

HH/PSYC 6650A 3.0: Research Methodology in Developmental Psychology (York University)
Term: Fall 2015
Course Day and Time: Wed. 2:30 – 5:30, Calumet 314

Course Director: Dr. Melody Wiseheart
Office: BSB 242
Office Hours: by appointment
Email: melodywiseheart@gmail.com (put in subject header: PSYC 6650A)

Course Website: <https://mwcourses.wikidot.com/>

Course Objectives:

You will learn about a variety of research tools, techniques, and strategies, in order to gain a general knowledge of available methods for addressing developmental research questions. You will learn about neural (EEG, ERP, MEG, fMRI, PET, SPECT, DTI, TMS), behavioral (RT, accuracy, eye movement), quantitative (SEM, MANCOVA, hierarchical regression), and model-based (mathematical, connectionist) methodology. You will evaluate hypotheses and theories, in order to determine which methods are most useful for answering specific research questions.

Because a key part of this class is weekly discussions, class attendance is expected. If you plan to miss a class, please notify the course director in advance.

Grading:

20% Leading class discussions
40% Methodology and experimental design paper
20% Feedback on peer paper drafts
20% Participation

Conversion of Percents to Letter Grades:

Percentage	Letter Grade	Grade Point	Percentage	Letter Grade	Grade Point
95-100	A+	9	70-74	C	4
90-94	A	8	65-69	D+	3
85-89	B+	7	60-64	D	2
80-84	B	6	55-59	E	1
75-79	C+	5	0-54	F	0

Readings:

Weekly readings will be assigned, mostly consisting of journal articles and book chapters. Readings should be completed prior to attending class.

Class Discussion:

You will lead discussions on course topics. Topics will be chosen during the first class, and ideally you should pick a topic relevant to your own research.

Methodology and Experimental Design Paper:

You will write a paper that describes a research project of interest to you, especially focusing on the methodology you will use to address your research question(s). While it is not required that you describe a developmental topic or ask developmental questions, doing so is preferable. Length of the paper is flexible, with an estimated average of 30 pages. The paper should (a)

briefly overview the topic, (b) include a detailed method section that uses novel (to you) methodology, (c) address an open question about your topic, and (d) describe how the methodology contributes to advancement of your research question(s). You will provide feedback on peer paper drafts.

Although you are encouraged to use other papers in strong field-specific journals (e.g., Psychophysiology) as guides for the relevant information to include, do not simply copy method sections from other articles. Your method section should demonstrate your knowledge of key parameters for a given technique and technique-specific design issues. Strong experimental design and rigorous and appropriate data collection, processing, and analysis are important. Some studies published in top journals include poor design choices, and it is your responsibility to learn as much as you can about a technique, so you don't repeat the authors' mistakes.

Participation:

Participation will be determined, at the sole discretion of the course director, based on your contributions to class lectures and discussions. You should come to class prepared to ask relevant questions about the readings, and it is expected that you will have read, made notes about, and highlighted confusing aspects of the readings in advance of each class. You should ask questions and contribute your knowledge about techniques, during lectures. This course will succeed or fail based on your interactions during the course.

Missed Deadlines:

If you think you are going to miss a deadline, please notify the course director, so alternate arrangements can be made.

Cheating:

Don't cheat! Cheating and plagiarism not only impair your learning, but also are penalized by the university. If you cheat, you may receive a failing grade for the assignment or the course, or other actions may be taken against you. For university policy on cheating, see:

<http://www.yorku.ca/secretariat/policies/document.php?document=69>

http://www.arts.yorku.ca/faculty_and_staff/policies_and_procedures_for_faculty/academic_honesty_students.php

General Information:

Important information for students regarding the Ethics Review process, Access/Disability, Academic Honesty/Integrity, Student Conduct, and Religious Observance Days is available on the CCAS webpage (see Reports, Initiatives, Documents):

http://www.yorku.ca/secretariat/senate_cte_main_pages/ccas.htm

Weekly Topics:

Day 1 – Sep 16: ERP lecture
Day 2 – Sep 23: ERP discussion
Day 3 – Sep 30: SEM lecture
Day 4 – Oct 7: SEM discussion
Day 5 – Oct 14: Eye movements discussion
Day 6 – Oct 21: Eye movements discussion
Day 7 – Oct 28: Outlier detection discussion
Day 8 – Nov 4: Outlier detection discussion
Day 9 – Nov 11: Mathematical modeling discussion
Day 10 – Nov 18: Mathematical modeling discussion
Day 11 – Nov 25: Computational modeling discussion
Day 12 – Dec 2: Computational modeling discussion

Methodology paper due dates:

Sep 30: Specific topic and methodology to be used
Oct 14: Outline of paper
Nov 4: Draft of paper
Nov 11: Feedback on paper drafts
Dec 2: Final paper

Weekly Readings:

Day 1: ERP lecture

Slides: Courtesy Steve Luck, <http://www.erpinfo.org/>

1. Olvet, D. M., & Hajcak, G. (2008). The error-related negativity (ERN) and psychopathology: Toward an endophenotype. *Clinical Psychology Review*, 28, 1343-1354.

Day 2: ERP discussion

1. Kappenman, E.S., & Luck, S. J. (2012). ERP components: The ups and downs of brainwave recordings. In S. J. Luck & E. S. Kappenman (Eds.), *The Oxford Handbook of ERP Components* (pp. 3-30). New York: Oxford University Press.
2. Keil, A., Debener, S., Gratton, G., Junhöfer, M., Kappenman, E.S., Luck, S. J., Luu, P., Miller, G., & C.M., Yee. (2014). Publication guidelines and recommendations for studies using electroencephalography and magnetoencephalography. *Psychophysiology*, 51, 1-21.

Day 3: SEM lecture

Slides: Courtesy John Fox, <http://socserv.mcmaster.ca/jfox/Courses/soc761/index.html>

1. Huizinga, M., Dolan, C. V., & van der Molen, M. W. (2006). Age-related change in executive function: Developmental trends and a latent variable analysis. *Neuropsychologia*, 44, 2017-2036.

Day 4: SEM discussion

1. MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology*, 51, 201-226.
2. Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, 99, 323-338.

Day 5: Eye movements discussion

1. Rayner, K. (1998). Eye movements in reading and information processing: 20 years of research. *Psychological Bulletin*, 124(3), 372-422.

Day 6: Eye movements discussion

1. Fukushima, J., Hatta, T., & Fukushima, K. (2000). Development of voluntary control of saccadic eye movements: I. Age-related changes in normal children. *Brain and Development*, 22, 173-180.
2. Kramer, A. F., Gonzalez de Sather, J. C. M., & Cassavaugh, N. D. (2005). Development of attentional and oculomotor control. *Developmental Psychology*, 41(5), 760-772.
3. Kramer, A. F., Hahn, S., Irwin, D. E., & Theeuwes, J. (2000). Age differences in the control of looking behavior: Do you know where your eyes have been? *Psychological Science*, 11(3), 210-217.

Day 7: Outlier detection discussion

1. Aguinis, H., Gottfredson, R. K., & Joo, H. (2013). Best-practice recommendations for defining, identifying, and handling outliers. *Organizational Research Methods*, 16, 270-301.

2. Leys, C., Ley, C., Klein, O., Bernard, P., & Licata, L. (2013). Detecting outliers: Do not use standard deviation around the mean, use absolute deviation around the median. *Journal of Experimental Social Psychology*, 49, 764-766.

Day 8: Outlier detection discussion

1. Zijlstra, W. P., van der Ark, L. A., & Sijtsma, K. (2011). Outliers in questionnaire data: Can they be detected and should they be removed? *Journal of Educational and Behavioral Statistics*, 36, 186-212.
2. Hodge, V. J., & Austin, J. (2004). A survey of outlier detection methodologies. *Artificial Intelligence Review*, 22, 85-126.

Day 9: Mathematical modeling discussion

1. Heathcote, A., Popiel, S. J., & Mewhort, D. J. K. (1991). Analysis of response time distributions: An example using the Stroop task. *Psychological Bulletin*, 109, 340-347.
2. Ashby, F. G., & Townsend, J. T. (1980). Decomposing the reaction time distribution: Pure insertion and selective influence revisited. *Journal of Mathematical Psychology*, 21, 93-123.

Day 10: Mathematical modeling discussion

1. Lindsey, R., Mozer, M., Cepeda, N. J., & Pashler, H. (2009). Optimizing memory retention with cognitive models. In A. Howes, D. Peebles, & R. Cooper (Eds.), *Proceedings of the Ninth International Conference on Cognitive Modeling (ICCM)*. Manchester, UK.
2. Mozer, M. C., Pashler, H., Cepeda, N. J., Lindsey, R., & Vul, E. (2009). Predicting the optimal spacing of study: A multiscale context model of memory. In Y. Bengio, D. Schuurmans, J. Lafferty, C. K. I. Williams, & A. Culotta (Eds.), *Advances in Neural Information Systems 22* (pp. 1321-1329). La Jolla, CA: Neural Information Processing Systems Foundation.

Day 11: Computational modeling discussion

1. O'Reilly, R. C. (2006). Modeling integration and dissociation in brain and cognitive development. In Y. Munakata & M. H. Johnson (Eds.), *Processes of change in brain and cognitive development: Attention and performance XXI*. Oxford: Oxford University Press.
2. Munakata, Y., & McClelland, J. L. (2003). Connectionist models of development. *Developmental Science*, 6(4), 413-429.

Day 12: Computational modeling discussion

1. Morton, J. B., & Munakata, Y. (2001). Active versus latent representations: A neural network model of perseveration, dissociation, and decalage. *Developmental Psychobiology*, 40, 255-265.
2. Frank, M. J., Santamaria, A., O'Reilly, R. C., & Willcutt, E. (2007). Testing computational models of dopamine and noradrenaline dysfunction in attention deficit / hyperactivity disorder. *Neuropsychopharmacology*, 32, 1583-1599.