Multilevel Theory and Research
(16:545:617:01)
Spring 2021 Syllabus

Instructor: Professor Michael Sturman, Ph.D., SPHR

Class Time: Monday, 2:30-5:10

Technology: The class is supported in Canvas. Note that the Canvas platform has instructions and tutorial to help you (see https://canvas.rutgers.edu/students/). Communication with the professor will be conducted using WebEx (https://it.rutgers.edu/webex/), and email communication is welcome.

Office Hours: Open **WebEx** office hours will be held twice a week. Office hours will be an open
(Policy) discussion on any topic. Participation in office hours is **_NOT_** required and does **_NOT_** influence your grade. Questions can be asked or messaged to me in WebEx. I will answer questions in the order they are received. If there are many participants in a given session, I will take one question from a time from participants, allowing each participant to take a turn.

Office Hours
- Tuesday 3:00-4:00
- Thursday 11:00-12:00
- You can also make an appointment to meet with me. Please contact me by emails, preferably with 2 or 3 possible times (in order of preference, if any).

E-mail: michael.sturman@rutgers.edu

Readings: Readings should be accessible through the library system as well as the Canvas course webpage.

Attendance: Attendance is expected. As a seminar, your participation in the class and work on the in-class exercises is essential. It is also expected that you will have your camera on during class sessions. I do understand that there may be times missing a class is unavoidable, but students should ideally not miss any classes, and missing more than one class may affect your grade.

Flexibility: If a student has personal/medical/family emergency during the semester, I may be able to provide some flexibility to help you complete the course. Depending on the scope (and timing) of the emergency, I can work with you on revised due dates to help you complete the course. If absolutely necessary, an incomplete can be taken and the course finished in the Summer semester.

Grading: All grading involves either assignments within WebEx or documents "handed in" to me through the Canvas system.

COURSE DESCRIPTION

The discussion of multilevel theory and the use of hierarchically clustered data are increasingly common in social science and business research. Simultaneously, increasingly complex research questions and designs are necessitating more sophisticated conceptualization of multilevel phenomena, as well as methods that go beyond the capabilities of standard multilevel modeling and structural equations modeling. This course will introduce issues of multilevel theorization, measures, and analyses, with a particular focus on the set of techniques known as multilevel structural equations modeling (MSEM). The course will be focused on teaching students how to conceptualize multilevel theory and issues in their research, and actually *use* MSEM in their analyses. The course will review the basics of both structural equations modeling and multi-level modeling, as well as the mathematics behind MSEM, but the focus will be on the application of MSEM to solve applied research questions.

Course Objectives:
Upon successfully completing this course, students should be capable of the following:
- Engage in theory building with respect to multilevel theory
- Engaging in critical thinking, translating how multilevel research questions can be framed and tested
- Conduct appropriate multilevel analyses to address research questions
- Write a research paper that employs multilevel theory and methods

Course Prerequisites:
Strong knowledge of regression analysis required; knowledge of structural equations modeling and the Mplus software is highly recommended. If you have questions or concerns about your statistics background leading into this class, please let me know and let's discuss any potential issues.

Course Software:
Analyses in the course will be conducted using the Mplus software: https://www.statmodel.com/. You will need the Mplus Base Program and the Combination Add-On (which includes the Mixture Add-On and the Multilevel Add-On). A student license is available for $350; the base cost is $895. The software has been provided to SMLR doctoral students. If you need the software but do not have it and cannot get it, please let me know. It is unlikely that I could provide you with a copy of the software, but I can try.

Note that analyses can be conducted in other software packages, including R (which is free) and Stata. If you wish to use these software packages, that is your choice; however, I am not sufficiently proficient in them to assist you if you have difficulties. If you choose to use software other than Mplus, you will still be expected to complete all the necessary assignments and be able to complete in-class assignments along with the rest of the class.

MY TEACHING PHILOSOPHY

My goal, quite simply, is for you to learn. I want you coming out of this class knowing how to "do things" with multilevel modeling that you did not know going into this course. I know people come to the course with different comfort levels with respect to their prior research experience, their comfort and knowledge of statistics, as well as their skills in using statistical software. If you don't know how to do something with Mplus, or how to conduct a particular type of analysis, I should teach you. If I don't cover what you need in a lecture, I should have. If there is something you need to know and I didn't cover it, you should therefore ask about it in office hours (as, chances are, others will be similarly confused).

I also think your education is more important than a schedule set up months ahead of time. It is more important to me that you learn than it is for me to show that I can enforce deadlines. If you will be late with an assignment, I would rather you do the assignment and hand it in late, rather than you not do the assignment. I give an assignment so you can learn from it, not to enforce a deadline or just have something with which to rationalize a grade. In my view, your learning from the assignment is more important than an arbitrary deadline. So, while I have the option of lowering your grade if it is late (and, honestly, I generally do not do that unless it gets extreme or it becomes a pattern), I would still rather you do the assignment than not. While the end-of-semester deadline is fixed (I can't accept assignments after May 12, because I have to get everything graded and final grades entered into the system), I will take any late assignment up to May 12 and will not lower any assignment's grade more than two letter grades for being late.

Finally, I fully recognize the chaos of this year. If something happens and you need some help or accommodation, please ask. I cannot help you learn if I don't know what challenges you are facing. I will sincerely try to accommodate problems that arise so that you can come out of this class truly understanding and being able to engage in multilevel theorizing and analytics.

Of course, this all said, this is still a doctoral seminar. I have a certain level of expectations from doctoral students, and you are (or at least, most of you are) quite literally being paid to attend this class and learn this material. So, I expect you to work quite hard as part of this class. Furthermore, you should be willing to work hard to "figure out" many of your own questions. Yes, it is my job to teach you and help make you successful with multilevel theory and methods; at the same time, you have your own responsibility to devote the effort to learn the necessary material. You will likely have to read papers multiple times before class to understand them. You may need to read papers not specifically assigned in class to help you understand the background on certain material. You may have to devote several hours to trying to figure out where the "bugs" are in your computer code. Office hours are not a substitute for you doing your best to try to figure things out first.

GRADING

Material	Weight

Homework Assignments: **50%**

For most days, there will be a homework assignment, typically including a reading and an analysis. The analyses will typically require the use of the MPlus software (Muthén & Muthén, 2020).

Participation: **10%**

Students are expected to come to class prepared, including having completed all the readings assigned for the day and corresponding homework assignments. As a seminar, your participation will be critical to the success of the class. ***Because of the online formatted, I will likely call on students to answer questions about the day's readings and related content.***

Research Paper: **40%**

Each student will be expected to write a research paper as a final project. Ideally, by the end of the semester, the paper should be ready to submit to a conference or journal (note: note accepted or anything like that, just good enough that you could submit it, most likely to a conference). The paper will need to apply the material learned in class to some topic of your choice. The paper may be a paper in a particular theoretical area or it may be a methodological paper. We can discuss this more as the semester progresses, but you should be cognizant that you will need data for your paper and you can either acquire your own data or generate it specifically for class. It should be noted that the class will cover some Monte Carlo methods, which will be particularly relevant for methodological papers.

90-100	A
87-89	B+
80-86	B
77-79	C+
70-76	C
60-69	D
0 - 59	F

COURSE INFORMATION, POLCIES, AND RESOURCES

Course Website:
> The course Canvas website will be the primary mechanism that I will use to communicate information to the entire class outside of lecture. Copies of important material, readings, assignments, datasets, lecture slides, and grades will all be available on the course website.
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> The course website will also have copies of the PowerPoint slides that I will use in class. I will try to make these all available at least one day before the scheduled lecture. Assignments and datasets for the assignments will also be available on the course website.

Computer Use:
> This class will make extensive use of the MPlus software as part of class sessions. It is essential that you have the software so that you can follow along with lectures and engage in in-class exercises. That said, students are expected to only use the computers for class purposes.

Academic Integrity:
> All students enrolled in this course are responsible for abiding by the guidelines outlined in the University's Academic Integrity Policy. You can find the full policy at http://academicintegrity.rutgers.edu/academic-integrity-policy/. In particular, the principles of academic integrity require that a student do the following:
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> - *Properly acknowledge and cite all use of the ideas, results, or words of others.*
> - *Properly acknowledge all contributors to a given piece of work.*
> - *Make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.*
> - *Obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.*
> - *Treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.*
> - *Uphold the canons of the ethical or professional code of the profession for which he or she is preparing.*

Attendance Policy:
 I do not take attendance, although attendance is expected: it is necessary to receive a good grade, and more importantly, to understand all aspects of the course's content. If you miss class, for whatever reason, it is your responsibility to obtain the missed material and hand in the homework. Missing any class, let alone more than one class, may be detrimental to your grade and learning.

 If you miss class, please understand that it is your decision to do so. *It is not necessary to inform me that you have missed or will miss a class and informing me of such does not change any of the above policies.* I am happy to answer questions about the material in office hours; however, I will not reiterate entire lectures to those who missed class.

Assignment Policy:
 Homework assignments are due before class begins. Assignments handed in after class may be marked down.

Student-Wellness Services
 Rutgers provides several resources to assist student who may be experiencing distress or mental health concerns. The following are some of the resources that are available to you if you need them.

Counseling, ADAP & Psychiatric Services (CAPS)
(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ www.rhscaps.rutgers.edu/
CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)
(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/
The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services
 (848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / https://ods.rutgers.edu/
The Office of Disability Services works with students with a documented disability to determine the eligibility of reasonable accommodations, facilitates and coordinates those accommodations when applicable, and lastly engages with the Rutgers community at large to provide and connect students to appropriate resources.

Scarlet Listeners: **(732) 247-5555 / http://www.scarletlisteners.com/**
Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.

LECTURE TOPICS AND ASSIGNMENTS

January 25:   Topic #1: *Introduction to Multilevel Data, Theory, and Modeling*
Reading:

- 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.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 3-90). San Francisco, CA, US: Jossey-Bass.

February 1:   Topic #2: *Multilevel Theory Development*
DUE:

    Homework #1: Develop a (one-page) theory
Readings:

- Kozlowski, S. W. J., Chao, G. T., Grand, J. A., Braun, M. T., & Kuljanin. (2013). Advancing multilevel research design: Capturing the dynamics of emergence. *Organizational Research Methods*, 16, 581-615.
- Ostroff, C. (2018). Contextualizing context in organizational research. In S. E. Humphrey & J. M. LeBreton (Eds.) *The Handbook of Multilevel Theory, Measurement, and Analysis* (pp. 39-66. APA: Washington, DC.
- Cronin, M. A., & Vancouver, J. B. (2018). The only constant is change: Expanding theory by incorporating dynamic properties into one's models. In S. E. Humphrey & J. M. LeBreton (Eds.) *The Handbook of Multilevel Theory, Measurement, and Analysis* (pp. 89-114. APA: Washington, DC.
- Wee, E. X., & Taylor, M. S. (2018). Attention to change: A multilevel theory on the process of emergent continuous organizational change. Journal of Applied Psychology, 103, 1-13.
- Tasheva, S., & Hillman, A. J. (2019). Integrating diversity at different levels: Multilevel human capital, social capital, and demographic diversity and their implications for team effectiveness. *Academy of Management Review*, 44, 746-765.
- Steinbach, A. L., Gamache, D. L., & Johnson, R. E. (2019). Don't get it misconstrued: Executive construal-level shifts and flexibility in the upper echelons. *Academy of Management Review*, 44, 871-895.

February 8:   Topic #3: *Multilevel Modeling: Model Choice and Centering Issues*
Readings:
- Hofmann, D. A., & Gavin, M. B. (1998). Centering Decision in Hierarchical Linear Models: Implications for Research in Organizations. *Journal of Management*, 24, 623-641.
- McNeish, D., Stapleon, L. M., & Silverman, R. D. (2017). On the Unnecessary Ubiquity of Hierarchical Linear Modeling. *Psychological Methods*, 22, 114-140.
- Antonakis, J., Bastardoz, N., & Rönkkö, M. (2020). On ignoring the random effects assumption in multilevel models: Review, critique, and recommendations. *Organizational Research Methods*.

February 15:   Topic #4: *Aggregation and Multilevel Constructs*
Readings:
- Geldhof, G. J., Preacher, K. J., & Zyphur, M. J. (2014). Reliability estimation in a multilevel confirmatory factor analysis framework. *Psychological Methods*, 19, 72-91.
- Dyer, N. G., Hanges, P. J., & Hall, R. J. (2005). Applying multilevel confirmatory factor analysis techniques to the study of leadership. *Leader Quarterly*, 16, 149-167.
- Zuroff, D. C., Sadikaj, G., Kelly, A. C., & Leybman, M. J. (2016). Conceptualizing and measuring self-criticism as both a personality trait and a personality state. *Journal of Personality Assessment*, 98, 14-21.

February 22:   Topic #5: *Multilevel Structural Equation Modeling*
DUE:
    Homework #2: Multilevel CFA Examples
Readings:
- Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A General Multilevel SEM Framework for Assessing Multilevel Mediation. *Psychological Methods*, 15, 209-233.
- Sitzmann, T., Ployhart, R. E., & Kim, Y. (2019). A process model linking occupational strength to attitudes and behaviors: The explanatory role of occupational personality heterogeneity. *Journal of Applied Psychology*, 104, 247-269.
- Distel, A. P. (2019). Unveiling the microfoundations of absorptive capacity: A study of Coleman's bathtub model. *Journal of Management*, 45, 2014-2044.

March 1: Topic #6: *Multilevel Mediation*
    DUE:
      Homework #3: MSEM examples
    Readings:

- Preacher, J. 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. (2015). Advances in Mediation Analysis: A Survey and Synthesis of New Developments. *Annual Review of Psychology*, 66, 825-852.
- Lachowicz, M. J., Sterba, S. K., & Preacher, K. J. (2015). Investigating multilevel mediation with fully or partially nested data. *Group Processes & Intergroup Relations*, 18, 274-289.

March 8: Topic #7: *Multilevel Moderation*
    DUE:
      Homework #4: Multilevel mediation examples
    Readings:

- Preacher, K. J., Zhang, Z., & Zyphur, M. J. (2016). Multilevel Structural Equation Models for Assessing Moderation Within and Across Levels of Analysis. *Psychological Methods*, 21, 189-205.
- Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational Tools for Probing Interactions in Multiple Linear Regression, Multilevel Modeling, and Latent Curve Analysis. *Journal of Educational and Behavioral Statistics*, 31, 437-448.

March 22: Topic #8: *More Complex MSEM Models*
    DUE:
      Homework #5: Multilevel moderation examples
    Readings:

- Liu, D., Chen, X. P., & Yao, X. (2011). From autonomy to creativity: A multilevel investigation of the mediating role of harmonious passion. *Journal of Applied Psychology*, 96(2), 294-309.
- Rapp, T. L., & Mathieu, J. E. (2019). Team and individual influences on members' identification and performance per membership in multiple team membership arrangements. *Journal of Applied Psychology*, 104, 303-320.

March 29:   Topic #9: *Meta-Analysis as a Multilevel Process*
DUE:
> **Homework #6:** Cross-nested and three-level examples

Readings:
- Erez, A., Bloom, M. C., & Wells, M. T. (1996). Using random rather than fixed effects models in meta-analysis: Implications for situational specificity and validity generalization. *Personnel Psychology*, 49, 275-306.
- Gooty, J., Banks, G. C., Loignon, A. C., Tonidandel, S., & Williams, C. E. (2019). Meta-analyses as a multi-level model. *Organizational Research Methods*.
- Cheung, M. E. L. (2015). Conducting meta-analysis with Mplus. In M. E.-L. Cheung, *Meta-Analysis: A Structural Equation Modeling Approach* (Chapter 9), pp. 313-355.
- Badura. K. L., Grijalva, E., Galvin, B. M., Owens, B. P., & Joseph, D. L. (2019). Motivation to lead: A meta-analysis and distal-proximal model of motivation and leadership. *Journal of Applied Psychology*, 105, 331-354,

April 5:   Topic #10: *Heterogeneous Variance as a Variable and Outcome*
DUE:
> **Homework #7:** Meta-analysis examples

Readings:
- Lester, H. F., Cullen-Lester, K. L., & Walters, R. W. (2019). From nuisance to novel research questions: Using multilevel models to predict heterogeneous variances. *Organizational Research Methods*.
- McNeish, D. (2020). Specifying location-scale models for heterogeneous variances as multilevel SEMs. *Organizational Research Methods*.

April 12:   Topic #11: *Longitudinal Modeling as a Multilevel Process*
                   DUE:
                         Homework #8: Heterogeneous variance examples
                   Readings:
                   - Bliese, P. D., & Ployhart, R. E. (2002). Growth modeling using random coefficient models: Model building, testing, and illustrations. *Organizational Research Methods*, 5, 362-387.
                   - Bliese, P. D., & Lang, J. W. (2016). Understanding relative and absolute change in discontinuous growth models: Coding alternatives and implications for hypothesis testing. *Organizational Research Methods*, *19(4), 562-592.*
                   - McArdle, J. J. (2009). Latent variable modeling of differences and changes with longitudinal data. *Annual review of psychology*, 60, 577-605.
                   - McNeish. D., & Hamaker, E. L. (2020). A primer on two-level dynamic structural equation models for intensive longitudinal data in *Mplus*. *Psychological Methods*, 25, 610-635.
                   - Lang, J. W. B., Bliese, P. D., & de Voogt, A. (2016). Modeling consensus emergence in groups using longitudinal multilevel methods. *Personnel Psychology*, 71, 255-281.

April 19:   *Topic #12: Getting Models to Converge: Short Cuts & Tricks*
                   DUE:
                         Homework #9: Longitudinal examples

April 26:   Topic #13*: Thinking Again About Multilevel Theory Development*
                   DUE:
                         Homework #10: Comprehensive MSEM examples
                   Readings:
                   - Matusik, J. G., Hollenbeck, J. R., Matta, F. K., & Oh, J. K. (2019). Dynamic systems theory and dual change score models: Seeing teams through the lens of developmental psychology. *Academy of Management Journal*, 62, 1760-1788.
                   - Call, M. L., Campbell, E. M., Dunford, B. B., Boswell, W. R., & Boss, R. W. (2020). Shining with the Stars? Unearthing how group star proportion shapes non-star performance. *Personnel Psychology*.
                   - Farh, C. I., Liao, H., Shapiro, D. L., Shin, J., & Guan, O. Z. (2020). Out of sight and out of mind? Networking strategies for enhancing inclusion in multinational organizations. *Journal of Applied Psychology*.
                   - Call, M. J., & Ployhart, R. E. (2020). A theory of firm value capture from employee job performance: A multi-disciplinary perspective. *Academy of Management Review*.