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Estimating population sizes with the Rasch model

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Abstract The Rasch model has been used to estimate the unknown size of a population from multi-list data. It can take both the list effectiveness and individual heterogeneity into account. Estimating the population size is shown to be equivalent to estimating the odds that an individual is unseen. The odds parameter is nonidentifiable. We propose a sequence of estimable lower bounds, including the greatest one, for the odds parameter. We show that a lower bound can be calculated by linear programming. Estimating a lower bound of the odds leads to an estimator for a lower bound of the population size. A simulation experiment is performed and three real examples are studied.

Keywords Capture–recapture · Nonidentifiability · Social security

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