

1014-P1-36

Milo Schield* (milo@pro-ns.net), 1767 Alameda Street, Roseville, MN 55113. *The Mathematics of Association in Quantitative Literacy*. Preliminary report.

Quantitative Literacy studies the mathematical tools for quantitative association found in everyday arguments. These mathematical tools are organized in four levels.

First level tools involve one or two values. First level tools include counts, arithmetic comparisons (% change), ratios, and arithmetic comparisons of ratios. They also include relative risk, attributable risk and attributable events.

Second level tools involve variability and include ranks, percentiles, mean, median, ranges, standard deviations, z-scores and effect sizes.

Third level tools involve bivariate models such simple linear regression (ordinary least squares).

Fourth level tools involve multivariate models such as standardization (adjusting averages and ratios for the influence of confounders) and multivariate regression involving non-interactive and interactive models. The former provides a simple graphical explanation for a Simpson's Paradox reversal of an association.

This paper focuses on fourth level tools and shows how Simpson's Paradox can be related to an ordinary differential equation. The algebraic conditions under which a binary confounder can nullify or reverse an association between two binary variables as modeled using a non-interactive model are also investigated. (Received June 23, 2005)