Attention!

This is a representative syllabus. The syllabus for the course when you enroll may be different.

Use the syllabus provided by your instructor for the most up-to-date information. Please refer to your instructor for more information for the specific requirements for a given semester.

Feel free to contact the Psychology Advising Office for any questions regarding psychology courses either by email (psychadvising@osu.edu) or phone (614.292.5750).

Thank you!
Psychology 5628  
Fall 2021

Credit: 3 hours  
Text: readings will be posted online and are listed below  
Prerequisites: Either Psychology 3313 or 3513  
Course webpage:

Course Description & Objectives:
The field of developmental cognitive neuroscience involves trying to understand how the brain supports complex thoughts and behaviors by studying how these processes emerge over development, and how our genes, brains, and experiences interact to make us all unique individuals. Some hot questions include: How does the brain change over the first few years of life and how do these changes support the accompanying changes in perception and cognition? What brain architecture is present when you are born, and how does it change with maturation vs. experience? How does early brain structure and function constrain later learning and plasticity? We will assay foundational studies as well as the latest literature to formulate the field’s current answers to these questions.

Specific topics covered will include current methodologies, introduction to developmental neurobiology, low and high-level sensory perception, cognition, social and emotional processing, neurodevelopmental disorders, and early brain injury and plasticity. Although this class is mainly about the human brain, we will discuss some animal literature as it pertains to human evolution and ontogeny.

The objective of the course is for students to grasp the fundamentals of the field, understand the latest literature, and what gaps in our knowledge remain (and how to address these gaps with the latest methods). This course will be a mixture of lecture and discussion, with the instructor lecturing on the background/history of each topic during the first class of each topic, followed by student-led presentations and discussions on the latest empirical papers on the topic. Each student is expected to read the book chapter(s) and papers before each class. Grades will be given based on course participation, weekly response papers, and student presentations.

Resources:  
Textbooks: (optional)- Developmental Cognitive Neuroscience, 4th Edition Mark H. Johnson & Michelle de Haan  
(optional)- Handbook of Developmental Cognitive Neuroscience, edited by Charles A. Nelson & Monica Luciana  

Website: The course website is on Carmen. This site is where all course materials will be available.  

Presentations: All students will be responsible for presenting an empirical paper and leading a discussion on the paper. You will choose the date and paper to present from the available readings below. You will have to sign up for multiple presentation dates (TBD). The presentation should be a 10-13 minute powerpoint, keynote, or equivalent presentation of the background, methods, results, and implications of the paper. Each week/session will have a graduate student Session Leader. Presenters for each week should email their presentations to the Session Leader prior to the start of each class. This leader’s laptop will then be used by the presenters during class. Presenters also need to email the Session Leader points for their paper. At the end of all the talks (usually on Thursdays) the Session Leader will provide a short ~5 minute summary of the
papers and bring up a few central discussion points related to the topic of that week and how these papers address it/fail to address it/open questions that remain.

Every student will be expected to present at least once and perhaps more, depending on the total number of class participants. Presenters need to give a brief overview of the questions answered by the paper (talk about some background research as needed), present the methods in a clear manner such that we can all understand it, and discuss the results of the paper. In order to have productive conversations, please discuss one or more things the paper accomplishes well and one or more things that the paper fails to do well. Think about whether the paper answers the question(s) it set out to answer and how you would have set out to answer that question. **Presentations will be worth 60% of the grade. Graduate students will be expected to lead at least one session as part of their grade. Undergraduates will have an opportunity to lead one of the later sessions to earn more points/raise their grade.**

See Presentation Grading Scale document and Example Presentation posted on Carmen for more info.

**Participation:** All students are expected to attend class and participate in the lectures and discussions. Participation is worth **10% of the grade.**

**Discussion questions:** On weeks that they’re not presenting, students must submit weekly discussion questions/response papers (half-page, due Thursdays at 10pm). The weekly response can either compare the assigned papers and discuss their merits in answering questions in developmental cognitive neuroscience; OR find an alternative empirical paper that better addresses the current topic and discuss why. **Discussion questions will be worth 30% of the grade.**

**Absences:** Illness and personal/professional obligations may be accepted as an excuse for missing class and you **do not need a doctor’s note.** You will still be responsible for turning in discussion questions for the day that you were absent, with a reasonable (~1 week) delay. If you cannot present on the day that you are scheduled to present, you will need to present on another day on another topic. **If you are sick, please sign on through Zoom. I will provide the link on Carmen.**

**Grading:** Grades will be based out of 100 points.
Presentation: 60 points
Participation: 10 points
Response papers: 30 points

The following grading scale will be used to assign final grades:

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<tr>
<th>Grade</th>
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<tbody>
<tr>
<td>A</td>
<td>93-100%</td>
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<tr>
<td>A-</td>
<td>90-92.99%</td>
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<td>B+</td>
<td>87-89.99%</td>
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<td>B-</td>
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**Assistance:** I am available to talk to you about any of the course topics. I encourage starting your class preparation earlier so that we can discuss any questions or concerns you have in advance of the class, especially if you are presenting. **Email me to set up an appointment to chat over Zoom but please no unscheduled drop-ins or in-person appointments.**
Disabilities Statement: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at http://studentlife.osu.edu/csc/.

Sexual misconduct/relationship violence: Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu.
Class Schedule (subject to change)

**Week 1: Introduction and Methods**

**Aug 24**
Introduction & background; why study developmental cognitive neuroscience? Organization of class, sign up for presentation papers.

**Aug 26**
Methodological paradigms; event-related potentials; magnetic resonance imaging; genetic methods; neural networks; application of animal tests of cognition

**Background reading:** https://www.nature.com/articles/nrn.2018.1

**Week 2: Building a Brain: Genetics, Activity-dependent & experience-dependent change**
How can we model the developing human brain & mind, how much of the brain is determined by genetics, spontaneous activity, and experience?

**Aug 31 – Presentations**

**Sept 2 – Presentations**
5. Bitzenhofer S.H., et al. Transient developmental increase in prefrontal activity alters network maturation and causes cognitive dysfunction in adult mice.
6. Rekik et al. 2017 Neuroimage. Joint prediction of longitudinal development of cortical surfaces and white matter fibers from neonatal MRI.

**Week 3: Low level vision & endogenous vs. experience-dependent brain development**
How does endogenous activity in the womb shape visual perception?

**Sept 7 – Presentations**

**Sept 9 – Presentations**

**Week 4 High-level visual perception**
To what extent are high-level visual representations innate and how are they honed with experience?

**Sept 14 – Presentations**

**Sept 16 – Presentations**

**Week 5 Literacy and Numeracy**
How are new cultural representations like reading instantiated in the brain?

**Sept 21 – Presentations**

**Sept 23 – Presentations**
5. Glezer et al. (2015). http://www.jneurosci.org/content/35/12/4965

**Week 6 Connectivity driving development & plasticity**
How much does early connectivity drive cortical arealization in normal development or in the case of sensory deprivation? How does early connectivity predict later cognitive gains and individual variability in typical development?

**Sept 28 – Presentations**


**Sept 30 – Presentations**


**Week 7 Auditory perception, Speech, Language, Music (p.1)**

What aspects of language are innate, how are representations honed through maturation and experience, and how can language facilitate domain-general cognition?

**Oct 5 – Presentations**


**Oct 7 – Presentations**


**Week 8 Auditory perception, Speech, Language, Music (p.2)**

**Oct 12 – Presentations**

Week 9 Declarative & Non-declarative Learning & Memory

How do children learn and retain knowledge?

Oct 19 – Presentations
3. Finn et al. 2016. Developmental dissociation between the maturation of procedural memory and declarative memory

Oct 21 – Presentations

Week 10 Emotional processing

How innate or universal are emotional responses and perceptions and how does stress impact development?

Oct 26 – Presentations

Oct 28 – Presentations
**Week 1 Social Cognition**
How do we perceive & act on the social world, how does it develop, and how much does it depend on other mental faculties like language or executive function?

**Nov 2 – Presentations**

**Nov 4 – Presentations**
5. Pavlova et al. 2017; "Social cognition in autism: Face tuning" Scientific Reports. 7: 2734. DOI:10.1038/s41598-017-02790-1

**Week 12 Geometry & Navigation**
Are geometry & navigation innate representations that require little to no experience? Do we use these reference frames to guide more complex conceptual representations?

**Nov 9 – Presentations**

**Nov 11 – No class (Veteran’s Day)**

**Week 13 Cognitive Control & Decision-Making**
How does executive function develop, why does it take so long, and how does its development influence other cognitive functions?

**Nov 16 – Presentations**
2. Brod et al. 2017. Does One Year of Schooling Improve Children’s Cognitive Control and Alter Associated Brain Activation?
Nov 18 – Presentations

Week 14 Early brain injury, intervention, and plasticity (p.1)
How do neural representations reorganize after early brain injury & early intervention (and does the location of the injury matter)? What mental faculties recover after injury and what are the critical periods for plasticity?

Nov 23 – Presentations

Nov 25 (thanksgiving break)

Week 15 Early brain injury and plasticity (p.2)
Nov 30 – Presentations

Dec 2 – Presentations


Week 16 last class
Dec 7
Concluding remarks, putting it all together, class debate, surveys