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## Software:

- Raudenbush, S.W., Bryk, A.S, Cheong, Y.F. & Congdon, R. (2019). HLM 8 for Windows [Computer software]. Skokie, IL: Scientific Software International, Inc.

## Useful sites:

- Free copies of HLM papers from the Journal of Management can be found at <http://www.findarticles.com/p/articles/>
- Visit [Joop Hox's homepage](#) from where you can [view chapter 2 of his Multilevel book](#). Get the [previous edition of his text](#) (Hox, J. (1995). Applied Multilevel Analysis).

- A [free electronic version of Multilevel Statistical Models \(Goldstein, 1995\)](#) is available from the author's homepage.
- Don Hedeker's MIXREG/MIXOR programs and documentation can be found at his [Mixreg/Mixor homepage](#)

## General multilevel texts and estimation:

- Bock, R. (1975). *Multivariate Statistical Methods in Behavioral Research*. New York: McGrawHill.
- Breslow, N., & Clayton, D. (1993). Approximate inference in generalized linear mixed models. *Journal of the American Statistical Association*, **88**, 925.
- Bryk, A., & Raudenbush, S. W. (1992). *Hierarchical Linear Models for Social and Behavioral Research: Applications and Data Analysis Methods*. Newbury Park, CA: Sage.
- Cheong, Y. F., Fotiu, R. P., & Raudenbush, S. W. (2001). Efficiency and robustness of alternative estimators for 2- and 3-level models: The case of NAEP. *Journal of Educational and Behavioral Statistics*, **26**, 411-429.
- Dempster, A., Laird, N., & Rubin, D. (1977). Maximum likelihood from incomplete data via the EM algorithm. *Journal of the Royal Statistical Society, Series B*(39), 18.
- Goldstein, H.I. (2003). *Multilevel statistical models*. (3rd Edition). London: Edward Arnold.
- Hox, J. (2002). *Multilevel analysis: Techniques and applications*. Mahwah, NJ: Erlbaum.
- Jennrich, R., & Schluchter, M. (1986). Unbalanced repeated measures models with structured covariance matrices. *Biometrics*, **42**, 805-820.
- Kreft, I., & de Leeuw, J. (1998). *Introducing multilevel modeling*. London: Sage.
- Longford, N. (1993). *Random Coefficient Models*. Oxford: Clarendon Press.
- McCullagh, P., & Nelder, J. (1989). *Generalized Linear Models, 2nd Edition*. London: Chapman and Hill.
- Pinheiro, J., & Bates, D. (1995). Approximations to the log-likelihood function in the nonlinear mixed-effects model. *Journal of Computational and Graphical Statistics*, **4**, 12-35.
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- Raudenbush, S. W., & Sampson, R. (1999). Assessing direct and indirect associations in multilevel designs with latent variables. *Sociological Methods and Research*, **28**(2), 123-153.
- Rodriguez, G., & Goldman, N. (1995). An assessment of estimation procedures for multilevel models with binary responses. *Journal of the royal Statistical Society, A*, **158**, 73-89.
- Schall, R. (1991). Estimation in generalized linear models with random effects. *Biometrika*, **40**, 719-727.
- Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. London: Sage.
- Yang, M. (1995). A simulation study for the assessment of the nonlinear hierarchical model estimation via approximate maximum likelihood. Unpublished apprenticeship paper, College of Education, Michigan State University.
- Yang, M.L. (1998). Increasing the efficiency in estimating multilevel Bernoulli models [Diss], East Lansing, MI: Michigan State University.

## Growth models/longitudinal data:

- Bryk, A.S., & Raudenbush, S.W. (1987). Application of hierarchical linear models to assessing change. *Psychological Bulletin*, **101**, 147-158.
- Cudeck, R., Klebe, K.J. (2002). Multiphase mixed-effects models for repeated measures data. *Psychological Methods*, **7**, 41-63.

- Elliot, D., Huizinga, D., & Menard, S. (1989). *Multiple Problem Youth: Delinquency, Substance Use, and Mental Health Problems*. New York: SpringerVerlag.
- Huttenlocher, J.E., Haight, W., Bryk, A.S., & Seltzer, M. (1991). Early vocabulary growth: Relations to language input and gender. *Developmental Psychology*, **22**(2), 236-249.
- Miyazaki, Y., & Raudenbush, S.W. (2000). A test for linkage of multiple cohorts from an accelerated longitudinal design. *Psychological Methods*, **5**, 44-63.
- Raudenbush, S. W. (2001). Toward a coherent framework for comparing trajectories of individual change. Collins, L., & Sayer, A. (Eds.), *Best Methods for Studying Change* (pp. 33-64). Washington, DC: The American Psychological Association.
- Raudenbush, S. W., & Chan, W.S. (1993). Application of hierarchical linear models to study adolescent deviance in an overlapping cohort design. *Journal of Clinical and Consulting Psychology*, **61**(6), 941-951.
- Raudenbush, S. W., Yang, M.I., & Yosef, M. (2000). Maximum likelihood for hierarchical models via high order, multivariate LaPlace approximation. *Journal of Computational and Graphical Statistics*, **9**(1), 141-157.
- Singer, J.D., & Willett, J.B. (2003). *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence*. New York: Oxford Press.
- Willet, J.B., Singer, J.D., & Martin, N.A. (1998). The design and analysis of longitudinal studies of development and psychopathology in context: Statistical models and methodological recommendations. *Development and Psychopathology*, **10**, 395-426.
- Zeger, S., Liang, K.Y., & Albert, P. (1988). Models for longitudinal data: A likelihood approach. *Biometrics*, **44**, 1049-1066.
- Zeger, S., & Liang, L. (1986). Longitudinal data analysis using generalized linear models. *Biometrika*, **73**, 13-22.

## Binary outcomes (HGLM models):

- Fielding, A. (2003). Ordered category responses and random effects in multilevel and other complex structures. In S.P. Reise & N. Duan (Eds.), *Multilevel modeling: Methodological advances, issues, and applications* (pp. 181-208). Mahwah, NJ: Erlbaum.
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- Hox, J. (2002). *Multilevel analysis: Techniques and applications*. Mahwah, NJ: Erlbaum. Chapter 6.
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- Snijders, T.A.B., & Bosker, R.J. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. London: Sage.

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- Willet, J.B., Singer, J.D., & Martin, N.A. (1998). The design and analysis of longitudinal studies of development and psychopathology in context: Statistical models and methodological recommendations. *Development and Psychopathology*, **10**, 395-426.
- Wong, G., & Mason, W. (1985). The hierarchical logistic regression model for multilevel analysis. *Journal of the American Statistical Association*, **80**(391), 513-524.

## Cross-classified random effect models:

- Garner, C., & Raudenbush, S. (1991). Neighborhood effects on educational attainment: A multi-level analysis of the influence of pupil ability, family, school, and neighborhood. *Sociology of Education*, **64**(4), 251-262.
- Hill, P.W., & Goldstein, H. (1998). Multilevel modeling of educational data with cross-classification and missing identification of units. *Journal of Educational and Behavioral Statistics*, **23**, 117-128.

## Missing data and multiple imputation:

- Little, R., & Rubin, D. (1987). *Statistical analysis with missing data*. New York: Wiley.
- Little, R., & Schenker, N. (1995). Missing data. In G. Arminger, C. C. Clogg & M. E. Sobel (Eds.), *Handbook of Statistical Modeling for the Social and Behavioral Sciences* (pp. 39-76). New York: Plenum Press.
- Rogers, A., & et. al. (1992). *National Assessment of Educational Progress: 1990 Secondary-use Data Files User Guide*. Princeton, New Jersey: Educational Testing Service.
- Rubin, D. (1987). *Multiple Imputation for Nonresponse in Surveys*. New York: Wiley.
- Schafer, J. (1997). *Analysis of Incomplete Multivariate Data*. London: Chapman & Hall.

## Weighting:

- Pfefferman, D., Skinner, C.J., Homes, D.J., Goldstein, H., and Rasbash, J. (1998). Weighting for unequal selection models in multilevel models. *Journal of the Royal Statistical Society, Series B*, **60**, 1, 23-40.

## Latent variable analysis:

- Raudenbush, S. W., & Sampson, R. (1999). Assessing direct and indirect associations in multilevel designs with latent variables. *Sociological Methods and Research*, **28**(2), 123-153.

## Power:

- Raudenbush, S.W. (2002). New Directions in the Evaluation of Title I. Invited speaker at the Secretary's Forum on Research and Value-Added Assessment Data, U.S. Department of Education, Washington DC (Dec. 2002).
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## Mediation:

- Bauer, D. J., & Curran, P. J. (2005). Probing interactions in fixed and multilevel regression: Inferential and graphical techniques. *Multivariate Behavioral Research*.
- Curran, P. J., Bauer, D. J., & Willoughby, M. T. (2006). Testing and probing interactions in hierarchical linear growth models. C. S. Bergeman & S. M. Boker (Eds.), *The Notre Dame Series on Quantitative Methodology, Volume 1: Methodological Issues in Aging Research*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Krull, J.L., & MacKinnon, D.P. (1999). Multilevel mediation modeling in group-based intervention studies. *Evaluation Review*, **23**, 418-444.
- Krull, J. L., & MacKinnon, D. P. (2001). Multilevel modeling of individual and group level mediated effects. *Multivariate Behavioral Research*, **36**, 249-277.
- Kenny, D.A., Korchmaros, J.D., & Bolger, N. (2003). Lower level mediation in multilevel models. *Psychological Methods*, **8**, 115-128.
- Pituch, K. A., Whittaker, T. A., & Stapleton, L. M. (2005). A Comparison of Methods to Test for Mediation in Multisite Experiments. *Multivariate Behavioral Research*, **40**, 1-23.
- Pituch, K. A., Stapleton, L. M., & Kang, J. Y. (2006). A comparison of single sample and bootstrap methods to assess mediation in cluster randomized trials. *Multivariate Behavioral Research*, **41**, 367-400.

## Meta-Analysis:

- Hox, J.J., & de Leeuw, E.D. (2003). Multilevel models for meta-analysis. In S.P. Reise & N. Duan (Eds.), *Multilevel modeling: Methodological advances, issues, and applications* (pp. 90-111). Mahwah, NJ: Erlbaum.

## Multivariate (HMLM) models:

- Raudenbush, S.W., & Bryk, A.S. (2002). Hierarchical Linear Models: *Applications and data analysis methods* (2nd Edition). Thousand Oaks, CA: Sage.
- Raudenbush, S.W., & Sampson, R. (1999). Assessing direct and indirect effects in multilevel designs with latent variables. *Sociological Methods & Research*, 28(2), 123-153.
- Kuo, M., Mohler, B., Raudenbush, S.W., & Earls, F.J. (2000). Assessing exposure to violence using multiple informants: Application of hierarchical linear model. *The Journal of Child Psychology and Psychiatry*, 41, 1049-1056.
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- Thum, Y.M. (1997). Hierarchical linear models for multivariate outcomes. *Journal of Educational and Behavioral Statistics*, **22**, 77-108.

## Centering:

- Kreft, I.G.G., de Leeuw, J., & Aiken, L. (1995). The effect of different forms of centering in hierarchical linear models. *Multivariate Behavioral Research*, **30**, 1-22.

## Item response models:

- Cheong, Y.F. & Raudenbush, S.W. (2000). Measurement and structural models for children's problem behaviors. *Psychological Methods*, 5(4), 477-495.

## Psychometric Applications:

- Kreft, I.G.G. (1997). The interactive effect of alcohol prevention programs in high school classes: An illustration of item homogeneity scaling and multilevel analysis techniques. In K.J. Bryant, M. Windle, and S.G. West (eds.), *Science of prevention: Methodological advances from alcohol and substance abuse research*. Washington, D.C.: American Psychological Association.

## Assumptions and Diagnostics:

- Ecob, R., & Der, G. (2003). An interactive method for the detection of outliers in longitudinal growth data using multilevel models. In S.P. Reise & N. Duan (Eds.), *Multilevel modeling: Methodological advances, issues, and applications* (pp. 229-254). Mahwah, NJ: Erlbaum.
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- Seltzer, M., Novak, J., Choi, K., & Lim, N. (2002). Sensitivity analysis form hierarchical models employing t level-1 assumptions. *Journal of Educational & Behavioral Statistics*, 27, 181-222.

## FIRC models and automated imputation:

- Bloom, Howard S. Raudenbush, Stephen W., Weiss, Michael J. & Porter, Kristin (2017). Using Multisite Experiments to Study Cross-Site Variation in Treatment Effects: A Hybrid Approach with Fixed Intercepts and a Random Treatment Coefficient, *Journal of Research on Educational Effectiveness*, 10(4). Pages 817-842.
- Little, R. J. A., & Rubin, D. B. (2002). *Statistical analysis with missing data* (2nd ed.). Hoboken, NJ: Wiley.
- Raudenbush, S. W. (2009). Adaptive centering with random effects: An alternative to the fixed effects model for studying time-varying treatments in school settings. *Education Finance and Policy*, 4(4), 468-491.
- Raudenbush, S. W., & Bloom, H. S. (2015). Learning about and from a distribution of program impacts using multisite trials. *American Journal of Evaluation*, 36(4), 475-499.
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- Shin, Y., & Raudenbush, S. W. (2007). Just-Identified Versus Overidentified Two-Level Hierarchical Linear Models with Missing Data. *Biometrics*, 63(4), 1262-1268.
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- Shin, Y., & Raudenbush, S. W. (2013). Efficient Analysis of Q-Level Nested Hierarchical General Linear Models Given Ignorable Missing Data. *The international journal of biostatistics*, **9**(1).
- Tourangeau, K., Nord, C., Lê, T., Sorongon, A. G., & Najarian, M. (2009). *Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K): Combined User's Manual for the ECLS-K Eighth-Grade and K-8 Full Sample Data Files and Electronic Codebooks*. NCES 2009-004. National Center for Education Statistics.
- von Hippel, P. T. (2018). How many imputations do you need? A two-stage calculation using a quadratic rule. *Sociological Methods & Research*, 0049124117747303.
- Weiss, M. J., Bloom, H. S., Verbitsky-Savitz, N., Gupta, H., Vigil, A. E., & Cullinan, D. N. (2017). How much do the effects of education and training programs vary across sites? Evidence from past multisite randomized trials. *Journal of Research on Educational Effectiveness*, **10**(4), 843-876.

## Papers by Steve Raudenbush not listed above:

To check for recent updates, please visit [Steve Raudenbush's page](#)

- Rowe, M.L., Raudenbush, S.W. and Goldin-Meadow, S., The shape of early vocabulary growth helps predict later vocabulary skill. (under review). *Child development*.
- Clark, D.E., Hanna, E.L. & Raudenbush, S.W. (in press). Using a hierarchical model to estimate risk-adjusted mortality for hospitals not included in the reference sample. *Health Services Research*.
- Raudenbush, S.W. (in press). Can School Improvement Reduce Racial Inequality? In Tate, W.F. (Eds.), *Research on Schools, Neighborhoods, and Communities: Toward Civic Responsibility*. Lanham, MD: Rowman & Littlefield.
- Raudenbush, S.W. (in press). Connecting Developmental Science to Educational Policy by Studying Classroom Instruction. In Stein, N.L. (eds) *Developmental Science Goes to School*. New York: Routledge.
- Shin, Y. & Raudenbush, S.W. (in press). The causal effect of class size on academic achievement: multivariate instrumental variable indicators with missing data at random. *Journal of Educational and Behavioral Statistics*.
- Raudenbush, S.W. (submitted). Reorganizing schools to reduce social inequality. Paper presented at America's Urban Infrastructure: Confronting Her Challenge, Embracing her Opportunities Conference. Washington University in Saint Louis, MO.
- Shin, Y. & Raudenbush, S.W. (2010) A latent cluster mean approach to the contextual effects model with missing data. *Journal of Educational and Behavioral Statistics*. Vol 35, No.1, 36-35.
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- Spybrook, J. & Raudenbush, S.W. (2009). An examination of the precision and technical accuracy of the first wave of group randomize trials funded by the Institute of Education Sciences. *Educational Evaluation and Policy Analysis*. Vol 31, No.3, 298-318.
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- Raudenbush, S.W. (2003). Designing Field Trials of Educational Innovations. Invited speaker at the DRDC Conference: Conceptualizing Scale-UP: Multidisciplinary Perspectives? Washington DC (Nov. 2003).
- Raudenbush, S.W. (2002). Identifying Scientifically-Based Research in Education. Invited speaker at the Scientifically Based Research Seminar, U.S. Department of Education, Washington DC (Feb. 2002).
- Barnett, R. C., Brennan, R. T., Raudenbush, S. W., & Marshall, N. L. (1993). Gender and the relationship between marital role equality and psychological distress: A study of dual earner couples. *Journal of Personality and Social Psychology*, **64**, 794-806.
- Raudenbush, S.W., & Willms, J.D. (1991). *Pupils, Classrooms, and Schools: International Studies of Schooling from a Multilevel Perspective*. New York: Academic Press.
- Raudenbush, S.W. (2008). Many small groups. deLeeuw, Jan and Kreft, Ita (Eds.), *Handbook of Quantitative Multilevel Analysis*. Kluwer Press.
- Raudenbush, S. W. (1999). Hierarchical models. In S. Kotz (Ed.), *Encyclopedia of Statistical Sciences*, Update Volume 3 (pp. 318-323). New York: John Wiley & Sons, Inc.
- Raudenbush, S.W. (1993). Hierarchical linear models and experimental design. In Lynne K. Edwards (Ed.), *Applied analysis of variance in behavioral science*. New York: Marcel Dekker.
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- Johnson, C and Raudenbush, S.W. (2006) A repeated measures, multilevel Rasch model with application to self-reported criminal behavior. Bergeman, C.S. & Boker, S.M. (eds.) *Quantitative Methodology in Aging Research*. Proceedings from the *Notre Dame Series on Quantitative Methodology: Quantitative Methodology in Aging Research*. Erlbaum Press.
- Sampson, R.J., Morenoff, J.D. and Raudenbush, S.W. (2005). Social anatomy of racial and ethnic disparities in violence. *American Journal of Public Health*.
- Sampson, R.J. & Raudenbush, S.W. (2004). The social structure of seeing disorder. *Social Psychology Quarterly*.
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- Bingenheimer, J. & Raudenbush, S.W. (2004). Statistical and substantive inferences in public health: Issues in the application of multilevel models. *Annual Review of Public Health*, **25**, 53-77.
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- Ewing, R., Schmid, T.L., Killingsworth, R.E., Zlot, A.I. and Raudenbush, S.W. (2003). Relationship between urban sprawl and physical activity, obesity, and morbidity. *The American Journal of Health Promotion*, **18**(1), 47-57.
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- Buka, S. L., Brennan, R.T., Rich-Edwards, J.W., Raudenbush, S.W. and Earls, F. (2003). Neighborhood support and the birth weight of urban infants. *The American Journal of Epidemiology*, **157**(1), 1-8.
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- Cohen, D., K., Raudenbush, S. W., & Ball, D. L. (2002). Resources, Instruction, and Research. In F. Mosteller & R. Boruch (Eds.), *Evidence matters: Randomized trials in education research*, (pp. 80-119). Washington, DC: Brookings Institution Press.
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- Raudenbush, S. W., & Kim, J.S. (2002). Statistical issues in analysis of international comparisons of educational achievement. In A. C. Porter & A. Gamoran (Eds.), *Methodological Advances in Cross National Surveys of Educational Achievement* (pp. 267-294). Washington DC: National Academy Press.
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- Raudenbush, S.W. & Liu, X. (2001). Effects of Study Duration, Frequency of Observation, and Sample Size on Power in Studies of Group Differences in Polynomial Change. *Psychological Methods*, 6(4), 387-401.
- Duncan, G.J. & Raudenbush, S.W. (2001). Neighborhoods and adolescent development: How can we determine the links? In Alan Booth and Nan Crouter (Eds.), *Does it Take a Village? Community Effects on Children, Adolescents, and Families*, [pp. 105-136]. State College, PA: Pennsylvania State University Press.
- Duncan, G.J. & Raudenbush, S.W. (2001). Getting context right in quantitative studies of child development. In Arland Thornton (Ed.), *The Well-Being of Children and Families*, [pp.356-383]. Ann Arbor, MI: The University of Michigan Press.
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