PSYOLOGY 1453 Consciousness Explored
Spring 2012 Monday 3-5 PM

Instructors:

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What is this course about?

What is the state of the scientific study of consciousness? In this course we'll discuss the methods used to probe conscious awareness, what these methods have taught us, and the theoretical/philosophical issues that remain. Specific topics include disorders of consciousness, what your mind can do without conscious awareness, existing models of consciousness, and what neuroscience tells us about free will.

Who is this course designed for?

There is no particular background knowledge you need to succeed in this course. While this course is primarily based around reviewing a variety of key experiments, we're going to spend plenty of time discussing them , often demonstrating them in class. Anyone with an interest in consciousness, regardless of background/field of study (i.e. psychology, philosophy, neuroscience, computer science, physics, math, etc.) should take this course.

How will I be evaluated?

60% will come from a paper (approx. 10-15 pgs.) due at the end of the semester.
15% will come from an "initial proposal process" We'll go over this more in class, but the basic idea is that you'll come to an initial meeting with a firm idea/question/thesis that you're going to explore in the paper. In this meeting, we will help you refine that idea and point you to certain readings/studies that are related to your topic. A follow up meeting can be scheduled if needed but the whole proposal process should be completed 3 weeks before the due date of the paper. We put a "grade" on this because we want people to think about their final paper sufficiently in advance and take the needed time to work through the issues.
25% will come from your participation/attendance in class.

A note about how to read the schedule:

For each week you'll see some things that are in bold and have the word "READ:" next to it. Those are the things you should read *before* you come to class that week. The other things are the papers/citations we're going to discuss in class that week but you do not need to read. We put them on the schedule for two reasons: 1) If you want to get a head start, you can check out those papers in advance and 2) for your papers and so forth, you may want to be able to go back and look at the actual papers that we'll discuss. Everything is up on the website in a (hopefully) clear fashion so you don't get overwhelmed and think you have to read 7 papers for a particular class.

Academic Honesty

For the final paper, you may find it useful to discuss your chosen topic with your peers, particularly if you are working on the same topic as a classmate. However, you should ensure that any written work you submit is the result of your own research and writing. You must also adhere to standard citation practices and cite any books, articles, etc. that have helped you with your work.

Academic Assistance

Students needing academic adjustments or accommodations should present their letter from the Accessible Education Office (AEO) and speak with the professor by the end of the second week of class. Failure to do so may result in the Course Head's inability to respond in a timely manner. All discussions will remain confidential, although AEO may be consulted to discuss appropriate implementation.

1. Introduction/Demonstrations

- Enns and DiLollo (1997) Object substitution: A new form of visual masking in unattended visual locations. *Psychological Science.*
- Bonneh et al. (2001) Motion-induced blindness in normal observers. *Nature*.
- Blake and Logothetis (2002) Visual competition. *Nature Reviews Neuroscience*.
- Tsuchiya and Koch (2005) Continuous flash suppression reduces negative afterimages. *Nature Neuroscience*.

2. The problem of consciousness or Can we scientifically study consciousness?

- READ: Chalmers (1995) The puzzle of conscious experience. *Scientific American*.
- READ: Baars (1988) A cognitive theory of consciousness (Excerpt on the course website)
- Dennett (1997) Facing backwards on the problem of consciousness. J*ournal of consciousness studies.*
- Ryle (1949) The Concept of Mind (Excerpt on the course website)

3. Disorders of consciousness

- NOTE: The Owen/Nachen/Greenbert back and forth may seem like a lot but each of them is literally a page or less.
- READ: Owen et al. (2006) Detecting awareness in the vegetative state. *Science.*
    - Nachev and Husain (2007) Comments on "Detecting awareness in the vegetative state." *Science*.
    - Greenbert (2007) Comment on "Detecting awareness in the vegetative state." *Science*.
    - Owen et al. (2007) Response to Comments on "Detecting awareness in the vegetative state." *Science*.
- READ: Monti et al. (2010) Willful modulation of brain activity in disorders of consciousness. *New England Journal of Medicine.*
- Ramachandran and Blakeslee (1998) Phantoms in the brain. (Excerpts on course website)
- Weiskrantz (1998) Blindsight: A Case Study and Implications. (Excerpt on course website)
- Gazaniga (2005) Forty-five years of split-brain research and still going strong. *Nature Reviews Neuroscience.*

4. The unconscious mind (Masking and Crowding)

- READ: Dell'Acqua and Grangier (1999) Unconscious semantic priming from pictures. *Cognition*
- READ: Pelli and Tillman (2008) The uncrowded window of object recognition. *Nature Neuroscience.*
- Dehaene et al. (1998) Imaging unconscious semantic priming. *Nature*
- Dehaene et al. (2001) Cerebral mechanisms of word masking and unconscious repetition priming. *Nature Neuroscience.*
- Pessiglione et al. (2007) How the brain translates money into force: A nueorimaging study of subliminal motivation. *Science*.
- Lau and Passingham. (2007) Unconscious activation of the cognitive control system in the human prefrontal cortex. *Journal of Neuroscience.*
- Eimeer and Schlaghecken (1998) Effects of masked stimuli on motor activation: Behavioral and electrophysiological evidence. *Journal of Experimental Psychology: Human Perception and Performance.*
- Sumner et al. (2007) Human medial frontal cortex mediates unconscious inhibition of voluntary action. *Neuron.*
- Yeh et al. (2012) Semantic priming from crowded words. *Psychological Science*
- Faivre and Kouider (2011) Mutli-feature objects elicit nonconscious priming despite crowding. *Journal of Vision*

5. The unconscious mind (Continuous flash suppression)

- READ: Fang and He (2005) Cortical responses to invisible objects in the human dorsal and ventral pathways. *Nature Neuroscience.*
- READ: Jiang and He (2006) Cortical responses to invisible faces: Dissociating subsystems for facial-information processing. *Current Biology.*
- Jiang et al. (2006) A gender- and sexual orientation-dependent spatial attention effect of invisible images. *Proceedings of the National Academy of Sciences.*
- Yang et al. (2007) Fearful expressions gain preferential access to awareness during continuous flash suppression. *Emotion*.
- Mudrik et al. (2011) Integration without awareness. *Psychological Science.*
- Raio et al. (2012) Nonconscious fear is quickly acquired but swiftly forgotten. *Current Biology.*
- Bahrami et al. (2010) Unconscious numerical priming despite interocular suppression. *Psychological Science*.
- Tong et al. (1998) Binocular rivalry and visual awareness in human extrastriate cortex. *Neuron.*

6. The mechanisms of attention

- READ: Wolfe et al. (2006) Sensation and perception. Chapter 7 (Excerpt on course website)
- Reynolds et al. (1999) Competitive mechanisms subserve attention in macaque areas V2 and V4. *Journal of Neuroscience*. (and see *Neuron* review for other things worth mentioning)
- Kastner et al. (1999) Increased activity in human visual cortex during directed attention in the absence of visual stimulation. *Neuron*.
- O'Craven et al. (1999) fMRI evidence for objects as the units of attentional selection. *Nature*
- McMains and Somers (2004) Multiple spotlights of attentional selection in human visual cortex. *Neuron*.

- Cavanagh and Alvarez (2005) Tracking multiple targets with multifocal attention. *Trends in Cognitive Sciences.*
- Kim and Blake (2005) Psychophysical magic: Rendering the visible 'invisible.' *Trends in Cognitive Sciences.*

7. The unconscious mind with an attentional twist

- READ: Luck et al. (1996) Word meanings can be access but not reported during the attentional blink. *Nature*.
- READ: Lavie (1995) Perceptual load as a necessary condition for selective attention*. Journal of Expeirmental Psychology: Human Perception and Performance.*
- Marois et al. (2004) The neural fate of consciously perceived and missed events in the attentional blink. *Neuron.*
- Bahrami et al. (2007) Attentional load modulates responses of human primary visual cortex to invisible stimuli. *Current Biology.*
- Hsieh et al. (2011) Pop-out without awareness: unseen feature singletons capture attention. *Psychological Science.*
- Yi et al. (2004) Neural fate of ignored stimuli: dissociable effects of perceptual and working memory load. *Nature Neuroscience.*

8. Is attention necessary for consciousness?

- READ: Li et al. (2002) Rapid natural scene categorization in the near absence of attention. *Proceedings of the National Academy of Sciences USA.*
- READ: Kentridge et al. (2004) Spatial attention speeds discrimination in blindsight. *Neuropsychologia*.
- Mack and Rock (1998) Inattentional blindness. (Excerpt on course website)
- Koch and Tsuchiya (2007) Attention and consciousness: two distinct brain processes. *Trends in Cognitive Sciences.*
- Cohen et al. (2012) The attentional requirements of consciousness. *Trends in Cognitive Sciences.*
- Joseph et al. (1997) Attentional requirements in a "preattentive" feature search task. *Nature*.

9. Are there different types of consciousness?

- READ: Block. (1995) On a confusion about a function of consciousness. *Behavioral and Brain Sciences* (Excerpt on course website)
- READ: Lamme (2003) Why visual attention and awareness are different. *Trends in Cognitive Sciences*.
- Block (2005) Two neural correlates of consciousness. *Trends in Cognitive Sciences.*
- Lamme (2010) How neuroscience will change our view on consciousness. *Cognitive Neuroscience.*
- Sperling (1960) The information available in brief visual presentation. *Psychological Monographs.s*
- Sligte et al. (2008) Are there multiple visual short-term memory stores? *PLoS One.*

10. Are there different types of consciousness 2.0?

- READ: De Gardelle et al. (2009) Perceptual illusions in brief visual presentations. *Consciousness and Cognition.*
- READ: Kouider et al. (2010) How rich is consciousness? The partial awareness hypothesis. *Trends in Cognitive Sciences.*
- Cohen and Dennett (2011) Consciousness cannot be separated from function. *Trends in Cognitive Sciences.*
- Matsukura and Hollingworth (2011) Does visual short-term memory have a high-capacity storage? *Psychonomic Bulletin and Review.*
- Makovski (2012) Are multiple visual short-term memory storages necessary to explain the retro-cue effect? *Psychonomic Bulletin and Review.*

11. Empirical theories of consciousness
    - READ: Koch (2009) A theory of consciousness. *Scientific American.*
    - READ: Dehaene et al. (2006) Conscious, preconscious, and subliminal processing: a testable taxonomy. *Trends in Cognitive Sciences.*
    - Edelman (2003) Naturalizing consciousness: A theoretical framework. *Proceedings of the National Academy of Sciences.*
    - Dehaene and Changeaux (2011) Experimental and theoretical approaches to conscious processing. *Neuron.*

12. Free will
    - READ: Searle (2004) Mind. (Excerpt on course website)

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NOTE: FINAL PAPER IS DUE VIA EMAIL BY MIDNIGHT ON MAY XX, 2013
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