

BADM 6553 / Advanced Methods in Management Research III

Instructor

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Course Site: (Canvas): <http://canvas.okstate.edu>

Catalogue Description:

Building on the first two seminars in the sequence, this class focuses on developing and testing more nuanced hypotheses such as those involving moderated mediation, change, and non-linear effects. In addition, more sophisticated analytical approaches necessary to deal with complex samples, contexts, and measurement will be introduced; such as, structural equation modeling, multilevel modeling, polynomial and spline regression, and logistic regression.

Course Overview and Objectives:

This course focuses on a range of advanced statistical models and approaches that you can use to test statistical models and write up the results for publication in any management journal. We review then build on the fundamentals discussed your previous classes, and discuss the conceptual and practical steps that need to be undertaken to provide a complete methods section. We will discuss models ranging from the simple (regression analysis) to more advanced models (moderation; mediation; combinations of these two) and statistical techniques (SEM; Path Models; Multilevel Modeling; Non-Continuous DVs).

Course Objectives	SSB Ph.D. Learning Goal
Demonstrate in-depth competency of fundamental principles of statistical analysis	Knowledge of scholarly literature Ability to conduct rigorous research
Apply class principles together with theoretical considerations to set-up and test study hypotheses.	Knowledge of scholarly literature Ability to conduct rigorous research Effective communication and presentation
Apply skills, knowledge, and tools to the start-to-finish production of the methodological part of a research paper	Ability to conduct rigorous research Effective communication and presentation

Textbook

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.

Besides the required textbook, we will cover a number of readings each week, as indicated in the list of readings below. These readings are available on Canvas. I also have a list of recommended books that, while optional, are great resources and can be useful in honing your data analysis skills.

Course Organization

This is only partially a lecture course. I will give a lecture outlining some main points relevant to a topic at hand, but most of the learning will be done collectively. In other words, the discussion will be facilitated to a large extent by the students.

Each week, there will be a core set of foundational readings that we will all go over in depth, and then each student will be responsible for asking questions, discussing how the topic applies to their work, and linking this to broader research questions. Some of the issues discussed will be posted in advance; others will arise during conversation. For the posted ones, students will ensure that they are properly prepared for the relevant discussion.

Demonstrations of competence will be ensured via homework assignments. Finally, at the conclusion of the semester, each student will submit and present a research report on a topic that interests you; only constraint is that it needs to represent a quantitative analysis of a stated question or set of hypotheses, and that it has to utilize the methods presented in class.

Course Topic Overview

Important note: No (lesson) plan extends with any certainty beyond the first contact with the classroom (von Moltke, 1871, paraphrased). I fully expect to need to spend more time on particular topics, and this outline has this explicitly accounted for.

Week	Topic
1	Course introduction
2	Moderation revisited
3	Mediation revisited
4	Multiple regression
5	Non-continuous outcomes
6	Review and Midterm Presented
7	Midterm exam due – Discuss in Class
8	Change as IV/DV
9	Multilevel Modeling
10	Review?
11	Synthesis
12	Meta-analysis
13	Bayesian Analysis
14	Presentations
15	Review
16	Final Exam

List of Readings

Moderation Revisited

1. Southwood, K. E. (1978). Substantive theory and statistical interaction: Five models. *American Journal of Sociology*, 83, 1154-1203.
2. Allison, P. (1977). Testing for interaction in multiple regression. *American Journal of Sociology*, 83, 374-381.
3. Cohen, J. (1978). Partialled products are interactions: Partialled powers are curve components. *Psychological Bulletin*, 85, 858-866.
4. Zedeck, S. (1971). Problems with the use of "moderator" variables. *Psychological Bulletin*, 76, 295-310.
5. Edwards, J. R. (2008). Seven deadly myths of testing moderation in organizational research. In C. E. Lance & R. J. Vandenberg (Eds.), *Statistical and methodological myths and urban legends: Received doctrine, verity, and fable in the organizational and social sciences* (pp. 145-166). Mahwah, NJ: Erlbaum.
6. Ganzach, Y. (1997). Misleading interaction and curvilinear terms. *Psychological Methods*, 2, 235-247.
7. Kromrey, J. D., & Foster-Johnson, L. (1998). Mean centering in moderated multiple regression: Much ado about nothing. *Educational and Psychological Measurement*, 58, 42-68.
8. Cortina, J. M., Koehler, T., Keeler, K. R., & Nielsen, B. B. (2018). Restricted variance interaction effects: What they are and why they are your friends. *Journal of Management*.

Optional

9. Aguinis, H. (1995). Statistical power problems with moderated multiple regression in management research. *Journal of Management*, 21, 1141-1158.
10. Dunlap, W. P., & Kemery, E. R. (1988). Effects of predictor intercorrelations and reliabilities on moderated multiple regression. *Organizational Behavior and Human Decision Process*, 41, 248-258.
11. Cortina, J. M. (1993). Interaction, nonlinearity, and multicollinearity: Implications for multiple regression. *Journal of Management*, 19, 915-922.

Mediation Revisited

1. Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
2. James, L. R., & Brett, J. M. (1984). Mediators, moderators, and tests for mediation. *Journal of Applied Psychology*, 69, 307-321.
3. Edwards, J. R., & Lambert, L. S. (2007). Methods for integrating moderation and mediation: A general analytic framework using moderated path analysis. *Psychological Methods*, 12, 1-22.
4. Mathieu, J. E. & Taylor, S. R. (2006). Clarifying conditions and decision points for mediational type inferences in organizational behavior. *Journal of Organizational Behavior*, 27, 1031-1056.
5. Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76, 408-420.
6. Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, 7, 422-445.
7. MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology*, 58, 593-614.
8. Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, 42(1), 185-227.

Optional

9. MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, 39, 99-128.
10. MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effects. *Prevention Science*, 1, 173-181.
11. Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods*, 12, 23-44.
12. Koopman, J., Howe, M., Hollenbeck, J. R., & Sin, H. P. (2015). Small sample mediation testing: Misplaced confidence in bootstrapped confidence intervals. *Journal of Applied Psychology*, 100(1), 194.

Multiple Regression

1. Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (pp. 452-477). Hillsdale, NJ: Erlbaum.
2. Alwin, D. F., & Hauser, R. M. (1975). The decomposition of effects in path analysis. *American Sociological Review*, 37-47.
3. Bollen, K. A. (1987). Total, direct, and indirect effects in structural equation models. In C. C. Clogg (Ed.), *Sociological methodology* (pp. 37-70). Washington, DC: American Sociological Association.
4. Kline, R. B. (2005). Introduction to path analysis. In *Principles and practice of structural equation modeling* (Ch. 5, pp. 93-122). New York: Guilford Press.
5. Kline, R. B. (2005). How to fool yourself with SEM. In *Principles and practice of structural equation modeling* (Ch. 9, pp. 313-324). New York: Guilford Press.
6. Cortina, J. M., Chen, G., & Dunlap, W. P. (2001). Testing interaction effects in LISREL: Examination and illustration of available procedures. *Organizational Research Methods*, 4, 324-360.
7. Kenny, D. A., & McCoach, D. B. (2003). Effect of the number of variables on measures of fit in structural equation modeling. *Structural Equation Modeling*, 10(3), 333-351.

Optional

8. Kline, R. B. (2005). Details of path analysis. In *Principles and practice of structural equation modeling* (Ch. 6, pp. 123-164). New York: Guilford Press.
9. Kline, R. B. (2005). Models with structural and measurement components. In *Principles and practice of structural equation modeling* (Ch. 8, pp. 209-236). New York: Guilford Press.
10. Kline, R. B. (2005). Multi-sample SEM. In *Principles and practice of structural equation modeling* (Ch. 9, pp. 289-312). New York: Guilford Press.

Non-Continuous Outcomes

1. Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (pp. 479-535). Hillsdale, NJ: Erlbaum.
2. Cohen, J. (1983). The cost of dichotomization. *Applied Psychological Measurement*, 7, 249-253.
3. Agresti, A. (1989). Tutorial on modeling ordered categorical response data. *Psychological Bulletin*, 105, 290-301.
4. DeMaris, A. (1995). A tutorial in logistic regression. *Journal of Marriage and the Family*, 57, 956-968.
5. Gardner, W., Mulvey, E. P., & Shaw, E. C. (1995). Regression analysis of counts and rates: Poisson, overdispersed Poisson, and negative binomial models. *Psychological Bulletin*, 118, 392-404.
6. Hoetker, G. (2007). The use of logit and probit models in strategic management research: Critical issues. *Strategic Management Journal*, 28, 331-343
7. Tansey, R., White, M., Long, R. G., & Smith, M. (1996). A comparison of loglinear modeling and logistic regression in management research. *Journal of Management*, 22, 339-358.
8. Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology*, 67(3), 451-470.

Optional

9. DeMaris, A. (1991). A framework for the interpretation of first-order interaction in logit modeling. *Psychological Bulletin*, 110, 557-570.
10. MacCallum, R., Zhang, S., Preacher, K. J., & Rucker, D. D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods*, 7, 19-40.
11. Maxwell, S. E., & Delaney, H. D. (1993). Bivariate median splits and spurious statistical significance. *Psychological Bulletin*, 113, 181-190.
12. Strube, M. J., & Bobko, P. (1989). Testing hypotheses about ordinal interactions: Simulations and further comments. *Journal of Applied Psychology*, 74, 247-252.
13. Boyle, R. P. (1970). Path analysis and ordinal data. *American Journal of Sociology*, 75, 461-480.

14. Ganzach, Y., Saporta, I., & Weber, Y. (2000). Interaction in linear versus logistic models: A substantive illustration using the relationship between motivation, ability, and performance. *Organizational Research Methods*, 3, 237-253.

Change as Independent Variable

1. Edwards, J. R. (2001). Ten difference score myths. *Organizational Research Methods*, 4, 264-286.
2. Harrison, D. A., & Klein, K. J. (2007). What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review*, 32(4), 1199-1228.
3. Shanock, L. R., Baran, B. E., Gentry, W. A., Pattison, S. C., & Heggestad, E. D. (2010). Polynomial regression with response surface analysis: A powerful approach for examining moderation and overcoming limitations of difference scores. *Journal of Business and Psychology*, 25(4), 543-554.
4. Irving, P. G., & Meyer, J. P. (1999). On using residual difference scores in the measurement of congruence: The case of met expectations research. *Personnel Psychology*, 52, 85-95.
5. Edwards, J. R., & Parry, M. E. (2018). On the use of spline regression in the study of congruence in organizational research. *Organizational Research Methods*, 21(1), 68-110.
6. Edwards, J. R., & Parry, M. E. (1993). On the use of polynomial regression equations as an alternative to difference scores in organizational research. *Academy of Management Journal*, 36(6), 1577-1613.
7. Edwards, J. R., Cable, D. M., Williamson, I. O., Lambert, L. S., & Shipp, A. J. (2006). The phenomenology of fit: linking the person and environment to the subjective experience of person-environment fit. *Journal of Applied Psychology*, 91(4), 802.
8. Irving, P. G., & Meyer, J. P. (1994). Reexamination of the met-expectations hypothesis: A longitudinal analysis. *Journal of Applied Psychology*, 79(6), 937.

Optional

9. Toms, J. D., & Lesperance, M. L. (2003). Piecewise regression: a tool for identifying ecological thresholds. *Ecology*, 84(8), 2034-2041.
10. Jansen, K. J., Shipp, A. J., & Michael, J. H. (2016). Champions, converts, doubters, and defectors: The impact of shifting perceptions on momentum for change. *Personnel Psychology*, 69(3), 673-707.
11. Lambert, L. S., Tepper, B. J., Carr, J. C., Holt, D. T., & Barelka, A. J. (2012). Forgotten but not gone: An examination of fit between leader consideration and initiating structure needed and received. *Journal of Applied Psychology*, 97(5), 913.

Multilevel Modeling

1. Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (pp. 536-567). Hillsdale, NJ: Erlbaum.
2. Robinson, W. S. (1950). Ecological correlations and the behavior of individuals. *American Sociological Review*.
3. Davis, J. A., Spaeth, J. L. & Huson, C. 1961. A technique for analyzing effects of group composition. *American Sociological Review*, 26, 215-255.
4. Burstein, L. (1978). Assessing differences between grouped and individual-level regression coefficients: Alternative approaches. *Sociological Methods & Research*, 7(1), 5-28.
5. Bliese, P. D., & Hanges, P. J. (2004). Being both too liberal and too conservative: The perils of treating grouped data as though they were independent. *Organizational Research Methods*, 7, 400.
6. Mathieu, J. E., & Chen, G. (2010). The etiology of the multilevel paradigm in management research. *Journal of Management*, 37, 610-641.
7. Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological methods*, 15(3), 209.
8. Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, 12, 121-138.
9. 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(2), 189.

Optional

10. Dimotakis, N., Ilies, R., & Judge, T. A. (2013). Experience Sampling Methodology. In Cortina & Landis (Eds.), *Modern Research Methods for the Study of Behavior in Organizations*. NY: Routledge.
11. Klein, K. J., & Kozlowski, S. W. J. (2000). From micro to meso: Critical steps in conceptualizing and conducting multilevel research. *Organizational Research Methods*, 3, 211-236.
12. Hofmann, D. A., Griffin, M. A., & Gavin, M. B. (2000). The application of hierarchical linear modeling to organizational research. In Klein & Kozlowski (Eds.), *Multilevel*

Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions (pp. 467-511). SF: Jossey.

13. Snijders, T. A., & Berkhof, J. (2008). Diagnostic checks for multilevel models. In *Handbook of multilevel analysis* (pp. 141-175). Springer New York.
14. De Leeuw, J., & Kreft, I. G. (1995). Questioning multilevel models. *Journal of Educational and Behavioral Statistics*, 20(2), 171-189.
15. MacCallum, R. C., Kim, C., Malarkey, W. B., & Kiecolt-Glaser, J. K. (1997). Studying multivariate change using multilevel models and latent curve models. *Multivariate Behavioral Research*, 32(3), 215-253.

Change as Dependent Variable

1. Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (pp. 568-607). Hillsdale, NJ: Erlbaum.
2. Cronbach, L. J., & Furby, L. (1970). How we should measure "change": Or should we?. *Psychological Bulletin*, 74(1), 68.
3. Allison, P. D. (1990). Change scores as dependent variables in regression analysis. In C. C. Clogg (Ed.), *Sociological Methodology* (pp. 93-114). Washington, DC: ASA.
4. Gottman, J. M., McFall, R. M., & Barnett, J. T. (1969). Design and analysis of research using time series. *Psychological Bulletin*, 72(4), 299.
5. Morita, J. G., Lee, T. W., & Mowday, R. T. (1989). Introducing survival analysis to organizational researchers: A selected application to turnover research. *Journal of Applied Psychology*, 74(2), 280.
6. Meredith, W., & Tisak, J. (1990). Latent curve analysis. *Psychometrika*, 55(1), 107-122.
7. Wen, Z., Marsh, H. W., & Hau, K. T. (2002). Interaction effects in growth modeling: A full model. *Structural Equation Modeling*, 9, 20-39.
8. McArdle, J. J. (2009). Latent variable modeling of differences and changes with longitudinal data. *Annual Review of Psychology*, 60, 577-605.

Optional

9. Wiseman, R. M. (2009). On the use and misuse of ratios in strategic management research. In *Research methodology in strategy and management* (pp. 75-110). Emerald Group Publishing Limited.
10. Rogosa, D., Brandt, D., & Zimowski, M. (1982). A growth curve approach to the measurement of change. *Psychological Bulletin*, 92, 726-748.
11. Crosbie, J. (1993). Interrupted time-series analysis with brief single-subject data. *Journal of Consulting and Clinical Psychology*, 61(6), 966.
12. Feingold, A. (2009). Effect sizes for growth-modeling analysis for controlled clinical trials in the same metric as for classical analysis. *Psychological Methods*, 14(1), 43.
13. Willett, J. B. (1989). Some results on reliability for the longitudinal measurement of change: Implications for the design of studies of individual growth. *Educational and Psychological Measurement*, 49(3), 587-602.

14. Chou, C. P., Bentler, P. M., & Pentz, M. A. (1998). Comparisons of two statistical approaches to study growth curves: The multilevel model and the latent curve analysis. *Structural Equation Modeling*, 5(3), 247-266.
15. Boker, S. M., Rotondo, J. L., Xu, M., & King, K. (2002). Windowed cross-correlation and peak picking for the analysis of variability in the association between behavioral time series. *Psychological Methods*, 7(3), 338.

Meta-Analysis

1. Schmidt, F. L., & Hunter, J. E. (1977). Development of a general solution to the problem of validity generalization. *Journal of Applied Psychology*, 62(5), 529-540.
2. Schmidt, F. L., & Hunter, J. E. (2001). Meta-analysis. In N. Anderson, D. Ones, H. K. Sinangil, & C. Viswesvaran (Eds.), *Handbook of industrial, work and organizational psychology* (pp. 51-70). London: Sage Publications.
3. Viswesvaran, C., & Ones, D. S. (1995). Theory testing: Combining psychometric meta-analysis and structural equations modeling. *Personnel Psychology*, 48, 865-885.
4. Cheung, M. W. L. (2008). A model for integrating fixed-, random-, and mixed-effects meta-analyses into structural equation modeling. *Psychological Methods*, 13(3), 182.
5. Yu, J. J., Downes, P. E., Carter, K. M., & O'Boyle, E. H. (2016). The problem of effect size heterogeneity in meta-analytic structural equation modeling. *Journal of Applied Psychology*, 101(10), 1457.
6. Cheung, S. F., Sun, R. W., & Chan, D. K. S. (2018). Correlation-based meta-analytic Structural Equation Modeling: Effects of parameter covariance on point and interval estimates. *Organizational Research Methods*, 1094428118770736.
7. Bergh, D. D. et al., (2016). Using meta-analytic structural equation modeling to advance strategic management research: Guidelines and an empirical illustration via the strategic leadership-performance relationship. *Strategic Management Journal*, 37(3), 477-497.
8. Hunter, J. E., & Schmidt, F. L. (1990). Dichotomization of continuous variables: The implications for meta-analysis. *Journal of Applied Psychology*, 75, 334-349.

Optional

9. Schmidt, F. L., et al. (1985). Forty questions about validity generalization and meta-analysis. *Personnel Psychology*, 38(4), 697-798.
10. Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, 315(7109), 629-634.

Bayesian Analysis

1. Efron, B. (1986). Why isn't everyone a Bayesian? *The American Statistician*, 40(1), 1-5.
2. Bem, D. J. (2011). Feeling the future: Experimental evidence for anomalous retroactive influences on cognition and affect. *Journal of Personality and Social Psychology*, 100(3), 407.
3. Wagenmakers, E. J., Wetzels, R., Borsboom, D., & Van Der Maas, H. L. (2011). Why psychologists must change the way they analyze their data: The case of psi. Comment on Bem (2011). *Journal of Personality and Social Psychology*, 100(3), 426-432.
4. Gelman, A. (2008). Objections to Bayesian statistics. *Bayesian Analysis*, 3(3), 445-449.
5. Bowers, J. S., & Davis, C. J. (2012). Bayesian just-so stories in psychology and neuroscience. *Psychological Bulletin*, 138(3), 389.
6. Griffiths, T. L., Chater, N., Norris, D., & Pouget, A. (2012). How the Bayesians got their beliefs (and what those beliefs actually are): Comment on Bowers and Davis (2012). *Psychological Bulletin*, 138, 415-422.
7. Rouder, J. N., & Morey, R. D. (2012). Default Bayes factors for model selection in regression. *Multivariate Behavioral Research*, 47(6), 877-903.
8. Morey, R. D., & Rouder, J. N. (2011). Bayes factor approaches for testing interval null hypotheses. *Psychological Methods*, 16(4), 406-419.

Optional

9. Fienberg, S. E. (2006). When did Bayesian inference become "Bayesian"? *Bayesian Analysis*, 1(1), 1-40.
10. Rouder, J. N., Morey, R. D., Speckman, P. L., & Province, J. M. (2012). Default Bayes factors for ANOVA designs. *Journal of Mathematical Psychology*, 56(5), 356-374.
11. O'Hara, R. B., & Sillanpää, M. J. (2009). A review of Bayesian variable selection methods: What, how and which. *Bayesian Analysis*, 4(1), 85-117.
12. Browne, W. J., & Draper, D. (2006). A comparison of Bayesian and likelihood-based methods for fitting multilevel models. *Bayesian Analysis*, 1(3), 473-514.

Other Suggested Material

1. Aiken, L. S., West, S. G., & Reno, R. R. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.
2. Allison, P. D. (2001). *Missing data*. Sage.*
3. Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. Sage.*
4. Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Lawrence Erlbaum Associates.
5. Cook, T. D., Campbell, D. T., & Shadish, W. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.
6. Fox, J. (1991). *Regression diagnostics*. Sage.*
7. Kaplan, D. (2008). *Structural Equation Modeling: Foundations and extensions* (Vol. 10). Sage Publications.
8. Kennedy, P. (2003). *A guide to econometrics*. MIT press.
9. Kenny, D. A., Kashy, D. A., Cook, W. L., & Simpson, J. A. (2006). *Dyadic data analysis*. New York: Guilford.
10. Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research*. Forth Worth, TX: Harcourt.
11. Kline, R. B. (2005). *Principles and practice of Structural Equation Modeling*. New York: Guilford.
12. Lance, C. E., & Vandenberg, R. J. (Eds.). (2009). *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences*. Taylor & Francis.
13. Luke, D. A. (2004). *Multilevel modeling*. Sage.*
14. Raudenbush, S. W. and Bryk, A.S. (2002). *Hierarchical Linear Models: Applications and data analysis methods*. Newbury Park: Sage.
15. Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel Analysis: An introduction to basic and advanced multilevel modeling* (2nd Ed). London: Sage.

*Sage “little green books”. These are all great as an introduction and overview.