June 2-5, 2025
CARMA Online Short Course

Advanced Multilevel Analysis with R and MPlus

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WORKSHOP DESCRIPTION

The purpose of this workshop is to develop the theoretical/conceptual background and methodological/statistical skills required for conducting multilevel research in the areas of Organizational Behavior, Human Resource Management, and related fields (e.g., Strategy, Behavioral Marketing). Topic areas to be covered include: (1) multilevel construct and measurement development and aggregation, (2) basics of multilevel modeling, and (3) advanced topics in multilevel modeling (growth modeling, 3-level models, & multilevel moderated-mediation models). The workshop assumes participants have basic background in scientific principles, psychometrics (e.g., classical test theory, reliability & validity), and general linear model methods (e.g., ANOVA, regression).

Given the complex nature of the topics covered, the main focus will be on providing an overview and basic understanding of the topics, such that participants will gain the tools needed to continue learning more about the topics following (outside) the course. The workshop will consist of lectures, class discussions, and exercises – all conducted via Zoom. The lectures and discussions will provide the background and thorough description of each of the topics to be covered. The exercises will allow participants to learn how to actually conduct and interpret the multilevel analyses covered in the lectures and discussions.

There is no required textbook for this workshop. Instead, readings taken from a variety of journals and book chapters will be assigned. Some of the readings will be discussed more explicitly in class than others. Those readings that are relevant to course topics, but may not be discussed explicitly in class, are marked with *. Participants are encouraged to read the articles and chapters BEFORE our scheduled meetings, to get the most out of this workshop. Since the workshop meetings are scheduled very close together, I strongly encourage you to complete the reading ahead of time, before our first meeting.

Participants are also expected to have access to MPlus (Base Program and Multilevel Add-On; see http://www.statmodel.com/) as well as the R program (see http://www.r-project.org/). We will use both programs during the workshop, for some overlapping as well as unique purposes and capabilities. If you cannot gain access to MPlus, you can still participate in this workshop, but will not be able to perform some of the analyses we will conduct.

TOPICS, READINGS, & EXERCISES

NOTE:
- All readings and materials are available in the workshop's Dropbox folders;
- Sessions' power point slides will be provided, via the workshop Dropbox folders, prior to the workshop.
- Al sessions will be held via Zoom, 10:00am to 3:00pm (EST)

1. June 2: Framework for analyzing multilevel data in Random Coefficient Modeling (RCM)

Topics:
- Introduction to levels of analysis principles and concepts
- Overview of random coefficient modeling (RCM)
- Analytical process in RCM
- Modeling same-level (nested) and cross-level effects
- **Exercise:** Multilevel analyses in R and MPlus

Readings:

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: Jossey-Bass.

Mathieu, J. E. & Chen, G. (2011). The etiology of the multilevel paradigm in management research. *Journal of Management*, 37, 610-641.

*Arend, M. G., & Schäfer, T. (2019). Statistical power in two-level models: A tutorial based on Monte Carlo simulation. *Psychological Methods, 24*, 1-19.

Bliese, P. D. (2002). Using multilevel random coefficient modeling in organizational research. In F. Drasgow & N. Schmitt (Eds.), *Advances in measurement and data analysis*, pp. 401-445. San Francisco, CA: Jossey-Bass.

*Bliese, P. D. & Hanges, P. J. (2004). Being too liberal and too conservative: The perils of treating grouped data as though they were independent. *Organizational Research Methods, 7*, 400-417.

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

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

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. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions*, pp. 467-511. San Francisco, CA: Jossey-Bass.

*Hofmann, D. A., Morgeson, F. P., & Gerras, S. J. (2003). Climate as a moderator of the relationship between leader-member exchange and content specific citizenship: Safety climate as an exemplar. *Journal of Applied Psychology, 88*, 170-178.

LaHuis, D. M., Hartman, M. J., Hakoyama, S., & Clark, P. C. (2014). Explained variance measures for multilevel models. *Organizational Research Methods, 17,* 433-451.

*Mathieu, J. E., Aguinis, H., Culpepper, S. A., & Chen, G. (2012). Understanding and estimating the power to detect cross-level interaction effects in multilevel modeling. *Journal of Applied Psychology*.

2. June 3: Time-varying data analyses in RCM

Topics:
- Within-person data analysis (e.g., ESM studies)
- Growth modeling in RCM
- **Exercise:** Growth modeling analyses in R and MPlus

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.

*Chan, D. (1998). The conceptualization and analysis of change over time: An integrative approach incorporating longitudinal mean and covariance structures analysis (LMACS) and multiple indicator latent growth modeling (MLGM). *Organizational Research Methods, 1*, 421-483.

Chen, G. (2005). Newcomer adaptation in teams: Multilevel antecedents and outcomes. *Academy of Management Journal, 48*, 101-116.

*Chen, G., Ployhart, R. E., Cooper-Thomas, H. D., Anderson, N., & Bliese, P. D. (2011). The power of momentum: A new model of dynamic relationships between job satisfaction change and turnover decisions. *Academy of Management Journal, 54*, 159-181.

Podsakoff, N. P., Spoelma, T. M., Chawla, N., & Gabriel, A. S. (2019). What predicts within-person variance in applied psychology constructs? An empirical examination. *Journal of Applied Psychology*.

Woolum, A. H., Foulk, T. A., Lanaj, K., & Erez, A. (2017). Rude-colored glasses: The contaminating effects of witnessed morning rudeness on perceptions and behaviors throughout the workday. *Journal of Applied Psychology, 102*, 1658-1672.

3. <u>June 4: Advanced multilevel models, Part I</u>

<u>Topics:</u>
- 3-level analyses
- Moderated-mediation in multilevel models
- **<u>Exercise</u>**: 3-level RCM analyses
- **<u>Exercise</u>**: Multilevel moderated mediation analyses

<u>Readings:</u>

*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.

Chen, G., Kanfer, R., DeShon, R. P., Mathieu, J. E., & Kozlowski, S. W. J. (2009). The motivating potential of teams: A test and extension of Chen & Kanfer's (2006) model. *Organizational Behavior and Human Decision Processes, 110*, 45-55.

Chen, G., Kirkman, B. L., Kanfer, R., Allen, D., & Rosen, B. (2007). A multilevel study of leadership, empowerment, and performance in teams. *Journal of Applied Psychology, 92*, 331-346.

Chen, G., Kirkman, B. L., Kim, K., Farh, C. I. C., & Tangirala, S. (2010). When does cross-cultural motivation enhance expatriate effectiveness? A multilevel investigation of the moderating roles of subsidiary support and cultural distance. *Academy of Management Journal*, *53*, 1110-1130.

*Mathieu, J. E. & Taylor, S. R. (2007). A framework for testing meso-mediational relationships in organizational behavior. *Journal of Organizational Behavior, 2*8, 141-172.

*Zhou, L., Wang, M., Chen, G., & Shi, J. (2012). Effects of supervisors' upward exchange relationships on subordinates: Testing the multilevel mediation role of empowerment. *Journal of Applied Psychology, 97*, 668-680.

4. <u>June 5: Advanced multilevel models, Part II</u>

<u>Topics:</u>
- Data with complex nesting structures (e.g., multiple teams membership data)
- **<u>Exercise</u>**: Modeling multiple teams membership data
- Discussion of other topics, per participants' research agenda and questions

<u>Readings:</u>

Chen, G., Smith, T. A., Kirkman, B. L., Zhang, P., Lemoine, G. J., & Farh, J. L. (2019). Multiple team membership and empowerment spillover effects: Can empowerment processes cross team boundaries? *Journal of Applied Psychology, 104*, 321-340.