This Week's Citation Classic

Costner H L. Criteria for measures of association.
Amer. Sociol. Rev. 30:341-53, 1965.
[University of Washington, Seattle, WA]

General rules and definitions are specified for measures of association interpretable in terms of the proportional reduction in prediction error made possible by statistical association. Measures thus interpretable are identified. Implications for choice of measures and for interpreting results are examined. [The Science Citation Index® (SCI®) and the Social Sciences Citation Index® (SSC/®) indicate that this paper has been cited over 175 times since 1965.1

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"Confession, they say, is good for the soul, and herein I confess. In the summer of 1964, the University of Washington provided me salary support to complete the analysis of some data I had collected. Early in the summer, I was asked by a graduate student to write a brief statement on how to interpret measures of association, to be included in a student handbook for users of a multi-purpose statistical computer program. I agreed to write such a statement, thinking that it would be quickly done because it would be nothing more than a summary of ideas featured in a course I had recently taught. But as I attempted to write a succinct statement that would make sense to those who had never taken the course, I found that it was not as easy as I had thought. Writing the statement for the student handbook and subsequently expanding and revising it into the paper as it appeared in print became an obsession that I could not lay aside, and I spent a good part of the summer on it. The designation of this paper as a Citation Classic has emboldened me to make this belated confession to the University that I did not use the time supported that summer to complete the project described in my request.

"The basic idea of this paper did not originate with me. As indicated in the paper, Guttman had briefly outlined the idea of an error-reduction interpretation for measures of association in 1941;[1] Goodman and Kruskal emphasized the use of 'probabilistic models of predictive activity' for measures of association in their 1954 paper.[2] My paper expressed these in a different way and introduced an awkward acronym (PRE for Proportional Reduction in Error).

"I assume this paper has been frequently cited because of its simplicity, and because it helped make sense out of a bewildering array of measures that yield different numerical values for the same data. The awkward acronym may also be partly responsible for the frequent citation since that abbreviation encapsulated the basic idea and may have made it easier to grasp and recall. I have an aversion to acronyms and would not have used one except that comments on my early draft suggested that an abbreviation would make the paper more readable. The acronym now seems to appear more frequently than citations to its source.

"There are two errors in the paper which I feel obliged to mention. First, my statement that Somers's d_{yx} did not lend itself to a PRE interpretation was incorrect, as Somers demonstrated in a note published in 1968.[3] The second error was an error in judgment. In the closing paragraphs of the paper I anticipated that emphasizing the PRE interpretation would 'diminish our inclination to conceive of associations between two variables as varying in degree only' because such an interpretation requires one to recognize explicitly the rule for predicting one variable from the other. My anticipation was unduly optimistic. We still seem to give undue attention to the degree of association per se, whereas it is the nature and 'shape' of the linkage between variables that is of greater substantive importance. If I were writing the paper with today's hindsight, I would make that point more strongly and request that it be printed entirely in italics."

1. Gunman L. Supplementary study B-l: an outline of the statistical theory of prediction. (Horst P.) The prediction of personal adjustment. New York: Social Science Research Council, 1941. Bulletin 48. p. 261-2.
2. Goodman L A & Kruskal W H. Measures of association for cross classifications. J Amer. Statist. Assn. 49:732-64, 1954. [Citation Classic. Current Contents/Social & Behavioral Sciences (26):14, 25 June 1979.)
3. Somers R H. On the measurement of association. Amer. Sociol. Rev. 33:291-2, 1968.