SOCIETY FOR THE TEACHING OF PSYCHOLOGY

PSY 437 Seminar in Neuroscience: Educational Neuroscience

Fall 2020

MWF, 10:50am-12:05pm

https://goucher.zoom.us/j/93757503979

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(she/her/hers)
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Drop-in Zoom hours: Mondays 2:30-4pm; Thursdays 12-1pm (or send me an email to schedule a separate meeting)

> *"Understanding the brain mechanisms that underlie learning and memory, and the effects of genetics, the environment, emotion, and age on learning could transform educational strategies and enable us to design programs that optimize learning for people of all ages and of all needs. Only by understanding how the brain acquires and lays down information and skills will we be able to reach the limits of its capacity to learn."*
>
> - Sarah-Jayne Blakemore & Uta Frith, *The Learning Brain*

Seminar Description:

As you read this syllabus, how is your brain turning black shapes on a white page into meaning? And when we were children, how did our brains learn to read? When you go to the grocery store and choose which bag of almonds to buy, or estimate your total bill, how did your brain process that numerical information? When you sit in class and focus on new content, how is your brain deciding what to pay attention to and what to ignore? And how do these processes vary in people with learning differences?

Educational neuroscience is at the intersection of cognitive neuroscience, and developmental and educational psychology. This evolving field is a fusion of research on educational processes, and research on the underlying neural mechanisms that give rise to specific cognitive skills. This includes domain-specific skills (such as reading and math), as well as domain-general skills (like self-control, attention, and working memory).

In this seminar, we will explore cognitive neuroscience research on learning and individual differences that hold relevance to education. We will focus on some core specific and general abilities, as well as additional topics determined by your specific areas of interest. Additional topics may include the influence of emotion on learning ability, cultural variations in learning and brain activity, and the influence of socio-economic status on learning and brain mechanisms. Finally, we will evaluate the empirical basis of different forms of "brain training" and "brain-based learning," and consider how learning technology may be optimized with the inclusion of cognitive neuroscience research.

What is a seminar?

Here is a description from the Center for Psychology:

Seminars are advanced courses that represent the highest academic and intellectual experience of the psychology curriculum. They are small in size (no more than 15 students), and are typically taken by juniors and seniors. Focusing on specific topics related to the professor's expertise, advanced students move beyond previously developed proficiencies in deep, critical, reflective, and integrative thinking and action, to become skilled, independent, self-regulated and responsible scholars and learning leaders.

On a typical day:

- We will spend the first part of class digging into the assigned reading, and engaging in critical thinking to understand, evaluate, and interpret the material.
- There will be some kind of interactive or collaborative component that helps us better understand and apply the content of the readings, or explore current directions in the field. This will often be computer-based, so you are encouraged to bring a personal laptop (and if that's not possible, you can always work with a classmate).
- Class sessions will be facilitated by me, or by Session Leaders. However, *everyone* is responsible for contributing thoughtful and generative ideas to the discussion. You should have your 3-2-1 Response completed, and draw from it during class (see "Student Responsibilities" below).
- At the end of most classes, we will document and/or update important terms and concepts, with citations, in a Glossary (on Canvas) that is editable by everyone. Use this Glossary as a resource for readings and assignments!

Overarching Themes

Throughout the semester, we will consider the following questions:

- How does neuroscience research contribute to our understanding of the topic at hand?
- What theoretical perspective are we/the researchers taking? What assumptions are we/the researchers making? Are there alternative explanations?
- How does this empirical finding fit with current educational practice?
- How might I interpret this if I were in the position of student, teacher, parent, policymaker, or funding agency?
- Next steps: What research should be done next? How can this idea be implemented?

Learning Objectives

By the end of this course, you will have gained the following skills and areas of knowledge:

- *LO #1: Content knowledge.* Describe findings from primary scientific literature regarding neural changes that occur as children progress through formal education, and the neural underpinnings of learning differences.
- *LO #2: Critical thinking about methodology.* Describe techniques commonly used in educational neuroscience research, and their advantages/disadvantages.
- *LO #3: Analytical thinking.* Discuss the benefits of incorporating neuroscience research into educational practice, and identify challenges and obstacles to the successful bridging of neuroscience and education.
- *LO #4: Critical thinking about applied research.* Use your theoretical and methodological knowledge about developmental cognitive neuroscience to evaluate claims about educational tools and practices.
- *LO #5: Creativity and written communication.* Propose innovative yet feasible research to investigate critical questions in educational neuroscience.

Course Materials:

- ***Required:*** Sousa, D.A. (Ed.). (2010) *Mind, brain, and education: Neuroscience implications for the classroom.* Solution Tree Press. *(Referred to in the Schedule as "MBE")*
  ISBN: 978-1935249634

  This book is a collection of chapters written by neuroscientists who have expertise in specific educational neuroscience topics. It is intended for people who have a general background in psychology, but not necessarily neuroscience; I hope you will find it approachable and easy to read. Chapters from *Mind, Brain, and Education* will be paired with more recent articles from scientific journals and other such resources, which will be posted on Canvas.

Your Responsibilities

- **3-2-1 Responses (25% of grade; LO #1, #4):** For most readings (indicated by *"+ Response"* in the Schedule), you will write your own answers to the following questions:

  3 most important points – Think of these as the major take-home messages, or three pieces of information that stood out/felt most salient to you.

  2 questions, including:

  - One clarification question, or something you found confusing

        - One question that extends beyond the content of the reading (ideally a discussion question that you may bring up in class)
    - ***1 connection*** to previous class topics/other courses (or personal experience)
  - Responses should be submitted on Canvas in Word or PDF format by the beginning of class. Response grades are based on your depth of thought and effort to understand the readings. Each individual Response is not worth very much of your final grade, but completing these will help you organize and clarify your thoughts.
  - *You may miss three* Responses over the course of the semester. You are not responsible for completing Responses for classes for which you are a Session Leader.
  - These are not meant to be busywork! Responses are intended to reinforce knowledge (LO #1), but also help you think deeply, integratively, and critically (LO #4).

- **Session Leader (20% of grade; LO #1, #2, #3, #4):** *Twice* over the course of the semester, you and a partner will lead most of a class session (about 45 minutes, which leaves time at the beginning and end of class for me to give a brief introduction and wrap-up). During this time, you and your partner will:
  - Summarize the article(s) that were assigned for that day (LO #1), highlighting any key findings, tables, figures, or other important elements (have any relevant images ready to project onto a screen). You are responsible for understanding these readings and clearing up any questions with me prior to class.
  - Incorporate an interactive activity related to the content of the readings (for example, a demo of an experimental task, testing out a learning technology, etc.; LO #4))
  - Prepare 3-4 thought-provoking discussion questions around the material you present (LO #2, LO #3).
  - Facilitate class discussion.
  - After class is over, add any new and important concepts (with citations) to our class Glossary on Canvas.

  Timeline: You are responsible for knowing when you are scheduled to be Session Leader, and keeping to the following timeline when planning your session:
  - ~1 week before: Meet with me to discuss ideas.
  - 2-3 days before: Check in with me to confirm plans and address any questions.

- **Participation (20%; LO #3, #4):** Seminars rely on the active and thoughtful participation of everyone in the room – that is why this component carries a significant weight. You are expected to be present and engaged during each class session. This means actively listening to the ongoing discussion, contributing your thoughts and questions, and respectfully considering the viewpoints of others. It also means not texting during class (professors notice this more than you think we do), and only using laptops/tablets when relevant to class. We all have "off" days, but generally I expect to hear at least one substantial contribution from you during each class.

- **Grant Proposal (35%; LO #1, #2, #3, #5):** As your final project, you will each create, and write a grant proposal for, an innovative research project that investigates a topic of interest within the realm of educational neuroscience (LO #5). This can be any kind of research study that you think should be done (you can study the neural characteristics of a specific population during a specific task, or the impact of an environmental context on neural activity, or the effectiveness of new educational app in improving neural efficiency), but you must provide empirically-supported justification for the need and usefulness of your study (LO #1; LO #3). For example, a former student proposed to measure changes in long-term potentiation in children who were exposed to lead poisoning from living in low-income housing. Another student proposed to measure neural changes in dyscalculic children before and after playing a novel board game focused on teaching fractions. During the last week of class (Dec. 3-7), you will give a 10-minute presentation to the class about your proposal.

  Some general guidelines (specifics will be provided in class):
  - Proposals should be no more than 10 double-spaced pages, with references in APA style, and should be written according to the National Science Foundation proposal guidelines (adapted to fit the criteria for this assignment).

- Be specific about your methods (LO #2): if you're proposing to study the effectiveness of a new training app, describe and/or storyboard a module. If you're proposing to study brain activity during a rhythm-matching task in kindergartners at risk for dyslexia, plan out and provide images of the task.
- You have no limit on your hypothetical budget, but your project must be experimentally sound and logistically feasible (e.g., you must consider the constraints that MRI technology places on experimental tasks, and you probably cannot collect DTI data on 3,000 preschoolers).

This project will be broken down into multiple components that are due throughout the semester:

- Topic idea blurb (1%) – *due in class on Friday, Oct. 9*
- Literature review check-in (3%) – bring notes about 3 pieces of literature that you've found so far, and be ready to explain them to a classmate – *due in class on Friday, Oct. 16*
- Draft (5%) – *submit to Canvas by the end of the day on Friday, Oct. 30*
- Peer review of two classmates' drafts (3%) – *rubrics due in class on Wednesday, Nov. 4*
- Final paper (15%) – *submit to Canvas by the end of the day on Monday, Nov. 9*
- Presentation (8%) – *last week of classes (Nov. 11, 13, 16, or 18)*

Grading Timeline:

Grades for Session Leaders and the Grant Proposal will be provided within 1 week of the submission date (for Session Leaders, this means 1 week from the class you led). Grades for Responses and Participation will be provided at the end of the semester. You can track your progress on the Gradebook in Canvas; if you have any questions about your grades, upcoming assignments, or anything else, you are welcome to talk to me after class or send me an email. I generally respond to emails within 24 hours; if you have not received a response after two days, please email me again!

Final course grades will be rounded to the nearest whole number. Grades will follow a typical scale, as follows:

	A 93%+	A- 90-92%
B+ 87-89%	B 83-86%	B- 80-82%
C+ 77-79%	C 73-76%	C- 70-72%
D+ 67-69%	D 63-66%	D- 60-62%
F <60% (<180 points)		

Zoom Etiquette

We are all adjusting to Zoom as a new format for our classes. Here is the expected etiquette for Zoom classes:

Video: To optimize interaction and community building, I request that you turn your video on - however, *this is not required.* If you would rather keep your video off, please add an avatar instead.

Mute: If you are not speaking to the whole class, please "Mute" your audio.

Raise Hand: If you'd like to speak during class sessions, use the "Raise Hand" feature. (This is not necessary for small group discussions in "Breakout Rooms.")

You Are In Class: On Zoom, you should conduct yourself as though you are physically in a classroom with a professor and classmates.

Missing Class

Your safety and wellbeing are more important than anything going on in class. I understand that this semester, you may encounter circumstances that prevent you from participating in Zoom classes or completing work on time. Please *email me as soon as you can* to discuss how we can accommodate this. Communication is key!

Zoom classes will be recorded *(pending permission from all students)*. Links to view recorded classes will be posted on Canvas so that you can catch up, but they need to be watched *within two weeks*. After two weeks, links will be taken down, and videos will be deleted from the Zoom cloud. Make sure that you also check the syllabus and do the readings (in other words, do your "due diligence"); then, if you have additional questions or concerns about the class you missed, please don't hesitate to ask me.

Additional Class Resources:

Academic Center for Excellence (ACE): ACE is comprised of Academic Coaches, Pre-Major Academic Advisors and the Coordinator of Accessibility Services. *https://www.goucher.edu/learn/academic-support-and-resources/ace/*

Office of Accessibility Services (OAS): If you have already established accommodations with OAS, please ensure that you've renewed your accommodations for the current semester and that I've received your accommodation letter. If you have not yet established services through OAS, but have a disability that requires accommodations or temporary impairment, please visit the Accommodations and Services section on OAS webpage: *https://www.goucher.edu/accessibility-services/accommodations-and-services*. The Coordinator of Accessibility Services, Amanda Freeman, is available by appointment to answer questions and discuss any implementation issues you may have: *access@goucher.edu*

Center for Race, Equity and Identity (CREI): CREI invites all students to engage in educational and co-curricular opportunities dealing with social justice, intersectionality and Critical Race Theory. CREI seeks to foster an environment in which marginalized and oppressed community members feel affirmed and comfortable exploring and expressing their identities. From individual advising to group support and workshops open to the public, many services are offered to help build community and support your success. *www.goucher.edu/experience/equity-and-identity/center-for-race-equity-and-identity/*

Counseling Center: The Student Counseling Center offers a variety of services to support the emotional wellness and academic success of students. For more info or to schedule an appointment, call 410-337-6481. *http://www.goucher.edu/experience/staying-healthy/counseling-services/*

Honor Code: The cornerstone of the academic community at Goucher is the honor code. As always, all students are bound by the standard of the Academic Honor Code; suspected violations of the Honor Code will be referred to the Academic Honor Board. *www.goucher.edu/documents/General/AcademicHonorCode.pdf*

Library: Our librarians help students through the entire research process: from choosing a research topic to publishing that senior thesis, and everything in between. *https://www.goucher.edu/library*

Title IX Office: Goucher College seeks to provide an environment that is free of bias, discrimination, and harassment. If you have been the victim of discrimination/sexual harassment/misconduct/assault, we encourage you to report this. *https://www.goucher.edu/title-ix/*

Writing Center: The Writing Center serves students, faculty, and staff by offering one-on-one consultations on any issue related to writing, from brainstorming ideas to polishing drafts. In addition to writing support, we offer speaking sessions for English language learners, and we can be a practice audience for oral and group presentations. We are providing two options for tutoring in the fall, synchronous and asynchronous tutoring. Synchronous tutoring (live online tutoring) allows the student and the tutor to meet online for 30 or 60 minutes through audio/video or chat. Unlike live

online tutoring, with asynchronous tutoring (e-tutoring) students can upload their draft to the system and receive written feedback from one of our tutors within two business days.

gwctutor@gmail.com; *https://blogs.goucher.edu/writingcenter*; *Scheduling: https://goucher.mywconline.com*

Fall 2020 Schedule

Assigned readings are subject to change, with fair notice.

Date	To Do Before Class	In-Class Topic
Mon 8/24		Introduction, course overview Course topic preferences
Wed 8/26	Get to know our Canvas website Centre for Educational Neuroscience (n.d.) What is Educational Neuroscience? http://www.educationalneuroscience.org.uk/about-us/what-is-educational-neuroscience/	What do you already know about how the brain learns?
Fri 8/28	Ansari, D., & Coch, D. (2006). Bridges over troubled waters: education and cognitive neuroscience. *Trends in Cognitive Sciences, 10,* 4, 146-151. http://dx.doi.org/10.1016/j.tics.2006.02.007 ***(+ Response)*** *MBE,* Ch. 3: "The Current Impact of Neuroscience on Teaching and Learning" (pgs. 45-66) – *this chapter is available on Canvas if you are still waiting for your book*	Foundations of educational neuroscience
Mon 8/31	Dekker, S., et al. (2013). Neuromyths in education: Prevalence and predictors of misconceptions among teachers. *Frontiers in Psychology, 3,* 429, 1-7. http://dx.doi.org/10.3389/fpsyg.2012.00429 ***(+ Response)***	Sorting the "neuro" from the "myth"
Wed 9/2	*MBE,* Ch. 2: "Neuroimaging Tools and the Evolution of Education Neuroscience" (pgs. 26-43) ***(+ Response)*** Blakemore, S.J., & Frith, U. (2005). *The Learning Brain*, Appendix ("Tools Used to Study the Brain"), pg. 188-195.	*Brain Bootcamp, Part 1:* Methods in cognitive neuroscience

Date	To Do Before Class	In-Class Topic
Fri 9/4	Ward, J. (2015). *The Student's Guide to Cognitive Neuroscience (Third Edition)*, Ch. 15 ("The Developing Brain") – posted on Canvas ***(+ Response)***	*Brain Bootcamp, Part 2:* Brain development
Mon 9/7	*The Learning Brain,* Ch. 2 ("The Developing Brain"), pg. 25-36. ***(+ Response)*** *** This chapter will repeat some of what we have discussed previously, but it has a focus on implications for education – specifically, how school can be optimized for sensitive periods in brain development.*	*Brain Bootcamp, Part 3:* Critical and sensitive periods
Wed 9/9	Dehaene, S., & Cohen, L. (2007). Cultural recycling of cortical maps. *Neuron, 56,* 384-398. http://dx.doi.org/10.1016/j.neuron.2007.10.004 ***(+ Response)***	*Evolutionary questions:* Why are human brain regions specialized?
Fri 9/11	*The Learning Brain,* Ch. 3 ("Words and Numbers in Early Childhood"), pg. 37-52. ***(+ Response)*** *This chapter is about how three domains of cognitive ability – language, reading, and number skills – develop over infancy and childhood. The purpose is to give you a general overview before we talk about each of these abilities in more detail – later on, you may want to come back to this chapter as a refresher.*	*Primer on cognitive development:* The emergence of cognitive skills in infancy and early childhood
Mon 9/14	*MBE,* Ch. 5: "The Speaking Brain" (pgs. 85-109) ***(+ Response)***	Language: an overview
Wed 9/16	Kuhl, P. (2011) Early language learning and literacy: Neuroscience implications for education. *Mind, Brain, and Education, 5,* 3, 128-142. http://dx.doi.org/10.1111/j.1751-228X.2011.01121.x ***(+ Response)*** Gomez, D.M., et al. (2014). Language universals at birth. *Proceedings of the National Academy of Sciences, 111,* 16, 5837-5841. http://dx.doi.org/10.1073/pnas.1318261111 ***(+ Response)***	Early language development

Date	To Do Before Class	In-Class Topic
Fri 9/18	Petitto, L.A. (2009). New discoveries from the bilingual brain and mind across the lifespan: Implications for education. *Mind, Brain, and Education, 3,* 4, 185-197. http://dx.doi.org/0.1111/j.1751-228X.2009.01069.x ***(+ Response)*** Kamenetz, A. (2016, November 29). *6 Potential Brain Benefits of Bilingual Education*. NPR. https://www.npr.org/sections/ed/2016/11/29/497943749/6-potential-brain-benefits-of-bilingual-education	Bi/Multilingualism ***Student-led class #1***
Mon 9/21	Georgetown University Medical Center. (2007, September 28). *Music and Language Are Processed By The Same Brain Systems.* ScienceDaily. https://www.sciencedaily.com/releases/2007/09/070927121101.htm ***(+ Response)*** Kraus, N., & Chandrasekaran, B. (2010). Music training for the development of auditory skills. *Nature Reviews Neuroscience, 11,* 599-605. http://dx.doi.org/0.1038/nrn2882 ***(+ Response)***	Music training and language ***Student-led class #2***
Wed 9/23	*MBE,* Ch. 6: "The Reading Brain" (pgs. 113-124; stop at "Reading Difficulty in the Brain: Developmental Dyslexia") ***(+ Response)***	The reading brain
Fri 9/25	*MBE,* Ch. 7: "Constructing a Reading Brain" (pgs. 139-161) ***(+ Response)*** Sanchez, C. (2018, February 12). *The Gap Between The Science On Kids And Reading, And How It Is Taught.* NPR. https://www.npr.org/sections/ed/2018/02/12/582465905/the-gap-between-the-science-on-kids-and-reading-and-how-it-is-taught	Learning to read
Mon 9/28	*MBE,* Ch. 6, pgs. 124-129 ("Reading Difficulty in the Brain: Developmental Dyslexia") ***(+ Response)*** Hoeft, F., et al. (2011). Neural systems predicting long-term outcome in dyslexia. *Proceedings of the National Academy of Sciences,* 1-6. http://dx.doi.org/10.1073/pnas.1008950108 ***(+ Response)***	Understanding and remediating dyslexia ***Student-led class #3***

Date	To Do Before Class	In-Class Topic
Wed 9/30	*MBE,* Ch. 9: "The Calculating Brain" (pgs. 179-198) ***(+ Response)*** Pica, P., Lemer, C., Izard, V., & Dehaene, S. (2004). Exact and approximate arithmetic in an Amazonian indigene group. *Science, 306,* 499-503. http://dx.doi.org/10.1126/science.1102085 ***(+ Response)***	Learning math: Approximation and representations of number
Fri 10/2	*MBE,* Ch. 10: "The Computing Brain" (pgs. 201-212; stop at "Disorders of the Computing Brain") ***(+ Response)*** Price, G.R., Mazzocco, M.M.M., & Ansari, D. (2013). Why mental arithmetic counts: Brain activation during single digit arithmetic predicts high school math scores. *Journal of Neuroscience, 33,* 1, 156-163. http://dx.doi.org/10.1523/JNEUROSCI.2936-12.2013 ***(+ Response)***	Learning math: Higher-level number skills and building math fluency Introduce Grant Proposal assignment
Mon 10/5	*MBE,* Ch. 10, pgs. 212-221 (starting with "Disorders of the Computing Brain") ***(+ Response)*** Beilock, S.L. (2008). Math performance in stressful situations. *Current Directions in Psychological Science, 17,* 339-343. http://dx.doi.org/10.1111/j.1467-8721.2008.00602.x ***(+ Response)***	Math learning difficulties and math anxiety ***Student-led class #4***
Wed 10/7	Iuculano, T., et al. (2015). Cognitive tutoring induces widespread neuroplasticity and remediates brain function in children with mathematical learning disabilities. *Nature Communications,* 1-10. http://dx.doi.org/10.1038/ncomms9453 ***(+ Response)***	Remediating dyscalculia ***Student-led class #5***

Date	To Do Before Class	In-Class Topic
Fri 10/9	Schwartz, K. (2016, December 13). *Why Executive Function Is A Vital Stepping-Stone For Kids' Ability To Learn.* KQED. https://ww2.kqed.org/mindshift/2016/12/13/why-executive-function-is-a-vital-stepping-stone-for-kids-ability-to-learn/ Rueda, M.R., Checa, P., & Cómbita, L.M. (2012). Enhanced efficiency of the executive attention network after training in preschool children: Immediate changes and effects after two months. *Developmental Cognitive Neuroscience, 2S,* S192-S204. http://dx.doi.org/10.1016/j.dcn.2011.09.004 ***(+ Response)*** **Grant Proposal "topic idea blurb" due by beginning of class:** *Write approximately one paragraph describing your research question and research design idea.*	Executive function (attention) Discuss Grant Proposal topic ideas with peer groups
Mon 10/12	Halperin, J.M., & Healey, D.M. (2011). The influence of environmental enrichment, cognitive enhancement, and physical exercise on brain development: Can we alter the developmental trajectory of ADHD? *Neuroscience & Biobehavioral Reviews, 35,* 3, 621-634. http://dx.doi.org/0.1016/j.neubiorev.2010.07.006 ***(+ Response)***	Attention deficit hyperactivity disorder (ADHD) ***Student-led class #6***
Wed 10/14	Blair, C., & Diamond, A. (2008). Biological processes in prevention and intervention: The promotion of self-regulation as a means of preventing school failure. *Development and Psychopathology, 20,* 899-911. http://dx.doi.org/10.1017/S0954579408000436 ***(+ Response)***	Executive function (self-regulation) ***Student-led class #7***
Fri 10/16	Liu, C. et al. (2008). The visual word form area: Evidence from an fMRI study of implicit processing of Chinese characters. *NeuroImage, 40,* 1350-1361. http://dx.doi.org/10.1016/j.neuroimage.2007.10.014 ***(+ Response)*** **Grant Proposal literature review check-in:** *Submit notes from three pieces of relevant literature that you've found.*	Cross-cultural differences in learning to read Discuss Grant Proposal literature review progress with peer groups

Date	To Do Before Class	In-Class Topic
Mon 10/19	Paulesu, E., et al. (2001). Dyslexia: Cultural diversity and biological unity. *Science, 291,* 2165-2167. http://dx.doi.org/10.1126/science.1057179 ***(+ Response)*** Siok, W.T., Spinks, J.A., Jin, Z., & Tan, L.H. (2009). Developmental dyslexia is characterized by the co-existence of visuospatial and phonological disorders in Chinese children. *Current Biology, 19,* 19, R890-R892. http://dx.doi.org/10.1016/j.cub.2009.08.014 ***(+ Response)***	Cross-cultural differences in dyslexia ***Student-led class #8***
Wed 10/21	*Last names A through M:* Tang, Y., et al. (2006). Arithmetic processing in the brain shaped by cultures. *Proceedings of the National Academy of Sciences, 103,* 28, 10775-10780. http://dx.doi.org/10.1073/pnas.0604416103 ***(+ Response)*** *Last names N through Z:* Shaki, S., Fischer, M.H., & Göbel, S. (2012). Direction counts: A comparative study of spatially directional counting biases in cultures with different reading directions. *Journal of Experimental Child Psychology, 112,* 275-281. http://dx.doi.org/10.1016/j.jecp.2011.12.005 ***(+ Response)***	Cross-cultural differences in learning math
Fri 10/23	Smith, T. (2014, March 17). *Can Focus on "Grit" Work In School Cultures That Reward Grades?* KQED. https://ww2.kqed.org/mindshift/2014/03/17/can-focus-on-grit-work-in-school-cultures-that-reward-grades/ Nemmi, F., Nymberg C., Helander, E., & Klingberg T. (2016). Grit is associated with structure of nucleus accumbens and gains in cognitive training. *Journal of Cognitive Neuroscience, 28,* 11, 1688-1699. http://dx.doi.org/10.1162/jocn_a_01031 ***(+ Response)***	"Grit" ***Student-led class #9***
Mon 10/26	Hackman, D.A., & Farah, M.J. (2009). Socioeconomic status and the developing brain. *Trends in Cognitive Sciences, 13,* 2, 65-73. http://dx.doi.org/10.1016/j.tics.2008.11.003 ***(+ Response)***	SES effects on child development and education

Date	To Do Before Class	In-Class Topic
Wed 10/28	Neville, H.J., et al. (2013). Family-based training program improves brain function, cognition, and behavior in lower socioeconomic status preschoolers. *Proceedings of the National Academy of Sciences,* 1-6. http://dx.doi.org/10.1073/pnas.1304437110 ***(+ Response)***	Overcoming SES-related differences in child development and education ***Student-lead class #10***
Fri 10/30	**Grant Proposal Project draft due by the end of the day**	*No official class; instead, take this time to work on your proposal. I will be holding drop-in office hours in our classroom for anyone who would has a question or would like to discuss part of their proposal.*
Mon 11/2	Masten, C.L., et al. (2009). Neural correlates of social exclusion during adolescence: Understanding the distress of peer rejection. *Social, Cognitive, and Affective Neuroscience, 4,* 143-157. http://dx.doi.org/10.1093/scan/nsp007 ***(+ Response)***	Social neuroscience: Peer rejection ***Student-led class #11***
Wed 11/4	**Peer review of two classmates' Grant Proposal Project drafts** *(rubric will be provided)*	In-class peer review workshop for grant proposal projects
Fri 11/6	Galván, A. (2020). The Need for Sleep in the Adolescent Brain. *Trends in Cognitive Sciences, 24,* 1, 79-89. http://dx.doi.org/10.1016/j.tics.2019.11.002 ***(+ Response)***	Influence of sleep on learning (particularly in adolescence) ***Student-led class #12***
Mon 11/9	**Final Grant Proposal Project due by the end of the day**	The autism spectrum: What we know about the underlying neurobiology
Wed 11/11		Grant proposal presentations
Fri 11/13		Grant proposal presentations
Mon 11/16		Grant proposal presentations
Wed 11/18		Grant proposal presentations Course reflections
TBA: Final Experience Day		Wrap-up conversation: The future of educational neuroscience