Similarity coefficients for binary data : properties of coefficients, coefficient matrices, multi-way metrics and multivariate coefficients

Warrens, M.J.

References

Albatineh, A. N., Niewiadomska-Bugaj, M., & Mihalko, D. (2006). On similarity indices and correction for chance agreement. *Journal of Classification*, *23*, 301-313.

Andrich, D. (1978). A rating scale formulation for ordered response categories. *Psychometrika*, *43*, 561-573.

Baroni-Urbani, C., & Buser, M. W. (1976). Similarity of binary data. *Systematic Zoology*, *25*, 251-259.

Barthélemy, J.-P., Brucker, F., & Osswald, C. (2004). Combinatorial optimization and hierarchical classifications. *4OR*, *2*, 179-219.

Batagelj, V., & Bren, M. (1995). Comparing resemblance measures. *Journal of Classification*, *12*, 73-90.

Baulieu, F. B. (1989). A classification of presence/absence based dissimilarity coefficients. *Journal of Classification*, *6*, 233-246.

Baulieu, F. B. (1997). Two variant axiom systems for presence/absence based dissimilarity coefficients. *Journal of Classification*, *14*, 159-170.

Benini, R. (1901). *Principii di Demografie. no. 29 of Manuali Barbèra di Science Giuridiche Sociali e Poltiche.* Firenzi: G. Barbèra.

Bennani-Dosse, M. (1993). *Analyses Métriques á Trois Voies.* Unpublished doctoral dissertation, Université de Haute Bretagne Rennes II, France.

Birnbaum, A. (1968). Some latent trait models and their use in inferring an examinee's ability. In F. M. Lord & M. R. Novick (Eds.), *Statistical Theories and Mental Test Scores.* Reading: Addinson-Wesley.

Blackman, N. J. M., & Koval, J. J. (1993). Estimating rater agreement in 2×2 tables: Correction for chance and intraclass correlation. *Applied Psychological Measurement, 17*, 211-223.

Bloch, D. A., & Kraemer, H. C. (1989). 2×2 Kappa coefficients: Measures of agreement or association. *Biometrics, 45*, 269-287.

Boorman, S. A., & Arabie, P. (1972). Structural measures and the method of sorting. In R. N. Shepard, A. K. Romney, & S. B. Nerlove (Eds.), *Multidimensional Scaling: Theory and Applications in the Behavioral Sciences, vol. 1: Theory* (p. 225-249). New York: Seminar Press.

Braun-Blanquet, J. (1932). *Plant Sociology: The Study of Plant Communities.* Authorized English translation of Pflanzensoziologie. New York: McGraw-Hill.

Bray, J. R. (1956). A study of mutual occurrence of plant species. *Ecology, 37,* 21-28.

Bray, J. R., & Curtis, J. T. (1957). An ordination of the upland forest communities of Southern Wisconsin. *Ecological Monographs, 27*, 325-349.

Brennan, R. L., & Light, R. J. (1974). Measuring agreement when two observers classify people into categories not defined in advance. *British Journal of Mathematical and Statistical Psychology, 27*, 154-163.

Brito, P. (1991). *Analyse de Données Symboliques: Pyramides d'Heritage.* Unpublished doctoral dissertation, Université Paris 9, Paris, France.

Bullen, P. S. (2003). *Handbook of Means and Their Inequalities.* Dordrecht, The Netherlands: Kluwer.

Buneman, P. (1974). A note on metric properties of trees. *Journal of Combinatorial Theory, Series B, 17*, 48-50.

Burt, C. (1948). The factorial study of temperamental traits. *British Journal of Psychology (Statistical Section), 1*, 178-203.

Cain, A. J., & Harrison, G. A. (1958). An analysis of the taxonomist's judgment of affinity. *Proceedings of Zoological Society London, 131*, 85-98.

Cheetham, A. H., & Hazel, J. E. (1969). Binary (presence-absence) similarity coefficients. *Journal of Paleontology, 43*, 1130-1136.

Chepoi, C., & Fichet, B. (2007). A note on three-way dissimilarities and their relationship with two-way dissimilarities. In P. Brito, P. Bertrand, G. Cucumel, & F. de Caravalho (Eds.), *Selected Contributions in Data Analysis and Classification* (p. 465-476). Berlin: Springer.

Chepoi, V., & Fichet, B. (1997). Recognition of Robinsonian dissimilarities. *Journal of Classification, 14*, 311-325.

Cheung, K. C., & Mooi, L. C. (1994). A comparison between the rating scale model and dual scaling for Likert scales. *Applied Psychological Measurement*, *18*, 1-13.

Clement, P. W. (1976). A formula for computing inter-observer agreement. *Psychological Reports*, *39*, 257-258.

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, *20*, 37-46.

Cohen, L. (1979). Approximate expressions for parameter estimates in the Rasch model. *British Journal of Mathematical and Statistical Psychology*, *32*, 113-120.

Cole, L. C. (1949). The measurement of interspecific association. *Ecology*, *30*, 411-424.

Coombs, C. H. (1964). *A Theory of Data.* New York: Wiley.

Cox, T. F., & Cox, M. A. A. (2000). A general weighted two-way dissimilarity coefficient. *Journal of Classification*, *17*, 101-121.

Cox, T. F., Cox, M. A. A., & Branco, J. A. (1991). Multidimensional scaling of n-tuples. *British Journal of Mathematical and Statistical Psychology*, *44*, 195-206.

Critchley, F. (1994). On exchangeability-based equivalence relations induced by strongly Robinson and, in particular, by quadripolar Robinson dissimilarity matrices. In B. Van Cutsem (Ed.), *Classification and Dissimilarity Analysis, Lecture Notes in Statistics.* New York: Springer-Verlag.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*, 297-334.

Cureton, E. E. (1959). Note on $\phi/\phi_{\max}$. *Psychometrika*, *24*, 89-91.

Czekanowski, J. (1932). Coefficient of racial likeliness und Durchschnittliche Differenz. *Anthropologischer Anzeiger*, *9*, 227-249.

Davenport, E. C., & El-Sanhurry, N. A. (1991). Phi/phimax: Review and synthesis. *Educational and Psychological Measurement*, *51*, 821-828.

De Gruijter, D. N. M., & Van der Kamp, L. J. T. (2008). *Statistical Test Theory for the Behavioral Sciences.* New York: Chapman & Hall.

De Gruijter, D. N. M. (1984). Homogeneity analysis of test score data: A confrontation with the latent trait approach. *Applied Psychological Measurement*, *8*, 385-390.

De Rooij, M. (2001). *Distance Models for Transition Frequency Data.* Doctoral dissertation: Leiden University, Leiden, The Netherlands.

De Rooij, M. (2002). Distance models for three-way tables and three-way association. *Journal of Classification, 19*, 161-178.

De Rooij, M., & Gower, J. C. (2003). The geometry of triadic distances. *Journal of Classification, 20*, 181-220.

Deza, M.-M., & Rosenberg, I. G. (2000). *n*-Semimetrics. *European Journal of Combinatorics, Special Issue Discrete Metric Spaces 21-6*, 797-806.

Deza, M.-M., & Rosenberg, I. G. (2005). Small cones of *m*-hemimetrics. *Discrete Mathematics, 291*, 81-97.

Diatta, J. (2006). Description-meet compatible multiway dissimilarities. *Discrete Applied Mathematics, 154*, 493-507.

Diatta, J. (2007). Galois closed entity sets and *k*-balls of quasi-ultrametric multi-way dissimilarities. *Advances in Data Analysis and Classification, 1*, 53-65.

Diatta, J., & Fichet, B. (1998). Quasi-ultrametrics and their 2-ball hypergraphs. *Discrete Mathematics, 192*, 87-102.

Dice, L. R. (1945). Measures of the amount of ecologic association between species. *Ecology, 26*, 297-302.

Diday, E. (1984). *Une Représentation Visuelle des Classes Empiétantes: Les Pyramides.* INRIA: Research report 291.

Diday, E. (1986). Orders and overlapping clusters in pyramids. In J. de Leeuw, W. J. Heiser, J. J. Meulman, & F. Critchley (Eds.), *Multidimensional Data Analysis* (p. 201-234). Leiden: DSWO Press.

Diday, E., & Bertrand, P. (1986). An extension of hierarchical clustering: The pyramidal representation. In E. Gelsema & L. Kanal (Eds.), *Pattern Recognition in Practice II* (p. 411-424). Amsterdam: North-Holland.

Digby, P. G. N. (1983). Approximating the tetrachoric correlation coefficient. *Biometrics, 39*, 753-757.

Doolittle, M. H. (1885). The verification of predictions. *Bulletin of the Philosophical Society of Washington, 7*, 122-127.

Driver, H. E., & Kroeber, A. L. (1932). Quantitative expression of cultural relationship. *The University of California Publications in American Archaeology and Ethnology, 31*, 211-256.

Fager, E. W., & McGowan, J. A. (1963). Zooplankton species groups in the North Pacific. *Science, 140*, 453-460.

Farkas, G. M. (1978). Correction for bias present in a method of calculating interobserver agreement. *Journal of Applied Behavior Analysis, 11*, 188.

Fichet, B. (1984). Sur une extension de la notion de hiérarchie et son équivalence avec quelques matrices de Robinson. *Actes des "Journées de Statistique de la Grande Motte"*, 12-12.

Fichet, B. (1986). Distances and Euclidean distances for presence-absence characters and their application to factor analysis. In J. de Leeuw, W. J. Heiser, J. J. Meulman, & F. Critchley (Eds.), *Multidimensional Data Analysis* (p. 23-46). Leiden: DSWO Press.

Fisher, R. A. (1922). On the interpretation of the χ^2 from contingency tables, and the calculation of P. *Journal of the Royal Statistical Society*, *85*, 87-94.

Fleiss, J. L. (1971). Measuring nominal scale agreement among many raters. *Psychological Bulletin*, *76*, 378-382.

Fleiss, J. L. (1975). Measuring agreement between two judges on the presence or absence of a trait. *Biometrics*, *31*, 651-659.

Forbes, S. A. (1907). On the local distribution of certain Illinois fishes: An essay in statistical ecology. *Bulletin of the Illinois State Laboratory for Natural History*, *7*, 273-303.

Fowlkes, E. B., & Mallows, C. L. (1983). A method for comparing two hierarchical clusterings. *Journal of the American Statistical Association*, *78*, 553-569.

Gantmacher, F. R. (1977). *Matrix Theory* (Vol. II). New York: Chelsea.

Gantmacher, F. R., & Krein, M. G. (1950). *Oscillation Matrices and Kernels and Small Vibrations of Mechanical Systems*. Washington: translation from Russian, issued (1961), AEC-tr-4481, by US Atomic Energy Commision.

Gaul, W., & Schader, M. (1994). Pyramidal classification based on incomplete dissimilarity data. *Journal of Classification*, *11*, 171-193.

Gifi, A. (1990). *Nonlinear Multivariate Analysis*. Chicester: Wiley.

Gleason, H. A. (1920). Some applications of the quadrat method. *Bulletin of the Torrey Botanical Club*, *47*, 21-33.

Goodman, L. A., & Kruskal, W. H. (1954). Measures of association for cross classifications. *Journal of the American Statistical Association*, *49*, 732-764.

Gower, J. C. (1966). Some distance properties of latent root and vector methods used in multivariate analysis. *Biometrika*, *53*, 325-338.

Gower, J. C. (1971). A general coefficient of similarity and some of its properties. *Biometrics*, *27*, 857-874.

Gower, J. C. (1986). Euclidean distance matrices. In J. de Leeuw, W. J. Heiser, J. J. Meulman, & F. Critchley (Eds.), *Multidimensional Data Analysis* (p. 11-22). Leiden: DSWO Press.

Gower, J. C. (1990). Fisher's optimal scores and multiple correspondence analysis. *Biometrics, 46*, 947-961.

Gower, J. C., & De Rooij, M. (2003). A comparison of the multidimensional scaling of triadic and dyadic distances. *Journal of Classification, 20*, 115-136.

Gower, J. C., & Legendre, P. (1986). Metric and Euclidean properties of dissimilarity coefficients. *Journal of Classification, 3*, 5-48.

Greenacre, M. J. (1984). *Theory and Applications of Correspondence Analysis.* New York: Academic Press.

Guilford, J. P. (1965). The minimal phi coefficient and the maximal phi. *Educational and Psychological Measurement, 25*, 3-8.

Guttman, L. (1941). The quantification of a class of attributes: A theory and method of scale construction. In P. Horst (Ed.), *The Prediction of Personal Adjustment.* New York: SSRC.

Guttman, L. (1950). The principal components of scale analysis. In S. A. Stouffer (Ed.), *Measurement and Prediction* (p. 312-361). Princeton: Princeton University Press.

Guttman, L. (1954). The principal components of scalable attitudes. In P. F. Lazarsfeld (Ed.), *Mathematical Thinking in the Social Sciences* (p. 216-257). Glencoe: Free Press.

Hamann, U. (1961). Merkmalsbestand und Verwandtschaftsbeziehungen der Farinose. Ein Betrag zum System der Monokotyledonen. *Willdenowia, 2*, 639-768.

Harris, F. C., & Lahey, B. B. (1978). A method for combining occurrence and nonoccurrence agreement scores. *Journal of Applied Behavioral Analysis, 11*, 523-527.

Hawkins, R. P., & Dotson, V. A. (1968). Reliability scores that delude: An Alice in Wonderland trip through the misleading characteristics of interobserver agreement scores in interval coding. In E. Ramp & G. Semb (Eds.), *Behavior Analysis: Areas of Research and Application* (p. 539-376). Englewood Cliffs, N.J.: Prentice-Hall.

Heiser, W. J. (1981). *Unfolding Analysis of Proximity Data.* Unpublished doctoral dissertation, Leiden University, Leiden, The Netherlands.

Heiser, W. J., & Bennani, M. (1997). Triadic distance models: Axiomatization and least squares representation. *Journal of Mathematical Psychology, 41*, 189-206.

Heuvelmans, A. P. J. M., & Sanders, P. F. (1993). Beoordelaarsovereenstemming. In T. J. H. M. Eggen & P. F. Sanders (Eds.), *Psychometrie in de Praktijk* (p. 443-470). Arnhem: Cito Instituut voor Toetsontwikkeling.

Holley, J. W., & Guilford, J. P. (1964). A note on the $G-$index of agreement. *Educational and Psychological Measurement, 24*, 749-753.

Hubálek, Z. (1982). Coefficients of association and similarity based on binary (presence-absence) data: An evaluation. *Biological Reviews, 57*, 669-689.

Hubert, L. J. (1977). Nominal scale response agreement as a generalized correlation. *British Journal of Mathematical and Statistical Psychology, 30*, 98-103.

Hubert, L. J., & Arabie, P. (1985). Comparing partitions. *Journal of Classification, 2*, 193-218.

Jaccard, P. (1912). The distribution of the flora in the Alpine zone. *The New Phytologist, 11*, 37-50.

Janson, S., & Vegelius, J. (1979). On the generalization of the $G-$index and the phi coefficient to nominal scales. *Multivariate Behavioral Research, 14*, 255-269.

Janson, S., & Vegelius, J. (1981). Measures of ecological association. *Oecologia, 49*, 371-376.

Janson, S., & Vegelius, J. (1982). The $J-$index as a measure of nominal scale response agreement. *Applied Psychological Measurement, 6*, 111-121.

Johnson, S. C. (1967). Hierarchical clustering schemes. *Psychometrika, 32*, 241-254.

Joly, S., & Le Calvé, G. (1995). Three-way distances. *Journal of Classification, 12*, 191-205.

Karlin, S. (1968). *Total Positivity I.* Stanford: Stanford Univeristy Press.

Kendall, D. G. (1971). Seriation from abundance matrices. In F. R. Hodson, D. G. Kendall, & P. Tautu (Eds.), *Mathematics in the Archaeological and Historical Sciences* (p. 215-252). Edinburgh: University Press.

Kent, R. N., & Foster, S. L. (1977). Direct observational procedures: Methodological issues in naturalistic settings. In A. R. Ciminero, K. S. Calhoun, & H. E. Adams (Eds.), *Handbook of Behavioral Assessment* (p. 279-328). New York: John Wiley & Sons.

Krippendorff, K. (1987). Association, agreement, and equity. *Quality and Quantity, 21*, 109-123.

Kroonenberg, P. M. (2008). *Applied Multiway Data Analysis.* Hoboken, New Jersey: Wiley.

Kuder, G. F., & Richardson, M. W. (1937). The theory of estimation of test reliability. *Psychometrika, 2*, 151-160.

Kulczynski, S. (1927). Die Pflanzenassociationen der Pienenen. *Bulletin International de L'Académie Polonaise des Sciences et des Letters, Classe des Sciences Mathematiques et Naturelles, Serie B, Supplément II, 2*, 57-203.

Lerman, I. C. (1988). Comparing partitions (mathematical and statistical aspects). In H. H. Bock (Ed.), *Classification and Related Methods of Data Analysis* (p. 121-131). North-Holland: Elsevier Science Publishers B.V.

Light, R. J. (1971). Measures of response agreement for qualitative data: Some generalizations and alternatives. *Psychological Bulletin, 76*, 365-377.

Loevinger, J. A. (1947). A systematic approach to the construction and evaluation of tests of ability. *Psychometrika, Monograph No. 4.*

Loevinger, J. A. (1948). The technique of homogeneous tests compared with some aspects of scale analysis and factor analysis. *Psychological Bulletin, 45*, 507-530.

Lord, F. M. (1952). A theory of mental test scores. *Psychometrika, Monograph No. 7.*

Lord, F. M. (1958). Some relations between Guttman's principal components analysis and other psychometric tests. *Psychometrika, 36*, 109-133.

Lord, F. M., & Novick, M. R. (1968). *Statistical Theories of Mental Test Scores.* Reading: Addinson-Wesley.

Mak, T. K. (1988). Analysing intraclass correlation for dichotomous variables. *Applied Statistics, 37*, 344-352.

Maxwell, A. E., & Pilliner, A. E. G. (1968). Deriving coefficients of reliability and agreement for ratings. *British Journal of Mathematical and Statistical Psychology, 21*, 105-116.

McConnaughey, B. H. (1964). The determination and analysis of plankton communities. *Marine Research, Special No, Indonesia*, 1-40.

McDonald, R. P. (1983). Alternative weights and invariant parameters in optimal scaling. *Psychometrika, 48*, 377-391.

Meulman, J. (1982). *Homogeneity Analysis.* Leiden: DSWO Press.

Michael, E. L. (1920). Marine ecology and the coefficient of association. *Journal of Animal Ecology, 8*, 54-59.

Mokken, R. J. (1971). *A Theory and Procedure of Scale Analysis.* The Hague, The Netherlands: Mouton.

Montgomery, A. C., & Crittenden, K. S. (1977). Improving coding reliability for open-ended questions. *Public Opinion Quarterly, 41*, 235-243.

Morey, L. C., & Agresti, A. (1984). The measurement of classification agreement: An adjustment to the Rand statistic for chance agreement. *Educational and Psychological Measurement, 44*, 33-37.

Mountford, M. D. (1962). An index of similarity and its applications to classificatory problems. In P. W. Murphy (Ed.), *Progress in Soil Zoology* (p. 43-50). London: Butterworths.

Murtagh, F. (2004). On ultrametricity, data coding, and computation. *Journal of Classification, 21*, 167-184.

Nei, M., & Li, W.-H. (1979). Mathematical model for studying genetic variation in terms of restriction endonucleases. *Proceedings of the National Academy of Sciences, 76*, 5269-5273.

Nishisato, S. (1980). *Analysis of Categorical Data: Dual Scaling and Its Applications.* Toronto: University of Toronto Press.

Ochiai, A. (1957). Zoogeographic studies on the soleoid fishes found in Japan and its neighboring regions. *Bulletin of the Japanese Society for Fish Science, 22*, 526-530.

Odum, E. P. (1950). Bird populations of the Highlands (North Carolina) Plateau in relation to plant succession and avian invasion. *Ecology, 31*, 587-605.

Pearson, E. S. (1947). The choice of statistical tests illustrated on the interpretation of data classed in a 2×2 table. *Biometrika, 34*, 139-167.

Pearson, K. (1926). On the coefficient of racial likeness. *Biometrika, 9*, 105-117.

Pearson, K., & Heron, D. (1913). On theories of association. *Biometrika, 9*, 159-315.

Peirce, C. S. (1884). The numerical measure of the success of predictions. *Science, 4*, 453-454.

Popping, R. (1983a). *Overeenstemmingsmaten voor Nominale Data.* Unpublished doctoral dissertation, Rijksuniversiteit Groningen, Groningen, The Netherlands.

Popping, R. (1983b). Traces of agreement. On the dot-product as a coefficient of agreement. *Quality and Quantity, 17*, 1-18.

Popping, R. (1984). Traces of agreement. On some agreement indices for open-ended questions. *Quality and Quantity, 18*, 147-158.

Post, W. J., & Snijders, T. A. B. (1993). Nonparametric unfolding models for dichotomous data. *Methodika, 7*, 130-156.

Rand, W. (1971). Objective criteria for the evaluation of clustering methods. *Journal of the American Statistical Association, 66*, 846-850.

Rao, C. R. (1973). *Linear Statistical Inference and Its Applications.* New York: Wiley.

Rasch, G. (1960). *Probabilistic Models for Some Intelligence and Attainment Tests. Studies in Mathematical Psychology.* Copenhagen: Danish Institute for Educational Research.

Restle, F. (1959). A metric and an ordering on sets. *Psychometrika, 24*, 207-220.

Robinson, W. S. (1951). A method for chronologically ordering archaeological deposits. *American Antiquity, 16*, 293-301.

Rogers, D. J., & Tanimoto, T. T. (1960). A computer program for classifying plants. *Science, 132*, 1115-1118.

Rogot, E., & Goldberg, I. D. (1966). A proposed index for measuring agreement in test-retest studies. *Journal of Chronic Disease, 19*, 991-1006.

Russel, P. F., & Rao, T. R. (1940). On habitat and association of species of Anopheline larvae in South-Eastern Madras. *Journal of Malaria Institute India, 3*, 153-178.

Schouten, H. J. A. (1980). Measuring pairwise agreement among many observers. *Biometrical Journal, 22*, 497-504.

Schriever, B. F. (1986). Multiple correspondence analysis and ordered latent structure models. *Kwantitatieve Methoden, 21*, 117-131.

Scott, W. A. (1955). Reliability of content analysis: The case of nominal scale coding. *Public Opinion Quarterly, 19*, 321-325.

Sepkoski, J. J. (1974). Quantified coefficients of association and measurement of similarity. *Mathematical Geology, 6*, 135-152.

Serlin, R. C., & Kaiser, H. F. (1978). A method for increasing the reliability of a short multiple-choice test. *Educational and Psychological Measurement, 38*, 337-340.

Sibson, R. (1972). Order invariant methods for data analysis. *Journal of the Royal Statistical Society, Series B, 34*, 311-349.

Sijtsma, K., & Molenaar, I. W. (2002). *Introduction to Nonparametric Item Response Theory.* Thousand Oaks: Sage.

Simpson, G. G. (1943). Mammals and the nature of continents. *American Journal of Science, 241*, 1-31.

Sneath, P. H. (1957). The application of computers to taxonomy. *Journal of General Microbiology, 17*, 201-226.

Snijders, T. A. B., Dormaar, M., Van Schuur, W. H., Dijkman-Caes, C., & Driessen, G. (1990). Distribution of some similarity coefficients for dyadic binary data in the case of associated attributes. *Journal of Classification, 7*, 5-31.

Sokal, R. R., & Michener, C. D. (1958). A statistical method for evaluating systematic relationships. *University of Kansas Science Bulletin, 38*, 1409-1438.

Sokal, R. R., & Sneath, P. H. (1963). *Principles of Numerical Taxonomy.* San Francisco: W. H. Freeman and Company.

Sørenson, T. (1948). A method of stabilizing groups of equivalent amplitude in plant sociology based on the similarity of species content and its application to analyses of the vegetation on Danish commons. *Kongelige Danske Videnskabernes Selskab Biologiske Skrifter, 5*, 1-34.

Sorgenfrei, T. (1958). *Molluscan Assemblages From the Marine Middle Miocene of South Jutland and Their Environments.* Copenhagen: Reitzel.

Steinley, D. (2004). Properties of the Hubert-Arabie adjusted Rand index. *Psychological Methods, 9*, 386-396.

Stiles, H. E. (1961). The association factor in information retrieval. *Journal of the Association for Computing Machinery, 8*, 271-279.

Thissen, D., Chen, W. H., & Bock, D. (2003). *Multilog 7: Analysis of multiple-category response data.* Scientific Software International.

Torgerson, W. S. (1958). *Theory and Methods of Scaling.* New York: Wiley.

Tucker, L. R. (1951). *A Method for Synthesis of Factor Analysis Studies.* Personnel research section report No. 984. Washington, D.C.: Department of the Army.

Van der Linden, W. J., & Hambleton, R. K. (1997). *Handbook of Modern Item Response Theory.* Berlin, Germany: Springer.

Van Cutsem, B. (1994). *Classification and Dissimilarity Analysis, Lecture Notes in Statistics.* New York: Springer-Verlag.

Wallace, D. L. (1983). A method for comparing two hierarchical clusterings: Comment. *Journal of the American Statistical Association, 78*, 569-576.

Warrens, M. J., De Gruijter, D. N. M., & Heiser, W. J. (2007). A systematic comparison between classical optimal scaling and the two-parameter IRT model. *Applied Psychological Measurement, 31*, 106-120.

Warrens, M. J., & Heiser, W. J. (2006). Scaling unidimensional models with multiple correspondence analysis. In M. J. Greenacre & J. Blasius (Eds.), *Multiple Correspondence Analysis and Related Methods* (p. 219-235). Boca Raton: Chapman & Hall.

Warrens, M. J., Heiser, W. J., & De Gruijter, D. N. M. (2006). Reparametrization of homogeneity analysis to accommodate item response functions. *Behaviormetrika, 32*, 127-139.

Wilkinson, E. M. (1971). Archaeological seriation and the traveling salesman problem. In F. R. Hodson, D. G. Kendall, & P. Tautu (Eds.), *Mathematics in the Archaeological and Historical Sciences* (p. 276-283). Edinburgh: University Press.

Williams, W. T., Lambert, J. M., & Lance, G. N. (1966). Multivariate methods in plant ecology. V. Similarity analyses and information-analysis. *Journal of Ecology, 54*, 427-445.

Yamada, F., & Nishisato, S. (1993). Several mathematical properties of dual scaling as applied to dichotomous item-category data. *Japanese Journal of Behaviormetrics, 20*, 56-63.

Yule, G. U. (1900). On the association of attributes in statistics. *Philosophical Transactions of the Royal Society, A, 75*, 257-319.

Yule, G. U. (1912). On the methods of measuring the association between two attributes. *Journal of the Royal Statistical Society, 75*, 579-652.

Yule, G. U., & Kendall, M. G. (1950). *An Introduction to the Theory of Statistics.* London: Charles Griffin and Co. Ltd.

Zegers, F. E. (1986). *A General Family of Association Coefficients.* Unpublished doctoral dissertation, Rijksuniversiteit Groningen, Groningen, The Netherlands.

Zegers, F. E., & Ten Berge, J. M. F. (1985). A family of association coefficients for metric scales. *Psychometrika, 50*, 17-24.

Zysno, P. V. (1997). The modification of the phi-coefficient reducing its dependence on the marginal distributions. *Methods of Psychological Research Online, 2*, 41-52.