



Psychology 260: Cognitive Neuroscience

Location	Sharpless 412
Haverford College	Tu/Th 1:00 – 2:30
Department of Psychology	Spring 2016

Instructor: Jake Kurczek, PhD
Visiting Professor of Psychology

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Office Hours: By appointment – If my door is open, feel free to come in

Textbook: *None Required*

Class Website: You will be able to find PDFs of the lectures and discussions posted on Moodle.

Course Goals and Overview

Examines the neural basis of higher mental functions, including brain systems supporting perception, attention, memory, spatial functions, language, emotion and decision-making. Major themes include mind/brain relationships, localization of function, and plasticity of the brain. Material will include studies of people with focal brain damage as well as neuroimaging studies of neurologically normal people. Cognitive neuroscience approaches to clinical conditions will also be explored. Prerequisite: one semester of introductory psychology.

- To provide an opportunity to work through scientific controversies by analyzing, comparing and contrasting theories and research
- To provide an opportunity to work through the scientific process through writing research paper
- To practice and improve your writing and presentation skills

Course Requirements and Policies

Course web page. Lecture slides, assignments and readings are available on the course web page - [moodle](#).

Lecture Attendance. Students are required –and expected - to attend all of the classes for this course. While I will not enforce a daily attendance policy, a failure to attend will reflect poorly in

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your participation/question portion of your final grade. A portion of this grade is reflected in the critical thinking journals, which are randomly distributed throughout the course. If you are going to miss a lecture, please do your best to let me know *before* class.

Absences and Make-ups. It is expected that you will take each examination at the scheduled time. A make-up exam can be taken only for excused absences. Unless highly unusual circumstances prevail, approval for excused absences must be obtained prior to the scheduled exam. If you fail to take an examination (an unexcused absence), you will receive a score of zero for that exam.

Posting of Lectures. PDF's of the lectures will be posted on the Moodle page for your reference. I will do my best to post lectures within 24 hours **after** the lecture. This is for both practical (I'm often working on these until the last minute) and pedagogical (I like you to take your own notes) reasons. Please note that these PDFs are not comprehensive in their information as much of what we study in class is through discussion and activities.

Academic Integrity. At Haverford College, the Honor Code is a defining aspect of life both inside and outside of the classroom. You can find the code [here](#) and read about how it interfaces with your academic conduct.

Cell phones, etc. Please turn off or silence all electronic devices during class. I will remember to do the same. Feel free to use a computer/tablet for taking notes in class. If you want to record a lecture for personal use, please get my permission and do not post or share it publically.

Students with disabilities. Haverford College is committed to supporting the learning process for all students. Please contact me as soon as possible if you are having difficulties in the course. There are also many resources on campus available to you as a student, including the [Office of Academic Resources](#) and the [Office of Access and Disability Services](#). If you think you may need accommodations because of a disability, you should contact [Access and Disability Services](#). If you have already been approved to receive academic accommodations and would like to request accommodations in this course because of a disability, please meet with me privately at the beginning of the semester (ideally within the first two weeks) with your verification letter.

Getting Help. If you find that you are having difficulties with the any of the material please contact me as soon as possible! Do not wait until late in the course. It is difficult to significantly improve your grade if there are only a few weeks left in the course. I am happy to help you. If you are not able to see me during office hours we can make other arrangements. You can also find resources at various centers including the [Library](#), [Writing Center](#), [Office of Academic Resources](#) and [Student Counseling Center](#).

Assignments

- Midterm project

For the midterm project, I'd like you to create sharable content about your topic informed by at least 10 primary scientific sources. This assignment could most easily take the form of a BuzzFeed listicle or quiz about your topic that is submitted to BuzzFeed Science. However, it could also be a Youtube/vimeo video, a list posted to Listverse, or an infographic (uploaded to

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imgur). As a class, I ask that we share our content across our social networks (Facebook, Twitter, Reddit) and at the end of March we'll check to see our class's impact in terms of the number of shares, likes and other social interactions with our products. Submit a link or the product to moodle by 3/3.

- Class Participation

This is a reading and discussion based course. I expect that everybody come to class having read the articles and put some thought into them. To facilitate the discussion, I'd like everybody to either ask questions or answer those questions about each of the readings/concepts and post these to moodle the night before class (this means that you'll post a question or answer 8 times throughout the semester). There will be a google doc with the schedule of when you write or answer questions. If you are asking a question please post by 11:59PM two nights before class, so the students answering can post by 11:59PM the night before class. Class participation will be based on active participation in both the on-line and in-class discussions. Further, class participation will include peer feedback and active participation in the symposium at the end of the semester.

Lastly we will also engage in two debates across the semester (2/23 – Education and 3/31 – Law). The neuro prefix is becoming more and more popular to the point that almost everything can be enhanced or viewed through neuroscience. However, are we truly able to take research and insight from neuroscience and apply it in real world contexts? In each debate we will look at an area where there are attempts to insert neuroscience and I will ask you to sign up to take a leading role in 1 of the 2 debates. You may sign up to argue for either the affirmative (yes, neuroscience is good and here's what we know and how to apply it) or the negative (no, neuroscience is not good here, what we know is flawed and incomplete and we cannot apply it yet). There will be approximately 10 available slots for each of the positions on each of the debate days. The rest of the class will serve as judges. I'll ask that each person arguing the affirmative and negative for the day that they're signed up for find an article. Each group will choose 5 students to each give a 2-3 minute summary/argument. I have created google documents that I will share with your respective groups so that each person can have a unique article. During each debate, we will switch back and forth between the 5 affirmative and negative position summary/arguments. After those presentations, teams will have 10 minutes to formulate a rebuttal and then each side will be allowed 5 minutes to voice their rebuttal to the judges. Then we will open the forum to questions from the judges before spending the last few minutes seeing where we fall on the issue.

- Podcast

I'd like you to join me for a 10 minute conversation about your final paper topic. These will be scheduled between 3/19 and 4/1. The form of the podcast will be like when Shankar Vedantam of the [Hidden Brain Podcast](#) visits NPR to talk about a new finding in science. I'll prepare some general questions, but we may talk about more specific things depending on your topic. It may be most helpful to you to have two recent articles about your topic that you can discuss.

- Research Paper

The major project for this course is a 10-15 page research paper (this limit does not include Title Page, Abstract or References). Your final paper will be a literature review and analysis of a topic in cognitive neuroscience. In such a small paper an exhaustive literature review is not required,

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so your topic should be specific enough to allow the 10 – 15 pages of review and analysis. The paper should be in APA style.

On January 28th, you will turn in a 1-2 page paper that includes your research question and briefly describes at least 2 academic studies that you are using as a basis for your research question. Further please include your plan for the midterm paper (what type of assignment will you pursue – buzzfeed, video, infographic) Please post these to the moodle forum on a first-come-first serve basis for the research topics.

On April 7th send your final paper to your partner for peer feedback. Your feedback is due back to your partner on April 14th.

By 5:00PM on April 21st, you will turn in the final draft of your paper (10-15 pages).
Your final paper will be graded using the following criteria:

- a) Identification of gaps in literature
- b) Analyses of supporting research studies
- c) Quality of research
- d) APA style

- **Research Presentation**

Psychology conferences typically host symposium sessions, in which researchers construct talks to present their research findings from a recent study or studies. The last week of class, starting April 26th, will consist of an academic symposium. Before the sessions, each student will present a powerpoint slideshow “datablitz” uploaded as a voicethread to moodle in which they have 3 minutes to describe their research proposal that they have developed over the course of the semester. The each day will then be an open symposium to present your midterm project and discuss your research. You should post your voicethread presentations to moodle by April 21st.

The presentations will be graded using the following criteria:

- a) Clear description of research
- b) Overall attractiveness of slides and information presented
- c) Oral description to audience

- **Quizzes**

There will be three quizzes. The quiz questions may include the following question formats: multiple-choice; fill-in-the-blank; matching; true/false; short-answer sections and essay. Everything that is presented in lecture and in the readings will be fair game for the quizzes. Note also, that some of the lecture material will be non-overlapping with the readings, as lectures are designed to augment, or expand upon, the readings.

- **Grading.** Grades will be based on the total points shown below.

A / 4.0 94% and above	B- / 2.7 80-82%	D+ / 1.3 67-69%
A- / 3.7 90-93%	C+ / 2.3 77-79%	D / 1.0 63-66%
B+ / 3.3 87-89%	C / 2.0 73-76%	D- / 0.7 60-62%

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B / 3.0 83-86%	C- / 1.7 70-72%	F 59% and below
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Grading Criteria:

Midterm Project	=100 pts	11.5%
Midterm Quiz 1	=133 pts	15.3%
Midterm Quiz 2	=133 pts	15.3%
Final Quiz	=134 pts	15.3%
Class Participation	=120 pts	13.7%
Q/A		
Debate		
Critical Thinking Journal		
Podcast	= 50 pts	5.7%
Research Presentation	= 30 pts	3.4%
Final Paper	= 170 pts	19.5%
Presentation		
Peer Review		
Total		
	= 870 pts	100%

Late Work. Late assignments will be docked 10% for everyday after the assigned due date.

Day	Topic	Assignment
1/19	Course Intro	
1/21	Foundations	Feinberg, T.E., & Farah, J.J. (2003). The development of modern behavioral neurology and neuropsychology. In T.E. Feinberg & M.J. Farah (Eds.), <i>Behavioral neurology and neuropsychology</i> , 2nd Edition. New York: McGraw- Hill, pp. 3-21. Franz, S.I. (1912). New phrenology. <i>Science</i> , 35, 321-328. Ochsner, K.N. & Kosslyn, S.M. (2000). Constraints and convergence: The cognitive neuroscience approach. In D.E. Rumelhart & B.O. Martin (Eds.), <i>Handbook of cognition and perception, Vol X. Cognitive Science</i> (pp. 83-111). San Diego, CA: Academic Press.
1/26	Anatomy/Neurons	Patestas, M.A., & Gartner, L.P. (2006). <i>A textbook of neuroanatomy</i> . Hoboken, NJ: Blackwell Publishing.
1/28	Anatomy/Plasticity Topics Due	Blumenfeld, H. (2002). Chapter 2: Neuroanatomy overview and basic definitions. In <i>Neuroanatomy through Clinical Cases</i> . Sunderland, MA: Sinauer Associates Inc., pp.

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		12-46. Clifford, E. (2009). Neural plasticity: Merzenich, Taub, and Greenough. <i>HarvardBrain</i> , 6, 16-20.
2/2	Brain Anatomy	Banich, M.T. (2004). Chapter 3: Methods. In <i>Cognitive neuroscience and neuropsychology</i> , 2nd Edition. New York: Houghton Mifflin Company, pp. 61- 111. Fellows, L.K., Heberlein, A.S., Morales, D.A., Shivde, G., Waller, S., & Wu, D.H. (2005). Method matters: An empirical study of impact in cognitive neuroscience. <i>Journal of Cognitive Neuroscience</i> , 17, 850-858.
2/4	Library Research Presentation	
2/9	Hemispheric Specialization	Banich, M.T. (2004). Chapter 4: Hemispheric specialization. In <i>Cognitive neuroscience and neuropsychology</i> , 2nd Edition. New York: Houghton Mifflin Company, pp. 112-142. Gazzaniga, M.S., Bogen, J.E., & Sperry, R.W. (1962). Some functional effects of sectioning the cerebral commissures in man. <i>Proceedings of the National Academy of Sciences USA</i> , 48, 1765-1769. Herve, P., Zago, Lu, Petit, L., Mazoyer, B., & Tzourio-Mazoyer, N. (2013). Revisiting human hemispheric specialization with neuroimaging. <i>Trends in Cognitive Neuroscience</i> , 17(2), 69-80. Sperry, R.W. (1982). Some effects of disconnecting the cerebral hemispheres. (Nobel Lecture) <i>Science</i> , 217, 1223-1226. Wang, D., Buckner, R., & Liu, H. (2014). Functional specialization in the human brain estimated by intrinsic hemispheric interaction. <i>Journal of Neuroscience</i> , 34(37), 12341-12352.
2/11	Methods	Kable, J. (2011). The cognitive neuroscience toolkit for the neuroeconomist: A functional overview. <i>Journal of Neuroscience, Psychology and Economics</i> , 42(2), 63-84. Zillmer, E.A., Spiers, M.V., & Culbertson, W.C. (2008). Chapter 2: Methods of investigating the brain. In <i>Principles of Neuropsychology</i> , 2nd Edition. Belmont, CA: Thomson Wadsworth, pp. 32-61.

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2/16	Methods	<p>Editorial (2004). When once is enough. <i>Nature Neuroscience</i>, 7, 93.</p> <p>D’Esposito, M. (2000). Functional neuroimaging of cognition. <i>Seminars in Neurology</i>, 20, 487-498.</p> <p>Logothetis, N.K. (2008). What we can do and what we cannot do with fMRI. <i>Nature</i>, 453, 869-878.</p> <p>Poldrack, R.A. (2012). The future of fMRI in cognitive neuroscience. <i>NeuroImage</i>, 62(2), 1216-1220.</p>
2/18	Midterm 1	Midterm 1
2/23	Debate 1 Neuroscience and Education	<p>Carew, T.J. & Magsamen, S.H. (2010). Neuroscience and education: An ideal partnership for producing evidence-based solutions to guide 21st century learning. <i>Neuron</i>, 67, 685-688.</p>
2/25	Memory	<p>Milner, B., Squire, L.R., & Kandel, E.R. (1998). Cognitive neuroscience and the study of memory. <i>Neuron</i>, 20, 445-468.</p> <p>Ranganath, C. & Ritchey, M. (2012). Two cortical systems for memory-guided behavior. <i>Nature Reviews Neuroscience</i>, 13, 713-726.</p>
3/1	Memory	<p>Cabeza, R., & Moscovitch, M. (2013). Memory systems, processing modes, and components: Functional neuroimaging evidence. <i>Perspectives on Psychological Science</i>, 8(1), 49-55.</p> <p>Robin, J., Hirshhorn, M., Rosenbaum, R.S., Winocur, G., Moscovitch, M., & Grady, C. (2015). Functional connectivity of hippocampal and prefrontal networks during episodic and spatial memory based on Real-World Environments. <i>Hippocampus</i>, 25, 81-93.</p>
3/3	Language Midterm Project	<p>Hickok, G., & Poeppel, D. (2007). The cortical organization of speech processing. <i>Nature Reviews Neuroscience</i>, 8, 393-402.</p> <p>Poeppel, D., Emmorey, K., Hickok, G., & Pylkkanen, L. (2012). Towards a new neurobiology of language. <i>32</i>(41), 14125-14131.</p>
Spring Break	Spring Break	Spring Break
3/15	Language	<p>Dick, A.S., Bernal, B. & Tremblay, P. (2014). The language connectome: New pathways, new</p>

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		<p>concepts. <i>The Neuroscientist</i>, 20(5), 453-467.</p> <p>Kurczek, J. Vanderveen, N. & Duff, M.C. (2014). Multiple memory systems and their support of language. <i>Perspectives on Neurophysiology and Neurogenic Speech and Language Disorders</i>, 24(2), 31-73.</p>
3/17	Decision-Making	<p>Bechara, A., Damasio, H., Tranel, D., & Damasio, A.R. (1997). Deciding advantageously before knowing the advantageous strategy. <i>Science</i>, 275, 1293- 1295.</p> <p>Schonberg, T., Fox, C.R., & Poldrack, R.A. (2011). Mind the gap: Bridging economic and naturalistic risk-taking with cognitive neuroscience. <i>Trends in Cognitive Sciecne</i>, 15(1), 11-19.</p>
3/22	Decision-Making	<p>Falk, E. B., Morelli, S. A., Welbourn, B. L., Dambacher, K., & Lieberman, M. D. (in press). Creating buzz: The neural correlates of effective message propagation. <i>Psychological Science</i>.</p> <p>Fellows, L. (2005). The cognitive neuroscience of human decision making: A review and conceptual framework. <i>Behavioral and Cognitive Neuroscience Reviews</i>. 3, 159-172.</p>
3/24	Executive Functions	<p>Damasio, A.R., & Anderson, S.W. (2003). The frontal lobes. In K.M. Heilman & E. Valenstein (Eds.), <i>Clinical neuropsychology</i>, 4th Edition. New York: Oxford University Press, pp. 404-446.</p> <p>Juardo, M. & Rosselli, M. (2007). The elusive nature of executive functions: A review of our current understanding. <i>Neuropsychological Review</i>, 17, 213-233.</p> <p>Stuss, D. (2011). Functions of the frontal lobes: Relation to executive functions. <i>Journal of the International Neuropsychological Society</i>, 17, 759-765.</p>
3/29	Midterm 2	Midterm 2
3/31	Debate 2 Neuroscience and Law	<p>Jones, O.D., Marois, R., Farah, M.J., & Greely, H.T. (2013). Law and neuroscience. <i>The Journal of Neuroscience</i>, 33(45), 17624-17630.</p>
4/5	CNS – Work Day	<p>Sleepy, I.M. (in press). Inhibition of eyelid movement. <i>Journal of Mental Fatigue</i>, 11, 1-1000.</p> <p>Will Eat, N. Sleep, & B. Quam Mesmerized</p>

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		(1996). <i>Dormant Networks</i> . Key West, Florida: Jimmy Buffet & Sun.
4/7	Executive Functions Send to Partner	Anderson, S.W., Bechara, A., Damasio, H., Tranel, D., & Damasio, A.R. (1999). Impairment of social and moral behavior related to early damage in the human prefrontal cortex. <i>Nature Neuroscience</i> , 2, 1032-1037. Harlow, J.M. (1868). Recovery from the passage of an iron bar through the head. <i>Publications of the Massachusetts Medical Society</i> , 2, 327-347.
4/12	Emotional Processing	Lindquist, K.A., Wagner, T., Kober, H., Bliss-Moreau, E., Fedlman Barrett, L. (2012). The brain basis of emotion: A meta-analytic review. <i>Behavioral Brain Sciences</i> , 35(3), 121-143. Ochsner, K.N., Silvers, J.A., & Buhle, J.T. (2012). <i>Annals of the New York Academy of Sciences</i> , 1251, E1-24.
4/14	Emotional Processing Send Feedback	Adolphs, R., Tranel, D., Damasio, H., & Damasio, A.R. (1994). Impaired recognition of emotion in facial expressions following bilateral damage to the human amygdala. <i>Nature</i> , 372, 669-672. Koenigs, M., Huey, E.D., Calamia, M., Raymont, V., Tranel, D., & Grafman, J. (2008). Distinct regions of prefrontal cortex mediate resistance and vulnerability to depression. <i>Journal of Neuroscience</i> , 28, 12341-12348.
4/19	Social Cognition	Falk, E. B., Berkman, E. T., Mann, T., Harrison, B, & Lieberman, M. D. (2010). Predicting persuasion-induced behavior change from the brain. <i>Journal of Neuroscience</i> , 30, 8421-8424. Frith, C.D., & Frith, U. (2012). Mechanisms of social cognition. <i>Annual Reviews of Psychology</i> , 63, 287-313. Walter, H. (2012). Social cognitive neuroscience of empathy: Concepts, circuits and genes. <i>Emotion Review</i> , 4(1), 9-17.
4/21	Psychopathology Final Papers Due Presentations Due	Andreasen, N.C. (1997). Linking mind and brain in the study of mental illnesses: A project for a scientific psychopathology. <i>Science</i> , 275, 1586-1582. Hasler, G. (2012). Can the neuroeconomics revolution revolutionize psychiatry?

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		<p><i>Neuroscience and Biobehavioral Reviews</i>, 36, 64-78.</p> <p>Posner, J., Russell, J.A., & Peterson, B.S. (2005). The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development, and psychopathology. <i>Developmental Psychopathology</i>, 17(3), 715-734.</p>
4/26	Presentations	
4/28	Presentations	
4/30 – 5/13	Final	Senior Finals – 5/9 – 5:00PM Underclass Finals – 5/13 – 12:00PM