Brain Development-Psychology 450
Wednesdays 1-2:20 and Fridays11:30-12:50, Biosciences Building room 2111

Professor: Dr. Beth Kelley
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Office Hours: Mondays 1-2 and Wednesdays 2:30-3:30
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Book: "Developmental Cognitive Neuroscience, Fourth Edition" by Johnson & de Haan

Course Description

This course is designed to be a relatively broad discussion of brain development, with a particular focus on issues such as the developmental course of brain development, how to most effectively measure brain development and the changes in brain functioning, how and when the brain may develop atypically, the role of plasticity and pruning in brain development, and how brain development is related to various aspects of cognitive development.

There are a lot of readings in this course (all of which are available in the book or online through Queen's journal system), particularly at the beginning of the course. I highly suggest that you at least skim each reading before coming to class that you can participate in the discussion-you can always go back and read them over in more detail when writing the final exam. Of course, if you are submitting a question for that day's readings, you will need to read them in more detail. Instead of me just re-iterating what you read in the readings, I will make a real attempt to make each class more of a discussion of these readings and how they relate to broader themes in developmental cognitive neuroscience.

The latter part of the course will be taken up by group presentations on atypically-developing brains.

Learning Outcomes

1. Construct the developmental course of brain development.
2. Evaluate the strengths and weaknesses of the various methods used to assess brain development over time.
3. Interpret the roles of plasticity and pruning as they are involved in brain development.
4. Compare and contrast the effects of different developmental disorders on the developing brain.
5. Appraise current research in the field.
6. Be able to argue a position using supporting evidence to back up your assertions.

Course Requirements

1. *Questions on the readings-worth 20% (best four of five*

and get them together for the whole class. The questions will be submitted through OnQ dropboxes and will be run through Turnitin. For the first few classes I will provide the discussion questions to give you an idea of what I am looking for.

2. *Attendance and participation-worth 5%*. You will be expected to attend every class and be engaged in the discussion. I know this is not always easy to do, but it is certainly not impossible! If you do need to be absent, please let me know the reason for your absence. In the past I have actually taken attendance and made check marks for people every time that they contributed to the discussion, but I found that this

academic consideration to students experiencing extenuating circumstances that are beyond their control and are interfering with their ability to complete academic requirements related to a course for a short period of time, not to exceed three months. Students receiving academic consideration must meet all essential requirements of a course. The Senate Policy on Academic Consideration for Students in Extenuating Circumstances was approved at Senate in April, 2017 (see http://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslcwww/files/files/policies/senateandtrustees/AcademicConsiderationsforExtenuatingCircumstancesPolicyFinal.pdf) Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. Arts and Science undergraduate students can find the Faculty of Arts and Science protocol and the portal where a request can be submitted at: http://www.queensu.ca/artsci/accommodations Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty. If you need to request academic consideration for this course, you will be required to provide the name and email address of the instructor/coordinator. Please use the following: Beth Kelley kelleyb@queensu.ca

Academic Integrity

Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see http://www.academicintegrity.org). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a found

onQ to Turnitin. In doing so, students' work will be included as source documents in the Turnitin reference database, where they will be used solely for the purpose of detecting plagiarism.
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A similarity score is the percentage of a document that is similar to content held within the database. Turnitin does not determine if an instance of plagiarism has occurred. Instead, it gives instructors the information they need to determine the authenticity of work as a part of a larger process.
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January 18

Poldrack, R. A. (2010). Interpreting developmental changes in neuroimaging signals. *Human Brain Mapping, 31,* 872-878.

Week 3

January 22nd-6 pm-last names A-Cr discussion question #1 on Peterson article due

January 23

Peterson, B.S. (2003). Conceptual, methodological, and statistical challenges in brain imaging studies of developmentally-based psychopathologies. *Development and Psychopathology, 15,* 811-832.

January 24th -6pm-last names Cu-D discussion question #1 on Dong & Greenough due
January 24th -6 pm-last names E-H discussion question #1 on Shaw et al. due

January 25

Dong, W. K., & Greenough, W. T. (2004). Plasticity of nonneuronal brain tissue: Roles in developmental disorders. *Mental Retardation and DevelopmentalDisabilities Research Reviews, 10,* 85-90.

Shaw, P., Gogtay, N., & Rapoport, J. (2010). Childhood psychiatric disorders as anomalies in neurodevelopmental trajectories. *Human Brain Mapping, 31,* 917-925.

Week 4

January 29th -6 pm-last names I-Mac-discussion question #1 on Chapter 3 due
January 29th 6pm-last names Mar-Z-discussion question #1 on Chapter 4 due

January 30

Textbook Chapters 3& 4- "From Gene to Brain" and "Building a Brain"

January 30th-6pm-last names A-Cr discussion question #2 on Casey et al due
January 30th-6pm-last names Cu-D-discussion question #2 on Thomas & Johnson due

February 1

Casey, B. J., Galvan, A., & Hare, T. A. (2005). Changes in cerebral functional organization during cognitive development. *Current Opinion in Neurobiology, 15,* 239-244.

Thomas, M. S. C., & Johnson, M. H. (2008). New advances in understanding sensitive periods in brain development. *Current Directions in Psychological Science, 17,* 1-5.

Week 5

February 5th -6pm-last names E-H-discussion question #2 on Stevens due
February 5th -6pm-last names I-Mac discussion questions #2 on Fox et al. due

February 6

Stevens, M. C. (2009) The developmental cognitive neuroscience of functional connectivity. *Brain and*

Cognition, 70, 1-12.

Fox, S. E., Levitt, P., & Nelson, C. A. (2010). How the timing and quality of early experiences influence the development of brain architecture. *Child Development, 81,* 28-40.

February 7-6pm-last names Mar-Z-discussion question #2 Chapter 5 due
February 7th -6pm-last names A-Cr- discussion question #3 Richards et al. due

February 8
Textbook Ch. 5 "Vision, Orienting and Attention"

Richards, J. E., Reynolds, G. D., & Courage, M. L. (2010). The neural bases of infant attention. *Current Directions in Psychological Science, 19,* 41-46.

Week 6

February 12th -6pm-last names Cu-D discussion question #3 (di4e)8 EMC ET /P <</M22(e)4(x)-10(Tm [(F)7

March 13

Textbook Chs. 11 & 13-" Cerebral Lateralization" and "Interactive Specialization"

March 14th at 11:59 pm Article Assignment #4 due

MacNeill, L.A., Ram, N., Bell, M. A., Fox, N. A., & Perez-Edgar, K. (2018). Trajectories of infants' Biobehavioral development: Timing and rate of A-not-B performance gains and EEG maturation. *Child*