

References

- Akaike, Hirotugu. 1974. "A New Look at the Statistical Model Identification." *IEEE Transactions on Automatic Control* 19 (6): 716–723.
- Allen, I. Elaine, and Christopher A. Seaman. 2007. "Likert Scales and Data Analyses." *Quality Progress* 40 (7): 64–65.
- Altman, D.G., and P. Royston. 2000. "What Do We Mean by Validating a Prognostic Model?" *Statistics in Medicine* 19 (4): 453–473.
- Anderson, T.W. 2005. "Origins of the Limited Information Maximum Likelihood and Two-Stage Least Squares Estimators." *Journal of Econometrics* 127 (1): 1–16.
- Anderson, J.C., and D.W. Gerbing. 1988. "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach." *Psychological Bulletin* 103 (3): 411.
- Anderson, Theodore W., and Herman Rubin. 1949. "Estimation of the Parameters of a Single Equation in a Complete System of Stochastic Equations." *The Annals of Mathematical Statistics* 20 (1): 46–63.
- . 1950. "The Asymptotic Properties of Estimates of the Parameters of a Single Equation in a Complete System of Stochastic Equations." *The Annals of Mathematical Statistics* 21 (4): 570–582.
- Anderson, T.W., N. Kunitomo, and Y. Matsushita. 2010. "On the Asymptotic Optimality of the Liml Estimator with Possibly Many Instruments." *Journal of Econometrics* 157 (2): 191–204.
- Bagozzi, Richard P., and Paul R. Warshaw. 1990. "Trying to Consume." *Journal of Consumer Research* 17 (2): 127–140.
- Barabasi, Albert-Laszlo, and Zoltan N. Oltvai. 2004. "Network Biology: Understanding the Cell's Functional Organization." *Nature Reviews Genetics* 5 (2): 101.
- Barabási, Albert-László, Zoltán Dezső, Erzsébet Ravasz, Soon-Hyung Yook, and Zoltán Oltvai. 2003. "Scale-Free and Hierarchical Structures in Complex Networks." *AIP Conference Proceedings* 661 (1): 1–16.
- Barclay, D., C. Higgins, and R. Thompson. 1995. "The Partial Least Squares (Pls) Approach to Causal Modeling: Personal Computer Adoption and Use as an Illustration." *Technology Studies* 2 (2): 285–309.
- Basman, Robert L. 1957. "A Generalized Classical Method of Linear Estimation of Coefficients in a Structural Equation." *Econometrica: Journal of the Econometric Society* 25 (1): 77–83.
- . 1963a. "A Note on the Exact Finite Sample Frequency Functions of Generalized Classical Linear Estimators in a Leading Three-Equation Case." *Journal of the American Statistical Association* 58 (301): 161–171.
- . 1963b. "The Causal Interpretation of Non-triangular Systems of Economic Relations." *Econometrica: Journal of the Econometric Society* 31 (3): 439–448.

- Bastien, Philippe, Vincenzo Esposito Vinzi, and Michel Tenenhaus. 2005. "PLS Generalised Linear Regression." *Computational Statistics & Data Analysis* 48 (1): 17–46.
- Benford, Frank. 1938. "The Law of Anomalous Numbers." *Proceedings of the American Philosophical Society* 78 (4): 551–572.
- Bennett, Craig M., George L. Wolford, and Michael B. Miller. 2009. "The Principled Control of False Positives in Neuroimaging." *Social Cognitive and Affective Neuroscience* 4 (4): 417–422.
- Bentler, Peter M. 1995. *EQS Structural Equations Program Manual*. Vol. 6. Encino, CA: Multivariate Software.
- Bentler, P.M. 1990. "Fit Indexes, Lagrange Multipliers, Constraint Changes and Incomplete Data in Structural Models." *Multivariate Behavioral Research* 25 (2): 163–172.
- Bentler, Peter M., and A.B. Mooijaart. 1989. "Choice of Structural Model via Parsimony: A Rationale Based on Precision." *Psychological Bulletin* 106 (2): 315.
- Bielby, William Thomas, and Robert Mason Hauser. 1977. "Structural Equation Models." *Annual Review of Sociology* 3 (1): 137–161.
- Bland, J. Martin, and Douglas G. Altman. 1995. "Multiple Significance Tests: The Bonferroni Method." *British Medical Journal* 310 (6973): 170.
- Blau, P.M., O.D. Duncan, and A. Tyree. 1967. "The Process of Stratification." In *Social Stratification. Class, Race & Gender*, 317–329. San Francisco: Boulder.
- Blunch, N.J. 2008. *Introduction to Structural Equation Modelling Using Spss and Amos*. Thousand Oaks: Sage Publications Ltd.
- Boker, Steven, Michael Neale, Hermine Maes, Michael Wilde, Michael Spiegel, Timothy Brick, Jeffrey Spies, Ryne Estabrook, Sarah Kenny, Timothy Bates, et al. 2011. OpenMx: An Open Source Extended Structural Equation Modeling Framework. *Psychometrika* 76 (2): 306–317.
- Bollen, Kenneth A. 1989a. *Structural Equations with Latent Variables*. Vol. 8. New York: Wiley.
- . 1989b. "A New Incremental Fit Index for General Structural Equation Models." *Sociological Methods & Research* 17 (3): 303–316.
- Bond, T.G., and C.M. Fox. 2001. *Applying the Rasch Model. Fundamental Measurement in the Human Sciences*. Mahwah: Lawrence Erlbaum Associates, Inc.
- Boomsma, A. 1982. "The Robustness of LISREL Against Small Sample Sizes in Factor Analysis Models." *Systems Under Indirect Observation: Causality, Structure, Prediction* 1: 149–173.
- . 1985. "Nonconvergence, Improper Solutions, and Starting Values in Lisrel Maximum Likelihood Estimation." *Psychometrika* 50 (2): 229–242.
- . 1987. *The Robustness of Maximum Likelihood Estimation in Structural Equation Models*. New York: Cambridge University Press.
- Box, George E.P., and Norman R. Draper. 2007. *Response Surfaces, Mixtures, and Ridge Analyses*. Vol. 649. Hoboken: Wiley.
- Browne, Michael W., and Robert Cudeck. 1989. "Single Sample Cross-Validation Indices for Covariance Structures." *Multivariate Behavioral Research* 24 (4): 445–455.
- . 1992. "Alternative Ways of Assessing Model Fit." *Sociological Methods & Research* 21 (2): 230–258.
- . 1993. "Alternative Ways of Assessing Model Fit." *Sage Focus Editions* 154: 136.
- Burns, Alvin C., Ronald F. Bush and Nilanjana Sinha. 2005. *Marketing Research: Online Research Applications*. Upper Saddle River: Pearson, Prentice Hall.
- Calhoun, Craig. 2007. *Nations Matter: Culture, History and the Cosmopolitan Dream*. Abingdon: Routledge.
- Cattell, Raymond B. 1966. "The Scree Test for the Number of Factors." *Multivariate Behavioral Research* 1 (2): 245–276.
- Chan, Jason C. 1991. "Response-Order Effects in Likert-Type Scales." *Educational and Psychological Measurement* 51 (3): 531–540.
- Chatelin, Yves-Marie, Vincenzo Esposito Vinzi, and Michel Tenenhaus. 2002. *State-of-Art on PLS Path Modeling Through the Available Software*. Jouy-en-Josas: Groupe HEC.

- Chen, Feinian, Kenneth A. Bollen, Pamela Paxton, Patrick J. Curran, and James B. Kirby. 2001. "Improper Solutions in Structural Equation Models: Causes, Consequences, and Strategies." *Sociological Methods & Research* 29 (4): 468–508.
- Cheung, Gordon W., and Roger B. Rensvold. 2002. "Evaluating Goodness-of-Fit Indexes for Testing Measurement Invariance." *Structural Equation Modeling* 9 (2): 233–255.
- Chin, W.W. 1998. "Commentary: Issues and Opinion on Structural Equation Modeling." *MIS Quarterly* 22 (1): vii–xvi.
- . 2010a. "Bootstrap Cross-Validation Indices for PLS Path Model Assessment." In *Handbook of Partial Least Squares*, 83–97. Heidelberg: Springer.
- . 2010b. "How to Write up and Report PLS Analyses." In *Handbook of Partial Least Squares*, 655–690. Berlin: Springer.
- Chin, Wynne W., Barbara L. Marcolin, and Peter R. Newsted. 2003. A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/Adoption Study. *Information Systems Research* 14 (2): 189–217.
- Chin, W.W., and J. Dibbern. 2009. "A Permutation Based Procedure for Multi-Group PLS Analysis: Results of Tests of Differences on Simulated Data and a Cross of Information System Services Between Germany and the USA." In *Handbook of Partial Least Squares: Concepts, Methods and Applications in Marketing and Related Fields*, 171–193. Berlin: Springer.
- Chin, W.W., and J. Dibbern. 2010. "An Introduction to a Permutation Based Procedure for Multi-Group PLS Analysis: Results of Tests of Differences on Simulated Data and a Cross Cultural Analysis of the Sourcing of Information System Services Between Germany and the USA." In *Handbook of Partial Least Squares*, 171–193. Berlin: Springer.
- Chin, W.W., and P.R. Newsted. 1999. "Structural Equation Modeling Analysis with Small Samples Using Partial Least Squares." *Statistical Strategies for Small Sample Research* 2: 307–342.
- Chollet, François, and Joseph J. Allaire. 2018. *Deep Learning with R, Ch.5.4*. Shelter Island: Manning Publications Company.
- Christ, Carl F. 1994. "The Cowles Commission's Contributions to Econometrics at Chicago, 1939–1955." *Journal of Economic Literature* 32 (1): 30–59.
- Clarke, Shelley, Jonathan Worcester, Glen Dunlap, Marcey Murray, and Kathy Bradley-Klug. 2002. "Using Multiple Measures to Evaluate Positive Behavior Support: A Case Example." *Journal of Positive Behavior Interventions* 4 (3): 131–145.
- Cliff, Norman. 1988. The Eigenvalues-Greater-Than-One Rule and the Reliability of Components. *Psychological Bulletin* 103 (2): 276.
- Cochran, William G., Frederick Mosteller, and John W. Tukey. 1954. "Principles of Sampling." *Journal of the American Statistical Association* 49 (265): 13–35.
- Cohen, Jacob. 1988. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hillsdale: Erlbaum Associates.
- Copas, John B., and H.G. Li. 1997. "Inference for Non-random Samples." *Journal of the Royal Statistical Society: Series B (Statistical Methodology)* 59 (1): 55–95.
- Cowles, A. 1933. "Can Stock Market Forecasters Forecast?" *Econometrica: Journal of the Econometric Society* 1 (3): 309–324.
- Cowles 3rd, Alfred, and Edward N. Chapman. 1935. "A Statistical Study of Climate in Relation to Pulmonary Tuberculosis." *Journal of the American Statistical Association* 30 (191A): 517–536.
- Cox III, Eli P. 1980. "The Optimal Number of Response Alternatives for a Scale: A Review." *Journal of Marketing Research* 17 (4): 407–422.
- Critchley, Hugo D. 2002. "Electrodermal Responses: What Happens in the Brain." *The Neuroscientist* 8 (2): 132–142.
- Critchley, Hugo D., Raphael N. Melmed, Eric Featherstone, Christopher J. Mathias, and Raymond J. Dolan. 2002. "Volitional Control of Autonomic Arousal: A Functional Magnetic Resonance Study." *Neuroimage* 16 (4): 909–919.
- Davis, Fred D., Richard P. Bagozzi, and Paul R. Warshaw. 1989. "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models." *Management Science* 35 (8): 982–1003.

- . 1992. “Extrinsic and Intrinsic Motivation to Use Computers in the Workplace 1.” *Journal of Applied Social Psychology* 22 (14): 1111–1132.
- Dawes, Sharon S., and Anthony M. Cresswell. 2012. “From ‘Need to Know’ to ‘Need to Share’: Tangled Problems, Information Boundaries, and the Building of Public Sector Knowledge Networks.” In *Debating Public Administration*, 93–114. Abingdon: Routledge.
- de Sola Pool, I., and M. Kochen. 1979. “Contacts and Influences.” *Social Networks* 1 (1): 5.
- Dhrymes, Phoebus J. 1972. *Distributed Lags: A Survey*. Report. Los Angeles: UCLA Department of Economics.
- . 1974. *Econometrics*. Berlin: Springer.
- Dhrymes, Phoebus J., and H. Erlat. 1972. *Asymptotic Properties of Full Information Estimators in Dynamic Autoregressive Simultaneous Models*. Report. Los Angeles: UCLA Department of Economics.
- Dhrymes, Phoebus J., E. Philip Howrey, Saul H. Hymans, Jan Kmenta, Edward E. Leamer, Richard E. Quandt, James B. Ramsey, Harold T. Shapiro, and Victor Zarnowitz. 1972. “Criteria for Evaluation of Econometric Models. Book Section.” In *Annals of Economic and Social Measurement, Volume 1, Number 3*, 291–325. Cambridge: NBER.
- Dietz, Laura, Steffen Bickel, and Tobias Scheffer. 2007. “Unsupervised Prediction of Citation Influences.” In *Proceedings of the 24th International Conference on Machine Learning*, 233–240. New York: ACM.
- Dijkstra, Theo. 1983. “Some Comments on Maximum Likelihood and Partial Least Squares Methods.” *Journal of Econometrics* 22 (1–2): 67–90.
- Ding, L., W.F. Velicer, and L.L. Harlow. 1995. “Effects of Estimation Methods, Number of Indicators Per Factor, and Improper Solutions on Structural Equation Modeling Fit Indices.” *Structural Equation Modeling: A Multidisciplinary Journal* 2 (2): 119–143.
- Ding, Z.J., and H.M. Li. 2005. Application of Monte Carlo Simulation to SEM Image Contrast of Complex Structures. *Surface and Interface Analysis: An International Journal Devoted to the Development and Application of Techniques for the Analysis of Surfaces, Interfaces and Thin Films* 37 (11): 912–918.
- Farebrother, R.W. 1999. *Fitting Linear Relationships: A History of the Calculus of Observations 1750–1900*. New York: Springer.
- Féré, Charles. 1899. *The Pathology of Emotions*. London: University Press.
- Fisher, Ronald A. 1921. “On the Probable Error of a Coefficient of Correlation Deduced from a Small Sample.” *Metron* 1: 3–32.
- Fisher, Ronald A. 1935. The Logic of Inductive Inference. *Journal of the Royal Statistical Society* 98 (1): 39–82.
- Fisher, Ronald Aylmer. 2006. *Statistical Methods for Research Workers*. New Delhi: Genesis Publishing Pvt Ltd (original 1925).
- Fornell, Claes, and D. Larcker. 1981. “Structural Equation Modeling and Regression: Guidelines for Research Practice.” *Journal of Marketing Research* 18 (1): 39–50.
- Fowles, Don C., Margaret J. Christie, Robert Edelberg, William W. Grings, David T. Lykken, and Peter H. VENABLES. 1981. “Publication Recommendations for Electrodermal Measurements.” *Psychophysiology* 18 (3): 232–239.
- Fox, John. 2002. “Cox Proportional-Hazards Regression for Survival Data.” An R and S-PLUS Companion to Applied Regression.
- Fox, John. 2006. Teacher’s Corner: Structural Equation Modeling with the SEM Package in R. *Structural Equation Modeling* 13 (3): 465–486.
- Frank, I.E., and J.H. Friedman. 1993. “A Statistical View of Some Chemometrics Regression Tools.” *Technometrics* 35 (2): 109–135.
- Freedman, David A. 1987. “As Others See Us: A Case Study in Path Analysis.” *Journal of Educational Statistics* 12 (2): 101–128.
- Freedman, David H. 2010. “Lies, Damned Lies, and Medical Science.” *The Atlantic* 306 (4): 76–84.
- Friedman, Hershey H., and Taiwo Amoo. 1999. “Rating the Rating Scales.” *Journal of Marketing Management, Winter*: 114–123.

- Friedman, Hershey H., Yonah Wilamowsky, and Linda W. Friedman. 1981. "A Comparison of Balanced and Unbalanced Rating Scales." *The Mid-Atlantic Journal of Business* 19 (2): 1–7.
- Friedman, Jerome, Trevor Hastie, Saharon Rosset, Robert Tibshirani, and Ji Zhu. 2004. "Discussion of Boosting Papers." *The Annals of Statistics* 32: 102–107.
- Friedman, Jerome, Trevor Hastie, and Rob Tibshirani. 2010. "Regularization Paths for Generalized Linear Models via Coordinate Descent." *Journal of Statistical Software* 33 (1): 1.
- Fruchterman, Thomas M.J., and Edward M. Reingold. 1991. "Graph Drawing by Force-Directed Placement." *Software: Practice and Experience* 21 (11): 1129–1164.
- Gerbing, D.W., and J.C. Anderson. 1988. "An Updated Paradigm for Scale Development Incorporating Unidimensionality and Its Assessment." *Journal of Marketing Research* 25 (2): 186–192.
- Geweke, J.F., and K.J. Singleton. 1981. "Maximum Likelihood 'Confirmatory' Factor Analysis of Economic Time Series." *International Economic Review* 22 (1): 37–54.
- Gilbert, Paul. 1998. "The Evolved Basis and Adaptive Functions of Cognitive Distortions." *British Journal of Medical Psychology* 71 (4): 447–463.
- Goh, Kwang-Il, Michael E. Cusick, David Valle, Barton Childs, Marc Vidal, and Albert-László Barabási. 2007. "The Human Disease Network." *Proceedings of the National Academy of Sciences* 104 (21): 8685–8690.
- Goodhue, Dale L. 1995. "Understanding User Evaluations of Information Systems." *Management Science* 41 (12): 1827–1844.
- Goodhue, Dale L., and Ronald L. Thompson. 1995. "Task-Technology Fit and Individual Performance." *MIS Quarterly* 19 (2): 213–236.
- Goodhue, Dale, William Lewis, and Ron Thompson. 2006. "PLS, Small Sample Size, and Statistical Power in Mis Research." In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences, 2006. Hicss'06*. Vol. 8, 202b. Piscataway: IEEE.
- . 2012a. "Comparing PLS to Regression and Lisrel: A Response to Marcoulides, Chin, and Saunders." *Mis Quarterly* 36 (3): 703–716.
- . 2012b. "Does PLS Have Advantages for Small Sample Size or Non-normal Data?" *Mis Quarterly* 36 (3): 981–1001.
- . n.d. "PLS, Small Sample Size, and Statistical Power in Mis Research." In *Conference Proceedings*. Vol. 8, 202b. Piscataway: IEEE.
- Gould, Stephen Jay. 1977. *Ontogeny and Phylogeny*. Cambridge: Harvard University Press.
- Greco, Alberto, Gaetano Valenza, and Enzo Pasquale Scilingo. 2016a. *Advances in Electrodermal Activity Processing with Applications for Mental Health*. Berlin: Springer.
- Greco, Alberto, Gaetano Valenza, Antonio Lanata, Enzo Pasquale Scilingo, and Luca Citi. 2016b. "CvxEDA: A Convex Optimization Approach to Electrodermal Activity Processing." *IEEE Transactions on Biomedical Engineering* 63 (4): 797–804.
- Grier, David Alan. 2013. *When Computers Were Human*. Princeton: Princeton University Press.
- Gross, Paul R., and Norman Levitt. 1997. *Higher Superstition: The Academic Left and Its Quarrels with Science*. Baltimore: JHU Press.
- Hair, Joe F., Christian M. Ringle, and Marko Sarstedt. 2011. "PLS-Sem: Indeed a Silver Bullet." *Journal of Marketing Theory and Practice* 19 (2): 139–152.
- Hair, Joe F., Marko Sarstedt, Christian M. Ringle, and Jeannette A. Mena. 2012. "An Assessment of the Use of Partial Least Squares Structural Equation Modeling in Marketing Research." *Journal of the Academy of Marketing Science* 40 (3): 414–433.
- Harris, R.L. 1999. *Information Graphics: A Comprehensive Illustrated Reference*. Oxford: Oxford University Press. <http://books.google.com/books?id=LT1RXREvkGIC>
- Hauser, Robert M. 1972. "Disaggregating a Social-Psychological Model of Educational Attainment." *Social Science Research* 1 (2): 159–188.
- Hauser, Robert M., and Arthur S. Goldberger. 1971. "The Treatment of Unobservable Variables in Path Analysis." *Sociological Methodology* 3: 81–117.
- He, Qinying, and H.N. Nagaraja. 2011. "Correlation Estimation in Downton's Bivariate Exponential Distribution Using Incomplete Samples." *Journal of Statistical Computation and Simulation* 81 (5): 531–546.

- Headon, Robert, and Rupert Curwen. 2002. "Movement Awareness for Ubiquitous Game Control." *Personal and Ubiquitous Computing* 6 (5–6): 407–415.
- Henrich, Joseph, and Richard McElreath. 2003. "The Evolution of Cultural Evolution." *Evolutionary Anthropology: Issues, News, and Reviews* 12 (3): 123–135.
- Henseler, J., and G. Fassott. 2010. "Testing Moderating Effects in PLS Path Models: An Illustration of Available Procedures." In *Handbook of Partial Least Squares*, 713–735. Berlin: Springer.
- Henseler, J., C.M. Ringle, and R.R. Sinkovics. 2009. "The Use of Partial Least Squares Path Modeling in International Marketing." *Advances in International Marketing* 20 (2009): 277–319.
- Hill, Bruce M. 1979. "Posterior Moments of the Number of Species in a Finite Population and the Posterior Probability of Finding a New Species." *Journal of the American Statistical Association* 74 (367): 668–673.
- . 1992. "Bayesian Nonparametric Prediction and Statistical Inference." In *Bayesian Analysis in Statistics and Econometrics*, 43–94. Berlin: Springer.
- Hill, Theodore P. 1995. "Base-Invariance Implies Benford's Law." *Proceedings of the American Mathematical Society* 123 (3): 887–895.
- Hotelling, Harold. 1933. "Analysis of a Complex of Statistical Variables into Principal Components." *Journal of Educational Psychology* 24 (6): 417.
- . 1936. "Relations Between Two Sets of Variates." *Biometrika* 28 (3/4): 321–377.
- Hox, Joop J. 1995. *Applied Multilevel Analysis*. Amsterdam: TT-publikaties.
- Hsu, Chien-Lung, J. Christopher Westland, and Chun-Hao Chiang. 2015. "Electronic Commerce Research in Seven Maps." *Electronic Commerce Research* 15 (2): 147–158.
- Hu, L., and P.M. Bentler. 1999. "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives." *Structural Equation Modeling: A Multidisciplinary Journal* 6 (1): 1–55.
- Hume, David. 1758. *Essays and Treatises on Several Subjects*. Edinburgh: A. Millar, A. Kincaid, A. Donaldson.
- Ioannidis, J.P.A. 2005a. "Why Most Published Research Findings Are False." *PLoS Medicine* 2 (8): e124.
- . 2005b. "Differentiating Biases from Genuine Heterogeneity: Distinguishing Artifactual from Substantive Effects." In *Publication Bias in Meta-Analysis: Prevention, Assessment and Adjustments*, 287–302. Chichester: Wiley.
- James, William. 1884. "What Is an Emotion?" *Mind* 9 (34): 188–205.
- Jamieson, Susan. 2004. "Likert Scales: How to (Ab) Use Them." *Medical Education* 38 (12): 1217–1218.
- Jöreskog, Karl G. 1970. "A General Method for Estimating a Linear Structural Equation System." *ETS Research Bulletin Series* 1970 (2): i–41.
- Jöreskog, Karl G. 1971a. Statistical Analysis of Sets of Congeneric Tests. *Psychometrika* 36 (2): 109–133.
- Jöreskog, Karl G. 1971b. Simultaneous Factor Analysis in Several Populations. *Psychometrika* 36 (4): 409–426.
- . 1993. "Testing Structural Equation Models." *Sage Focus Editions* 154: 294.
- Jöreskog, Karl G., and Arthur S. Goldberger. 1975. "Estimation of a Model with Multiple Indicators and Multiple Causes of a Single Latent Variable." *Journal of the American Statistical Association* 70 (351a): 631–639.
- Jöreskog, Karl G., and Dag Sörbom. 1982. "Recent Developments in Structural Equation Modeling." *Journal of Marketing Research* 19 (4): 404–416.
- Jöreskog, Karl G., and Dag Sörbom. 1996. *LISREL 8: User's Reference Guide*. Skokie: Scientific Software International.
- Jöreskog, Karl G., Fan Yang, G. Marcoulides, and R. Schumacker. 1996. Nonlinear Structural Equation Models: The Kenny-Judd Model with Interaction Effects. In *Advanced Structural Equation Modeling: Issues and Techniques*. Vol. 3, 57–88.
- Jöreskog, Karl G., and Marielle Van Thillo. 1972. "LISREL: A General Computer Program for Estimating a Linear Structural Equation System Involving Multiple Indicators of Unmeasured Variables."

- Jöreskog, Karl G., Dag Sorbom, and Jay Magidson. 1979. "Advances in Factor Analysis and Structural Equation Models."
- Jung, Carl Gustav. 1919. *Studies in Word-Association: Experiments in the Diagnosis of Psychopathological Conditions Carried Out at the Psychiatric Clinic of the University of Zurich*. Moffat: Yard & Co.
- Kahai, S.S., and R.B. Cooper. 2003. "Exploring the Core Concepts of Media Richness Theory: The Impact of Cue Multiplicity and Feedback Immediacy on Decision Quality." *Journal of Management Information Systems* 20 (1): 263–299.
- Kailath, Thomas. 1967. "The Divergence and Bhattacharyya Distance Measures in Signal Selection." *IEEE Transactions on Communication Technology* 15 (1): 52–60.
- Kaiser, Henry F. 1960. "The Application of Electronic Computers to Factor Analysis." *Educational and Psychological Measurement* 20 (1): 141–151.
- Kendall, Maurice, and J.D.R. Gibbons. 1990. *Correlation Methods*. Oxford: Oxford University Press.
- Kline, Rex B. 1998. "Software Review: Software Programs for Structural Equation Modeling: Amos, Eqs, and Lisrel." *Journal of Psychoeducational Assessment* 16 (4): 343–364.
- Kobourov, Stephen G. 2012. "Spring Embedders and Force Directed Graph Drawing Algorithms." arXiv Preprint arXiv:1201.3011.
- Komorita, Samuel S., and William K. Graham. 1965. "Number of Scale Points and the Reliability of Scales." *Educational and Psychological Measurement* 25 (4): 987–995.
- Koopmans, Tjalling C. 1951. "Analysis of Production as an Efficient Combination of Activities." *Activity Analysis of Production and Allocation* 13: 33–37.
- Koopmans, Tjalling C., and Martin Beckmann. 1957. "Assignment Problems and the Location of Economic Activities." *Econometrica: Journal of the Econometric Society*. 25 (1): 53–76.
- Kühberger, Anton. 1995. "The Framing of Decisions: A New Look at Old Problems." *Organizational Behavior and Human Decision Processes* 62 (2): 230–240.
- Leamer, Edward E. 1978. *Specification Searches: Ad Hoc Inference with Nonexperimental Data*. Vol. 53. New York: Wiley.
- Lee, Jerry W., Patricia S. Jones, Yoshimitsu Mineyama, and Xinwei Esther Zhang. 2002. "Cultural Differences in Responses to a Likert Scale." *Research in Nursing & Health* 25 (4): 295–306.
- Liberati, Alessandro, Douglas G. Altman, Jennifer Tetzlaff, Cynthia Mulrow, Peter C. Gøtzsche, John P.A. Ioannidis, Mike Clarke, PI J. Devereaux, Jos Kleijnen, and David Moher. 2009. "The Prisma Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration." *PLoS Medicine* 6 (7): e1000100.
- Likert, Rensis. 1932. "A Technique for the Measurement of Attitudes." In *Archives of Psychology*. New York: The Science Press.
- . 1961. *New Patterns of Management*. New York: McGraw-Hill.
- Lohmöller, Jan-Bernd, and Herman Wold. 1980. Three-Mode Path Models with Latent Variables and Partial Least Squares (PLS) Parameter Estimation.
- Lohmöller, Jan-Bernd. 1988. "The PLS Program System: Latent Variables Path Analysis with Partial Least Squares Estimation." *Multivariate Behavioral Research* 23 (1): 125–127.
- Lohmöller, Jan-Bernd, and Herman O.A. Wold. 1982. *Introduction to PLS Estimation of Path Models with Latent Variables, Including Some Recent Developments on Mixed Scales Variables*. Neubiberg: Hochschule der Bundeswehr.
- Lohmöller, Jan-Bernd. 2013. *Latent Variable Path Modeling with Partial Least Squares*. Heidelberg: Springer.
- . 1989. *Latent Variable Path Modeling with Partial Least Squares*. Heidelberg: Physica-Verlag.
- Lucas, Robert E. 1992. "On Efficiency and Distribution." *Economic Journal* 102(411): 233–247.
- Ludden, Thomas M., Stuart L. Beal, and Lewis B. Sheiner. 1994. "Comparison of the Akaike Information Criterion, the Schwarz Criterion and the F Test as Guides to Model Selection." *Journal of Pharmacokinetics and Biopharmaceutics* 22 (5): 431–445.

- Lydin, H., G Lohmöller, R. Lohmöller, H. Schmitz, and I. Walter. 1980. "Hemodynamic Studies on Adalat in Healthy Volunteers and in Patients." Conference Proceedings. In *2nd International Adalat Symposium*, 112–123. Berlin: Springer.
- Mandelbrot, Benoit B. 1982. *The Fractal Geometry of Nature*. Vol. 1. New York: WH Freeman.
- Marcoulides, George A., and Carol Saunders. 2006. "Editor's Comments: PLS: A Silver Bullet?" *MIS Quarterly*. 30 (2): iii–ix.
- Marsh, Herbert W., and Michael Bailey. 1991. "Confirmatory Factor Analyses of Multitrait-Multimethod Data: A Comparison of Alternative Models." *Applied Psychological Measurement* 15 (1): 47–70.
- Marsh, H.W., and A.S. Yeung. 1997. "Causal Effects of Academic Self-concept on Academic Achievement: Structural Equation Models of Longitudinal Data." *Journal of Educational Psychology* 89 (1): 41.
- . 1998. "Longitudinal Structural Equation Models of Academic Self-concept and Achievement: Gender Differences in the Development of Math and English Constructs." *American Educational Research Journal* 35 (4): 705.
- Marsh, H.W., B.M. Byrne, and R. Craven. 1992. "Overcoming Problems in Confirmatory Factor Analyses of Mtm Data: The Correlated Uniqueness Model and Factorial Invariance." *Multivariate Behavioral Research* 27 (4): 489–507.
- Marsh, H.W., Z. Wen, and K.T. Hau. 2004. "Structural Equation Models of Latent Interactions: Evaluation of Alternative Estimation Strategies and Indicator Construction." *Psychological Methods* 9 (3): 275.
- Marston, William Moulton. 1938. *The Lie Detector Test*. New York: RR Smith.
- Matell, Michael S., and Jacob Jacoby. 1972. "Is There an Optimal Number of Alternatives for Likert-Scale Items? Effects of Testing Time and Scale Properties." *Journal of Applied Psychology* 56 (6): 506.
- Matsumoto, Makoto, and Takuji Nishimura. 1998. "Mersenne Twister: A 623-Dimensionally Equidistributed Uniform Pseudo-Random Number Generator." *ACM Transactions on Modeling and Computer Simulation* 8 (1): 3–30.
- McArdle, John J. 1988. "Dynamic but Structural Equation Modeling of Repeated Measures Data." In *Handbook of Multivariate Experimental Psychology*, 561–614. Berlin: Springer.
- McArdle, Brian H., and Marti J. Anderson. 2001. "Fitting Multivariate Models to Community Data: A Comment on Distance-Based Redundancy Analysis." *Ecology* 82 (1): 290–297.
- McArdle, John J., and David Epstein. 1987. "Latent Growth Curves Within Developmental Structural Equation Models." *Child Development* 58 (1): 110–133.
- McCarthy, Mark I., Gonçalo R. Abecasis, Lon R. Cardon, David B. Goldstein, Julian Little, John P.A. Ioannidis, and Joel N. Hirschhorn. 2008. "Genome-Wide Association Studies for Complex Traits: Consensus, Uncertainty and Challenges." *Nature Reviews Genetics* 9 (5): 356.
- McCullagh, Peter, and John A. Nelder. 1989. *Generalized Linear Models*. Vol. 37. Boca Raton: CRC Press.
- McIver, John, and Edward G. Carmines. 1981. *Unidimensional Scaling*. Vol. 24. Thousand Oaks: Sage.
- Merton, R.K. 1968. "The Matthew Effect in Science." *Science* 159 (3810): 56.
- Merton, Robert K. 1988. "The Matthew Effect in Science, II: Cumulative Advantage and the Symbolism of Intellectual Property." *Isis* 79 (4): 606–623.
- . 1995. "The Thomas Theorem and the Matthews Effect." *Social Forces* 74 (2): 379–424.
- Merton, Robert King, and Robert C. Merton. 1968. *Social Theory and Social Structure*. New York City: Simon and Schuster.
- Meshkati, Najmedin, Peter A. Hancock, Mansour Rahimi, and Suzanne M. Dawes. 1995. *Techniques in Mental Workload Assessment*. Milton Park: Taylor & Francis.
- Michotte, Albert, and Georges Thines. 1991. "Perceived Causality." In *Michotte's Experimental Phenomenology of Perception*, 66–87. East Sussex: Lawrence Erlbaum Hove.
- Monecke, Armin, and Friedrich Leisch. 2012. "SemPLS: Structural Equation Modeling Using Partial Least Squares." *Journal of Statistical Software* 48 (3): 1–32. <http://www.jstatsoft.org/v48/i03/>

- Murphy, Gardner, and Rensis Likert. 1938. *Public Opinion and the Individual*. Oxford: Harper.
- Nakagawa, Shinichi, and Innes C. Cuthill. 2007. "Effect Size, Confidence Interval and Statistical Significance: A Practical Guide for Biologists." *Biological Reviews* 82 (4): 591–605.
- Neuhoff, John G. 2001. "An Adaptive Bias in the Perception of Looming Auditory Motion." *Ecological Psychology* 13 (2): 87–110.
- Neumann, Eva, and Richard Blanton. 1970. "The Early History of Electrodermal Research." *Psychophysiology* 6 (4): 453–475.
- Noonan, Richard, and Herman Wold. 1982. "PLS Path Modeling with Indirectly Observed Variables: A Comparison of Alternative Estimates for the Latent Variable." In *Systems Under Indirect Observation, Part II*. Amsterdam: North Holland.
- Norman, Geoff. 2010. "Likert Scales, Levels of Measurement and the 'Laws' of Statistics." *Advances in Health Sciences Education* 15 (5): 625–632.
- Nunnally, J.C. 1967. *Psychometric Theory*. New York City: Tata McGraw-Hill Education.
- Nunnally, Jum C., Ira H. Bernstein, and others. 1967. *Psychometric Theory*. Vol. 226. New York: McGraw-Hill.
- Picard, Rosalind W. 2010. "Affective Computing: From Laughter to IEEE." *IEEE Transactions on Affective Computing* 1 (1): 11–17.
- Podsakoff, Philip M., and Dennis W. Organ. 1986. "Self-reports in Organizational Research: Problems and Prospects." *Journal of Management* 12 (4): 531–544.
- Pryor, Robert. 1982. "Values, Preferences, Needs, Work Ethics, and Orientations to Work: Toward a Conceptual and Empirical Integration." *Journal of Vocational Behavior* 20 (1): 40–52.
- Ramaratnam, Sridharan, Gus A. Baker, and Laura H. Goldstein. 2008. "Psychological Treatments for Epilepsy." In *Cochrane Database of Systematic Reviews*, no. 3. Hoboken: Wiley.
- Raspe, Rudolf Erich. 2009. *The Surprising Adventures of Baron Munchausen*. Auckland: The Floating Press.
- Raykov, Tenko. 2005. Analysis of Longitudinal Studies with Missing Data Using Covariance Structure Modeling with Full-Information Maximum Likelihood. *Structural Equation Modeling* 12 (3): 493–505.
- Reips, Ulf-Dietrich, and Frederik Funke. 2008. "Interval-Level Measurement with Visual Analogue Scales in Internet-Based Research: VAS Generator." *Behavior Research Methods* 40 (3): 699–704.
- Ringle, Christian M., Sven Wende, and Alexander Will. 2005. SmartPLS 2.0 (M3) Beta, Hamburg, Germany
- Ringle, C.M., and R. Schlittgen. 2007. "A Genetic Algorithm Segmentation Approach for Uncovering and Separating Groups of Data in PLS Path Modeling." In *PLS*. Vol. 7, 75–78.
- Ringle, C.M., S. Wende, and A. Will. 2010. "Finite Mixture Partial Least Squares Analysis: Methodology and Numerical Examples." In *Handbook of Partial Least Squares*, 195–218. Berlin: Springer.
- Ringle, Christian M., Marko Sarstedt, and Detmar W. Straub. 2012. "Editor's Comments: A Critical Look at the Use of Pls-Sem in *Mis Quarterly*." *MIS Quarterly* 36 (1): iii–xiv.
- Roberts, Susan B., Dean M. Bonnici, Andrew J. Mackinnon, and Marian C. Worcester. 2001. "Psychometric Evaluation of the Hospital Anxiety and Depression Scale (Hads) Among Female Cardiac Patients." *British Journal of Health Psychology* 6 (4): 373–383.
- Rosseel, Yves. 2012. Lavaan: An R Package for Structural Equation Modeling and More. Version 0.5–12 (BETA). *Journal of Statistical Software* 48 (2): 1–36.
- Samuel, Mari Dominique Drouet Kotz, Dominique Drouet Mari, and Samuel Kotz. 2001. *Correlation and Dependence*. Singapore: World Scientific.
- Sanchez, Gaston, and Gaston Sanchez (Maintainer). 2012. Package 'plsdepot' Partial Least Squares (PLS) Data Analysis Methods, v. 0.1.17.
- Sargan, John D. 1958. "The Estimation of Economic Relationships Using Instrumental Variables." *Econometrica: Journal of the Econometric Society* 26: 393–415.
- Schechtman, Edna, and Shlomo Yitzhaki. 1999. "On the Proper Bounds of the Gini Correlation." *Economics Letters* 63 (2): 133–138.

- Scheines, Richard, Peter Spirtes, Clark Glymour, Christopher Meek, and Thomas Richardson. 1998. "The Tetrad Project: Constraint Based Aids to Causal Model Specification." *Multivariate Behavioral Research* 33 (1): 65–117.
- Schonhoff, Thomas, and Arthur Giordano. 2006. *Detection and Estimation Theory*. New Jersey: Prentice Hall.
- Sequeira, Henrique, Pascal Hot, Laetitia Silvert, and Sylvain Delplanque. 2009. "Electrical Autonomic Correlates of Emotion." *International Journal of Psychophysiology* 71 (1): 50–56.
- Shevlyakov, Georgy L., and Nikita O. Vilchevski. 2002. "Minimax Variance Estimation of a Correlation Coefficient for ε -Contaminated Bivariate Normal Distributions." *Statistics & Probability Letters* 57 (1): 91–100.
- Sokal, Alan D. 1996. "Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity." *Social Text*, no. 46/47: 217–252.
- Sokal, Alan D., and Jean Bricmont. 1998. *Intellectual Impostures: Postmodern Philosophers' Abuse of Science*. London: Profile Books.
- Sosik, John J., Surinder S. Kahai, and Michael J. Piovoso. 2009. "Silver Bullet or Voodoo Statistics? A Primer for Using the Partial Least Squares Data Analytic Technique in Group and Organization Research." *Group & Organization Management* 34 (1): 5–36.
- Sparks, Roland, Nick Desai, Perumal Thirumurthy, Cindy Kistenberg, and S. Krishnamurthy. 2006. "Measuring E-Commerce Satisfaction: Reward Error and the Emergence of Micro-Surveys." In *IADIS International E-Commerce Conference Proceedings*.
- Sterne, Jonathan AC, and George Davey Smith. 2001. "Sifting the Evidence—What's Wrong with Significance Tests?" *Physical Therapy* 81 (8): 1464–1469.
- Stigler, Stephen M. 1980. "Stigler's Law of Eponymy." *Transactions of the New York Academy of Sciences* 39 (1 Series II): 147–157.
- Stuart, Alan, Maurice George Kendall, and John Keith Ord. 1991. *Classical Inference and Relationship*. Oxford: Oxford University Press.
- Tabachnick, Barbara G., Linda S. Fidell, and Jodie B. Ullman. 2007. *Using Multivariate Statistics*. Needham Heights: Allyn & Bacon/Pearson Education.
- Tanaka, Jeffrey S. 1987. "'How Big Is Big Enough?': Sample Size and Goodness of Fit in Structural Equation Models with Latent Variables." *Child Development* 58: 134–146.
- Tao, Jianhua, and Tieniu Tan. 2005. "Affective Computing: A Review." In *International Conference on Affective Computing and Intelligent Interaction*, 981–995. Berlin: Springer.
- Temme, Dirk, Henning Kreis, and Lutz Hildebrandt. 2006. "PLS Path Modeling." Humboldt-Universität zu Berlin, Wirtschaftswissenschaftliche Fakultät.
- Tenenhaus, Michel, Silvano Amato, and Vincenzo Esposito Vinzi. 2004. "A Global Goodness-of-Fit Index for PLS Structural Equation Modelling." In *Proceedings of the Xlii Sis Scientific Meeting*. Vol. 1, 739–742.
- Tenenhaus, Michel, Vincenzo Esposito Vinzi, Yves-Marie Chatelin, and Carlo Lauro. 2005. "PLS Path Modeling." *Computational Statistics & Data Analysis* 48 (1): 159–205.
- Theil, Henri. 1980. *System-Wide Explorations in International Economics, Input-Output Analysis, and Marketing Research*. Vol. 2. Amsterdam: North-Holland.
- Theil, Henri, and John C.G. Boot. 1962. "The Final Form of Econometric Equation Systems." *Revue de L'Institut International de Statistique* 30: 136–152.
- Thurstone, Louis Leon. 1935. *The Vectors of Mind: Multiple-Factor Analysis for the Isolation of Primary Traits*. Chicago: University of Chicago Press.
- Travers, Jeffrey, and Stanley Milgram. 1967. "The Small World Problem." *Psychology Today* 1 (1): 61–67.
- . 1977. "An Experimental Study of the Small World Problem." In *Social Networks*, 179–197. New York: Elsevier.
- Turner, Malcolm E., and Charles D. Stevens. 1959. "The Regression Analysis of Causal Paths." *Biometrics* 15 (2): 236–258.

- Tukey, John W. 1954. Unsolved Problems of Experimental Statistics. *Journal of the American Statistical Association* 49 (268): 706–731.
- Tversky, Amos, and Daniel Kahneman. 1989. Rational Choice and the Framing of Decisions. In *Multiple Criteria Decision Making and Risk Analysis Using Microcomputers*, 81–126. Berlin: Springer.
- Velicer, W.F., J.O. Prochaska, J.L. Fava, G.J. Norman, and C.A. Redding. 1998. “Detailed Overview of the Transtheoretical Model.” *Homeostasis* 38: 216–233.
- Vinzi, Vincenzo Esposito, Carlo N. Lauro, and Silvano Amato. 2005. “PLS Typological Regression: Algorithmic, Classification and Validation Issues.” In *New Developments in Classification and Data Analysis*, 133–140. Berlin: Springer.
- Vogt, W. Paul, and Burke Johnson. 2011. *Dictionary of Statistics & Methodology: A Nontechnical Guide for the Social Sciences*. Thousand Oaks: Sage.
- Watts, Duncan J., and Steven H. Strogatz. 1998. “Collective Dynamics of ‘Small-World’ networks.” *Nature* 393 (6684): 440.
- Wedderburn, Robert W.M. 1974. “Quasi-Likelihood Functions, Generalized Linear Models, and the Gauss–Newton Method.” *Biometrika* 61 (3): 439–447.
- Wehrens, Ron, and B.-H. Mevik. 2007. “The PLS Package: Principal Component and Partial Least Squares Regression in R.”
- Werts, Charles E., Karl G. Jöreskog, and Robert L. Linn. 1972. “A Multitrait-Multimethod Model for Studying Growth.” *Educational and Psychological Measurement* 32 (3): 655–678.
- Werts, Charles E., Robert L. Linn, and Karl G. Jöreskog. 1974. “Intraclass Reliability Estimates: Testing Structural Assumptions.” *Educational and Psychological Measurement* 34 (1): 25–33.
- Westland, J. Christopher. 2010. “Lower Bounds on Sample Size in Structural Equation Modeling.” *Electronic Commerce Research and Applications* 9 (6): 476–487.
- . 2011a. “Affective Data Acquisition Technologies in Survey Research.” *Information Technology and Management* 12 (4): 387–408.
- . 2011b. “Electrodermal Response in Gaming.” *Journal of Computer Networks and Communications* 2011: 14 pp.
- Wildt, Albert R., and Michael B. Mazis. 1978. “Determinants of Scale Response: Label Versus Position.” *Journal of Marketing Research* 15: 261–267.
- Wittfogel, Karl A. 1957. “Chinese Society: An Historical Survey.” *The Journal of Asian Studies* 16 (3): 343–364.
- Wold, H. 1966. “Estimation of Principal Components and Related Models by Iterative Least Squares.” *Multivariate Analysis* 1: 391–420.
- . 1974. “Causal Flows with Latent Variables: Partings of the Ways in the Light of Nipals Modelling.” *European Economic Review* 5 (1): 67–86.
- Wold, Herman O.A., et al. 1961. Unbiased Predictors. In *Proceedings of the Fourth Berkeley Symposium on Mathematical Statistics and Probability, Volume 1: Contributions to the Theory of Statistics*, The Regents of the University of California.
- Wolfram, Stephen. 2002a. *A New Kind of Science*. Vol. 5. Champaign: Wolfram Media.
- . 2002b. *A New Kind of Science*. Vol. 5. Champaign: Wolfram Media.
- Worcester, Robert M., and Timothy R. Burns. 1975. “Statistical Examination of Relative Precision of Verbal Scales.” *Journal of the Market Research Society* 17 (3): 181–197.
- Wright, Sewall. 1920. The Relative Importance of Heredity and Environment in Determining the Piebald Pattern of Guinea-Pigs. *Proceedings of the National Academy of Sciences of the United States of America* 6 (6): 320.
- Wright, Sewall. 1921. “Correlation and Causation.” *Journal of Agricultural Research* 20 (7): 557–585.
- . 1934. “The Method of Path Coefficients.” *The Annals of Mathematical Statistics* 5 (3): 161–215.
- . 1960. “Path Coefficients and Path Regressions: Alternative or Complementary Concepts?” *Biometrics* 16 (2): 189–202.

- Xu, Weichao, Y.S. Hung, Mahesan Niranjan, and Minfen Shen. 2010. "Asymptotic Mean and Variance of Gini Correlation for Bivariate Normal Samples." *IEEE Transactions on Signal Processing* 58 (2): 522–534.
- Ye, H. Ge, X., and W.L. Shiau. 2010. "Website Quality and Consumer's Purchase Intention? Product Information, Navigation, and Visual Aesthetics." Working paper.
- Zellner, A. 1962. "An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias." *Journal of the American Statistical Association* 57: 348–368.
- Zellner, Arnold, and Henri Theil. 1962. "Three-Stage Least Squares: Simultaneous Estimation of Simultaneous Equations." *Econometrica: Journal of the Econometric Society* 30: 54–78.

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