

YORK UNIVERSITY, FACULTY OF HEALTH
DEPARTMENT OF PSYCHOLOGY

FALL/WINTER 2015-2016 COURSE OUTLINE

Course: PSYCH 4080 6.0A (Y), Neuropsychology of Abnormal Behaviour

Time and Location: 11:30 - 2:30 PM, Tuesday, MC 109

Course Instructor: Christine Till, PhD, C.Psych.
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Pre-requisites: PSYC 1010 or PSYC 2410, with a minimum grade of C
PSYC 2030 or PSYC 2530; one of PSYC 2021, PSYC 2020, PSYC 2510;
PSYC 2240 and PSYC 3140. Students without these prerequisites may enroll with the written permission of the instructor. Course credit exclusion: None.

Course Description:

Neuropsychology is the bridge between psychology and neuroscience. The focus of this seminar course is to examine how brain function is affected by a variety of neurological and clinical psychological disorders. Students will learn about the neuroanatomical and neurochemical underpinnings of abnormal behaviours associated with both adult and childhood-onset disorders. The course will challenge students to consider brain function from a broad perspective that integrates both clinical practice and biology rather than focusing on a purely cognitive organization that focuses on domains such as memory, language, etc. In addition, various assessment techniques, including clinical neuropsychological evaluation and neuroimaging, will be explored in order to delineate how we have come to understand and treat various clinical disorders. A final component of the course will be an examination of some of the multifaceted theoretical issues involved in understanding the relation between the brain and behaviour.

By the end of this course, students will be able to:

1. Identify the neuropsychological and neuroanatomical correlates associated with neurologic and clinical disorders across the lifespan
2. Critically evaluate various assessment procedures with respect to their clinical utility
3. Interpret various sources of assessment results in order to understand the impact of clinical disorders on cognition, psychosocial function, and personality
4. Give an oral clinical case presentation related the neuropsychology of a specific disorder
5. Conceptualize a research question and methodology related to neuropsychology
6. Write a basic grant proposal

Organization of the Course:

The course will involve didactic lecture, in-class demonstrations and videos, discussion of case presentations and readings, and student oral presentations. Lectures are designed to stimulate your interest in the field of clinical neuropsychology and will serve to enrich, clarify, and illustrate critical issues from the assigned readings. Oral presentations will provide students with the opportunity to prepare a teaching-style presentation – an important skill for graduate or professional training. My goal is to engage you in the field by interweaving biopsychological theory with real-life clinical examples and sophisticated scientific methods. Supplemental material will be presented in lectures to acquaint you with current issues and debate in the field of neuropsychology and is intended to elaborate on topics covered in the readings.

The course will be divided into three parts:

Part 1: Introduction to neuroanatomy, neural organization and neurodevelopment, general methodology, and theoretical issues of neuropsychological assessment with a short test assessing mastery of content in these areas.

Part 2: Seminars on how major clinical disorders affect behavioural function. Each seminar will begin with an overview and/or clinical case study examining the features of a disorder (i.e. diagnostic considerations in assessment, prevalence, etiology, symptomatology, neuropathology), and the neuropsychological profile related to each disorder. Students will assist in the seminars by discussing relevant theory, and/or issues related to the neuropsychology of the disorder. Seminars are designed to promote discussion of specific and relevant topics and to challenge students to apply knowledge acquired in class to real-life clinical and research situations. Students will be encouraged to participate in discussions about theoretical and experimental issues raised in presentations and readings.

Part 3. Working in pairs, students will conceptualize a research study and propose a methodology for answering a novel research question¹. Each member of the group will give a short presentation in class related to the grant proposal.

Course Management

This course will use **Moodle@York**, which can be accessed at. <http://moodle.yorku.ca/> using your Passport York username and password. Access the course website for PSY 4080 by clicking on **MY COURSES**. Course announcements, lecture slides, and handouts will be posted on Moodle.

Please contact Client Services Helpdesk at York ext. 55800 or helpdesk@yorku.ca for technical support if you have difficulty accessing the site.

¹Recommended text for grant proposal: Harrington, M. 2006. The design of experiments in neuroscience, 1st Ed., Thomson Learning, Inc.

Basis of Evaluation (specific assignment instructions and guidelines to follow):**1. Mastery of content (70%)**

15% In-class quiz (October 13, 2015). This quiz will assess your knowledge of functional neuroanatomy, neurodevelopment, general principles of clinical neuropsychology.

35% Take home Test 1 (due Dec 11, 2015; 20%) and Test 2 (due Feb 23, 2016; 15%). This test will assess your knowledge of neuropsychology theory as it relates to neurological disorders and syndromes that have been discussed in class. On each test, you will be provided with 5-6 questions and will be asked to answer a subset of the questions (maximum 2 pages, double-spaced for each answer).

20% Oral presentation (15%) and clarity of slides (5%). You will serve as a seminar leader for a topic of your choice from the syllabus. The focus of the seminar will be on how abnormal neurobiological processes, due to brain injury, disease, psychiatric disorders, adverse prenatal conditions, etc. can impact cognitive and behavioural functioning. Your presentation should focus on answering a specific question related to your topic (see syllabus for suggested topics). This level of focus will allow you to review the literature pertaining to your question in order to explain *how* investigators have been able to answer the question. You will be expected to critique any limitations associated with the methods and/or interpretation of the evidence (e.g. are there alternative explanations to account for the results? Do the findings generalize to a broader population?).

The minimum time for each presentation will be 20 min and the maximum time is 30 min, including time for discussion and questions. Typically, a power-point presentation is prepared. You will also provide the class with a summary of your presentation (can be a copy of your presentation or a hand-out summarizing the key points) which can be used by students to take notes and study from. A precise schedule will be worked out in collaboration with the class at the beginning of the term. You are encouraged to speak with (or email) the course instructor about your seminar at least one week prior to your presentation.

2. Development of ideas (30%)

20% Grant proposal (15% written, 5% oral presentation). Working with a partner, you will write a research proposal to explore the brain and behaviour relationship for one of the disorders that we have discussed in class. The purpose of this assignment is to help you learn how to conceptualize a research question and propose a methodology to study it. As well, the exercise is to provide you with the opportunity to work as a team. You will be provided with a template in early January for what to include in the grant and how to structure it. Each group will give a short, in-class oral presentation (25-30 min.) on the grant followed by 15 minutes for class feedback and discussion.

10% Participation. A participation grade will be based on weekly attendance and general quality of contributions to class discussions (5% per term)

Important York Policies

Policy for Missed Tests

Students with a documented and valid reason for missing a course test, such as illness, compassionate grounds, etc., which is confirmed by supporting documentation, i.e., Attending Physician's Statement Form available at: http://www.registrar.yorku.ca/pdf/petitions/attending_physician_statement.pdf may request to write a make-up test. Failure to provide appropriate documentation will result in a grade of 0% for the missed test.

Non-medical circumstances must be supported by appropriate documentation, i.e., death certificates, obituary notice, automobile accident reports, airline/bus ticket/receipt for emergency travel (must indicate date of booking, destination, departure and return dates).

A conflict in another course during the time of the make-up is not an acceptable reason for missing the make-up (unless there is an examination in the other course at that time).

Access/Disability

York provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods. Students with physical, learning or psychiatric disabilities who require accommodation in teaching style or evaluation methods should **discuss this with the course director early in the year** so that appropriate arrangements can be made. Failure to make these arrangements may jeopardize your opportunity to receive academic accommodations. Additional information is available at www.yorku.ca/disabilityservices

Cheating/Plagiarism

The University does not look favorably on cheating of any kind and the penalties for doing so are very harsh. Become familiar with the rules and regulations regarding cheating / plagiarism. If you have any questions about academic honesty/integrity, please go to the Academic Integrity web site at York University (<http://www.yorku.ca/academicintegrity>) to read the section 'For Students'.

GENERAL GUIDES TO WRITING AND PRESENTATIONS

Kosslyn, S.M. (2007). Clear and to the Point: 8 Psychological Principles for Compelling PowerPoint Presentations. New York, NY: Oxford University Press.

ONLINE RESOURCES FOR FUNCTIONAL NEUROANATOMY

University of Washington Brain Atlas: <http://www9.biostr.washington.edu/da.html>
An excellent resource for anyone trying to learn human neuroanatomy.

Harvard Medical School Brain Atlas: www.med.harvard.edu/AANLIB/home.html
Visit "Top 100 Brain Structures" under "Normal Brain"

The Brain from Top to Bottom: http://thebrain.mcgill.ca/flash/index_d.html (Author: Canadian Institute of Health Research). Material is presented for three type of learners (beginner, intermediate, advance) and topics are organized in five levels (social, psychological, neurological, cellular, molecular).

TEXTBOOKS RELATED TO NEUROPSYCHOLOGY

Baron, I.S. (2004). Neuropsychological Evaluation of the Child. New York: Oxford University Press.

Blumenfeld, H. (2002). Neuroanatomy through clinical cases. Sunderland, MA: Sinauer Associates.

Lezak, M. D., Howieson, D. B. Loring, D. W., Hannay, H. J., & Fischer, J. (2004). Neuropsychological assessment (4th ed.). New York: Oxford University Press.

Ogden, J.A. (2005). Fractured Minds: A Case Study Approach to Clinical Neuropsychology. (2nd ed). Oxford University Press.

COURSE SCHEDULE

The syllabus below is meant as a guide to how the course will progress. Students are expected to read the readings before the material is covered in class.

DATE	TOPIC	In-class exercises	READINGS / ASSIGNMENTS
Sept 15	Course overview	Discuss syllabus & course assignments	
Sept 22	History and methods in clinical neuropsychology	Student seminar topics assigned	Ch 1. History of neuropsychology (pp.3-35). From Zillmer EA, Spiers MV, Culbertson W. 2008. <u>Principles of neuropsychology</u> , 2nd edition. Thomson Learning, Inc. Rorden & Karnath (2004). Using human brain lesions to infer function: a relic from a past era in the fMRI age? <u>Nature Reviews</u> , 5, 812-819.
Sept 29	Nervous system, brain structure and brain systems	Check out online functional neuroanatomy resources	Ch. 5. Neuroanatomy for the neuropsychologist. (pp. 61-82) From Morgan, J. E. & Ricker, J. H. (2008). <u>Textbook of Clinical Neuropsychology</u> . New York: Psychology Press, Taylor & Francis Group.
Oct 6	Neuropsychological theory and practice	Clinical case presentation	Dennis M et al (2014). Functional plasticity in childhood brain disorders: When, what, how, and whom to assess. <u>Neuropsychology Review</u> , 24(2). Silver et al. (2006). The importance of neuropsychological assessment for the evaluation of childhood learning disorders: NAN Policy and Planning Committee. <u>Archives of Clinical Neuropsychology</u> , 21(7), 741-744.
Oct 13	Neuropsychological Assessment	Demonstrations of tests Guidelines for giving a talk	Quiz (15%) – focus on content discussed in class
	TOPIC & PRESENTERS	SUGGESTED SEMINAR TOPICS	READINGS
Oct 20	Learning Disabilities (LD) _____ _____	1. Phonologic processing in dyslexia 2. Nonverbal learning disability syndrome and the “white matter” pathway 3. Brain changes following reading intervention (see: Horowitz-Kraus et al, 2014).	Ch. 6. Dyslexia. (pp. 45-81). RL Peterson & LM McGrath. In BF Pennington (2009). <u>Diagnosing Learning Disorders. A neuropsychological framework</u> . 2nd edition. Guilford Press: New York. <i>Optional:</i> Horowitz-Kraus et al (2014). Reading acceleration training changes brain circuitry in children with reading difficulties. <u>Brain and Behav</u> , 4(6):886-902.
Oct 27	Attention deficit	1. Executive functions in ADHD (see Duff et al 2015)	Koziol LF & Stevens MC (2012): Neuropsycho-

	<p>hyperactivity disorder (ADHD)</p> <hr/> <hr/>	<p>2. Determinants of ADHD medication response (see: Hale et al (2011). Executive Impairment Determines ADHD Medication Response, Journal of Learning Disabilities, 44 (2),196-212)</p> <p>3. Reward circuits in ADHD</p>	<p>logical assessment and the Paradox of ADHD, <u>Applied Neuropsychology: Child</u>: 1(2): 79-89.</p> <p><i>Optional:</i> Wasserman T & Drucker Wasserman L (2015). The misnomer of ADHD. <u>Applied Neuropsychology: Child</u>: 4, 116-122.</p> <p><i>Optional:</i> Duff CT & Sulla EM (2015). Measuring executive function in the differential diagnosis of ADHD: Does it really tell us anything? <u>Applied Neuropsychology: Child</u>: 4, 188-196.</p>
<p>Nov 3</p>	<p>Autism</p> <hr/> <hr/>	<p>1. Focus on how one cognitive ability (i.e. visual attention, auditory / linguistic processing, theory of mind, face recognition) is affected in autism.</p> <p>2. Abnormal connectivity in autism</p> <p>3. Neurobiological correlates of autism (e.g. cerebellar involvement, role of frontal-striatal circuit in executive functioning).</p> <p>4. Autism and the mirror neuron system</p>	<p>Schroeder et al (2010). The neurobiology of autism: Theoretical applications. <u>Research in Autism Spectrum Disorders</u>, 4 (4), 555-564.</p> <p>Maximo JO, Cadena EJ, Kana RK (2014). The implications of brain connectivity in the neuropsychology of autism. <u>Neuropsychology Review</u>, 24: 16-31.</p>
<p>Nov 10</p>	<p>Depression</p> <hr/> <hr/>	<p>1. Interaction between genes and environments in the development of depression: polymorphisms of the serotonin transporter (5-HTTT) (see: Ciccetti et al, 2007 article).</p> <p>2. Neurochemical aspects of depression</p> <p>3. Attentional impairment as a core feature of major depressive disorder</p>	<p>aan het Rot M, Mathew SJ, Charney DS. (2009). Neurobiological mechanisms in major depressive disorder. <u>Can Med Assoc J</u>, 180(3): 305-313.</p> <p>Shenal BV, Harrison DW, Demaree HA (2003). The neuropsychology of depression: A literature review and preliminary model. <u>Neuropsychology Review</u>, 13(1): 33-42.</p> <p><i>Optional:</i> Ciccetti D, Rogosch FA, Sturge-Apple ML (2007). Interactions of child maltreatment and serotonin transporter and monoamine oxidase A polymorphisms: Depressive symptomatology among adolescents from low socioeconomic status backgrounds. <u>Devel Psychopath</u>, 19: 1161-1180.</p>

<p>Nov 17</p>	<p>Anxiety</p> <hr/> <hr/>	<ol style="list-style-type: none"> 1. Attentional bias in anxiety disorders 2. Role of the cortico-basal ganglia circuit in the etiology of anxiety disorders 3. Contribution of the amygdala to fear and fear learning 4. Gene x environment interactions and anxiety symptoms 5. Pharmacologic treatment of anxiety disorders 	<p>Ch. 6. Neuropsychological considerations in child and adolescent anxiety. Larson M, South M, Merkle T. (2011). In <u>Handbook of Child and Adolescent Anxiety Disorders</u>. Edited by McKay D, Storch EA: Springer: New York.</p> <p><i>Optional:</i> Cisler JM, Koster EHW. (2010). Mechanisms of attentional biases towards threat in anxiety disorders: An integrative review. <u>Clinical Psychology Review</u>, 30:203-216.</p> <p><i>Optional:</i> Marchand WR. (2010). Cortico-basal ganglia circuitry: A review of key research and implications for functional connectivity studies of mood and anxiety disorders. <u>Brain Structure Function</u>, 215: 73-96.</p>
<p>Nov 24</p>	<p>Traumatic brain injury (TBI)</p> <hr/> <hr/>	<ol style="list-style-type: none"> 1. Post-concussion syndrome – why are the effects of mild TBI sometimes viewed as being paradoxical? 2. Diminished motivation and self-awareness following TBI 3. Sex differences in TBI recovery 4. Predictors of recovery after moderate/severe TBI 5. Neurodegenerative changes following TBI 	<p>Ch. 11. Donders: TBI of childhood. In: Morgan, J. E. & Ricker, J. H. (2008). <u>Textbook of Clinical Neuropsychology</u>. New York: Psychology Press, Taylor & Francis Group.</p> <p>Karr et al. (2014). The Neuropsychological outcomes of concussion: A systematic review of meta-analyses on the cognitive sequelae of mild TBI. <u>Neuropsychology</u>, 28(3), 31-336.</p> <p><i>Optional:</i> Till et al. (2008). Post recovery cognitive decline in adults with TBI. <u>APRM</u>,89(2):25-33.</p>
<p>Dec 1</p>	<p>Psychotic disorders</p> <hr/> <hr/>	<ol style="list-style-type: none"> 1. Frontal-executive deficits in schizophrenia 2. Long-term course of cognitive functioning in schizophrenia 3. Neurodevelopmental hypothesis of schizophrenia 4. Predictors of outcome in the psychosis prodrome. 	<p>Palmer BW, Dawes SE, Heaton RK (2009). What do we know about neuropsychological aspects of schizophrenia? <u>Neuropsychol Review</u>, 19:365-84.</p> <p>TAKE HOME TEST #1 (20%)</p> <p><i>Optional:</i> Woodward ND (2014). The course of neuropsychological impairment and brain structure abnormalities in psychotic disorders. <u>Neuroscience Research</u>, <i>in press</i>.</p>
<p>Dec 11 (no class)</p>		<p>* DUE Responses to take-home test – pt 1</p>	
<p>DECEMBER BREAK!!!</p>			

Jan 5	Cerebrovascular disorders <hr/> <hr/>	<ol style="list-style-type: none"> 1. Neuropsychological impairment associated with stroke (focus on aphasia, dysexecutive syndrome, etc.) 2. Impact of right hemisphere stroke: Neglect 3. Executive function following childhood stroke: impact of age and lesion size 	<p>Ch 12. Cerebrovascular disorders and tumors (pp.340-357). From Zillmer EA, Spiers MV, Culbertson W. 2008. <u>Principles of neuropsychology</u>, 2nd edition. Thomson Learning, Inc.</p> <p>Summers MJ. (2002). Neuropsychological consequences of right thalamic haemorrhage: Case study and review. <u>Brain Cognition</u>, 50: 129-138.</p>
Jan. 12	Multiple Sclerosis <hr/> <hr/>	<ol style="list-style-type: none"> 1. How does reduced processing speed affect higher-order cognitive functioning? (see: Leavitt et al, 2011) 2. Disconnection syndrome in MS – the impact of callosal atrophy in MS 3. Benefits of physical activity on slowing disease progression in MS 	<p>Till et al. (2011). MRI correlates of cognitive impairment in pediatric onset MS. <u>Neuropsychology</u>, 25(3):319-332.</p> <p>Calabrese et al (2006). Neuropsychology of MS. <u>J Neurology</u>, 253(S1):1-15</p> <p><i>Optional:</i> Leavitt et al. (2011). The relative contributions of processing speed and cognitive load to working memory accuracy in MS. <u>J Clin Exp Neuropsych</u>, 33(5): 580-586.</p>
Jan 19	Epilepsy & Seizure disorders <hr/> <hr/>	<ol style="list-style-type: none"> 1. Memory impairment associated with seizure disorder 2. Neuroplasticity of language system in young patients with epilepsy 	<p>Westerveld M. Ch. 10. Neuropsychology in pediatric epilepsy. (pp. 149-157). From Morgan, J. E. & Ricker, J. H. (2008). <u>Textbook of Clinical Neuropsychology</u>. New York: Psychology Press, Taylor & Francis Group.</p> <p>*Groups assigned for grant project</p>
Jan 26	Mild cognitive impairment (MCI) and Alzheimer's disease (AD) <hr/> <hr/>	<ol style="list-style-type: none"> 1. MCI: When is memory impairment considered abnormal in an older person? 2. Spared vs. preserved memory systems in AD 3. Early cognitive markers of AD 4. Cognitive reserve as a protective factor for AD 	<p>Caselli et al. (2014). The neuropsychology of normal aging and preclinical Alzheimer's disease. <u>Alzheimer's & Dementia</u>, 10:84-92.</p> <p>Ogden JA (2005). Ch. 17. Dementia. A family tragedy (pp.304-327). In <u>Fractured Minds: A Case Study Approach to Clinical Neuropsychology</u>. (2nd ed). Oxford University Press.</p>
Feb 2	Subcortical dementias (Parkinson's, Huntington's Disease)	<ol style="list-style-type: none"> 1. Executive functioning in subcortical dementia 2. Neuroanatomical correlates of neuropsychiatric symptoms in PD (see: 	<p>Ogden JA (2005). Ch. 16. Huntington's disease (pp.276-303). In <u>Fractured Minds: A Case Study Approach to Clinical Neuropsychology</u>. (2nd ed). Oxford University Press.</p>

		Alzahrani & Venneri) 3. Cognitive reserve in PD (or HD) 4. Disruption of response inhibition circuits in HD	Optional: Alzahrani H & Venneri A. (2015). Cognitive and neuroanatomical correlates of neuropsychiatric symptoms in PD: A systematic review. J Neurolog Sci, 356:1-2: 32-44. *Sign-up for grant presentation dates
Feb. 9	Special topics in neuropsychology	1. Neuropsychology of emotional processing 2. Neuroendocrine disorders 3. Childhood maltreatment and effects on the brain 4. Substance disorders 5. Neurotoxicology	<i>Readings TBD</i> <i>Intro to grant writing (Dr. Till)</i> Discussion of sample grants *Receive take-home Test 2 questions (15%)
Feb. 16	READING WEEK: NO CLASS		
Feb. 23	Recovery, rehabilitation and intervention (Dr. Till)		Keshavan et al. (2014). Cognitive training in mental disorders: Update and future directions. Am J Psychiatry: A1-13. <u>DUE</u>: Responses to take-home questions – pt 2
Mar 1	Grant Presentations 1. 2. 3.		
Mar 8	Grant Presentations 1. 2. 3.		
Mar 15	Grant Presentations 1. 2. 3.		
Mar 22	Grant Presentations 1. 2. 3.		<u>DUE</u>: Written grant proposal group project (15%)
Mar 29	Course summary; Ethical and theoretical issues in understanding brain-behaviour relations		

*Last day to add course with permission of instructor (October 22). Last date to drop course without receiving a grade (Feb 5).