

A Univariate Statistical Parameter Assessing Effect Size for Multivariate Responses

Xiaohua Douglas Zhang

Abstract

The statistical significance has been intensively criticized in medical and social sciences because of many issues that it has. Effect sizes have been proposed as an alternative to statistical significance. Recently, strictly standardized mean difference (SSMD) has been proposed for the comparison of two groups with applications in a univariate-response setting. There is a need to extend this type of effect size from a univariate-response setting to a multivariate-response setting. In this paper, based on SSMD and Mahalanobis distance, I construct a novel parameter called dimension-adjusted squared Mahalanobis distance (DSMD). The concept of DSMD can be applicable to both univariate- and multivariate-response settings. Moreover, the criterion of DSMD to assess the differentiation between two groups can also be applicable to both univariate- and multivariate-response settings. Thus, DSMD may have the potency of being applicable to a variety of situations in medical and social sciences.

KEY WORDS: dimension-adjusted squared Mahalanobis distance, dimension-adjusted Mahalanobis distance, strictly standardized mean difference, d^+ -probability, effect size.

Affiliation: EDS – Asian Pacific, BARDS, Merck Research Laboratories, Beijing, China