory -- systems

Background reading: Ma, W. J., Husain, M. & Bays, P. M. (2014) Changing concepts of working memory. *Nature Neuroscience,* **17,** 347-56.

Target reading: Anderson, Serences, Vogel, and Awh (2014). Induced Alpha Rhythms Track the Content and Quality of Visual Working Memory Representations with High Temporal Precision. *The Journal of Neuroscience*, **34**, 7587-7599 presenter_____

Week 14 (12/10) "Against memory systems"

Background reading: Gaffan, D. (2002) Against memory systems. *Philosophical Transactions of the Royal Society of London*, B, **357**, 1111-1121; and Postle (2015), Web Clips 10.4 (Murray)

Target reading: Ranganath and Blumenfeld (2005). Doubts about double dissociations between short- and long-term memory. *Trends in Cognitive Sciences*, **9**: 374-380. presenter_____

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University legislation specifies that the following must appear on the syllabus:

Where to take complaints about a Teaching Assistant or Course Instructor:

Occasionally, a student may have a complaint about a Teaching Assistant or course instructor. If that happens, you should feel free to discuss the matter directly with the TA or instructor. If the complaint is about the TA and you do not feel comfortable discussing it with him or her, you should discuss it with the course instructor. If you do not want to approach the instructor, make an appointment to speak to the Department Chair, Professor Patricia Devine: chair@psych.wisc.edu.

If your complaint has to do with sexual harassment, you may also take your complaint to Vicky Lenzlinger, Instructional Program Manager, vlenzlinger@psych.wisc.edu. Her office is located on the second floor of the Psychology building, room 222.

If you believe the TA or course instructor has discriminated against you because of your religion, race, gender, sexual orientation, or ethnic background, you also may take your complaint to the Office of Equity and Diversity, room 179-A Bascom Hall, or go to: http://www.oed.wisc.edu/

(Optional) If your TA is not a native English speaker and you have difficulty understanding his or her speech, ask the TA to repeat sentences that you do not understand. If you have serious or prolonged difficulty understanding, discuss the problem with the course instructor. But remember that this is a multicultural institution and that the diversity of TAs can add substantially to your education. Some patience with unfamiliar accents may reward you with a better understanding of the world.

Department of Psychology's Strongly Recommended Ethics Statement:

Ethics of being a student in the Department of Psychology

The members of the faculty of the Department of Psychology at UW-Madison uphold the highest ethical standards of teaching and research. They expect their students to uphold the same standards of ethical conduct. By registering for this course, you are implicitly agreeing to conduct yourself with the utmost integrity throughout the semester.

In the Department of Psychology, acts of academic misconduct are taken very seriously. Such acts diminish the educational experience for all involved – students who commit the acts, classmates who would never consider engaging in such behaviors, and instructors. Academic misconduct includes, but is not limited to, cheating on assignments and exams, stealing exams, sabotaging the work of classmates, submitting fraudulent data, plagiarizing the work of classmates or published and/or online sources, acquiring previously written papers and submitting them (altered or unaltered) for course assignments, collaborating with classmates when such collaboration is not authorized, and assisting fellow students in acts of misconduct. Students who have knowledge that classmates have engaged in academic misconduct should report this to the instructor.

For detailed information on how to avoid plagiarism, please see the following website: http://writing.wisc.edu/Handbook/QuotingSources.html

Your instructor will contact you if s/he has concerns about academic misconduct. You will have an opportunity to explain your work and address your instructor's concerns. Following the meeting, if your instructor believes that you engaged in misconduct, s/he will decide on an action. Following UW protocol, your instructor will inform the Dean of Students' Office of the outcome of the meeting and proposed sanction. Penalties for substantiated cases of academic

misconduct include a zero on the assignment or exam, a lower grade in the course, and failure in the course. Repeated acts of academic misconduct may result in more serious actions such as probation or suspension. For complete information on proper conduct, academic misconduct, and sanctions, please see UWS Chapter 14:
http://students.wisc.edu/saja/misconduct/UWS14.html

Recommended info regarding pandemic/catastrophic readiness:

Pandemic/Catastrophic Readiness:
The University suggests that faculty develop and add a pandemic/catastrophic-readiness statement within each syllabus. This statement should instruct students to be proactive by determining if they would have computer and Internet access if relocation is imminent during or after event conditions. In addition, students with Internet access should be instructed to monitor the UW-Madison homepage (wisc.edu) for emergency information and updates.

For more info regarding creating a pandemic/catastrophic readiness plan for your course go to:
https://kb.wisc.edu/images/group86/21597/Preparing-your-course-for-social-distance-teaching.pdf

Example: Pandemic/Catastrophic Readiness Statement
In the event that this course is no longer able to meet face-to-face, students should (first go to section XX in this syllabus and complete the alternative assignment) and/or (immediately check the course site and read the announcement.) and/or (etc.). . . .”