Psychology 930

Social, Cognitive, and Affective Neuroscience

Fall 2021

Monday 9:10-12:00

South Kedzie S134

**PROFESSOR INFORMATION**

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Office hours: by appointment (virtual or in-person, depending on availability)

**COURSE OVERVIEW AND LEARNING OBJECTIVES**

In this course you will build a foundation of knowledge about the human brain, with emphasis on its social, cognitive and affective functions. You can then base your future interdisciplinary work on this foundation. In addition, topics related to diversity will be addressed throughout the course. In particular, we will discuss the ways in which diversity has been traditionally neglected from social, cognitive, and affective neuroscience, and address diversity and social implications of research as we read and discuss scientific articles.

More specifically, this course will equip you with:

* A simplified but serviceable understanding of the molecular and cellular levels of  description
* A deeper understanding of the “systems level” functioning of the human brain,  adequate to read primary literature in social, cognitive and  affective neuroscience
* Familiarity with brain anatomy (terminology, locations, functions), especially areas  and divisions that are relevant to social, cognitive and affective neuroscience
* Familiarity with key methods of human neuroscience, with a particular emphasis on fMRI
* Knowledge of key hypotheses and principles concerning the neural bases of  perception, attention, decision-making, learning and memory, emotion, social processes and development, with consideration of multiple aspects of diversity

**MATERIALS**

Required Texts

Readings from the following books will be covered in this course. They will be provided to you.

Gazzaniga, Ivry, Mangun (2010) Cognitive Neuroscience: The Biology of the Mind (5th Ed), W.W. Norton and Co.

Handbook of Cultural Psychology (2nd Ed.), Cohen, D. & Kitayama, S. (Eds.). Guilford Press: New York, New York.

Ward (2015) The Student’s Guide to Cognitive Neuroscience (3rd Ed.), Psychology Press.

Ward (2011) The Student’s Guide to Social Neuroscience (2nd Ed.), Psychology Press

**ASSIGNMENTS AND EVALUATION**

Your grade for this course will be determined by your performance in the following domains: (1) class participation; (2) quizzes; (3) leading discussion of scientific articles; (4) final project (written work and oral presentation). A total of 100 points is possible for this course**. All assignments are due on 9am of the day that they are assigned.**

*Class Participation (12 points).* It is expected that you come to class prepared and ready to discuss the topic for that day. This means that you should do the assigned readings before each class, and you should arrive with questions and ideas. You will receive a 0 or 1 for class participation each week (with the exception of the first class), depending on whether you contributed to the discussion of articles, and/or participated in class exercises. At the end of the semester, your lowest class participation grade will be replaced with a 1. Given the uncertainty of this semester and the possibility of extended absences, exceptions may be considered on an individual basis.

*Leading Article Discussion (12 points).*Each student will be required to lead the discussion of one assigned scientific article. You will have the opportunity to sign up for an article. The discussion will involve first walking us briefly through the background, methods, main findings, and the author’s interpretation using slides. You will not be graded on how beautiful your slides are. You will be asked to share your own thoughts on the paper as well as prepare questions to guide the class discussion. In particular, please explicitly note and discuss the sample composition (e.g. how representative is this sample), discuss any contextual factors that may bear on these results, and start a discussion of potential broader clinical or societal implications of the work.

*Quizzes (32 points)*. There will be four take-home quizzes aimed at reinforcing your understanding of course material.

*Final project (44 points).* You should choose a final project that is meaningful and useful for you and serves your professional or personal endeavors. Options include: a grant proposal, critical research review (on a topic for which there are currently no published reviews), an opinion article, creating a lecture for an undergraduate or community audience, creating a TED talk, drafting a study pre-registration, analyzing existing data and making a poster, or writing a letter to the editor in response to a published article. I will consider other options as well. The constraints are that the project:

1. Integrate across biological (i.e. brain) bases of behavior and, at least, one of the following: social, cognitive, or affective aspects of behavior**.**
2. Cannot overlap with any program milestone projects (e.g. Master’s thesis)
3. Must involve reading and referencing 10 papers or other academic, peer-reviewed works

You may work in groups of no more than 3 people. However, if the project overlaps with something you will plan to submit (e.g. grant application, review paper, poster, etc.), then you must work independently unless you will be co-authoring/submitting with someone in the class.

This assignment will be broken up into the following sub-assignments:

*Proposal (7 points):* Students will submit a short paper (no more than 1 page single-spaced) that outlines the topic of their project. Proposals should clearly outline the *question* that you will address in your project. There is an existing grading rubric for review papers and grant proposals. If you opt to submit anything other than a grant proposal or review paper, please also indicate how you think your work should be evaluated. Following receipt of this proposal, the instructor will meet with individuals/groups to discuss their topic, develop the grading rubric, and agree upon the assignment details.

*Final project (30 points).* Students will submit the agreed upon final project.

*Oral presentation (7 points).* At the end of the semester, each student/group will be asked to give an oral presentation on their project.

**GRADING**

A total of 100 points is possible for this course. You must receive a 3.0 or higher to pass the course.

4.0 91-100%

3.5 84-91%

3.0 76-83%

2.5 71-75%

2.0 66-70%

1.5 61-65%

1.0 56-60%

0.0 < 56%

**ADMINISTRATIVE DETAILS**

**Course Webpage**

On D2L (<https://d2l.msu.edu/>). This page will provide you with the notes for the lectures, grades, and other important class information.

COVID-19 related policies

Per MSU policy, all students must be vaccinated against COVID-19 by August (31 (either fully or with one dose of a two-dose vaccine) with limited medical and religious exemptions. Additionally, all individuals are required to wear a mask indoors on any MSU property (including in class). If you are feeling ill or have tested positive for COVID-19, you should self-isolate and avoid close contact with all others. You also should contact MSU's COVID-19 hotline at 855-958-2678 and stay in touch with your health care provider. Anyone diagnosed with COVID-19 should isolate from others for at least 10 days after symptoms first appear and for 24 hours after fever has subsided without the use of fever-reducing medications and other related symptoms are improving.  If you tested positive for COVID-19 but showed no symptoms, you should isolate for 10 days after your positive COVID-19 test. More information on what to do if you feel sick can be found on the [CDC website](https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/steps-when-sick.html?deliveryName=USCDC_2067-DM23796).

**I understand that this is an uncertain time and I will be as flexible as I can. If you are impacted by the pandemic in a way that affects your participation or performance in this class, please contact me.**

Mental Health

Mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. Services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via the Counseling & Psychiatric Services (CAPS) website at [www.caps.msu.edu](http://www.caps.msu.edu/). If you are struggling with this class, please contact me by email.

Inclement weather

Assume that if the University is open, we will have class.

Accommodation for persons with disabilities

Students with disabilities that affect their ability to participate fully in class or meeting course requirements are encouraged to bring this to my attention as soon as possible. Given documentation of your disability from the Resource Center for Persons with Disabilities (<https://www.rcpd.msu.edu/>), I will happily work with you to make appropriate accommodations. I will attempt to maintain the confidentiality of such information to the best of my ability.

Academic integrity

The Department of Psychology adheres to the policies on academic honesty as specified in General Student Regulations 1.0, *Protection of Scholarship* and Grades; the university-wide policy of *Integrity of Scholarship and Grades*; and Ordinance 17.00, *Examinations*. For more information, see *Spartan Life: Student Handbook and Resource Guide* at <http://splife.studentlife.msu.edu>.

Unless you are authorized by me, you are expected to complete all assignments without assistance from any source. Students who violate MSU rules may receive a penalty grade including but not limited to a failing grade on the assignment or in the course. Students are encouraged to reference the website prepared by the University Ombudsman at <http://www.msu.edu/unit/ombud>, especially the section on Academic Honesty.

Observing religious holidays

Students may make up coursework missed to observe a major religious holiday if they plan in advance with the instructor.

Late assignments

**If you need extra time for an assignment, please contact me.** If an extension has not been agreed upon prior to the due date, 10% will be deducted from your grade for late assignments, for each day (24 hour period) they are late.Assignments are due by 9am on their due date. As an example, if an assignment is due at 9am on Wednesday and it is turned in at 5pm, it will be graded with a 10% penalty. If it is turned in on Thursday at 10am, it will receive a 20% penalty (and so on, and so on).

**Schedule of class meetings, topics, and assignments:**

**Class 1: 9/1**

**Course overview, history, and introduction to broad conceptual issues**

Readings: None

Assignments Due: None

**Class 2: 9/13**

**Neurons and neuronal transmission; Functional neuroanatomy; Introduction to Methods: EEG and single-cell recordings**

Readings:

Gazzaniga Chapter 2, pp. 23-63 (through 2.6)

Ward (2015), Chapter 3

Assignments Due: Install standalone version of SPM on your laptop for use in class on 9/20

**Class 3: 9/20**

**Methods: fMRI; Hands-on fMRI analysis using SPM**

Readings: Ward (2015), Chapter 4

Assignments Due: Install standalone version of SPM on your laptop for use in class if you haven’t already

**Class 4: 9/27**

**Cognitive Neuroscience: Perception and Attention**

**Paper Discussion: Addressing (the lack of) diversity in Cognitive Neuroscience**

Lecture Readings:

Ward (2015) Chapter 6 pp. 107-113, 115 (starting at Functional Specialization section)-121 (until Gestalt part); Chapter 7 pp. 135-148 (until Theories of Attention); Chapter 10 pp. 232-239 (until “What” versus “Where” section)

Paper Discussion Readings:

\*Abiodun, S.J. (2019) “Seeing Color,” a discussion of the implications and applications of race in the field of neuroscience. *Frontiers in Human Neuroscience*, 13: 280.

\*Dotson, V.M., Duarte, A. (2020) The importance of diversity in cognitive neuroscience. *Annals of the New York Academy of Sciences*, 1464, 181-191.

Assignments Due: Quiz 1: Neurons, functional anatomy, and methods for measuring the brain

**Class 5: 10/4**

**Cognitive Neuroscience: Memory**

**Paper Discussion: Perception and Attention**

Lecture Readings:

Ward (2015), Chapter 9

Paper Discussion Readings:

O’Craven, K.M., Rosen, B.R., Kwong, K.K., Treisman, A., Savoy, R.L. (1997) Voluntary attention modulates fMRI activity in human MT-MST. Neuron, 18: 591-598.

Powers, A.R., Mathys, C., Corlett, P.R. Pavolvian conditioning-induced hallucinations result from overweighting of perceptual priors. Science, 357: 596-600.

Assignments Due: none

**Class 6: 10/11**

**Affective Neuroscience: Reward and Motivation**

**Paper Discussion: Memory**

Lecture Readings:

Gazzaniga (2019) Chapter 12, Section 4 (pp. 526-38)

Paper Discussion Readings:

Staresina, B.P., Alink, A., Kriegekorte, N., Henson, R.N. (2013) Awake reactivation predicts memory in humans. *Proceedings of the National Academy of Sciences*, 110: 21159-21164.

Garfinkel, S.N., Abelson, J.L., King, A.P., Sripada, R.K., Wang, X., Gaines, L.M., Liberzon, I. (2014) Impaired contextual modulation of memories in PTSD: An fMRI and psychophysiological study of extinction retention and fear renewal. Journal of Neuroscience, 34: 13435-13443.

Assignments Due: Proposals

**Class 7: 10/18**

**Affective Neuroscience: Emotion perception and emotional states**

**Paper Discussion: Reward and Motivation**

Lecture Readings:

Anderson, D., Adophs, R. (2014) A framework for studying emotions across species. *Cell*, 157: 187-200

Paper Discussion Readings:

Park, S.Q., Kahnt, T., Beck, A., Cohen, M.X., Dolan, R.J., Wrase, J., Heinz, A. (2010) Prefrontal cortex fails to learn from reward prediction errors in alcohol dependence. Journal of Neuroscience, 30: 7749-7753.

Assignments Due: Quiz 2: Cognitive Neuroscience

**Class 8: 11/1**

**Cognitive/Affective Neuroscience: Emotion-cognition interactions**

**Paper Discussion: Emotion perception and emotional states**

Lecture Readings:

Dolan, R.J. (2002) Emotion, cognition, and behavior. Science, 298: 1191-1194.

Paper Discussion Readings:

Méndez-Bértolo, C., Moratti, S., Toledano, R., Lopez-Sosa, F., Martínez-Alvarez, R. Mah, Y.H., Vuilleumier, P., Gil-Nagel, A., Strange, B.A. (2016) A fast pathway for fear in human amygdala. *Nature Neuroscience*, 19: 1041-1049.

Heller, A.S., Johnstone, T., Shackman, A.J., Light, S.N., Peterson, M.J., Kolden, G.G., Kalin, N.H., Davidson, R.J. (2009) Reduced capacity to sustain positive emotion in major depression reflects diminished maintenance of fronto-striatal brain activation. *Proceedings of the National Academy of Sciences*, 106: 22445-22450.

Assignments Due: None

**Class 9: 11/8**

**Social Neuroscience: Face, body, and biological motion processing**

**Paper Discussion: Emotion-cognition interactions**

Lecture Readings:

Ward (2017). Chapter 5.

Paper Discussion Readings:

Canli, T., Zhao, Z., Brewer, J., Gabrieli, J.D.E., Cahill, L. (2000) Event-related activation in the human amygdala associates with later memory for individual emotional experience. Journal of Neuroscience, 20: RC99.

Moser, J. S., Hartwig, R., Moran, T. P., Jendrusina, A. A., & Kross, E. (2014). Neural markers of positive reappraisal and their associations with trait reappraisal and worry. *Journal of Abnormal Psychology, 123*, 91-105.

Assignments Due: None

**Class 10: 11/15**

**Lecture: Social Neuroscience: Mind-reading—empathy and theory of mind**

**Paper Discussion: Social Neuroscience: Face, body, and biological motion processing**

Lecture Readings:

Saxe, R., Carey, S., Kanwisher, N. (2004) Understanding other minds: linking developmental psychology and functional neuroimaging, Annual Reviews of Psychology, 55: 87-124.

Paper Discussion Readings

Walker, P.M., Silvert, L., Hewstone, M., Nobre, A.C. (2008) Social contact and other-race face processing in the human brain. *Social Cognitive and Affective Neuroscience*, 3: 16-25.

Kryza-Lacombe, M., Iturri, N., Monk, C.S., Wiggins, J.L. (2020) Face emotion processing in pediatric irritability: neural mechanisms in a sample enriched for irritability with autism spectrum disorder. *Journal of the America Academy of Child & Adolescent Psychiatry*, 59: 1380-1391.

Assignments Due: Quiz 3: Affective neuroscience

**Class 11: 11/22**

**Social Neuroscience: Ingroups, outgroups, and cultural neuroscience**

Lecture Readings:

Kitayama, S., Varnum, M. E. W., & Salvador, C. E. (2019). Cultural Neuroscience. In Handbook of Cultural Psychology (2nd Ed.), Cohen, D. & Kitayama, S. (Eds.). Guilford Press: New York, New York.

Paper Discussion Readings:

Cikara, M. et al. (2011). Us v. Them: Social identity shapes neural responses to intergroup competition and harm. *Psychological Science,* 22, 306-313.

Chiao, J.Y. et al (2008) Cultural specificity in amygdala response to fear faces. Journal of Cognitive Neuroscience, 20: 2167-2174.

Assignments Due: none

**Class 12: 11/29**

**Group presentations**

Readings: None

Assignments Due: Quiz 4: Social neuroscience; Group presentation

**Class 13: 12/6**

**Group presentations**

Readings: None

Assignments Due: Group presentation

**12/13**

**Finals week—no class**

Assignments Due: Final projects due by 9am!!