

Psychology 795: Structure and Function of the Developing Brain

Wednesdays from 9:30 – 11:30 am

PAS 3026

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Course Description: This graduate-level seminar examines the development of brain-behaviour relationships between gestation and young adulthood from converging behavioural, neurophysiological, and neuroimaging perspectives. The objectives of this course are to (1) acquire baseline knowledge of the structural/functional organization of the developing brain, (2) become familiar with major themes and controversies that are integral to the study of brain development, and (3) develop in-depth knowledge of an aspect of developing brain structure/function that is germane to your area of research.

Course Web Site: Announcements, readings, and grades will be posted on the course web site in Learn. This forum also will be used for the purpose of submitting discussion questions and the final assignment.

Outcome Measures: Your final grade will reflect the points that you accrue in the following:

Group Discussion: 20%

Each week a student (or students) will be responsible for facilitating our discussion topic. The facilitator(s) should provide a brief (i.e., 15-20 minute) overview of the assigned readings in which they present any necessary background information, highlight important concepts and main ideas in the readings, and allow time for clarifying questions, and then stimulate discussion amongst the class. Facilitators may do so using a wide range of formats (e.g., question and answer, debates, etc.). We want this class to be engaging, so feel free to get creative. *Facilitators should arrange to meet with me to review their understanding of the assigned readings and to discuss their plan of action. Please note that my availability is very limited and that I am not on campus at all on Tuesdays – meaning that students will want to touch base no later than the Monday before class.*

Reflections: 25%

Each week students are to provide a 1 page single space critical reflection on the assigned readings (each facilitator for that week is exempt). The reflections are not intended to be a summary of what you have read. Rather, this is an opportunity for you to describe the issue(s) under consideration, identify differing viewpoints, critique methodology or interpretation of results, draw connections, highlight problems, suggest possible solutions, etc. *Your reflection paper should be e-mailed to myself and the facilitator(s) no later than Sunday by 10 pm.*

Discussion Question: 10%

Each week students are to generate at least 1 discussion question that is related to the assigned readings (each facilitator for that week is exempt). *These are to be posted to the discussion board in Learn no later than Monday by 10 pm.* Students should review the questions that are posted to the discussion board prior to coming to class so that we have a shared sense of the thoughts that everyone had in relation to the readings.

Participation: 15%

Because this is a seminar-style course, active participation is required in order for this to be an engaging experience. To receive credit for participation you need to speak-up in class.

Final assignment: 30%

Your final assignment will be a grant proposal that should be related to an aspect of brain development that intersects with your particular clinical/research interests. In addition to helping you to develop your grantsmanship, this is an opportunity for you to think deeply about brain development and how it may inform your clinical work and/or research. It is hoped that students will use this opportunity to generate a product that advances their training. So, perhaps you can flesh out an idea that may be incorporated into a future research project. Or, perhaps you can review an area of literature that eventually becomes incorporated into your Master's thesis or doctoral dissertation. I will provide some examples of grant proposals in Learn.

Your proposal should have either a primary or secondary focus on the brain (i.e., your proposal may entail studying brain structure/function directly OR brain structure/function may be relevant to the rationale of your study even though you may not intend to study brain structure/function per se). Also, your proposal must incorporate a developmental perspective (i.e., you may focus on children or compare children and young adults but do not focus on young adults exclusively unless you can demonstrate that the phenomenon under consideration undergoes major refinements during this time period).

There are 2 possible deadlines for this assignment. Students who desire detailed and constructive feedback for the purpose of making revisions to their proposal prior to the final submission deadline should upload their assignment to the course Dropbox on Learn **no later than December 1**. For all students, **the final submission deadline is December 15** via the course Dropbox on Learn. If you opt to submit your assignment on December 15, and not beforehand, I will provide you with general comments only.

Schedule:

Date	Topic	Readings
Sept. 10	Orientation and planning session	N/A

Sept. 17 & 24	<p>Brain development (TM)</p> <p>Note: readings, reflection papers, and discussion questions will apply to Sept 24 (i.e., no requirements for Sept 17)</p>	<p>Anderson, A., Northam, E., Hendy, J., & Wrennall, J. (Eds.). (2001). <i>Developmental neuropsychology: A clinical approach</i> (pp.39 – 68).</p> <p>Lenroot, R.K., & Giedd, J.N. (2006). Brain development in children and adolescents: Insights from anatomical magnetic resonance imaging. <i>Neuroscience and Biobehavioral Reviews</i>, 30, 718-729.</p> <p>Steinberg, L. (2012). Should the Science of Adolescent Brain Development Inform Public Policy? <i>Issues in Science and Technology</i>, 28(3), 67-78.</p>
Oct. 1	Methods and populations	<p>Johnson, M.H. (2011). <i>Developmental cognitive neuroscience: An introduction</i> (pp. 17-30).</p> <p>Thomas, M.S.C., Annaz, D., Ansari, D., et al. (2009). Using developmental trajectories to understand developmental disorders. <i>Journal of speech, language, and hearing research</i>, 52, 336-358.</p> <p>Courchesne, E., Campbell, K., & Solso, S. (2011). Brain growth across the life span in autism: Age-specific changes in anatomical pathology. <i>Brain Research</i>, 1380, 138-145.</p>
Oct. 8	Early brain injury	<p>Kennard, M.A. (1936). Age and other factors in motor recovery from precentral lesions in monkeys. <i>American Journal of Physiology</i>, 115, 138-146.</p> <p>Dennis, M. (2000). Developmental plasticity in children: The role of biological risk, development, time, and reserve. <i>Journal of Communication Disorders</i>, 33, 321-332.</p> <p>Westmacott, R., MacGregor, D., Askalan, R., & deVeber, G. (2009). Late emergence of cognitive deficits after unilateral neonatal stroke. <i>Stroke</i>, 40, 2012-2019.</p>
Oct. 15	Sexual differentiation	<p>Pfannkuche, K.A., Bouma, A., & Groothuis, T.G.G. (2009). Does testosterone affect lateralization of brain and behaviour? A meta-analysis in humans and other animal species. <i>Philosophical transactions of the Royal Society of London: Series B, Biological Sciences</i>, 364, 929-42.</p> <p>Auyeung, B., Baron-Cohen, S., Ashwin, E., Knickmeyer, R., Taylor, K., Hackett, G., & Hines, M. (2009). Fetal testosterone predicts sexually differentiated childhood behavior in girls and in boys. <i>Psychological Science</i>, 20(2), 144-8.</p>

		Halpern, D.F., Eliot, L., Bigler, R.S., Fabes, R., Hanish, L.D., et al. (2011). The pseudoscience of single-sex schooling. <i>Science</i> , 333(6050), 1706-1707.
Oct. 22	Epigenetics	<p>Champagne, F.A. (2010). Early adversity and developmental outcomes: Interaction between genetics, epigenetics, and social experiences across the life span. <i>Perspectives on Psychological Science</i>, 5, 564-574.</p> <p>Weaver, I.C.G., Cervoni, N., Champagne, F.A., Alessio, A.C.D., et al. (2004). Epigenetic programming by maternal behaviour. <i>Nature Neuroscience</i>, 7(8), 847-854.</p> <p>Hackman, D.A., & Farah, M.J. (2009). Socioeconomic status and the developing brain. <i>Trends in Cognitive Sciences</i>, 13(2), 65-73.</p>
Oct. 29	Brain specialization	<p>Johnson, M. (2001). Functional brain development in humans. <i>Nature Reviews Neuroscience</i>, 2, 475-483.</p> <p>Supekar, K., et al. (2009). Development of large-scale functional brain networks in children. <i>PLoS biology</i>, 7(7), e1000157.</p> <p>Rubia, K. (2013). Functional brain imaging across development. <i>European Child and Adolescent Psychiatry</i>, 22(12), 719-731.</p>
Nov. 5	Cognitive change	<p>Kail, R.V. (2004). Cognitive development includes global and domain-specific processes. <i>Merrill-Palmer Quarterly</i>, 50(4), 445-455.</p> <p>Bornstein, M.H., et al. (2006). Stability in cognition across early childhood: A developmental cascade. <i>Psychological Science</i>, 17(2), 151-158.</p> <p>Nettelbeck, T., & Burns, N.R. (2010). Processing speed, working memory and reasoning ability from childhood to old age. <i>Personality and Individual Differences</i>, 48, 379–384.</p>
Nov. 12	Temperament & self-regulation	<p>Rothbart, M., et al. (2007). Executive attention and effortful control: Linking temperament, brain networks, and genes. <i>Child Development Perspectives</i>, 1(1), 2-7.</p> <p>Pleuss, M., & Belsky, J. (2009). Differential susceptibility to rearing experience: the case of childcare. <i>Journal of Child Psychology and Psychiatry</i>, 50(4), 396–404.</p>

		Kim., S., & Kochanska, G. (2012). Child temperament moderates effects of parent-child mutuality on self-regulation: A relationship-based path for emotionally negative infants. <i>Child Development, 83</i> (4), 1275–1289.
Nov. 19	“Brain training”	Beck, S. J., et al. (2010). A controlled trial of working memory training for children and adolescents with ADHD. <i>Journal of Clinical Child and Adolescent Psychology, 39</i> (6), 825-836. Zylowska, L., et al. (2008). Mindfulness meditation training in adults and adolescents with ADHD: A feasibility study. <i>Journal of Attention Disorders, 11</i> (6), 737-746. Barnett, W.S., et al. (2008). Educational effects of the Tools of the Mind curriculum: A randomized trial. <i>Early Childhood Research Quarterly, 23</i> , 299–313.
Nov. 26	Wrap-up (all)	N/A