The interval truth model: A cultural consensus model for continuous bounded interval responses

Matthias Kloft, Philipps-Universität Marburg

Cultural Consensus Theory (CCT) leverages shared knowledge between individuals to optimally aggregate answers to questions for which the underlying truth is unknown. Existing CCT models have predominantly focused on unidimensional point truths using dichotomous, polytomous, or continuous response formats. However, certain domains such as risk assessment or interpretation of verbal quantifiers may require a consensus focused on intervals, capturing a range of relevant values. We introduce the Interval Truth Model (ITM), a novel extension of CCT designed to estimate consensus intervals from continuous bounded interval responses. We use a Bayesian hierarchical modeling approach to estimate latent consensus intervals. In a simulation study, we show that, under the conditions studied, the ITM performs better than using simple means of the responses. We then apply the model to empirical judgments of verbal quantifiers.