GENERAL INFORMATION

Class Time: Monday 9:05am-12:05pm  Class Location: 130 Moore Building
Zoom: https://psu.zoom.us/j/97032063579?pwd=aHJDhNKeHJXUZaei9OC9qbUVhQT09
Passcode: 145735
Instructor: James M. LeBreton  Office Location: 632 Moore Building
E-mail: james.lebreton@psu.edu  Office Hours: By Appointment
Zoom: https://psu.zoom.us/my/james.lebreton

TA Information
Assistant: Kayley Morris  Office Location: 608 Moore Building
E-mail: kmm8194@psu.edu  Office Hours: TBD

RECOMMENDED TEXTBOOKS


ADDITIONAL RESOURCES


STATISTICAL SOFTWARE

R & RStudio. R and RStudio are free software packages that will serve as the primary software used in the course. If you are using a PSU computer from the CLA, you should be able to download and install a copy from the software center (Windows)/self service dock (Mac) if it is not already installed. If you are having trouble, you can contact the LA Helpdesk at techsupport@la.psu.edu. On personal computers, you can just download R (https://www.r-project.org) and RStudio (https://www.rstudio.com).
COURSE OBJECTIVES

This class is designed to provide doctoral students with an introductory treatment of multilevel theory building and testing. Issues to be discussed include: multilevel theory & multilevel constructs, multilevel measurement models including composition and compilation models, data aggregation, aggregation bias, the role of within-group agreement in multilevel measurement, cross-level inference & cross-level bias, cross-level interactions, and multilevel regression models/hierarchical linear models/random coefficient regression models. If time permits, we will discuss other special topics based on class interest (e.g., dyadic data structures & analyses, missing data, multilevel mediation, assessment of EMA data). This course has three goals:

1) To provide students with a broad theoretical understanding of multilevel modeling,
2) To provide students with the technical skills necessary to incorporate multilevel data analytic techniques into their research projects, and
3) To provide students with a cursory treatment of the mathematical foundations of these topics so that the interested student has the requisite background to pursue advanced training in these areas.

COURSE PHILOSOPHY & EXPECTATIONS

This class is our opportunity to examine a number of advanced theoretical, methodological, and statistical issues related to multilevel models & modeling. It is my goal that each of you leaves the class capable of discussing in great depth the topics we cover. To be successful in this class, you must be proactive.

- READ: Read the weekly articles (at least once) prior to class.
- WRITE: Take notes as you read; what concepts were particularly confusing or difficult to grasp.
- THINK: Think outside the box; frame the topics in innovative and creative ways.
- ASK: If something is unclear to you, I can almost guarantee it is unclear to others. So, let me know; ask questions, seek clarification, request additional examples, etc.
- EXTEND: Consider how the topics we discuss relate back to the research questions in each of your specialty areas; extrapolate the local information & examples back to your research areas.

I view my role in this class differently than I do in undergraduate classes. The model typically adopted during undergraduate education is that of the instructor as "lecturer" and the students as "note takers." Though this model may be effective for undergraduate instruction, it is deficient for graduate instruction for several reasons. Specifically, a number of critical professional skills are not developed in this environment. These include:

- Organizing, analyzing, and integrating information,
- Effectively communicating this information both orally and in writing,
- Identifying weaknesses or "holes" in extant research and theory,
- Thinking critically about these weaknesses and develop alternatives to fill in the "holes,"
- Developing arguments for and against various theoretical or methodological positions (i.e., challenging theoretical & methodological orthodoxy),
- Effectively communicating these arguments both orally and in writing, and
- Effectively enhancing a group's understanding and knowledge of complex multifaceted issues.

I view my role as one of clarifying issues rather than pontificating to you about them. For many of the topics we will discuss there are no black and white answers, rather it is a case of how strong an argument you can provide for your particular shade of gray. What I will do is share my thoughts and opinions on the topics we discuss. I will also try and clarify theoretically, methodologically, or mathematically tricky issues.
OVERVIEW OF COURSE FORMAT

This course is scheduled to meet three hours each week. During each class period we will focus on a different topic. Because this course is an advanced doctoral course, emphasis is placed on students grasping issues at both the conceptual/theoretical level and the technical/operational level. In most instances, the mathematics for the procedures we discuss will be introduced, but not overly emphasized. I can recommend articles and books for those students seeking a more rigorous mathematical treatment of these topics.

Each week the class will be assigned a list of readings (usually 6-8 readings). An additional list of optional readings is available for students seeking supplementary information about that week’s topic. By no means are you limited to the contents of the reading list. I would encourage you to integrate any additional readings you believe are relevant to the topic at hand.

COURSE REQUIREMENTS

Attendance & Participation. Students are expected to be active members (both cognitively and verbally) of the class. Please be present, prepared, and on-time for each class. My discretion decides an excused absence (e.g., medical illness, family emergency, approved University absence). Unexcused absences (e.g., I over slept; I’m going on a vacation; I already bought my plane ticket to fly home at the end of the semester) are not acceptable and will result in the drop of a letter grade. I reserve the right to give pop quizzes over the assigned material. These pop quiz scores, in conjunction with weekly attendance/participation, will be used to determine the final participation grade. Participation (verbal and mental) is a function of (at least) the following:

- Oral Communication – Are your statements articulate and logically coherent?
- Technical Knowledge – Are you prepared for class? Are your descriptions conceptually clear?
- Activity – Are you actively participating in class discussion? Are you contributing not only in terms of quantity, but also in terms of quality to the discussion? Have you prepared to discuss your answers to out of class assignments?
- Civility – Are you treating the other members of the class with respect and courtesy? Are you allowing others the opportunity to share their thoughts or are you dominating the conversation?

Assignments. Most weeks, students will be asked to complete a brief assignment. These assignments may range from generating a set of multilevel hypotheses & describing how to measure the variables to analyzing data & writing up results using APA format.

Quizzes. Two quizzes/exams will be distributed at roughly the mid-point and the end of the semester. These quizzes will likely take the form of a data analysis and interpretation exercise. For example, I might give you a data set and set of hypotheses and you will be asked to test those hypotheses and write-up your findings like you would for a journal submission.

INDIVIDUAL AND GROUP WORK

You are strongly encouraged to consider working in groups for the homework/assignments so that you benefit from collaborative learning. However, you must submit your own individual solutions to each assignment. **Collaboration is not permitted on the quizzes.**
GRADES

Each requirement will contribute to your grade as noted below:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Percentage</th>
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<tr>
<td>Participation &amp; Pop Quizzes</td>
<td>10% (15%)</td>
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<tr>
<td>Assignments</td>
<td>60% (65%)</td>
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<tr>
<td>Quizzes/Tests</td>
<td>30% (20%)</td>
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Grades will be assigned using the following scale:

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<td>A+</td>
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<td>A</td>
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<tr>
<td>A-</td>
<td>10</td>
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<td>B+</td>
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<td>B</td>
<td>8</td>
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<td>B-</td>
<td>7</td>
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<td>C+</td>
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ACADEMIC INTEGRITY

Students with questions about academic integrity should visit:

https://la.psu.edu/current-students/undergraduate-students/education/academic-integrity

Penn State defines academic integrity as “the pursuit of scholarly activity in an open, honest and responsible manner.” (Senate Policy 49-20). Dishonesty of any kind will not be tolerated in this course. Dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without permission from the instructor or tampering with the academic work of other students. Students facing allegations of academic misconduct who drop the course will be returned and will be expected to complete course work and meet course deadlines until the allegations are dismissed and the drop is permitted. Students responsible for academic misconduct often receive academic sanctions, which can be severe, and put themselves at jeopardy for disciplinary sanctions assigned by the University’s Office of Student Conduct (see Senate Policy G-9).

To avoid plagiarism in this course, always include an in-text citation that includes the author(s) last name(s) and the year the source was published at the end of any sentence/after any image that includes words, images, or ideas you found in a source, always included quoted text within quotation marks, and always include a reference for any source at the end of your paper (reference format will be discussed in class).

Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University’s Code of Conduct states that all students should act with personal integrity, respect other students’ dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Students MAY collaborate on the homework assignments.

Students MAY NOT collaborate on the quizzes. If you have questions or require clarification about any aspect of the quizzes, please direct those inquiries to James or the TA. If you have any questions about what constitutes appropriate or inappropriate collaboration, please ask James or the TA.
DISABILITY SERVICES

Penn State welcomes students with disabilities into the University’s educational programs. Every Penn State campus has an office for students with disabilities. Student Disability Resources (SDR) website provides contact information for every Penn State campus (http://equity.psu.edu/sdr/disability-coordinator). For further information, please visit Student Disability Resources website (http://equity.psu.edu/sdr/).

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines (http://equity.psu.edu/sdr/guidelines). If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

COUNSELING & PSYCHOLOGICAL SERVICES

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

Counseling and Psychological Services at University Park (CAPS) (http://studentaffairs.psu.edu/counseling/): 814-863-0395

Counseling and Psychological Services at Commonwealth Campuses (http://senate.psu.edu/faculty/counseling-services-at-commonwealth-campuses/)

Penn State Crisis Line (24 hours/7 days/week): 877-229-6400
Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

EXTENDED ABSENCES

During your enrollment at Penn State, unforeseen challenges may arise. If you ever need to miss an extended amount of class in such a circumstance, please notify your professor so you can determine the best course of action to make up missed work. If your situation rises to a level of difficulty you cannot manage on your own with faculty support, reach out to the Student Care & Advocacy office by phone at (814-863-2020) or email them at StudentCare@psu.edu. Office hours are Monday-Friday, 8 a.m. to 5 p.m.
COVID-19

The course will be following Penn State COVID-19 guidance for faculty and instructors.

ZOOM

In the event we need to transition to Zoom, keep in mind that this is a classroom environment and others should be treated with respect. Please keep your microphone muted unless you want to ask a question or interact with someone. If your microphone is not muted, the entire class will be able to hear what is going on in your environment. Also, as an instructor, I personally like to see people’s faces. Also, as a participant, I am more involved when I have my camera on. I realize, however, that there are many reasons why you might not want to turn on your camera such as poor internet connection, joining via phone, or other privacy concerns. It is your choice as to whether you would like to have the camera on or not.

In the past when I have taught on Zoom, students found it helpful for me to record the sessions. Thus, video and audio recordings of class lectures will be part of the classroom activity. The video and audio recordings are used for educational uses/purposes and only may be made available to students presently enrolled in the class. For purposes where the recordings will be used in future class session/lectures, any type of identifying information will be adequately removed. At this point, I do not envision using these recordings again in the future.

NATURAL OR UNNATURAL DISASTERS

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Due Assignments</th>
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<tbody>
<tr>
<td>1</td>
<td>08/22/22</td>
<td>Topic 1: Introduction &amp; Course Overview</td>
<td>Assignment #1 Distributed</td>
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<tr>
<td>2</td>
<td>08/29/22</td>
<td>Topic 2: Multilevel Theory - Context, Dynamics, &amp; Emergence</td>
<td>Assignment #1 Due; Assignment #2 Distributed</td>
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<tr>
<td>3</td>
<td>09/05/22</td>
<td><strong>No Class – Labor Day</strong></td>
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<tr>
<td>4</td>
<td>09/12/22</td>
<td>Topic 3: Multilevel Measurement - Aggregation &amp; Cross-Level Inference</td>
<td>Assignment #2 Due; Assignment #3 Distributed</td>
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<tr>
<td>5</td>
<td>09/19/22</td>
<td>Topic 4: Multilevel Measurement - Agreement, Reliability, &amp; Isomorphisms</td>
<td>Assignment #3 Due; Assignment #4 Distributed</td>
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<tr>
<td>6</td>
<td>09/26/22</td>
<td>Topic 5: Multilevel Analysis - Overview of Nested Models</td>
<td>Assignment #4 Due; Assignment #5 Distributed</td>
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<td>7</td>
<td>10/03/22</td>
<td>Topic 5: Multilevel Analysis - Analysis of Nested Models Using R</td>
<td>Assignment #5 Due;</td>
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<td>8</td>
<td>10/10/22</td>
<td>Topic 5: Multilevel Analysis - Analysis of Nested Models Using R</td>
<td>Assignment #6 Due; Assignment #7 Distributed</td>
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<td>9</td>
<td>10/17/22</td>
<td>Topic 5: Multilevel Analysis - Analysis of Nested Models Using R</td>
<td>Assignment #7 Due</td>
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<td>Topic 6: Multilevel Analysis – Centering &amp; Scaling</td>
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<td>10</td>
<td>10/24/22</td>
<td>Topic 7: Multilevel Analysis - Variance Explained</td>
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<td>11</td>
<td>10/31/22</td>
<td>Topic 8: Multilevel Analysis - Overview of Growth Models</td>
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<td>12</td>
<td>11/07/22</td>
<td>Topic 8: Multilevel Analysis – Analysis of Growth Models Using R</td>
<td>Assignment #8 Distributed</td>
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<tr>
<td>13</td>
<td>11/14/22</td>
<td>TBD</td>
<td>Assignment #8 Due</td>
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<tr>
<td>14</td>
<td>11/21/22</td>
<td><strong>No Class – Thanksgiving</strong></td>
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<tr>
<td>15</td>
<td>11/28/22</td>
<td>Topic 8: Dyadic &amp; 3-Level Models</td>
<td>Assignment #9 Distributed</td>
</tr>
<tr>
<td>16</td>
<td>12/05/22</td>
<td>Topic 9: Multilevel Analysis Overview of ESM/EMA</td>
<td>Assignment #9 Due</td>
</tr>
<tr>
<td>17</td>
<td>12/12/22</td>
<td><strong>No Class – Final Exams</strong></td>
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</table>
Week 2
Topic 2: Multilevel Theory

Multilevel Theory – General & Contextual

Multilevel Theory – Dynamics & Emergence

Additional Readings
Theory & Method

Illustrations

Additional Readings
Scullen, S. E. (1997). When ratings from one source have been averaged, but ratings from another source have not: Problems and solutions. *Journal of Applied Psychology, 82*, 880-888.


**Illustrations**


**Additional Readings**


LeBreton, J. M., James, L. R., & Lindell, M. K. (2005). Recent issues regarding r\textsubscript{WG}, r\textsuperscript{*WG}, r\textsubscript{WG(J)}, r\textsuperscript{*WG(J)}. *Organizational Research Methods, 8*, 128-138.


Weeks 6 & 7

Topic 5: Multilevel Analysis I: Overview of Nested Models

Chapter 2: The Logic of HLM (pp. 16-31)

*Note: Just read pp. 16-31 (skip final section on centering/scaling of variables)*


*Note: Just read pp. 257-265 & 268-270 (skip longitudinal, 3-level models, & technical issues)*

Optional (A Bit More Technical):
Chapter 4: An Illustration

Week 8

Topic 5: Multilevel Analysis II: Analysis Using R


Additional Recommended Readings for Weeks 6-8


Week 9  
**Topic 6: Multilevel Analysis III: Variance Decomposition**


Week 10  
**Midterm Quiz**

Week 11

**Topic 7: Multilevel Analysis - Overview of Growth Models**


Chapter 6: Applications in the Study of Individual Change

Illustration


Recommended


Week 12  
**TBD**

Week 13  
**Topic 7: Multilevel Analysis – Analysis of Growth Models in R**


Week 14  
**No Class - Thanksgiving Recess**
Week 15
Topic 8: Multilevel Analysis - Analyzing Dyadic Data

Kenny, Kashy, & Cook (2006)
---Chapter 1 – Basic Definitions and Overview
---Chapter 4 – Using Multilevel Modeling to Study Dyads

Atkins, D. C. (2005). Using Multilevel Models to Analyze Couple and Family Treatment Data: Basic and

Krasikova, D., & LeBreton, J. M (2012). Just the two of us: Misalignment of theory and methods in examining

**Illustrative Example**
marital experiences and change in psychological distress: A longitudinal study of dual-earner couples.

**Recommended Readings**
between job experiences and psychological distress: A study of dual-earner couples. *Journal of
Personality and Social Psychology, 64*, 794-806.
*Handbook of multilevel theory, measurement, and analysis*. Washington, D.C.: American Psychological
Association.
Lyons, K., & Sayer, A. (2005). Longitudinal dyad models in family research. *Journal of Marriage and Family,
67*, 1048-1060.
Publications, Inc.

Illustrative Example


Week 17
No Class

Other Readings/Topics
Multilevel Analysis - Scaling Variables & Mediation

Scaling/Centering

Multilevel Mediation


Hierarchical Example

Longitudinal Example

Recommended Readings


