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# Non- and semiparametric tests for conditional independence in two-way contingency tables

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**Abstract.**
The classical chi-square test of independence between two categorical variables R and S suffers from the implicitly assumed homogeneity of the population. Yet, some characteristics of each individual can be associated with R and S, and influence the dependence structure of the induced contingency table. Along this, a generalization of the chi-square test is proposed, testing for the conditional independence of R and S given a vector of covariates. The conditional distributions of R and S are nonparametrically estimated, and a divergence criterion is built. Also, to avoid the curse of dimensionality, semiparametric estimators, based on a Single-Index assumption, are proposed for these conditional distributions, and the test is adapted.