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# Decision-theoretic issues in heterogeneity variance estimation

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**Abstract** Motivated by a heteroscedastic random effects setting of meta-analysis, a general model for the between-study variance is studied from the decision-theoretic point of view. This model leads to estimation of a linear in the variance reciprocals, random function or to simultaneous inference on curve-confined natural parameters of independent heterogeneous $\chi^2$-random variables with given degrees of freedom. A form of the Stein phenomenon for the suggested loss functions is noted; the exact minimax value is determined, and minimax estimators are derived.

**Keywords** Bayes estimator · Loss function · Meta-analysis · Minimax value · Random effects model · Stein phenomenon

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