

Brain Development-Psychology 451

Professor: Dr. Beth Kelley

Virtual Office Hours: Fridays 11-12

E-mail: kellyb@queensu.ca

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.

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 40% (best eight of twelve).* Each week (including week one) you will be asked to submit a discussion question on the readings. These questions will be due every Thursday night at 11:59 pm. Because I am taking the best eight out of 12, I will not give extensions on these questions unless you have academic accommodations, in which case you will have until Saturday night at 11:59 pm. All discussion questions will be turned in under the appropriate discussion forum available either through your course schedule links or the communications tab, then discussions from the drop-down menu.

These questions should be as substantive as possible and make a real attempt to tie the readings/lecture into other things you have learned in psychology and especially developmental psychology or Brain and Behaviour. Think big picture, critical thinking, theoretical type of questions. These questions will be worth five marks toward your final mark each (with the eight highest grades taken toward your mark). These questions will be discussed in the online discussion forum. Because these will be discussion questions, make sure that they are things that the whole class can discuss. Tie these questions to ideas you have learned in other classes or earlier in this class. They should NOT be clarification questions. If you are unclear about anything in the readings, the general class discussion board is the place to post these.

For the first few classes I will go easier on the marking and provide you with feedback and as the semester goes on I will give you less feedback and expect more out of you. The questions will generally be graded as follows:

0=not submitted

2.5 =very basic question of clarification

- 3.25=good question that gets at important points but doesn't go beyond the article**
3.75=good question that gets at important points and goes beyond the basics of the article
4.25=excellent that gets at important points and ties into larger theory
5=incredible insight, outstanding question that absolutely knocks my socks off!

2. *Participation by commenting on other's posts 10% (best five out of twelve).* You will be expected to make some contribution to the discussion for at least five of the twelve weeks. Ideally, you will make some contribution every week and the top five of your twelve grades will be taken. Your participation can be in the form of a question, in the form of a disagreement, or in the form of an agreement, but it should go beyond the original post by either discussing theory/research learned in other classes or in this class. You will only need to respond to one of your classmates' posts, but the response should be fairly substantial, that is, at least a paragraph. Again, I will give you feedback on your first few and go easier on you at the beginning, then expect more from you as the semester goes on. These are due Saturday night at 11:59 pm and for those with accommodations, Sunday night at 11:59 pm. Because you have so many opportunities to hand these in, they will not be accepted late. Another reason I am not accepting these late is that I will be incorporating both the discussion questions and the comments into the following week's first lecture. The general rubric for these will be a zero for not handed in, 1/2 for a question of clarification, 1.25/2 for a comment that questions or agrees/disagrees but doesn't go beyond the original post, 1.5/2 for a comment that goes beyond original post, 1.75/2 for a comment that ties the post to the larger literature, 2/2 for one that knocks my socks off! . All discussion replies will be turned in under the appropriate discussion forum available either through your course schedule links or the communications tab, then discussions from the drop-down menu.

Please read the following before submitting replies:

University is a place to share, question and challenge ideas. Each student brings a different lived experience from which to draw upon. To help one another learn the most we can from this experience please consider the following guidelines.

1. Make a personal commitment to learn about, understand, and support your peers.
2. Assume the best of others and expect the best of them.
3. Acknowledge the impact of oppression on the lives of other people and make sure your writing is respectful and inclusive.
4. Recognize and value the experiences, abilities, and knowledge each person brings.
5. Pay close attention to what your peers write before you respond. Think through and re-read your writings before you post or send them to others.
6. It's ok to disagree with ideas, but do not make personal attacks.
7. Be open to being challenged or confronted on your ideas and to challenging others with the intent of facilitating growth. Do not demean or embarrass others.
8. Encourage others to develop and share their ideas.

Article Review Assignment (15%-best one out of two): You will read two of the articles provided for the assignments and answer a number of questions (which will be provided with each article) on that article which will ask you to summarize the content, critique the methods, identify limitations of the research, and comment upon how that particular study fits within the larger literature on that topic, etc.. You will only write two of these article reviews, though there will be a choice of 4 articles. Each of these article reviews will have its own

due date listed in the class schedule and will not be accepted late unless you have accommodations, in which case they will be accepted 72 hours late. If you can't get it in on time, you will have to do another one.

We will spend the better part of the first class talking about how to read primary source articles with a critical eye and how to situate them within the larger literature. We will also spend some time talking about plagiarism, as many people in last year's class lost a significant proportion of their grades because of (mostly inadvertent) plagiarism.

Each assignment will be worth 30 points and will be multiplied by .5 to be worth 15% of your final grade. It is not mandatory that you do two, but highly suggested. These assignments will be handed into a dropbox in OnQ but will pass through Turnitin.

3. *Final Exam-worth 35%*. The final exam will be a take-home exam which will be given to you before you leave for reading week as you will have lots of time to work on it. It will consist of 10 short essay question (roughly 3 pages each) and you will be able to choose five of them. This exam will be due on April 15th at 11:59 pm. According to principles of Universal Design, you will be given an automatic extension of 72 hours after that due date without the need for accommodation or documentation-i.e., until April 18th at 11:59 pm. After that, your exam will lose 5% of the overall grade per 24 hours that it is late, unless you have documentation. Thus, if you were going to get an 85% on the exam, you will get a 75% if it is 2 days late. This policy includes people with accommodations unless otherwise previously negotiated with the instructor-this negotiation must take place before the 72 hour extension has expired. The paper will be submitted through OnQ dropboxes and will be run through Turnitin.

Grading Summary

Questions on the readings (best 8 of 12) (40%)

Participation by commenting on others' posts (best five of 12) (10%)

Article assignment (best one of 2-possible out of 4) (15%)

Final Exam 35% (due date April 15th)

Grading Policy

The Psychology Grading Policy, "mixed-marking method," is outlined on the following webpage:

<http://www.queensu.ca/psychology/Undergraduate/psycdepartmentalpolicies/psycgradingpolicy.html>

A full list of Departmental Policies, including exam absences, can be found at:

<http://www.queensu.ca/psychology/Undergraduate/psycdepartmentalpolicies.html>

NAVIGATING THE ACADEMIC CONSIDERATIONS & ACCOMMODATIONS PROCESS IN THE FACE OF ADVERSE CIRCUMSTANCES, INCLUDING SOCIAL INJUSTICE If you are experiencing extenuating circumstances that affect your ability to complete your schoolwork

Extenuating circumstances may impact your ability to meet deadlines in this class, including those that may arise from instances of social injustice, as well as sudden physical or mental illness, serious injury or required treatment, bereavement, traumatic event, or participation in significant event such as varsity championship). Please know that:

- 1) You can request an extension for up to 3 days *without supporting documentation* once per semester. To do so: a. Complete the Request for Academic Consideration form online at : <https://www.queensu.ca/artsci/undergrad-students/academic-consideration-for-students>

2) If an event happens a second time and you do not have supporting documentation available, you can connect with the Associate Dean's office to sign a formal "attestation document" as a form of supporting document. a. To do so, click on "Submit Request" at the link above.

b. In "Step One", select "No, I do not have supporting documentation". Then, select "Learn how to fill out a Formal Attestation form". After answering a question about enrollment, you will be able to download the form.

c. Please note that the details of these requests are not shared with your instructors. Instructors only receive notice that academic consideration adjustments are appropriate, and they will receive suggestions for how they might be able to help support you. Because your personal circumstances are not shared, it might feel like your instructor doesn't care about your situation. Please know that this is not the case—they are not aware of what is happening, and this is done to protect your privacy. (You can still choose to share with them if you'd like, but you don't have to and it is not the expectation that you would.)

3) If you require more than a 3-day extension, you should fill in a Request for Academic Consideration at the link above, using the paperwork for "longer than 3 days".

In all these cases, you should submit Requests and/or documentation as soon as possible. In general, 3-day extension requests should be entered within 1 day of the end of the extension period; long-term extension requests should be entered before the course ends.

More details about Academic Consideration requests (for extenuating circumstances) can be found at

<https://www.queensu.ca/artsci/undergrad-students/academic-consideration-for-students>.

If you are seeking accommodations for a disability

Navigating the accommodations process can be made more difficult by the experience of social injustice. To alleviate any confusion about the process of obtaining accommodations for disabilities, here is information about the steps to take to connect with Queen's Student Accommodations Services (QSAS). Follow these steps if you have a confirmed and documented disability.

1) If you have never registered with QSAS before:

<https://www.queensu.ca/studentwellness/accessibility-services/how-register/new-students>

2) If you have previously registered with QSAS:

<https://www.queensu.ca/studentwellness/accessibility-services/how-register/returning-students>

3) Documentation requirements can be found at:

<https://www.queensu.ca/studentwellness/accessibility-services/information-students/documentation-requirements#requirements>

4) If you have questions about the process, contact Intake Coordinator at QSAS

(qsas.intake@queensu.ca)

If you are experiencing high levels of academic or exam-related stress

Contact the Administrative Assistant for Extenuating Circumstances at Student Wellness Services at intake.wellness@queensu.ca

If you are looking for resources to support your success and well-being in the face of social injustice

Student Wellness Services provides a range of programs that could be helpful, including emergency help, after-hours supports, and same-day clinic appointments, among many other services. Visit

<https://www.queensu.ca/studentwellness/home> to see a few options of places to get help.

For support and problem solving of personal and academic concerns: Counselling Services:

<https://www.queensu.ca/studentwellness/counselling-services>

For peer support: AMS Peer Support Centre: <http://amspeersupport.com/>

For health services (including services related to immunizations, IUDs, HPV infection, depression and suicide risk, transgender care, etc.): Health Services:

<https://www.queensu.ca/studentwellness/health-services>

For mental health services (including help with stress, anxiety, low mood, depression, etc.): Mental

Health Services: <https://www.queensu.ca/studentwellness/mental-health>

For counselling support for Black and Racialized students: Request counselling/set up appointment by emailing counselling.services@queensu.ca

For services and supports for Indigenous students: Four Directions:

<https://www.queensu.ca/fourdirections/home>

For services and supports for international students: Queen's International Centre:

<https://quic.queensu.ca/>

For information about groups, programs, resources and initiatives surrounding inclusivity at

Queen's: Inclusive Queen's : <https://www.queensu.ca/inclusive/content/home>

For help with academic skills: Student Academic Success Services: <https://sass.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 foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities: <http://www.queensu.ca/secretariat/senate/policies/princpri/>).

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. **See Academic Regulation 1 Academic Integrity** of the Arts & Science Calendar:

<http://www.queensu.ca/artsci/academic-calendars/regulations>.

Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

Please note that we have had issues in the past with unintended plagiarism in this course. Please visit these very helpful websites for how to make sure that you are able to write things in your own words:

<https://integrity.mit.edu/handbook/academic-writing/avoiding-plagiarism-paraphrasing>

http://writing.wisc.edu/Handbook/QPA_paraphrase.html

<https://owl.english.purdue.edu/owl/resource/619/1>

Turnitin Statement

This course makes use of Turnitin, a third-party application that helps maintain standards of excellence in academic integrity. Normally, students will be required to submit their final exams through

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.

Turnitin is a suite of tools that provide instructors with information about the authenticity of submitted work and facilitates the process of grading. Turnitin compares submitted files against its extensive database of content, and produces a similarity report and a similarity score for each assignment.

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.

Please read Turnitin's Privacy Pledge, Privacy Policy, and Terms of Service, which governs users' relationship with Turnitin. Also, please note that Turnitin uses cookies and other tracking technologies; however, in its service contract with Queen's University Turnitin has agreed that neither Turnitin nor its third-party partners will use data collected through cookies or other tracking technologies for marketing or advertising purposes. For further information about how you can exercise control over cookies, see Turnitin's Privacy Policy:

Turnitin may provide other services that are not connected to the purpose for which Queen's University has engaged Turnitin. Your independent use of Turnitin's other services is subject solely to Turnitin's Terms of Service and Privacy Policy, and Queen's University has no liability for any independent interaction you choose to have with Turnitin.

SUGGESTED TIME COMMITMENT

Students can expect to spend approximately 10 hours a week (114 hours per term) in study, listening, attending seminars, reading articles and preparing for the presentation for Psyc 450.

CLASS SCHEDULE

Week 1-Introduction

Introduction to class, "getting to know you", go over syllabus, discuss expectations and grading

"How to critique an article"

Textbook Chapter 1 "The Biology of Change"

Gottlieb, G. (2007). Probabilistic epigenesis. *Developmental Science*, 10, 1-11.

Week 2-Brain Imaging

Textbook Ch 2-"Methods and Populations"

Gilmore, J. H., Knickmeyer, R. C., & Gao, W. (2018). Imaging structural and functional brain

development in early childhood. *Nature Reviews Neuroscience*, 19, 123-137.
DOI:10.1038/nrn.2018.1

Week 3-Basics in Brain Development

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

Week 4-Atypical Brain Development

Matthews, M., & Fair, D. A. (2014). Research Review: Functional brain connectivity and child psychopathology – overview and methodological considerations for investigators new to this field. *Journal of Child Psychology and Psychiatry*, 56 (4), 400-414.
doi: 10.1111/jcpp.12335

Horga, G., Kaur, T., & Peterson, B. S. (2014). Annual research review: Current limitations and future directions in MRI studies of child-and adult-onset developmental psychopathologies. *Journal of Child Psychology and Psychiatry*. doi:10.1111/jcpp.12185

Week 5-More Basics of Brain Development

Camacho, M. C., Quinones-Camacho, L. E., & Perlman, S. B. (2020). Does the child brain rest?: An examination and interpretation of resting cognition in developmental cognitive neuroscience. *Neuroimage*, 212: 116688. <https://doi.org/10.1016/j.neuroimage.2020.116688>

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 12th at 11:59 pm-Article Assignment #1 due

Noble, K. G., Houston, S. M., Kan, E., & Sowell, E. R. (2012) Neural correlates of socioeconomic status in the developing brain. *Developmental Science*, 15, 516-527. DOI: 10.1111/j.1467-7687.2012.02247.x

Week 6

Textbook Ch 7-“Perceiving and Acting on the Social World”

Wiesmann, C. G., Friederici, A. D., Singer, T., & Steinbeis, N. (2020). Two systems for thinking about others’ thoughts in the developing brain. *Proceedings of the National Academy of Sciences*, 117, 6928-6935. www.pnas.org/cgi/doi/10.1073/pnas.1916725117

Week 7

Textbook Ch. 8 “Learning and Long-Term Memory”

Bauer, P. J. (2008). Toward a neuro-developmental account of the development of declarative memory. *Developmental Psychobiology*, 50, 19-31.

March 5th -11:59 pm. Article Assignment #2 Due

Sylvester, C. M., Whalen, D. J., Belden, A. C., Sanchez, S. L., Luby, J. L., & Barch, D. M. (2018). Shyness and functional network connectivity over early adolescence. *Child Development, 89*, 734-745.
DOI: 10.1111/cdev.13005

Week 8

Textbook Ch. 9 “Language”

Etchell, A., Adhikari, A., Weinberg, L. S., Choo, A. L., Garnett, E. O., Chow, H. M., & Chang, S-E. (2018). A systematic literature review of sex differences in childhood language and brain development. *Neuropsychologia, 114*, 19-31. <http://doi.org/10.1016/j.neuropsychologia.2018.04.011>

Week 9

Textbook Ch. 10 “Prefrontal Cortex, Working Memory and Decision Making”

Fiske, A., & Holmboe, K. (2019). Neural substrates of early executive function development. *Developmental Review, 52*, 42-62. <https://doi.org/10.1016/j.dr.2019.100866>

March 19th at 11:59 pm. Article Assignment #3 due

Wade, M., Fox, N. A., Zeanah, C. H., & Nelson, C. A. (2019). Long-term effects of institutional rearing, foster care, and brain activity on memory and executive functioning. *Proceedings of the National Academy of Sciences, 116*, 1808-1813. www.pnas.org/cgi/doi/10.1073/pnas.1809145116

Week 10

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

March 26th 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 Development, 89*, 711-724. DOI: 10.1111/cdev.13022

Week 11 Autism

Johnson, M. H. (2017). Autism as an adaptive common variant pathway for human brain development. *Developmental Cognitive Neuroscience, 25*, 5-11. <https://doi.org/10.1016/j.dcn.2017.02.004>

Donovan, A. P. A., & Basson, M. A. (2017). The neuroanatomy of autism- A developmental perspective. *Journal of Anatomy, 230*, 4-15. DOI:10.1111/joa.12542

Week 12 The effects of poverty on brain development

Blair, C., & Raver, C. C. (2016). Poverty, stress and brain development: New directions for prevention and research. *Academic Pediatrics, 16*, S30-S36.

Betancourt, L., Avants, B. B., Farah, M. J., Brodsky, N. L., Wu, J., Ahstari, M., & Hurt, H. (2016). Effects of socioeconomic status (SES) disparity on neural development in female African-American infants at 1 month. *Developmental Science, 19*, 947-956. <http://dx.doi.org.10.1111/desc.12344>

Final Exam Due Date TBA