Course Syllabus

Instructor: Paul F. Tremblay, Ph.D.
Email: ptrembla@uwo.ca
Phone (wk): 519 858-5010 ext 22021
Office: CAMH Suite 200 (2nd floor) Mogenson Building, (in UWO Research Park)
Office hours: By appointment (availability usually afternoons 1:00-3:00); arrangements can be made to meet with you in your building.

Psychology 9542B. (Winter 2013). Multilevel Modeling (MLM)
This course serves as an introduction to multilevel modeling (also known as hierarchical linear modeling, mixed models). The course is designed as a continuation of the Psychology 9555 Structural Equation Modeling (SEM) focusing on Mplus as the main analytical software and including research and analytical methods that merge MLM with SEM. Students should therefore have a solid understanding of multiple regression and structural equation modeling and would benefit from previous knowledge of analysis of variance. Course topics include a review of traditional regression procedures, research design with multilevel structures, the basic two-level regression model (and extension to three-levels), methodological and statistical issues including power analyses, models with longitudinal data, models with dichotomous, categorical or count outcomes and structural equation models with multiple data levels. The objective of this course is to provide students with the necessary knowledge to apply MLM to research; the course will therefore involve hands-on projects in which students have the opportunity to analyze their own data or to conduct simulation studies (in Mplus or other packages such as HLM or SPSS Mixed Models). Prerequisite: must have taken Psychology 9540 (Research Design) and should have taken Psychology 9555 (SEM) or obtained the permission of the instructor. Class size is limited to 15 students and there will be no audits. Wednesdays, 9:00 am to 12:00 noon, Room SSC 8438-8440. Start date: Wednesday, January 9, 2012.

The course textbook is Hox J. J. (2010). *Multilevel analysis. Techniques and application. 2nd edition*. New York: Routledge.

Additional Resources:
www.statmodel.com
free demo version of Mplus
free *Version 7 Mplus User's Guide* in pdf

HLM7 Student version
http://www.ssicentral.com/hlm/student.html

Schedule

	Date	Topic	Readings
1	Jan 9	Overview and review of multiple regression issues. (e.g., centering, interactions, logistic…) Mplus. Review of basic syntax and discussion of other software	Although not indicated below, skim the Mplus manual throughout the course. Chapter 9 is the main chapter for multilevel modeling.
2	Jan 16	Overview of MLM logic and design	Hox chapter 1 Kahn, J. H. (2011). Multilevel modeling: Overview and applications to research in counseling psychology. *Journal of Counseling Psychology*, *58(2)*, 257-271. Nezlek, J. B. (2008). An introduction to multilevel modeling for social and personality psychology. *Social and Personality Psychology Compass, 2(2)*, 842-860.
3	Jan 23 (test 1)	The Basic Two-Level Regression Model	Hox chapter 2 Peugh, J. L. (2010). A practical guide to multilevel modeling. *Journal of School Psychology*, *48*, 85-112.
4	Jan 30 (test 2)	The Basic Two-Level Regression Model	Hox chapters 2, 3 Peugh (2010)
5	Feb 6 (test 3)	Methodological and Statistical Issues	Hox chapters 3, 4 Peugh (2010)
6	Feb 13 (test 4)	Analyzing Longitudinal Data	Hox chapter 5 Quené, H., & van den Bergh, H. (2004). On multi-level modeling of data from repeated measures designs: a tutorial. *Speech Communication, 43*, 103-121.
	Feb 20	Reading Week	
7	Feb 27 (test 5)	Analyzing Longitudinal Data	Hox chapters 5, 16 (latent curve models) Quené, H., & van den Bergh, H. (2004)
8	Mar 6 (test 6)	Dichotomous, Categorical, Count Data	Hox chapters 6,7 (skim)
9	Mar 13 (test 7)	Sample size, power, Monte Carlo	Hox chapter 12
10	Mar 20 (test 8)	MLM meets SEM: Factor models	Hox chapter 14
11	Mar 27 (test 9)	MLM meets SEM: Path models Presentations	Hox chapter 15
12	Apr 3	Presentations	
13	Apr 10	Presentations	

Evaluation

40%: Short tests and labs. Each week, beginning during the third class (Jan 23), there will be either a short test (15 min max) test just before the mid-break or a mini-lab assignment (approximately 6 tests and 3 labs). The tests will consist of a question from core material mainly from the previous week lecture and readings and will focus on understanding and application of the procedures. The mini-lab assignments will consist of running analyses in Mplus (or other MLM software of your choice). **Your total grade for the short-test/lab component will be calculated as the average of the best 8 of 9 tests**. There will be no make-up tests; thus if you miss a class, your grade for this component will be based on the 8 tests/labs that you will have taken. Students who miss more than one class will need to write an additional test at the end of the course to compensate for their incomplete evaluation.

10%: Participation. Coming to class (including presentations during the three last classes). You will be assigned to comment on specific presentations.

50%: Individual project. You will be required to conduct analyses for an individual multilevel modeling project. You will have the choice between using a large data set that I can provide, providing one yourself (approved by the instructor), or creating a simulation data set as part of a research proposal (I will explain this option). Please have your research idea approved by the instructor by Feb 13. The project will have three components:

- a research proposal outlining your project worth 10% (due March 6)
- a 15-20 min presentation (like a conference oral presentation) of your project worth 20% (March 27, April 3, or April 10)
- a final write-up of the project worth 20% (due one week after last class – April 17)

See next page for more details on project.

Individual Project

Requirements. The main requirement is a multilevel design with observations at level-1 nested in a level-2 unit (e.g., students nested within classrooms, repeated observations nested within people). The second requirement is that you have at least one level-1 predictor and one level-2 predictor. The third requirement is that you use a model building approach in which you start with a simple intercept-only model and add your predictors in subsequent models. Note that for those using repeated measures, you have the option to model time using a latent growth modeling approach. If you want to do something different such as a montecarlo study or a confirmatory factor analysis/structural equation model combining level-1 and level-2 data please discuss your idea with me.

1. **Research idea (due Feb 13)**. Have your idea approved by me by Feb 13. No write-up necessary. The main goal is to decide on your design in general and your data set. You can discuss your idea with me in class, or by email, or we can set up a meeting.
2. **Research proposal (due March 6; 10%)**. A two-page max description of your project outlining your objectives, hypotheses, research design, description of data, and description of variables/measures.
3. **Presentation (March 27, April 3, April 10; 20%)**. You will have 15 minutes (max) to do your presentation followed by a 10 min discussion. Two students will be assigned to comment and to ask questions first followed by questions from the rest of the class. You will be rated on the material in your slideshow as well your presentation itself (ability to present and explain clearly). Your slides will be due the same day. For those who present during the last class (April 10), I will provide your evaluation by the following day so that you have feedback in time to finish your paper.
4. **Paper (April 17; 20%).** Your paper should generally be written as a manuscript for publication. Your introduction can be less elaborate than a publication manuscript but you should include a rationale, objectives and hypotheses and a brief review of the literature. The text should be no longer than 20-25 double spaced pages and you should include tables and or figures. One good way to present your analyses is by using a table describing the models that you ran. See for example the tables in the Peugh (2010) article. See also articles below.

   EXAMPLE: Wang Y.-D., & Hsieh, H.-H (2012).Toward a better understanding of the link between ethical climate and job satisfaction: A Multilevel analysis. *Journal of Business Ethics, 105*, 535-545.

   Pike, G. R., & Rocconi, L. M. (2012). Multilevel modeling: Presenting and publishing the results for internal and external constituents. *New Directions for Institutional Research, 154*, 111-124.

   Dedrick, R. F., Ferron, J. M., Hess, M. R. et al. (Spring, 2009). Multilevel Modeling: A Review of Methodological Issues and Applications. *Review of Educational Research, 79(1),* 69-102.