

PSY 531
Multilevel Theory, Measurement, & Analysis
Fall, 2021

GENERAL INFORMATION

Class Time: Monday 9:05am-12:05pm Class Location: 130 Moore Building
Zoom: <https://psu.zoom.us/j/97032063579?pwd=aHJDbHNKaHJXUIZaei9oOC9qbUVhQT09>
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

Humphrey, S. E., & LeBreton, J. M. (2019). *The handbook of multilevel theory, measurement, and analysis*. Washington, D.C.: American Psychological Association.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.

ADDITIONAL RESOURCES

Bliese, P. (2016). Multilevel modeling in R (2.6): A brief introduction to R, the multilevel package and the nlme package. https://cran.r-project.org/doc/contrib/Bliese_Multilevel.pdf

Heck, R. H., Thomas, S. L., & Tabata, L. N. (2013). *Multilevel and longitudinal modeling with IBM SPSS*. New York, NY: Routledge.

Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York: Routledge.

Klein, K. J., & Kozlowski, S. W. (2000.) *Multilevel theory, research, and methods in organizations*. San Francisco, CA: Jossey-Bass.

Muenchen, R. A. (2011). *R for SAS and SPSS users* (2nd ed.). New York: Springer.

Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling* (2nd ed.). Washington, D. C.: Sage.

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:

Participation & Pop Quizzes	10% (15%)
Assignments	60% (65%)
Quizzes/Tests	30% (20%)

Grades will be assigned using the following scale:

12 = A+	6 = C+	0 = F
11 = A	5 = C	
10 = A-	4 = C-	
9 = B+	3 = D+	
8 = B	2 = D	
7 = B-	1 = D-	

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.

TENTATIVE COURSE SCHEDULE

1	08/22/22	Topic 1: Introduction & Course Overview	Assignment #1 Distributed
2	08/29/22	Topic 2: Multilevel Theory - Context, Dynamics, & Emergence	Assignment #1 Due; Assignment #2 Distributed
3	09/05/22	No Class – Labor Day	
4	09/12/22	Topic 3: Multilevel Measurement - Aggregation & Cross-Level Inference	Assignment #2 Due; Assignment #3 Distributed
5	09/19/22	Topic 4: Multilevel Measurement - Agreement, Reliability, & Isomorphisms	Assignment #3 Due; Assignment #4 Distributed
6	09/26/22	Topic 5: Multilevel Analysis - Overview of Nested Models	Assignment #4 Due; Assignment #5 Distributed
7	10/03/22	Topic 5: Multilevel Analysis - Analysis of Nested Models Using R	Assignment #5 Due;
8	10/10/22	Topic 5: Multilevel Analysis - Analysis of Nested Models Using R	Assignment #6 Due Assignment #7 Distributed
9	10/17/22	Topic 5: Multilevel Analysis - Analysis of Nested Models Using R Topic 6: Multilevel Analysis – Centering & Scaling	Assignment #7 Due
10	10/24/22	Topic 7: Multilevel Analysis - Variance Explained	
11	10/31/22	Topic 8: Multilevel Analysis - Overview of Growth Models	
12	11/07/22	Topic 8: Multilevel Analysis – Analysis of Growth Models Using R	Assignment #8 Distributed
13	11/14/22	TBD	Assignment #8 Due
14	11/21/22	No Class – Thanksgiving	
15	11/28/22	Topic 8: Dyadic & 3-Level Models	Assignment #9 Distributed
16	12/05/22	Topic 9: Multilevel Analysis Overview of ESM/EMA	Assignment #9 Due
17	12/12/22	No Class – Final Exams	

Week 2

Topic 2: Multilevel Theory

Multilevel Theory – General & Contextual

1. Gully, S. M., & Phillips, J. M. (2019). On finding your level. In S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of multilevel theory, measurement, and analysis* (pp. 11-38). Washington, D.C.: American Psychological Association.
2. Kozlowski, S.W.J. & Klein, K.J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal and emergent processes. In K.J. Klein & S.W.J. Kozlowski (eds.), *Multi-level Theory, Research and Methods in Organizations*. San Francisco: Jossey-Bass.

Multilevel Theory – Dynamics & Emergence

1. Cronin, M. A., & Vancouver, J. B. (2019). The only constant is change: Expanding theory by incorporating dynamic properties into one's models. In S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of multilevel theory, measurement, and analysis* (pp. 89-114). Washington, D.C.: American Psychological Association.
2. Mathieu, J. E., & Luciano, M. M. (2019). Multilevel emergence in work collectives. In S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of multilevel theory, measurement, and analysis* (pp. 163-186). Washington, D.C.: American Psychological Association.

Additional Readings

- Aiken, J. R., Hanges, P. J. & Chen, T. (2019). The means are the end: Complexity science in organizational research. In S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of multilevel theory, measurement, and analysis* (pp. 115-140). Washington, D.C.: American Psychological Association.
- Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology*, 83, 234-246.
- Chan, D. (2019). Team-level constructs. *Annual Review of Organizational Psychology and Organizational Behavior*, 6, 325-348.
- Dunn, E. C., Masyn, K. E., Yudron, M., Jones, S. M., & Subramanian, S. V. (2014). Translating multilevel theory into multilevel research: Challenges and opportunities for understanding the social determinants of psychiatric disorders. *Social Psychiatry and Psychiatric Epidemiology*, 49, 859-872.
- George, J. M., & James, L. R. (1994). Levels issues in theory development. *Academy of Management Review*, 19, 636-640.
- House, R., Rousseau, D.M. & Thomas-Hunt, M. (1995). The meso paradigm: A framework for the integration of micro and macro organizational behavior. *Research in Organizational Behavior*, 17, 71-114.
- Johns, G. (1991). Substantive and methodological constraints on behavior and attitudes in organizational research. *Organizational Behavior and Human Decision Processes*, 49, 80-104.
- Klein, K.J., Dansereau, F. & Hall, R.J. (1994). Levels issues in theory development, data collection and analysis. *Academy of Management Review*, 19, 195-229.
- Kozlowski, S. W. J., Chao, G. T., Grand, J. A., Braun, M. T., & Kuljanin, G. (2013). Advancing multilevel research design: Capturing the dynamics of emergence. *Organizational Research Methods*, 16, 581-615.
- Meyer, R. D., England, K., Kelly, E. D., Helbling, A., Li, M. S., & Outten, D. (2019). Ask not what the study of context can do for you: Ask what you can do for the study of context. In S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of multilevel theory, measurement, and analysis* (pp. 67-88). Washington, D.C.: American Psychological Association.
- Morgeson, F.P. & Hofmann, D.A. (1999). The structure and function of collective constructs: Implications for multilevel research and theory development. *Academy of Management Review*, 24, 249-265.
- Roberts, K., Hulin, C.L. & Rousseau, D.M. (1978). *Developing an interdisciplinary science of organizations*. San Francisco: Jossey-Bass. Chapters 1-4.
- Rousseau, D.M. (1985). Issues of level in organizational research: Multi-level and cross-level perspectives. In L. L. Cummings & B.M. Staw (Eds.) *Research in Organizational Behavior*, 7, 1-37.
- Rousseau, D.M. & House, R.J. (1994). Meso organizational behavior: Avoiding Three Fundamental Biases. *Trends in Organizational Behavior*, 1, 13-13.
- Von Bertalanffy, L. (1972). The history and status of general systems theory. In G.J. Klir (Ed.), *Trends in General Systems Theory* (pp. 21-41). NY: Wiley.

Week 04

Topic 3: Multilevel Measurement I: Aggregation & Cross-Level Inference

Theory & Method

- Firebaugh, G. (1978). A rule for inferring individual-level relationships from aggregate data. *American Sociological Review*, 43, 557-572.
- Greenland, S. (2002). A review of multilevel theory for ecologic analysis. *Statistics in Medicine*, 21, 389-395.
- James, L. R. (1982). Aggregation bias in estimates of perceptual agreement. *Journal of Applied Psychology*, 67, 219-229.
- Ostroff, C. (1993). Comparing correlations based on individual-level and aggregated data. *Journal of Applied Psychology*, 78, 569-582.

Illustrations

- Finney, J. W., Humphreys, K., Kivlahan, D. R., & Harris, A. H. (2011). Why health care process performance measures can have different relationships to outcomes for patients and hospitals: Understanding the ecological fallacy. *American Journal of Public Health*, 101, 1635-1642.
- Haymart, M. R., Banerjee, M., Stewart, A. K., Koenig, R. J., Birkmeyer, J. D., & Griggs, J. J. (2011). Use of radioactive iodine for thyroid cancer. *JAMA: Journal of the American Medical Association*, 306, 721-728.
- Livingston, E. H., & McNutt, R. A. (2011). The hazards of evidence-based medicine: Assessing variations in care. *JAMA: Journal of the American Medical Association*, 306, 762-763.
- Finney, J. W., Humphreys, K., Harris, A. H. S. (2011). Cross-level bias and variations in care. *JAMA: Journal of the American Medical Association*, 306, 2096-2097.

Additional Readings

- Glick, W. (1988). Response: Organizations are not central tendencies: Shadowboxing in the dark round 2. *Academy of Management Review*, 13, 133-137.
- James, L.R., Joyce, W.F., & Slocum, J.W. Jr. (1988). Comment: Organizations do not cognize. *Academy of Management Review*, 13, 129-132.
- Mossholder, K. W., & Bedian, A. G. (1983). Cross-level inference in organizational research: Perspectives on interpretation and application. *Academy of Management Review*, 8, 547-558.
- Rushton, J.P., Brainerd, C.J. & Pressley, M. (1983). Behavioral development and construct validity: The principle of aggregation. *Psychological Bulletin*, 94, 18-38.
- 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.

Week 5

Topic 4: Multilevel Measurement II: Agreement, Reliability, & Aggregation

- LeBreton, J. M., & Senter, J. L. (2008). Answers to twenty questions about interrater reliability and interrater agreement. *Organizational Research Methods*, 11, 815-852.
- Zhou, L., Song, Y., Alterman, V., Liu, Y., & Wang, M. (2019). Introduction to data collection in multilevel research. S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of multilevel theory, measurement, and analysis* (pp. 225-252). Washington, D.C.: American Psychological Association.

Illustrations

- Baysinger, M., Scherer, K. T., & LeBreton, J. M. (2014). Exploring the disruptive effects of psychopathy and aggression on group processes and group performance. *Journal of Applied Psychology*, 99, 48-65.
- Schneider, B., Salvaggio, A. N., & Subirats, M. (2002). Climate strength: A new direction for climate research. *Journal of Applied Psychology*, 87, 220-229.

Additional Readings

- Bliese, P. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K. J. Klein & S. W. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 349-381). San Francisco: Jossey-Bass.
- Brown, R.D., & Hauenstein, N.M.A. (2005). Interrater agreement reconsidered: An alternative to the r_{WG} indices. *Organizational Research Methods*, 8, 165-184.
- Burke, M.J., & Dunlap, W.P. (2002). Estimating interrater agreement with the average deviation index: A user's guide. *Organizational Research Methods*, 5, 159-172.
- Burke, M. J., Finkelstein, L. M., & Dusig, M. S. (1999). On average deviation indices for estimating interrater agreement. *Organizational Research Methods*, 2, 49-68.
- Cohen, A., Doveh, E., & Eick, U. (2001). Statistical properties of the $r_{WG(J)}$ index of agreement. *Psychological Methods*, 6, 297-310.
- James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, 69, 85-98.
- James, L. R., Demaree, R. G., & Wolf, G. (1993). r_{WG} : An assessment of within-group interrater agreement. *Journal of Applied Psychology*, 78, 306-309.
- Jebb, A. T., Tay, L., Ng, V., Woo, S. E. (2019). Construct validation in multilevel studies. S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of multilevel theory, measurement, and analysis* (pp. 253-278). Washington, D.C.: American Psychological Association.
- Krasikova, D. V., & LeBreton, J. M. (2019). Non-independence, within-unit agreement, and the reliability of unit-level means: Implications for multilevel research.
- LeBreton, J. M., James, L. R., & Lindell, M. K. (2005). Recent issues regarding r_{WG} , r^*_{WG} , $r_{WG(J)}$, $r^*_{WG(J)}$. *Organizational Research Methods*, 8, 128-138.
- LeBreton, J. M., Burgess, J. R. D., Kaiser, R. B., Atchley, E. K. P., & James, L. R. (2003). The restriction of variance hypothesis and interrater reliability and agreement: Are ratings from multiple sources really dissimilar? *Organizational Research Methods*, 6, 80-128.
- Lindell, M.K. (2001). Assessing and testing interrater agreement in multi-item rating scales. *Applied Psychological Measurement*, 25, 89-99.
- Lindell, M. K., Brandt, C. J., Whitney, D. J. (1999). A revised index of agreement for multi-item ratings of a single target. *Applied Psychological Measurement*, 23, 127-135.
- Meyer, R. D., Mumford, T. V., Burrus, C. J., Campion, M. A., & James, L. R. (2014). Selecting null distributions when calculating r_{WG} : A tutorial and review. *Organizational Research Methods*, 17, 324-345.
- McGraw, K. O., & Wong, S. P. (1996). Forming inferences about some intraclass correlation coefficients. *Psychological Methods*, 1, 30-46.
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing reliability. *Psychological Bulletin*, 86, 420-428.
- Tay, L., Woo, S. E., Vermunt, J. K. (2014). A conceptual and methodological framework for psychometric isomorphism: Validation of multilevel construct measures. *Organizational Research Methods*, 17, 77-106.

Weeks 6 & 7

Topic 5: Multilevel Analysis I: Overview of Nested Models

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Application and data analysis methods* (2nd ed.). Newbury Park: Sage.

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

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

Shiverdecker, L., & LeBreton, J. M. (2019). A primer on multilevel (random coefficient) regression modeling. In S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of Multilevel Theory, Measurement, and Analysis*. Washington, D.C.: American Psychological Association.

Kahn, J. H. (2011). Multilevel modeling: Overview and applications to research in counseling psychology. *Journal of Counseling Psychology*, 58, 257-271.

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

Optional (A Bit More Technical):

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Application and data analysis methods* (2nd ed.). Newbury Park: Sage.

Chapter 4: An Illustration

Week 8

Topic 5: Multilevel Analysis II: Analysis Using R

Bliese, P. (2016). Multilevel modeling in R (2.6): A brief introduction to R, the multilevel package and the nlme package. https://cran.r-project.org/doc/contrib/Bliese_Multilevel.pdf

Additional Recommended Readings for Weeks 6-8

Hofmann, D.A. (1997). An overview of the logic and rationale of hierarchical linear models. *Journal of Management*, 23, 723-744.

Hofmann, D. A., Griffin, M. A., & Gavin, M. B. (2000). The application of hierarchical linear modeling to organizational research. In K.J. Klein & S. W. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 467-511). San Francisco, CA: Jossey-Bass, Inc.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical Linear Models: Applications and Data Analysis Methods*. Newbury Park, CA: Sage.

Week 9

Topic 6: Multilevel Analysis III: Variance Decomposition

- Aguinis, H., & Culpepper, S. A. (2015). An expanded decision-making procedure for examining cross-level interaction effects with multilevel modeling. *Organizational Research Methods*, 18, 155-176.
- LaHuis, D. M., Hartman, M. J, Hakoyama, S., & Clark, P. C. (2014). Explained variance measures for multilevel models. *Organizational Research Methods*, 17, 433-451.
- LaHuis, D. M., Blackmore, C.E., & Bryant-Lees, K. B. (2019). Explained variance measures for multilevel models. In S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of Multilevel Theory, Measurement, and Analysis*. Washington, D.C.: American Psychological Association.

Week 10 Midterm Quiz

Week 11

Topic 7: Multilevel Analysis - Overview of Growth Models

- Bliese, P.D., & Ployhart, R.E. (2002). Growth modeling using random coefficient models: Model building, testing, and illustration. *Organizational Research Methods*, 5, 362-387.
- Bryk, A. S., & Raudenbush, S. W. (2002). *Hierarchical linear models: Application and data analysis methods*. Newbury Park: Sage.
Chapter 6: Applications in the Study of Individual Change

Illustration

- Durbin, C. E., & Klein, D. N. (2006). Ten-year stability of personality disorders among outpatients with mood disorders. *Journal of Abnormal Psychology*, 115, 75-84.

Recommended

- Bryk, A. S., & Raudenbush, S. W. (1987). Application of hierarchical linear models to assessing change. *Psychological Bulletin*, 101, 147-158.

Week 12 TBD

Week 13

Topic 7: Multilevel Analysis – Analysis of Growth Models in R

- Bliese, P.D., & Ployhart, R.E. (2002). Growth modeling using random coefficient models: Model building, testing, and illustration. *Organizational Research Methods*, 5, 362-387.

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 Advanced Issues. *Journal of Family Psychology*, 19, 98-110.

Krasikova, D., & LeBreton, J. M (2012). Just the two of us: Misalignment of theory and methods in examining dyadic phenomena. *Journal of Applied Psychology*, 97, 739-757.

Illustrative Example

Barnett, R.C., Raudenbush, S.W., Brennan, R.T., Pleck, J.H., & Marshall, N.L. (1995). Change in job and marital experiences and change in psychological distress: A longitudinal study of dual-earner couples. *Journal of Personality and Social Psychology*, 69, 839-850.

Recommended Readings

Aquino, K., Lamertz, K. (2004) A Relational Model of Workplace Victimization: Social Roles and Patterns of Victimization in Dyadic Relationships. *Journal of Applied Psychology*, 89, 1023-1034.

Barnett, R.C., Marshall, N.L., Raudenbush, S.W., & Brennan, R.T. (1993). Gender and the relationship between job experiences and psychological distress: A study of dual-earner couples. *Journal of Personality and Social Psychology*, 64, 794-806.

Cano, A., Johansen, A., & Franz, A. (2005). Multilevel analysis of couple congruence on pain, interference, and disability. *Pain*, 118, 369-379.

Goldberg, A.E., & Sayer, A. (2006). Lesbian Couples' Relationship Quality Across the Transition to Parenthood. *Journal of Marriage and Family*, 68, 87- 100.

Knight, A. P., & Humphrey, S. E. (2019). Dyadic data analysis. In S. E. Humphrey & J. M. LeBreton (Eds.), *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.

Sayer, A., & Klute, M. (2005). Analyzing Couples and Families: Multilevel Methods. Bengtson, Vern L (Ed). *Sourcebook of family theory & research*. (pp. 289-313). xxii, 666 pp. Thousand Oaks, CA, US: Sage Publications, Inc.

Week 16
Topic 9: Multilevel Analysis - Overview of ESM/EMA

Shiffman, S. (2014). Conceptualizing analyses of ecological momentary assessment data. *Nicotine & Tobacco Research*, 16, S76-S87.

Beal, D. J., & Gabriel, A. S. (2019). Looking within: An examination, combination, and extension of within-person methods across multiple levels of analysis. In S. E. Humphrey & J. M. LeBreton (Eds.), *Handbook of multilevel theory, measurement, and analysis*. Washington, D.C.: American Psychological Association.

Illustrative Example

Judge, T. A., Scott, B. A., & Ilies, R. (2006). Hostility, job attitudes, and workplace deviance: Test of a multilevel model. *Journal of Applied Psychology*, 91, 126-138.

Beal, D. J., & Weiss, H. M. (2003). Methods of ecological momentary assessment in organizational research. *Organizational Research Methods*, 6, 440-464.

Week 17
No Class

Other Readings/Topics
Multilevel Analysis - Scaling Variables & Mediation

Scaling/Centering

Hofmann, D. A., & Gavin, M. B. (1998). Centering decisions in hierarchical linear models: Implications for organizational research. *Journal of Management*, 24, 623-641.

Multilevel Mediation

Bauer, D. J., Preacher, K. J., & Gil, K. M. (2006). Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: New procedures and recommendations. *Psychological Methods*, 11, 142-163.

Zhang, Z., Zyphur, M. J., & Preacher, K. J. (2009). Testing multilevel mediation using hierarchical linear models: Problems and solutions. *Organizational Research Methods*, 12, 695-719.

Hierarchical Example

Karna, A., Voeten, M., Poskiparta, E., & Salmivalli, C. (2010). Vulnerable children in varying classroom contexts: Bystanders' behaviors moderate the effects of risk factors on victimization. *Merrill-Palmer Quarterly*, 56, 261-282.

Longitudinal Example

Impett, E. A., Kogan, A., English, T., John, O., Oveis, C., Gordon, A. M., & Keltner, D. (2012). Suppression sours sacrifice: Emotional and relational costs of suppressing emotions in romantic relationships. *Personality and Social Psychology Bulletin*, 38, 707-720.

Recommended Readings

Kenny, D. A., Korchmaros, J. D., & Bolger, N. (2003). Lower level mediation in multilevel models. *Psychological Methods*, 8, 115-128.

Kreft, I., & de Leeuw, J. (1998). Introducing multilevel modeling. Thousand Oaks, CA: Sage Publications. Chapter 5 – Section 5.2: The effects of centering (pp. 106 -114)

Mathieu, J. E., & Taylor, S. R. (2007). A framework for testing meso-mediational relationships in organizational behavior. *Journal of Organizational Behavior*, 28, 141-172.

Preacher, K. J. (2011). Multilevel SEM strategies for evaluating mediation in three-level data. *Multivariate Behavioral Research*, 46, 691-731.

Preacher, K. J., Zhang, Z., & Zyphur, M. J. (2011). Alternative methods for assessing mediation in multilevel data: The advantages of multilevel SEM. *Structural Equation Modeling*, 18, 161-182.

Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods*, 15, 209-233.