**Psychology 992-602 – Multilevel Modeling – Spring 2021**

**Tuesdays 12:40-3:30**

**Synchronous Online via Zoom**

**Instructor:** Dr. Debby Kashy  **Office Hours**: ***Appointments arranged via email***

**Home Phone**: 517-410-1978

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# Course Description: This course provides an introduction to multilevel modeling theory and application. Multilevel modeling is an extension of the General Linear Model that is typically used with observations that are nested within groups (e.g., students in classrooms, patients in group therapy) or when participants are measured repeatedly over time (e.g., intervention studies with multiple follow-up assessments, daily diary studies, longitudinal panel studies). In addition to discussing the underlying models and assumptions of MLM, the course will emphasize applications of the method and we will be using SPSS software. Students who wish to use other data analysis packages (R, SAS, STATA) can do so, however, class examples and discussion will be strongly tied to SPSS syntax. Coursework will include weekly readings, several homework assignments, and a research project requiring a written paper and a class presentation. These elements are described in detail below.

**Online Format:** The course will be conducted **synchronously via Zoom**. Although I will post links to the recorded lectures, attendance at each meeting is expected so that we can have course discussions and students can ask questions.

**Prerequisites:** Multilevel modeling builds on ***Multiple Regression*** and ***ANOVA*** techniques. I will review this material briefly at the beginning of the course, but I am assuming that every student in the class has strong familiarity with the two approaches.

# Text: Hox, J. J., Moerbeek, M., & Van de Schoot, R. (2017). *Multilevel analysis: Techniques and applications*. Routledge.

Other Readings will be available for downloading on D2L

**Required Computer Software:** We will primarily be using SPSS in this course. To start the class you should obtain SPSS for your computer. The student license for SPSS can be purchased for $20.00 at the following site:

<https://techstore.msu.edu/software/spss-student-license-valid-until-01312022>

**Graded components of the class:** Guaranteed baseline final grade calculation: 90% 4.0, 85% 3.5 80% 3.0, 75% 2.5 70% 2.0 69% or lower 0.0.

**Reading summaries and ratings (15%)** In addition to each week’s assigned readings, you will need to find and read an applied paper in your own research area that uses MLM as the primary data analytic approach. (You can find many examples by just including “multilevel modeling” in the Google Scholar along with your interest-specific keywords.) Each week you will need to email a pdf version of the paper you read to me, along with a word document that has a 3-4 sentence description of the topic AND two ratings of the paper on clarity and helpfulness (with regards to the MLM component of the paper):

1. 1 = not at all clear to 7 = very clear
2. 1 = not at all helpful to 7 = very helpful

The title of the word document that contains your summary should include a word or two describing the content and both ratings. For example: *SchoolBullying64.doc* might be the name of a paper on bullying in schools that you rate as a 6 on clarity but a 4 on helpfulness.

These summaries with ratings, and the pdf files of the papers must be sent by midnight on Mondays or they will receive a score of 0 for that week. Your email should have **MLM Reading** in the subject. I will post the summaries and readings on D2L so other students will have access to them.

**Homework (25%): There will be 4-6 homework assignments during the class. Assignments will** require students to analyze data sets provided by the instructor using the statistical techniques that will be discussed in class. Students will be required to conduct analyses of these data sets, table results, and write up the results using APA format.

**Research Project (45%) and Presentation (15%):** You will be required to complete a

project in which you employ multilevel analysis to analyze a dataset of your choosing. (If you do not have a dataset available for analysis, I will provide one.) A 1-page description of the data set and research question must be submitted by **2/9/21**. There will be two components of the project. The first is a paper, written in APA format, writing up the results of the study. The paper should include 1) a *brief* overview that clearly lays out the research questions to be addressed, 2) a method section that describes how the data were collected and the measures to be analyzed, 3) an analysis section that describes the basic components of the analytic approach - including issues such as centering and/or how interactions are computed and interpreted, 4) a results section and accompanying Tables, and 5) a *brief* discussion that summarizes results and puts them in context. **The paper will be due on Wednesday, April 28** (our scheduled final exam day for the class) at 10:00am. The second component to the project is an in-class research presentation (15-20 minutes) that will occur on the last two days of class **(4/13 and 4/20).**

Course Schedule

**Note: This schedule is tentative and subject to change. Changes will be noted in class. Also note that readings may be added or changed as the semester progresses. These too will be noted in class.**

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| **Week** | **Topic** | **Readings: Readings should be completed by the class period they are listed for** |
| **1/19** | **1. Introduction to MLM: Communication in groups** |  |
| **1/26** | **2. Review of Regression (Multiple Regression, Categorical predictors, Interactions in Regression)** | **Hox ch. 1;**  **Heck1SPSS.pdf.**  **Topic Reading** |
| **2/2** | **3. Data Restructuring; Intraclass correlations; Basic MLM using SPSS** | **Hox ch. 2;**  **Snijders & Bosker ch. 2 & 3; Heck2SPSS.pdf;**  **Topic Reading** |
| **2/9** | **4. MLM fundamentals, covariance structures, R-squared and deviance tests** | **Hox ch. 3;**  **Heck3SPSS.pdf;**  **Topic Reading** |
| **2/16** | **5. MLM fundamentals, Categorical predictors, Repeated versus Random effects, Centering** | **Hox ch. 4;**  **Enders & Tofighi 2007;**  **Topic Reading** |
| **2/23** | **6. MLM for over-time data: Growth Curve Models** | **Judd et al., 2017;**  **Curran & Bauer 2011;**  **Topic Reading** |
| **2/18** | **7. MLM in the over-time context, Growth Curve Models** | **Hox ch. 5;**  **Biesanz et al., 2004**  **Bolger & Laurenceau ch.2, 3;**  **Topic Reading** |
| **2/25** | **8. Dyadic data analysis** | **Grimm et al. ch. 1;**  **Grimm et al. ch. 3 to page 58;**  **Topic Reading** |
| **3/2** | **Spring break** |  |
| **3/9** | **9. Actor-partner Interdependence Model for Dyads and Groups** | **Kenny et al. ch. 1,4,7;**  **Topic Reading** |
| **3/16** | **10. Over-time dyadic data** | **Manne et al. 2012;**  **Topic Reading** |
| **3/23** | **11. Analysis of categorical outcomes** | **Hox ch. 6;**  **Heck1Cat.pdf;**  **Heck3Cat.pdf** |
| **3/30** | **12. Power in MLM** | **Hox ch. 12;**  **Maas & Hox, 2005** |
| **4/6** | **Finish Material** |  |
| **4/13** | **Student Research Presentations** |  |
| **4/20** | **Student Research Presentations** |  |
| **4/28** | **Student Research Presentations**  **(Wednesday 4/28 at 10:00 during Final Exam Period)** |  |

References

Bickel, R. (2007). *Multilevel analysis for applied research: It's just regression!*. Guilford Press.

Biesanz, J. C., Deeb-Sossa, N., Papadakis, A. A., Bollen, K. A., & Curran, P. J. (2004). The role of coding time in estimating and interpreting growth curve models. *Psychological methods*, *9*(1), 30-52.

Bolger, N., & Laurenceau, J. P. (2013). Intensive longitudinal methods. *New York, NY: Guilford*.

Curran, P. J., & Bauer, D. J. (2011). The disaggregation of within-person and between-person effects in longitudinal models of change. *Annual review of psychology*, *62*, 583-619.

Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: a new look at an old issue. *Psychological methods*, *12*(2), 121.

Grimm, K. J., Ram, N., & Estabrook, R. (2016). *Growth modeling: Structural equation and multilevel modeling approaches*. Guilford Publications.

Guo, G., & Zhao, H. (2000). Multilevel modeling for binary data. *Annual review of sociology*, *26*(1), 441-462.

Kashy, D. A. & Donnellan, M. B. (2012). Conceptual and Methodological Issues in the Analysis of Data from Dyads and Groups. In K. Deaux and M. Snyder (Eds.), *The Oxford Handbook of Personality and Social Psychology*. (pp. 209-238). New York: Oxford University Press.

Kenny, D. A., Kashy, D. A., Cook, W. L., (2006). Dyadic data analysis (Methodology in the social sciences). *New York, NY: Guilford*.

Kreft, I. G., De Leeuw, J., & Aiken, L. S. (1995). The effect of different forms of centering in hierarchical linear models. *Multivariate behavioral research*, *30*(1), 1-21.

Judd, C. M., Westfall, J., & Kenny, D. A. (2017). Experiments with more than one random factor: Designs, analytic models, and statistical power. *Annual Review of Psychology*, *68*, 601-625.

Maas, C. J., & Hox, J. J. (2005). Sufficient sample sizes for multilevel modeling. *Methodology*, *1*(3), 86-92.

Manne, S., Badr, H., & Kashy, D. A. (2012). A Longitudinal Analysis of Intimacy Processes and Psychological Distress among Couples Coping with Head and Neck or Lung Cancers. *Journal of Behavioral Medicine. 35,* 334-346*.* DOI 10.1007/s10865-011-9349-1

Neupert, S. D., Patterson, T. R., Davis, A. A., & Allaire, J. C. (2011). Age differences in daily predictors of forgetting to take medication: The importance of context and cognition. *Experimental aging research*, *37*(4), 435-448.

Singer, J. D. (1998). Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models. *Journal of educational and behavioral statistics*, *23*(4), 323-355.

Snijders, T., & Bosker, R. (1999). Multilevel analysis: An introduction to basic and applied multilevel analysis.

**COVID-19**

* 1. Office Hours: For Spring 2021, all office hours will be via computer or telephone. If you email me, I will schedule a Zoom meeting or a phone call at a set time. I will email you a Zoom link for Zoom meetings.
  2. If you are sick and cannot keep up with the material please contact me and we can figure out a solution. I will be videotaping the course so that you will be able to continue with the material when you feel up to it. **Please know that I will make accommodations for those who must miss class due to illness.**

In the unlikely case that we choose to try to meet on campus:

* 1. Staying Home or Self-Isolating when Appropriate: If you need to quarantine yourself because 1) you have been sick with COVID-19[symptoms](https://urldefense.com/v3/__https:/www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html__;!!HXCxUKc!j90TOohLUcyoYW_rtsmeTdHNaw_s8XpMR2J04s55ESQPKpWEJ_JueEjSLo54Sw$), or 2) you have tested positive for COVID-19, or 3) you have been potentially[exposed](https://urldefense.com/v3/__https:/www.cdc.gov/coronavirus/2019-ncov/php/public-health-recommendations.html__;!!HXCxUKc!j90TOohLUcyoYW_rtsmeTdHNaw_s8XpMR2J04s55ESQPKpWEJ_JueEheFYRBbg$) to someone with COVID-19 you need to follow CDC guidance to[self-isolate and stay home](https://urldefense.com/v3/__https:/www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/quarantine-isolation.html__;!!HXCxUKc!j90TOohLUcyoYW_rtsmeTdHNaw_s8XpMR2J04s55ESQPKpWEJ_JueEjiylbgZg$).
  2. Cloth Face Coverings On Campus: [Cloth face coverings are required](https://msu.edu/together-we-will/keeping-spartans-safe/?utm_source=reopening-email&utm_medium=email&utm_campaign=faculty-staff) for everyone on campus.

                                                    i.     Face coverings must be worn by everyone (including all faculty, staff, students, vendors, and visitors) indoors and outdoors while on property owned or governed by MSU and while participating in MSU-related or MSU-sponsored activities. If you have a medical condition that may prevent you from safely wearing a face covering, you should contact [MSU’s Resource Center for Persons with Disabilities](https://www.rcpd.msu.edu/) to begin the accommodation process.

                                                   ii.     Face coverings should (a) be non-medical grade to maintain supplies for health care use, (b) fit snugly against the side of your face, (c) cover your nose and mouth, (d) be secured with ties or ear loops, and (e) allow for breathing without restriction. Cloth face coverings should only be worn for one day at a time, and they must be properly hand washed or laundered before subsequent use. Face coverings may vary (for example, disposable non-medical face coverings or neck gaiters are acceptable).

                                                  iii.   Failure to wear a face covering for those without an accommodation will result in the following: (1) A reminder of the requirement, the reason for it (to minimize spread), and a request to comply. (2) A request to leave the classroom if no compliance. (3) If no face covering compliance and the student refuses to leave the classroom, class will be dismissed. (4) Should an emergency develop that you feel cannot be resolved by classroom dismissal, consider calling 911 for assistance.

**Miscellaneous MSU Rules/Regulations etc:**

**Academic Honesty**: [The Spartan Code of Honor](https://honorcode.msu.edu/) states, "As a Spartan, I will strive to uphold values of the **highest ethical standard**. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that **honor is worth more than grades**. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do." In addition, Article 2.III.B.2 of the [Student Rights and Responsibilites (SRR)](http://splife.studentlife.msu.edu/academic-freedom-for-students-at-michigan-state-university) states that "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." The Psychology department

adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades; the all-University Policy on Integrity of Scholarship and Grades; and Ordinance 17.00, Examinations. (See [Spartan Life: Student Handbook and Resource Guide](http://splife.studentlife.msu.edu/) and/or the MSU Web site: [www.msu.edu](http://www.msu.edu/).)

Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, lab work, quizzes, tests and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit course work you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the www.allmsu.com Web site to complete any course work in this course. Students who violate MSU academic integrity rules may receive a penalty grade, including a failing grade on the assignment or in the course. Contact your instructor if you are unsure about the appropriateness of your course work. (See also the [Academic Integrity](https://msu.edu/~ombud/academic-integrity/index.html) webpage.)

**Limits to confidentiality.** Essays, journals, and other materials submitted for this class are generally considered confidential pursuant to the University's student record policies.  However, students should be aware that University employees, including instructors, may not be able to maintain confidentiality when it conflicts with their responsibility to report certain issues to protect the health and safety of MSU community members and others.  As the instructor, I must report the following information to other University offices (including the [MSU Police Department](http://police.msu.edu/)) if you share it with me:

--Suspected child abuse/neglect, even if this maltreatment happened when you were a child,

--Allegations of sexual assault or sexual harassment when they involve MSU students, faculty, or staff, and

--Credible threats of harm to oneself or to others.

These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared.  In almost all cases, it will be your decision whether you wish to speak with that individual.  If you would like to talk about these events in a more confidential setting you are encouraged to make an appointment with the [MSU Counseling Center](http://counseling.msu.edu/).

**Accommodations for Students with Disabilities** (from the [Resource Center for Persons with Disabilities (RCPD):](http://counseling.msu.edu/) Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored.

**Commercialized Lecture Notes**: [The Code of Teaching Responsibility](https://reg.msu.edu/AcademicPrograms/Print.asp?Section=514) requires that students receive the written consent of the instructor to sell or otherwise commercialize class notes and materials.  Specifically, the Code of Teaching Responsibility states, “Instructors may allow commercialization by including permission in the course syllabus or other written statement distributed to all students in the class.”  The Ad Hoc Committee on Social Media, Pedagogy, Academic Rights and Responsibilities in their final report (January 10, 2014) suggested the following language:

*As members of a learning community, students are expected to respect the intellectual property of course instructors.  All course materials presented to students are the copyrighted property of the course instructor and are subject to the following conditions of use:*

*1. Students may record lectures or any other classroom activities and use the recordings only for their own course-related purposes.*

*2. Students may share the recordings with other students enrolled in the class, provided that they also use the recordings only for their own course-related purposes.*

*3. Students may not post the recordings or other course materials online or distribute them to anyone not enrolled in the class without the advance written permission of the course instructor and, if applicable, any students whose voice or image is included in the recordings.*

*4. Any student violating the conditions described above may face academic disciplinary sanctions, including receiving a penalty grade in the course.*

**Disruptive Behavior**: Article 2.III.B.4 of the [Student Rights and Responsibilities (SRR)](http://splife.studentlife.msu.edu/academic-freedom-for-students-at-michigan-state-university) for students at Michigan State University states: "The student's behavior in the classroom shall be conducive to the teaching and learning process for all concerned." Article 2.III.B.10 of the [SRR](http://splife.studentlife.msu.edu/academic-freedom-for-students-at-michigan-state-university) states that "The student and the faculty share the responsibility for maintaining professional relationships based on mutual trust and civility." [General Student Regulation 5.02](http://splife.studentlife.msu.edu/regulations/general-student-regulations) states: "No student shall . . . interfere with the functions and services of the University (for example, but not limited to, classes . . .) such that the function or service is obstructed or disrupted. Students whose conduct adversely affects the learning environment in this classroom may be subject to disciplinary action.

**Religious Accommodations**

If you will miss class for a religious observance, let me know in advance.

**Emergency Procedures**

If an emergency should occur that would require the cancellation of class, I will send an email. While an emergency occurring during class is unlikely, please take time the first day to think through your emergency plans for such events (e.g., know at least two exits from the building). To receive emergency messages, set your cellular phones on silent mode when you enter this classroom.  If you observe or receive an emergency alert, immediately and calmly inform your instructor.  (See also [www.alert.msu.edu](http://www.alert.msu.edu/).)