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References

Baron et al.: The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations **Baron-Kenny-1986**

Reuben M. Baron and David A. Kenny. “The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations”. In: *Journal of Personality and Social Psychology* 51.6 (1986), pp. 1173–1182. DOI: [10.1037/0022-3514.51.6.1173](https://doi.org/10.1037/0022-3514.51.6.1173).

Abstract: In this article, we attempt to distinguish between the properties of moderator and mediator variables at a number of levels. First, we seek to make theorists and researchers aware of the importance of not using the terms moderator and mediator interchangeably by carefully elaborating, both conceptually and strategically, the many ways in which moderators and mediators differ. We then go beyond this largely pedagogical function and delineate the conceptual and strategic implications of making use of such distinctions with regard to a wide range of phenomena, including control and stress, attitudes, and personality traits. We also provide a specific compendium of analytic procedures appropriate for making the most effective use of the moderator and mediator distinction, both separately and in terms of a broader causal system that includes both moderators and mediators.

Browne: Asymptotically distribution-free methods for the analysis of covariance structures **Browne-1984**

Michael W. Browne. “Asymptotically distribution-free methods for the analysis of covariance structures”. In: *British Journal of Mathematical and Statistical Psychology* 37.1 (May 1984), pp. 62–83. DOI: [10.1111/j.2044-8317.1984.tb00789.x](https://doi.org/10.1111/j.2044-8317.1984.tb00789.x).

Abstract: Methods for obtaining tests of fit of structural models for covariance matrices and estimator standard error which are asymptotically distribution free are derived. Modifications to standard normal theory tests and standard errors which make them applicable to the wider class of elliptical distributions are provided. A random sampling experiment to investigate some of the proposed methods is described.

Efron: Better bootstrap confidence intervals**Efron-1987**

Bradley Efron. “Better bootstrap confidence intervals”. In: *Journal of the American Statistical Association* 82.397 (Mar. 1987), pp. 171–185. DOI: [10.1080/01621459.1987.10478410](https://doi.org/10.1080/01621459.1987.10478410).

Abstract: We consider the problem of setting approximate confidence intervals for a single parameter θ in a multiparameter family. The standard approximate intervals based on maximum likelihood theory, $\hat{\theta} \pm \hat{\sigma}z^{(\alpha)}$, can be quite misleading. In practice, tricks based on transformations, bias corrections, and so forth, are often used to improve their accuracy. The bootstrap confidence intervals discussed in this article automatically incorporate such tricks without requiring the statistician to think them through for each new application, at the price of a considerable increase in computational effort. The new intervals incorporate an improvement over previously suggested methods, which results in second-order correctness in a wide variety of problems. In addition to parametric families, bootstrap intervals are also developed for nonparametric situations.

Efron: Bootstrap confidence intervals: Good or bad?**Efron-1988**

Bradley Efron. “Bootstrap confidence intervals: Good or bad?” In: *Psychological Bulletin* 104.2 (1988), pp. 293–296. DOI: [10.1037/0033-2909.104.2.293](https://doi.org/10.1037/0033-2909.104.2.293).

Abstract: The bootstrap is a nonparametric technique for estimating standard errors and approximate confidence intervals. Rasmussen has used a simulation experiment to suggest that bootstrap confidence intervals perform very poorly in the estimation of a correlation coefficient. Part of Rasmussen’s simulation is repeated. A careful look at the results shows the bootstrap intervals perform-

ing quite well. Some remarks are made concerning the virtues and defects of bootstrap intervals in general.

James et al.: Mediators, moderators, and tests for mediation

James-Brett-1984

Lawrence R. James and Jeanne M. Brett. “Mediators, moderators, and tests for mediation”. In: *Journal of Applied Psychology* 69.2 (1984), pp. 307–321. DOI: [10.1037/0021-9010.69.2.307](https://doi.org/10.1037/0021-9010.69.2.307).

Abstract: Discusses mediation relations in causal terms. Influences of an antecedent are transmitted to a consequence through an intervening mediator. Mediation relations may assume a number of functional forms, including nonadditive, nonlinear, and nonrecursive forms. Although mediation and moderation are distinguishable processes, with nonadditive forms (moderated mediation) a particular variable may be both a mediator and a moderator within a single set of functional relations. Current models for testing mediation relations in industrial and organizational psychology often involve an interplay between exploratory (correlational) statistical tests and causal inference. It is suggested that no middle ground exists between exploratory and confirmatory (causal) analysis and that attempts to explain how mediation processes occur require specified causal models.

Judd et al.: Process analysis

Judd-Kenny-1981

Charles M. Judd and David A. Kenny. “Process analysis”. In: *Evaluation Review* 5.5 (Oct. 1981), pp. 602–619. DOI: [10.1177/0193841x8100500502](https://doi.org/10.1177/0193841x8100500502).

Abstract: This article presents the rationale and procedures for conducting a process analysis in evaluation research. Such an analysis attempts to identify the process that mediates the effects of some treatment, by estimating the parameters of a causal chain between the treatment and some outcome variable. Two different procedures for estimating mediation are discussed. In addition we present procedures for examining whether a treatment exerts its effects, in part, by altering the mediating process that produces the outcome. Finally, the benefits of process analysis in evaluation research are underlined.

Micceri: The unicorn, the normal curve, and other improbable creatures

Micceri-1989

Theodore Micceri. “The unicorn, the normal curve, and other improbable creatures”. In: *Psychological Bulletin* 105.1 (1989), pp. 156–166. DOI: [10.1037/0033-2909.105.1.156](https://doi.org/10.1037/0033-2909.105.1.156).

Sobel: Asymptotic confidence intervals for indirect effects in structural equation models

Sobel-1982

Michael E. Sobel. “Asymptotic confidence intervals for indirect effects in structural equation models”. In: *Sociological Methodology* 13 (1982), p. 290. DOI: [10.2307/270723](https://doi.org/10.2307/270723).

Sobel: Some new results on indirect effects and their standard errors in covariance structure models

Sobel-1986

Michael E. Sobel. “Some new results on indirect effects and their standard errors in covariance structure models”. In: *Sociological Methodology* 16 (1986), p. 159. DOI: [10.2307/270922](https://doi.org/10.2307/270922).

Sobel: Direct and indirect effects in linear structural equation models

Sobel-1987

Michael E. Sobel. “Direct and indirect effects in linear structural equation models”. In: *Sociological Methods & Research* 16.1 (Aug. 1987), pp. 155–176. DOI: [10.1177/0049124187016001006](https://doi.org/10.1177/0049124187016001006).

Abstract: This article discusses total indirect effects in linear structural equation models. First, I define these effects. Second, I show how the delta method may be used to obtain the standard errors of the sample estimates of these effects and test hypotheses about the magnitudes of the indirect effects. To keep matters simple, I focus throughout on a particularly simple linear structural equation system; for a treatment of the general case, see Sobel (1986). To illustrate the ideas and results, a detailed example is presented.

Venzon et al.: A method for computing profile-likelihood-based confidence intervals

Venzon-Moolgavkar-1988

D. J. Venzon and S. H. Moolgavkar. “A method for computing profile-likelihood-based confidence intervals”. In: *Applied Statistics* 37.1 (1988), p. 87. DOI: [10.2307/2347496](https://doi.org/10.2307/2347496).

Abstract: The method of constructing confidence regions based on the generalised likelihood ratio statistic is well known for parameter vectors. A similar construction of a confidence interval for a single entry of a vector can be implemented by repeatedly maximising over the other parameters. We present an algorithm for finding these confidence interval endpoints that requires less computation. It employs a modified Newton-Raphson iteration to solve a system of equations that defines the endpoints.

White: A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity

White-1980

Halbert White. “A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity”. In: *Econometrica* 48.4 (May 1980), pp. 817–838. DOI: [10.2307/1912934](https://doi.org/10.2307/1912934).

Abstract: This paper presents a parameter covariance matrix estimator which is consistent even when the disturbances of a linear regression model are heteroskedastic. This estimator does not depend on a formal model of the structure of the heteroskedasticity. By comparing the elements of the new estimator to those of the usual covariance estimator, one obtains a direct test for heteroskedasticity, since in the absence of heteroskedasticity, the two estimators will be approximately equal, but will generally diverge otherwise. The test has an appealing least squares interpretation.