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Some collapsibility results for *n*-dimensional contingency tables

Abstract For a multidimensional contingency table, we obtain several necessary and sufficient conditions for collapsibility and strict collapsibility, using the technique of Möbius inversion formula. As a consequence, the results of Whittemore (*Journal of the Royal Statistical Society B, 40*, 328–340, 1978) are stated in a form which is easy to understand and the proofs are much simpler and straightforward. Several new results on collapsibility and strict collapsibility with respect to more than one interaction parameter, are established, and their relationships to conditional independence are also pointed out. As applications of our results, several typical examples on collapsibility, strict collapsibility and conditional independence are discussed. It is also shown that Bishop et al. (*Discrete Multivariate Analysis: Theory and Practice*, MIT Press, Cambridge, 1975) conditions are necessary and sufficient for strict collapsibility with respect to a set of interaction factors.