## betaDelta: References

## Ivan Jacob Agaloos Pesigan

## References

- Arbuckle, J. L. (1996). Full information estimation in the presence of incomplete data. In G. A. Marcoulides & R. E. Schumacker (Eds.), Advanced structural equation modeling. https://doi.org/10.4324/9781315827414
- Arbuckle, J. L. (2020). Amos 27.0 user's guide. Chicago, IBM SPSS.
- Arbuckle, J. L. (2021). Amos 28.0 user's guide. Chicago, IBM SPSS.
- Aroian, L. A. (1947). The probability function of the product of two normally distributed variables.

  The Annals of Mathematical Statistics, 18(2), 265–271. https://doi.org/10.1214/aoms/
  1177730442
- Asparouhov, T., & Muthén, B. O. (2022). Multiple imputation with Mplus (tech. rep.). http://www.statmodel.com. http://www.statmodel.com/download/Imputations7.pdf
- 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 (6), 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173
- 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(2), 142–163. https://doi.org/10.1037/1082-989x.11.2.142
- Biesanz, J. C., Falk, C. F., & Savalei, V. (2010). Assessing mediational models: Testing and interval estimation for indirect effects. *Multivariate Behavioral Research*, 45(4), 661–701. https://doi.org/10.1080/00273171.2010.498292

- Blanca, M., Arnau, J., López-Montiel, D., Bono, R., & Bendayan, R. (2013). Skewness and kurtosis in real data samples. *Methodology*, 9(2), 78–84. https://doi.org/10.1027/1614-2241/a000057
- Boettiger, C., & Eddelbuettel, D. (2017). An introduction to Rocker: Docker containers for R. *The R Journal*, 9(2), 527. https://doi.org/10.32614/rj-2017-065
- Bollen, K. A., & Stine, R. (1990). Direct and indirect effects: Classical and bootstrap estimates of variability. *Sociological Methodology*, 20, 115. https://doi.org/10.2307/271084
- Bradley, J. V. (1978). Robustness? British Journal of Mathematical and Statistical Psychology, 31(2), 144–152. https://doi.org/10.1111/j.2044-8317.1978.tb00581.x
- Browne, M. W. (1984). Asymptotically distribution-free methods for the analysis of covariance structures. *British Journal of Mathematical and Statistical Psychology*, 37(1), 62–83. https://doi.org/10.1111/j.2044-8317.1984.tb00789.x
- Cheung, G. W., & Lau, R. S. (2007). Testing mediation and suppression effects of latent variables. Organizational Research Methods, 11(2), 296–325. https://doi.org/10.1177/1094428107300343
- Cheung, M. W.-L. (2009a). Comparison of methods for constructing confidence intervals of standardized indirect effects. *Behavior Research Methods*, 41(2), 425–438. https://doi.org/10. 3758/brm.41.2.425
- Cheung, M. W.-L. (2009b). Constructing approximate confidence intervals for parameters with structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal*, 16(2), 267–294. https://doi.org/10.1080/10705510902751291
- Cheung, M. W.-L. (2021). Synthesizing indirect effects in mediation models with meta-analytic methods. *Alcohol and Alcoholism*, 57(1), 5–15. https://doi.org/10.1093/alcalc/agab044
- Cheung, S. F., & Pesigan, I. J. A. (2023a). FINDOUT: Using either SPSS commands or graphical user interface to identify influential cases in structural equation modeling in AMOS.

  Multivariate Behavioral Research, 1–5. https://doi.org/10.1080/00273171.2022.2148089
- Cheung, S. F., & Pesigan, I. J. A. (2023b). semlbci: An R package for forming likelihood-based confidence intervals for parameter estimates, correlations, indirect effects, and other derived

- parameters. Structural Equation Modeling: A Multidisciplinary Journal, 1–15. https://doi.org/10.1080/10705511.2023.2183860
- Cheung, S. F., Pesigan, I. J. A., & Vong, W. N. (2022). DIY bootstrapping: Getting the non-parametric bootstrap confidence interval in SPSS for any statistics or function of statistics (when this bootstrapping is appropriate). Behavior Research Methods, 55(2), 474–490. https://doi.org/10.3758/s13428-022-01808-5
- Chow, S.-M., Ho, M.-h. R., Hamaker, E. L., & Dolan, C. V. (2010). Equivalence and differences between structural equation modeling and state-space modeling techniques. Structural Equation Modeling: A Multidisciplinary Journal, 17(2), 303–332. https://doi.org/10.1080/10705511003661553
- Cochran, W. G. (1952). The  $\chi^2$  test of goodness of fit. The Annals of Mathematical Statistics, 23(3), 315–345. https://doi.org/10.1214/aoms/1177729380
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Routledge. https://doi.org/10.4324/9780203771587
- Craig, C. C. (1936). On the frequency function of xy. The Annals of Mathematical Statistics, 7(1), 1–15. https://doi.org/10.1214/aoms/1177732541
- Cribari-Neto, F., Souza, T. C., & Vasconcellos, K. L. P. (2007). Inference under heteroskedasticity and leveraged data. *Communications in Statistics Theory and Methods*, 36(10), 1877–1888. https://doi.org/10.1080/03610920601126589
- Davison, A. C., & Hinkley, D. V. (1997). Bootstrap methods and their application. Cambridge, New York, NY, USA, Cambridge University Press. https://doi.org/10.1017/CBO9780511802843
- Deboeck, P. R., & Preacher, K. J. (2015). No need to be discrete: A method for continuous time mediation analysis. Structural Equation Modeling: A Multidisciplinary Journal, 23(1), 61– 75. https://doi.org/10.1080/10705511.2014.973960
- Dudgeon, P. (2017). Some improvements in confidence intervals for standardized regression coefficients. *Psychometrika*, 82(4), 928–951. https://doi.org/10.1007/s11336-017-9563-z
- Eddelbuettel, D. (2013). Seamless R and C++ integration with Rcpp. Springer New York. https://doi.org/10.1007/978-1-4614-6868-4

- Eddelbuettel, D., Francois, R., Allaire, J., Ushey, K., Kou, Q., Russell, N., Ucar, I., Bates, D., & Chambers, J. (2023). Rcpp: Seamless R and C++ integration. https://CRAN.R-project.org/package=Rcpp
- Eddelbuettel, D., & François, R. (2011). Rcpp: Seamless R and C++ integration. *Journal of Statistical Software*, 40(8). https://doi.org/10.18637/jss.v040.i08
- Efron, B. (1987). Better bootstrap confidence intervals. Journal of the American Statistical Association, 82(397), 171–185. https://doi.org/10.1080/01621459.1987.10478410
- Efron, B. (1988). Bootstrap confidence intervals: Good or bad? *Psychological Bulletin*, 104(2), 293–296. https://doi.org/10.1037/0033-2909.104.2.293
- Efron, B., & Tibshirani, R. J. (1993). An introduction to the bootstrap. New York, Chapman & Hall. https://doi.org/10.1201/9780429246593
- Enders, C. K. (2010). Applied missing data analysis. Guilford Publications.
- Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect.

  \*Psychological Science\*, 18(3), 233–239. https://doi.org/10.1111/j.1467-9280.2007.01882.x
- Goodman, L. A. (1960). On the exact variance of products. *Journal of the American Statistical Association*, 55(292), 708–713. https://doi.org/10.1080/01621459.1960.10483369
- Graham, J. W., Olchowski, A. E., & Gilreath, T. D. (2007). How many imputations are really needed? some practical clarifications of multiple imputation theory. *Prevention Science*, 8(3), 206–213. https://doi.org/10.1007/s11121-007-0070-9
- Hayes, A. F. (2022). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (3rd ed.). Guilford Publications.
- Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis. *Psychological Science*, 24(10), 1918–1927. https://doi.org/10.1177/0956797613480187
- Hunter, M. D. (2017). State space modeling in an open source, modular, structural equation modeling environment. Structural Equation Modeling: A Multidisciplinary Journal, 25(2), 307–324. https://doi.org/10.1080/10705511.2017.1369354

- James, L. R., & Brett, J. M. (1984). Mediators, moderators, and tests for mediation. *Journal of Applied Psychology*, 69(2), 307–321. https://doi.org/10.1037/0021-9010.69.2.307
- Jones, J. A., & Waller, N. G. (2013a). Computing confidence intervals for standardized regression coefficients. Psychological Methods, 18(4), 435–453. https://doi.org/10.1037/a0033269
- Jones, J. A., & Waller, N. G. (2013b). The normal-theory and asymptotic distribution-free (ADF) covariance matrix of standardized regression coefficients: Theoretical extensions and finite sample behavior (tech. rep.). University of Minnesota-Twin Cities. Retrieved July 22, 2022, from http://users.cla.umn.edu/~nwaller/downloads/techreports/TR052913.pdf
- Jones, J. A., & Waller, N. G. (2015). The normal-theory and asymptotic distribution-free (ADF) covariance matrix of standardized regression coefficients: Theoretical extensions and finite sample behavior. *Psychometrika*, 80(2), 365–378. https://doi.org/10.1007/s11336-013-9380-y
- Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., & Rosseel, Y. (2022). semTools: Useful tools for structural equation modeling. https://CRAN.R-project.org/package=semTools
- Judd, C. M., & Kenny, D. A. (1981). Process analysis. Evaluation Review, 5(5), 602–619. https://doi.org/10.1177/0193841x8100500502
- Koopman, J., Howe, M., & Hollenbeck, J. R. (2014). Pulling the Sobel test up by its bootstraps. In More statistical and methodological myths and urban legends: Doctrine, verity and fable in organizational and social sciences (pp. 224–243). Routledge/Taylor & Francis Group. https://doi.org/10.4324/9780203775851
- 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), 194–202. https://doi.org/10.1037/a0036635
- Kurtzer, G. M., cclerget, Bauer, M., Kaneshiro, I., Trudgian, D., & Godlove, D. (2021). hpcng/singularity: Singularity 3.7.3. Zenodo. https://doi.org/10.5281/ZENODO.1310023
- Kurtzer, G. M., Sochat, V., & Bauer, M. W. (2017). Singularity: Scientific containers for mobility of compute (A. Gursoy, Ed.). PLOS ONE, 12(5), e0177459. https://doi.org/10.1371/journal. pone.0177459

- Kwan, J. L. Y., & Chan, W. (2011). Comparing standardized coefficients in structural equation modeling: A model reparameterization approach. Behavior Research Methods, 43(3), 730– 745. https://doi.org/10.3758/s13428-011-0088-6
- Kwan, J. L. Y., & Chan, W. (2014). Comparing squared multiple correlation coefficients using structural equation modeling. Structural Equation Modeling: A Multidisciplinary Journal, 21(2), 225–238. https://doi.org/10.1080/10705511.2014.882673
- Li, K. H., Raghunathan, T. E., & Rubin, D. B. (1991). Large-sample significance levels from multiply imputed data using moment-based statistics and an F reference distribution. Journal of the American Statistical Association, 86 (416), 1065-1073. https://doi.org/10.1080/01621459. 1991.10475152
- Li, Y., Oravecz, Z., Zhou, S., Bodovski, Y., Barnett, I. J., Chi, G., Zhou, Y., Friedman, N. P., Vrieze, S. I., & Chow, S.-M. (2022). Bayesian forecasting with a regime-switching zero-inflated multilevel poisson regression model: An application to adolescent alcohol use with spatial covariates. *Psychometrika*, 87(2), 376–402. https://doi.org/10.1007/s11336-021-09831-9
- Little, R. J. A., & Rubin, D. B. (2019). Statistical analysis with missing data (3rd ed.). Wiley. https://doi.org/10.1002/9781119482260
- MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. Hoboken, Erlbaum Psych Press. https://doi.org/10.4324/9780203809556
- MacKinnon, D. P., Fritz, M. S., Williams, J., & Lockwood, C. M. (2007). Distribution of the product confidence limits for the indirect effect: Program PRODCLIN. Behavior Research Methods, 39(3), 384–389. https://doi.org/10.3758/bf03193007
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7(1), 83–104. https://doi.org/10.1037/1082-989x.7.1.83
- 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(1), 99–128. https://doi.org/10.1207/s15327906mbr3901\_4

- McNeish, D., & MacKinnon, D. P. (2022). Intensive longitudinal mediation in Mplus. *Psychological Methods*. https://doi.org/10.1037/met0000536
- Merkel, D. (2014). Docker: Lightweight Linux containers for consistent development and deployment. Linux Journal, 2014 (239), 2. https://www.linuxjournal.com/content/docker-lightweight-linux-containers-consistent-development-and-deployment
- Micceri, T. (1989). The unicorn, the normal curve, and other improbable creatures. *Psychological Bulletin*, 105(1), 156–166. https://doi.org/10.1037/0033-2909.105.1.156
- Muthén, L. K., & Muthén, B. O. (2017). Mplus user's guide. Eighth edition. Los Angeles, CA, Muthén.
- National Research Council. (1982). An assessment of research-doctorate programs in the United States: Social and behavioral sciences. Washington, D.C., National Academies Press. https://doi.org/10.17226/9781
- Neale, M. C., Hunter, M. D., Pritikin, J. N., Zahery, M., Brick, T. R., Kirkpatrick, R. M., Estabrook, R., Bates, T. C., Maes, H. H., & Boker, S. M. (2015). OpenMx 2.0: Extended structural equation and statistical modeling. *Psychometrika*, 81(2), 535–549. https://doi.org/10.1007/s11336-014-9435-8
- Nüst, D., Eddelbuettel, D., Bennett, D., Cannoodt, R., Clark, D., Daróczi, G., Edmondson, M., Fay, C., Hughes, E., Kjeldgaard, L., Lopp, S., Marwick, B., Nolis, H., Nolis, J., Ooi, H., Ram, K., Ross, N., Shepherd, L., Sólymos, P., ... Xiao, N. (2020). The Rockerverse: Packages and applications for containerisation with R. The R Journal, 12(1), 437. https://doi.org/10.32614/rj-2020-007
- Ou, L., Hunter, M. D., & Chow, S.-M. (2019). What's for dynr: A package for linear and nonlinear dynamic modeling in R. The R Journal, 11(1), 91. https://doi.org/10.32614/rj-2019-012
- Pawitan, Y. (2013). In all likelihood: Statistical modelling and inference using likelihood. Oxford University Press.
- Pesigan, I. J. A. (2022). Confidence intervals for standardized coefficients: Applied to regression coefficients in primary studies and indirect effects in meta-analytic structural equation modeling (Doctoral dissertation). University of Macau.

- Pesigan, I. J. A., & Cheung, S. F. (2020). SEM-based methods to form confidence intervals for indirect effect: Still applicable given nonnormality, under certain conditions. Frontiers in Psychology, 11. https://doi.org/10.3389/fpsyg.2020.571928
- Pesigan, I. J. A., & Cheung, S. F. (2023). Monte Carlo confidence intervals for the indirect effect with missing data. *Behavior Research Methods*. https://doi.org/10.3758/s13428-023-02114-4
- Pesigan, I. J. A., Sun, R. W., & Cheung, S. F. (2023). betaDelta and betaSandwich: Confidence intervals for standardized regression coefficients in R. Multivariate Behavioral Research, 1–4. https://doi.org/10.1080/00273171.2023.2201277
- Peugh, J. L., & Enders, C. K. (2004). Missing data in educational research: A review of reporting practices and suggestions for improvement. Review of Educational Research, 74(4), 525– 556. https://doi.org/10.3102/00346543074004525
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717–731. https://doi.org/10.3758/bf03206553
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891. https://doi.org/10.3758/brm.40.3.879
- Preacher, K. J., & Selig, J. P. (2012). Advantages of monte carlo confidence intervals for indirect effects. Communication Methods and Measures, 6(2), 77–98. https://doi.org/10.1080/19312458.2012.679848
- R Core Team. (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/
- R Core Team. (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/
- R Core Team. (2023). R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/

- Raghunathan, T. E., Lepkowski, J. M., Hoewyk, J. V., & Solenberger, P. (2001). A multivariate technique for multiply imputing missing values using a sequence of regression models.

  Survey Methodology, 27(1), 85–95.
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2). https://doi.org/10.18637/jss.v048.i02
- Rubin, D. B. (1976). Inference and missing data. *Biometrika*, 63(3), 581–592. https://doi.org/10. 1093/biomet/63.3.581
- Rubin, D. B. (1987). Multiple imputation for nonresponse in surveys. New York, John Wiley & Sons, Inc. https://doi.org/10.1002/9780470316696
- Savalei, V., & Rosseel, Y. (2021). Computational options for standard errors and test statistics with incomplete normal and nonnormal data in SEM. Structural Equation Modeling: A Multidisciplinary Journal, 29(2), 163–181. https://doi.org/10.1080/10705511.2021.1877548
- Schafer, J. L. (1997). Analysis of incomplete multivariate data. Chapman; Hall/CRC. https://doi.org/10.1201/9780367803025
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7(2), 147–177. https://doi.org/10.1037/1082-989x.7.2.147
- Schouten, R. M., Lugtig, P., & Vink, G. (2018). Generating missing values for simulation purposes:

  A multivariate amputation procedure. *Journal of Statistical Computation and Simulation*,

  88(15), 2909–2930. https://doi.org/10.1080/00949655.2018.1491577
- Serlin, R. C. (2000). Testing for robustness in Monte Carlo studies. *Psychological Methods*, 5(2), 230–240. https://doi.org/10.1037/1082-989x.5.2.230
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, 7(4), 422–445. https://doi.org/10.1037/1082-989x.7.4.422
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. Sociological Methodology, 13, 290. https://doi.org/10.2307/270723
- Sobel, M. E. (1986). Some new results on indirect effects and their standard errors in covariance structure models. *Sociological Methodology*, 16, 159. https://doi.org/10.2307/270922

- Sobel, M. E. (1987). Direct and indirect effects in linear structural equation models. Sociological Methods & Research, 16(1), 155–176. https://doi.org/10.1177/0049124187016001006
- Taylor, A. B., MacKinnon, D. P., & Tein, J.-Y. (2007). Tests of the three-path mediated effect. Organizational Research Methods, 11(2), 241–269. https://doi.org/10.1177/1094428107300344
- Tofighi, D., & Kelley, K. (2019). Indirect effects in sequential mediation models: Evaluating methods for hypothesis testing and confidence interval formation. *Multivariate Behavioral Research*, 55(2), 188–210. https://doi.org/10.1080/00273171.2019.1618545
- Tofighi, D., & Kelley, K. (2020). Improved inference in mediation analysis: Introducing the model-based constrained optimization procedure. *Psychological Methods*, 25, 496–515. https://doi.org/10.1037/met0000259
- Tofighi, D., & MacKinnon, D. P. (2015). Monte Carlo confidence intervals for complex functions of indirect effects. Structural Equation Modeling: A Multidisciplinary Journal, 23(2), 194–205. https://doi.org/10.1080/10705511.2015.1057284
- van Buuren, S. (2018). Flexible imputation of missing data (2nd ed.). Chapman; Hall/CRC. https://doi.org/10.1201/9780429492259
- van Buuren, S., Brand, J. P. L., Groothuis-Oudshoorn, C. G. M., & Rubin, D. B. (2006). Fully conditional specification in multivariate imputation. *Journal of Statistical Computation and Simulation*, 76(12), 1049–1064. https://doi.org/10.1080/10629360600810434
- van Buuren, S., & Groothuis-Oudshoorn, K. (2011). mice: Multivariate imputation by chained equations in R. *Journal of Statistical Software*, 45(3). https://doi.org/10.18637/jss.v045.i03
- Venables, W. N., & Ripley, B. D. (2002). Modern applied statistics with S. Springer New York. https://doi.org/10.1007/978-0-387-21706-2
- Venzon, D. J., & Moolgavkar, S. H. (1988). A method for computing profile-likelihood-based confidence intervals. Applied Statistics, 37(1), 87. https://doi.org/10.2307/2347496
- Waller, N. G. (2022). fungible: Psychometric functions from the Waller Lab. The R Foundation. https://CRAN.R-project.org/package=fungible

- Wang, L., & Zhang, Q. (2020). Investigating the impact of the time interval selection on autoregressive mediation modeling: Result interpretations, effect reporting, and temporal designs. Psychological Methods, 25(3), 271–291. https://doi.org/10.1037/met0000235
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48(4), 817–838. https://doi.org/10.2307/1912934
- Wu, W., & Jia, F. (2013). A new procedure to test mediation with missing data through nonparametric bootstrapping and multiple imputation. *Multivariate Behavioral Research*, 48(5), 663–691. https://doi.org/10.1080/00273171.2013.816235
- Yuan, K.-H., & Bentler, P. M. (2000). Three likelihood-based methods for mean and covariance structure analysis with nonnormal missing data. Sociological Methodology, 30(1), 165–200. https://doi.org/10.1111/0081-1750.00078
- Yuan, K.-H., & Chan, W. (2011). Biases and standard errors of standardized regression coefficients.

  Psychometrika, 76(4), 670–690. https://doi.org/10.1007/s11336-011-9224-6
- Yzerbyt, V., Muller, D., Batailler, C., & Judd, C. M. (2018). New recommendations for testing indirect effects in mediational models: The need to report and test component paths. *Journal of Personality and Social Psychology*, 115(6), 929–943. https://doi.org/10.1037/pspa0000132
- Zhang, Z., & Wang, L. (2012). Methods for mediation analysis with missing data. *Psychometrika*, 78(1), 154–184. https://doi.org/10.1007/s11336-012-9301-5
- Zhang, Z., Wang, L., & Tong, X. (2015). Mediation analysis with missing data through multiple imputation and bootstrap. In *Quantitative psychology research* (pp. 341–355). Springer International Publishing. https://doi.org/10.1007/978-3-319-19977-1\_24