Aggregation of Subjective Location Judgments:
An Extension of Cultural Consensus Theory to 2-Dimensional Continuous Data

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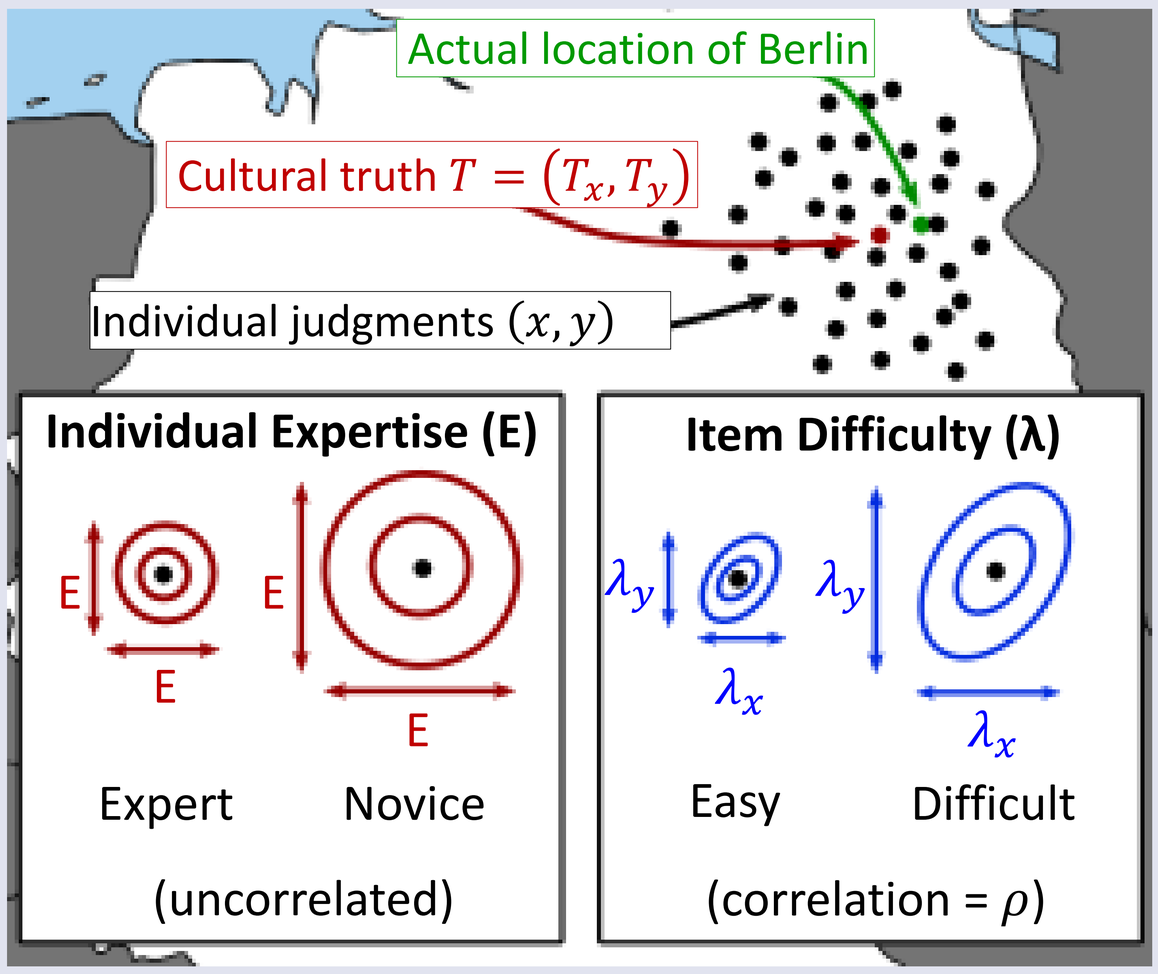
Abstract

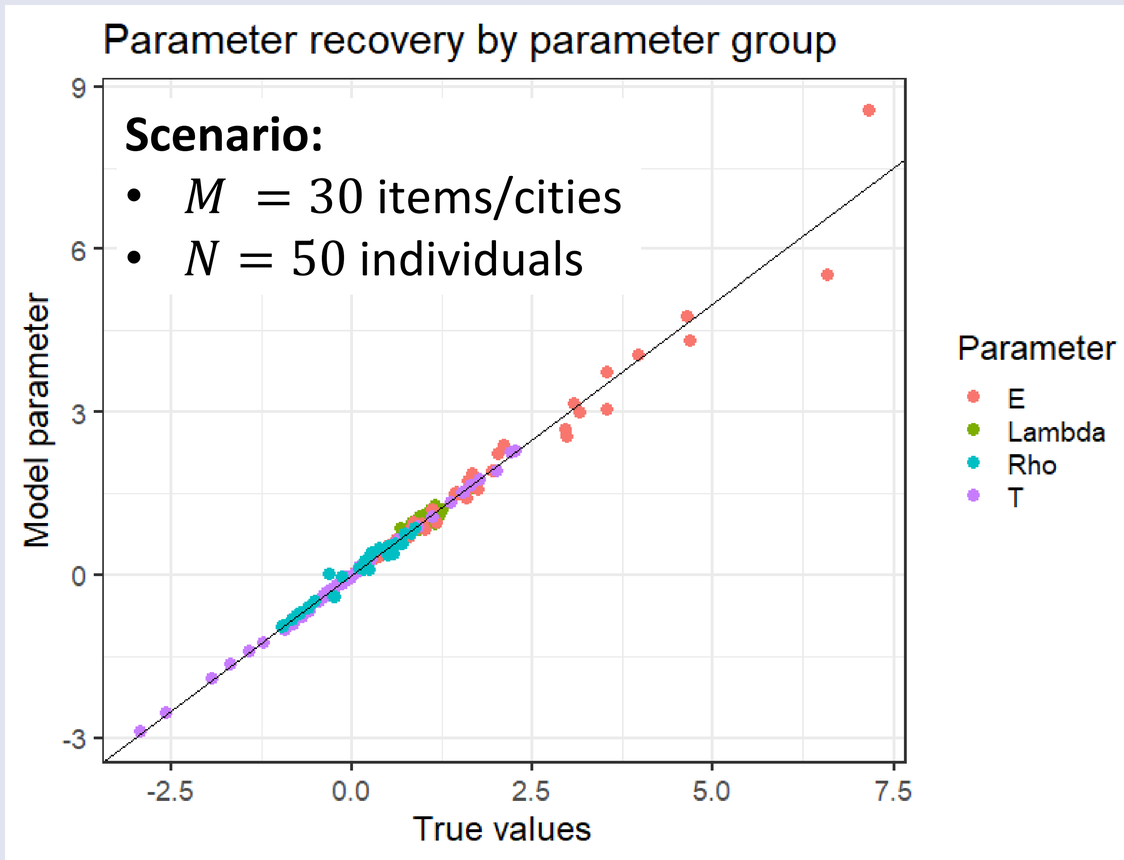
- *Paradigm*: Aggregation of individual, 2-dimensional location judgments on geographical maps
- *Goal*: Comparison of Cultural Consensus Theory (CCT) and Wisdom of Crowds (WOC) for 2-dimensional data
- *Hypothesis*: CCT outperforms WOC because it identifies experts and assigns higher weights to experts

Extended CCT Model & Parameters

- CCT is a data aggregation method for cases in which correct answers and expertise of informants are unknown (Batchelder & Romney, 1988; Anders et al., 2014)
- We extend CCT for 2-dimensional continuous data
- Relevance: 2-dimensional location judgments placed by individuals on geographical maps
- We compare the (expertise-weighted) CCT estimates to typical WOC estimates (Merkle et al., 2020)

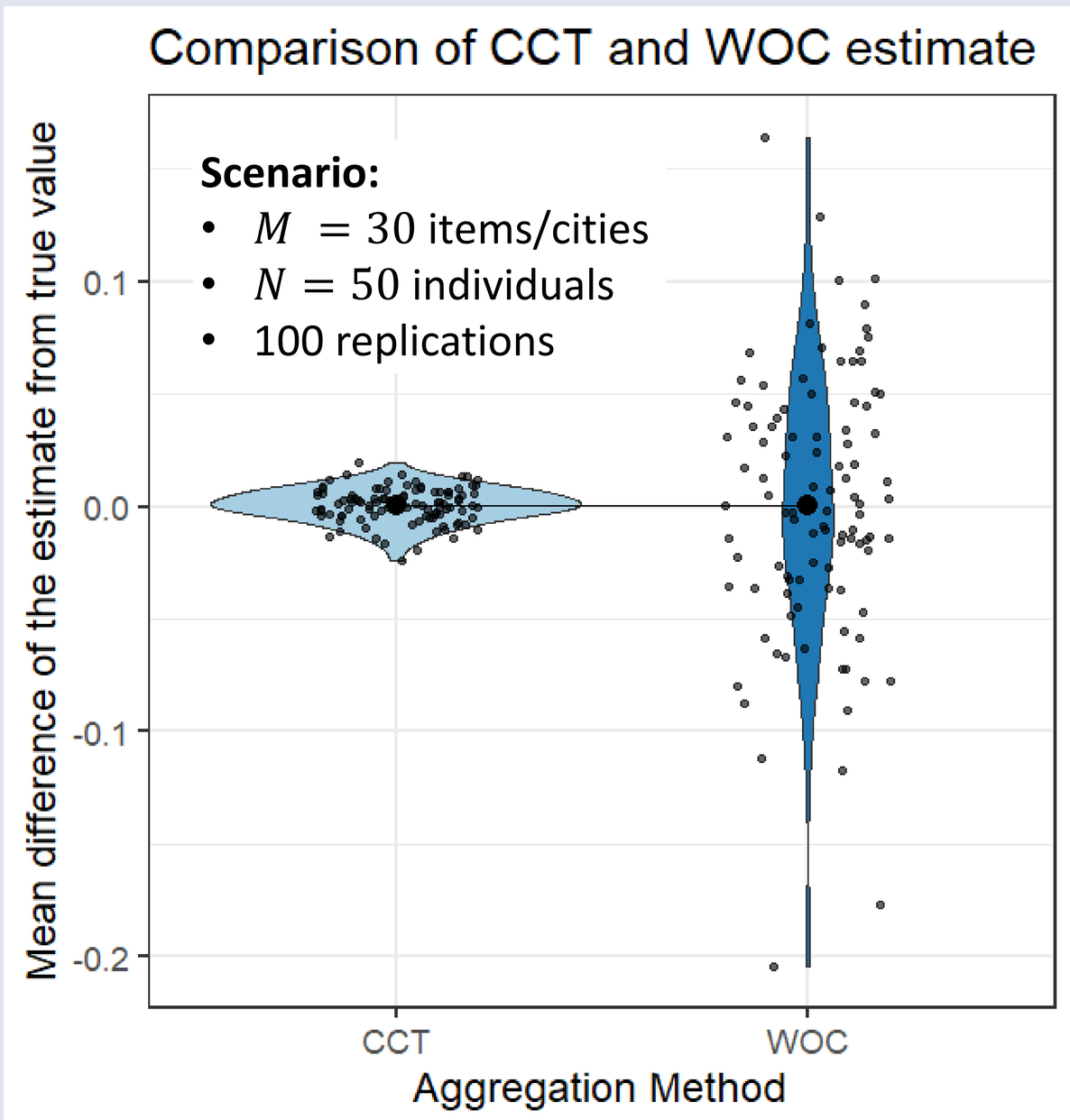


Parameter Recovery



Accuracy of Expertise Weighting

- Both aggregation methods (expertise-weighted CCT vs. standard WOC) provide unbiased mean estimates
- Variance of estimates decreases when using the expertise-weighted CCT model.



Mean differences between the true values and the CCT estimate and the WOC estimate respectively were aggregated over items and dimension.

Discussion

- Extended model allows applying Cultural Consensus Theory (CCT) to 2-dimensional data for the first time
- Comparison with typical WOC estimate supports earlier findings that weighting by expertise improves accuracy
- Applications of the model to empirical data are planned

References

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- Merkle, E.C., Saw, G., & Davis-Stober, C. (2020). Beating the average forecast: Regularization based on forecaster attributes. *Journal of Mathematical Psychology, 98*, 102419.

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