

Psych 329
Neuroscience and Society
Rebecca Compton
Spring 2020
Tuesday 1:30 – 4:00

Overview:

This seminar aims to critically examine the intersection between neuroscience research and broad domains of society, including education, law, politics, and the marketplace. In what ways can scientific developments in understanding the brain be appropriately applied to advance policy or application in these societal domains? In what ways is neuroscience being inappropriately interpreted or misapplied, and what are some of the causes of these misapplications? How does neuroscience research intersect with money, the media, and political agendas? Course materials will encompass both primary scientific literature and critical perspectives.

Course Goals:

- Deepen critical thinking about neuroscience from both inside and outside the discipline
- Gain appreciation for the ways in which scientific practice is socially situated
- Develop the ability to evaluate different positions on controversial issues and form independent opinions supported by reasoning and evidence

Schedule in brief:

Week 1 (Jan. 21): Critical neuroscience
Week 2 (Jan. 28): Ethics in patient research & human neuroimaging
Week 3 (Feb. 4): Ethics in animal research
Week 4 (Feb. 11): Neuroscience and education
Week 5 (Feb. 18): Neuroscience and childhood adversity
Week 6 (Feb. 25): Neuroscience and race
Week 7 (Mar. 3): Neuroscience and criminal culpability
Week 8 (Mar. 17): Neuroimaging approaches to lie detection
Week 9 (Mar. 24): Neuroscience and marketing
Week 10 (Mar. 31): Neuroscience of cognitive enhancement
Week 11 (Apr. 7): Neuroscience and the military
Week 12 (Apr. 14): Brain injury in professional sports
Week 13 (Apr. 21): Neuroscience and end-of-life dilemmas
Week 14 (Apr. 28): Neuroscience of moral reasoning

Grading requirements and expectations:

20% discussion questions for each class period

- Students will be expected to submit an original discussion question based on the reading by noon the day before the seminar meets. These student-generated DQs will be compiled, distributed to other students in class, and used to guide discussion during the class period. The DQs should be brief (1-3 sentences) and can focus on any aspect of the reading that the student thinks would stimulate discussion by the class.
- DQs will be graded on a 3-point basis (3 points = original/insightful; 2 = satisfactory; 1 = shows little evidence of reflection on reading).
- Each student is allowed one “opt-out” (week with no DQ submitted); 12 expected in total

30% participation in discussion

- 15% - Leading discussion for one assigned class period. During this class period, the student will be responsible for preparing the sheet of DQs, guiding other students through discussion of the reading using the DQs, and contributing additional ideas and materials for discussion (e.g., handout, activity, video). Discussion leading will be graded on normal 4.0 scale.
- 15% - Active oral participation in all other class periods. Participation for the semester will be graded on 3-point scale: 3 = consistently engaged and reflective; 2 = generally good but inconsistently engaged, or reflections are not consistently pertinent or clearly expressed; 1 = not much contribution to discussion.

20% empirical article presentation

- Class presentation of a primary research article pertaining to the day’s topic, which other students have not read. Presentations should be about 15 minutes long, and should use slides to summarize the key aims, methods, results, and conclusions, and then relate the findings conceptually and critically to the day’s topic. Grading will be on the normal 4.0 scale.
- Article choice should be communicated to the professor for approval by (at the latest) the Thursday prior to presentation.

30% final project

- In-depth analysis of an issue in the intersection of neuroscience and society that was not fully covered in class.
- Requires engagement with primary research literature as well as synthesis and critique from a societal perspective.
- Approximately 12-15 pages, graded on normal 4.0 scale
- Due at the end of finals period.

Assigned readings:

Week 1 (Jan. 21): Critical neuroscience

Choudhury, S., & Slaby, J. (2016). Introduction: Critical neuroscience—between lifeworld and laboratory. In *Critical neuroscience: A handbook of the social and cultural contexts of neuroscience*. Wiley. [excerpts]

Week 2 (Jan. 28): Ethics in patient research & human neuroimaging

- Corkin, S. (2013). *Permanent present tense: The unforgettable life of the amnesic patient, H.M.* New York: Basic Books. [prologue, Ch. 13, epilogue]
- Dittrich, L. (2016, August 3). The brain that couldn't remember: The untold story of the fight over the legacy of "H.M."—the patient who revolutionized memory. *New York Times Magazine*.
- Illes, J., & Bird, S. J. (2006). Neuroethics: a modern context for ethics in neuroscience. *Trends in Neurosciences*, 29(9), 511-517.
- Wardlaw, J. M., O'Connell, G., Shuler, K., DeWilde, J., Haley, J., Escobar, O., ... & Schafer, B. (2011). "Can it read my mind?" What do the public and experts think of the current (mis)uses of neuroimaging? *PloS ONE*, 6(10), e25829.
- Racine, E., Bar-Ilan, O., & Illes, J. (2010). fMRI in the public eye. In M.J. Farah, Ed., *Neuroethics: An Introduction with Readings*. MIT Press.

Week 3 (Feb. 4): Ethics in animal research

- Regan, T. (2001). Ethical theory and animals. *Defending Animal Rights*. Urbana, IL: University of Illinois Press.
- Gluck, J.P. (2016). *Voracious Science & Vulnerable Animals: A Primate Scientist's Ethical Journey*. Chicago: University of Chicago Press. [excerpts]
- Stangroom, J. (2005). Animal experimentation, ethics, and medical research: In conversation with Colin Blakemore. *What Scientists Think*. London: Routledge.
- Marris, E. (2006). Grey matters: Many scientists have nuanced views on animal research. *Nature*, 444, 808-810.

Week 4 (Feb. 11): Neuroscience and education

- Sigman, M., Peña, M., Goldin, A. P., & Ribeiro, S. (2014). Neuroscience and education: Prime time to build the bridge. *Nature Neuroscience*, 17(4), 497-502.
- Cuthbert, A.S. (2015). Neuroscience and education—an incompatible relationship. *Sociology Compass*, 9(1), 49-61.
- Dougherty, M.R., & Robey, A. (2018). Neuroscience and education: A bridge astray? *Current Directions in Psychological Science*, 27(6), 401-406.
- Howard-Jones, P. A. (2014). Neuroscience and education: myths and messages. *Nature Reviews Neuroscience*, 15(12), 817-824.
- Hook, C. J., & Farah, M. J. (2013). Neuroscience for educators: what are they seeking, and what are they finding? *Neuroethics*, 6(2), 331-341.

Week 5 (Feb. 18): Neuroscience and childhood adversity

- Farah, M.J. (2018). Socioeconomic status and the brain: Prospects for neuroscience-informed policy. *Nature Reviews Neuroscience*, *19*, 428-438.
- McLaughlin, K.A., Weissman, D., & Bitran, D. (2019). Childhood adversity and neural development: A systematic review. *Annual Review of Developmental Psychology*, in press.
- Hair, N. L., Hanson, J. L., Wolfe, B. L., & Pollak, S. D. (2015). Association of child poverty, brain development, and academic achievement. *JAMA Pediatrics*, *169*(9), 822-829.
- Nelson, C. A., Zeanah, C. H., Fox, N. A., Marshall, P. J., Smyke, A. T., & Guthrie, D. (2007). Cognitive recovery in socially deprived young children: The Bucharest Early Intervention Project. *Science*, *318*(5858), 1937-1940.

Week 6 (Feb. 25): Neuroscience and race

- Kubota, J. T., Banaji, M. R., & Phelps, E. A. (2012). The neuroscience of race. *Nature Neuroscience*, *15*(7), 940-948.
- Amodio, D. M. (2014). The neuroscience of prejudice and stereotyping. *Nature Reviews Neuroscience*, *15*(10), 670-682.
- Malinowska, J. K. (2016). Cultural neuroscience and the category of race: the case of the other-race effect. *Synthese*, *193*(12), 3865-3887.
- Isamah, N., Faison, W., Payne, M. E., MacFall, J., Steffens, D. C., Beyer, J. L., ... & Taylor, W. D. (2010). Variability in frontotemporal brain structure: the importance of recruitment of African Americans in neuroscience research. *PLoS One*, *5*(10), e13642.
- Bai, J., et al. (2012). Population differences in brain morphology and microstructure among Chinese, Malay, and Indian neonates. *PLoS One*, *7*(10), e47816.

Week 7 (Mar. 3): Neuroscience and criminal culpability

- Jones, O. D., et al. (2014). Law and neuroscience. *Journal of Neuroscience*, *33*(45), 17624-17630.
- Meynen, G. (2013). A neurolaw perspective on psychiatric assessments of criminal responsibility: decision-making, mental disorder, and the brain. *International Journal of Law and Psychiatry*, *36*(2), 93-99.
- Schweitzer, N. J., & Saks, M. J. (2011). Neuroimage evidence and the insanity defense. *Behavioral Sciences & The Law*, *29*(4), 592-607.
- Buckholtz, J. W., & Faigman, D. L. (2014). Promises, promises for neuroscience and law. *Current Biology*, *24*(18), R861-R867.
- Morse, S.J. (2010). Brain Overclaim Syndrome and criminal responsibility: A diagnostic note. In M.J. Farah, Ed., *Neuroethics: An Introduction with Readings*. MIT Press.

SPRING BREAK

Week 8 (Mar. 17): Neuroimaging approaches to lie detection

- Farah, M. J., Hutchinson, J. B., Phelps, E. A., & Wagner, A. D. (2014). Functional MRI-based lie detection: Scientific and societal challenges. *Nature Reviews Neuroscience*, *15*(2), 123-131.
- Kozel, F. A., et al. (2009). Functional MRI detection of deception after committing a mock sabotage crime. *Journal of Forensic Sciences*, *54*(1), 220-231.
- Langleben, D. D., & Moriarty, J. C. (2013). Using brain imaging for lie detection: Where science, law, and policy collide. *Psychology, Public Policy, and Law*, *19*(2), 222-234.

Week 9 (Mar. 24): Neuroscience and marketing

- Ariely, D., & Berns, G. S. (2010). Neuromarketing: the hope and hype of neuroimaging in business. *Nature Reviews Neuroscience*, *11*(4), 284-292.
- Chancellor, B., & Chatterjee, A. (2011). Brain branding: When neuroscience and commerce collide. *AJOB Neuroscience*, *2*(4), 18-27.
- Plassmann, H., O'Doherty, J., & Rangel, A. (2007). Orbitofrontal cortex encodes willingness to pay in everyday economic transactions. *Journal of Neuroscience*, *27*(37), 9984-9988.
- Plassmann, H., Venkatraman, V., Huettel, S., & Yoon, C. (2015). Consumer neuroscience: applications, challenges, and possible solutions. *Journal of Marketing Research*, *52*(4), 427-435.

Week 10 (Mar. 31): Neuroscience and cognitive enhancement

- Chatterjee, A. (2007). Cosmetic neurology and cosmetic surgery: parallels, predictions, and challenges. *Cambridge Quarterly of Healthcare Ethics*, *16*(02), 129-137.
- Coffman, B. A., Clark, V. P., & Parasuraman, R. (2014). Battery powered thought: Enhancement of attention, learning, and memory in healthy adults using transcranial direct current stimulation. *Neuroimage*, *85*, 895-908.
- Hamilton, R., Messing, S., & Chatterjee, A. (2011). Rethinking the thinking cap: Ethics of neural enhancement using noninvasive brain stimulation. *Neurology*, *76*(2), 187-193.
- Iuculano, T., & Kadosh, R. C. (2013). The mental cost of cognitive enhancement. *Journal of Neuroscience*, *33*(10), 4482-4486.
- Smith, M. E., & Farah, M. J. (2011). Are prescription stimulants “smart pills”? The epidemiology and cognitive neuroscience of prescription stimulant use by normal healthy individuals. *Psychological Bulletin*, *137*(5), 717.

Week 11 (Apr. 7): Neuroscience and the military

- Huang, J.Y., & Kosal, M.E. (2008). The security impact of the neurosciences. *Bulletin of the Atomic Scientists*, 20.
- Miranda, R. A., et al. (2015). DARPA-funded efforts in the development of novel brain-computer interface technologies. *Journal of Neuroscience Methods*, 244, 52-67.
- Tennison, M. N., & Moreno, J. D. (2012). Neuroscience, ethics, and national security: the state of the art. *PLoS Biology*, 10, e1001289.
- Tracey, I., & Flower, R. (2014). The warrior in the machine: Neuroscience goes to war. *Nature Reviews Neuroscience*, 16(3), 825-834.
- Moreno, J.D. (2012). *Mind wars: Brain science and the military in the twenty-first century*. Bellevue Literary Press. [excerpts]

Week 12 (Apr. 14): Head injury in professional sports

- Fainaru-Wada, M., & Fainaru, S. (2013). *League of denial: The NFL, concussions, and the battle for truth*. Three Rivers Press. [excerpts]
- Mez, J., Daneshvar, D. H., Kiernan, P. T., Abdolmohammadi, B., Alvarez, V. E., Huber, B. R., ... & Cormier, K. A. (2017). Clinicopathological evaluation of chronic traumatic encephalopathy in players of American football. *Jama*, 318(4), 360-370.
- Lehman, E. J., et al. (2012). Neurodegenerative causes of death among retired National Football League players. *Neurology*, 79, 1970-1974.
- Seichepine, D. R., et al. (2013). Profile of self-reported problems with executive functioning in college and professional football players. *Journal of Neurotrauma*, 30, 1299-1304.

Week 13 (Apr. 21): Neuroscience and end-of-life dilemmas

- Laureys, S. (2010). Death, unconsciousness, and the brain. In M.J. Farah, Ed., *Neuroethics: An Introduction with Readings*. MIT Press.
- Bruno, M. A., Gosseries, O., Ledoux, D., Hustinx, R., & Laureys, S. (2011). Assessment of consciousness with electrophysiological and neurological imaging techniques. *Current Opinion in Critical Care*, 17, 146-151.
- Demertzi, A., Soddu, A., & Laureys, S. (2013). Consciousness supporting networks. *Current Opinion in Neurobiology*, 23, 239-244.
- Owen, A. M., & Coleman, M. R. (2008). Functional neuroimaging of the vegetative state. *Nature Reviews Neuroscience*, 9, 235-243.
- Owen, A. M., Coleman, M. R., Boly, M., Davis, M. H., Laureys, S., & Pickard, J. D. (2006). Detecting awareness in the vegetative state. *Science*, 313, 1402.

Week 14 (Apr. 28): Neuroscience of moral reasoning

- Brosnan, S. F., & De Waal, F. B. (2003). Monkeys reject unequal pay. *Nature*, 425(6955), 297-299.
- Brosnan, S. F., & de Waal, F. B. (2014). Evolution of responses to (un)fairness. *Science*, 346(6207), 1251776.
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, 293(5537), 2105-2108.
- Decety, J., & Cowell, J. M. (2015). Empathy, justice, and moral behavior. *AJOB Neuroscience*, 6(3), 3-14.
- Berker, S. (2009). The normative insignificance of neuroscience. *Philosophy & Public Affairs*, 37(4), 293-329.