

# OPTIMIZING DISCRETE CHOICE EXPERIMENTS USING SIMULATIONS

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## [Objectives]

Discrete choice experiments (DCE) range prominently among the applied methods to elicit preferences in the field of health economics. With ongoing methodological learning, best practice remains a moving target. It is seldom plausible to implement a full factorial design and while software tools have been developed to improve design efficiency, “design error” remains.

The aim of this study was to illustrate how simulation studies can inform the designing of DCE’s and minimize design error given study size constraints and prior knowledge on preferences.

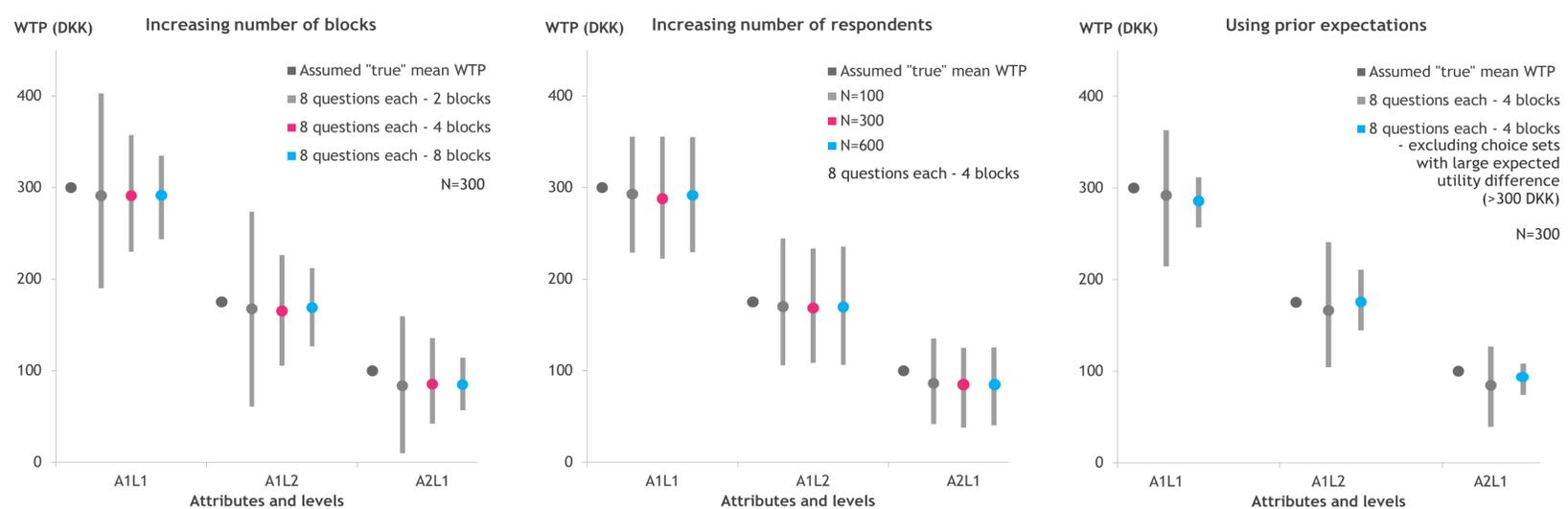
## [Methods]

We specified a hypothetical set of attributes and levels for a DCE game as well as an expected linear additive utility function for individuals. We used Monte Carlo simulations – programmed in SAS 9.2 and using SAS DCE routines – to examine how different design decisions affected design error given the specified utility function, attributes and levels. For each iteration WTP is estimated in a conditional logit model.

## [Results]

- Using blocking to increase choice sets reduces design error.
- Maximizing the number of respondents may improve estimation but will not markedly reduce design error unless used to include more choice sets.
- Given respondent and choice set constraints, excluding choice sets on the basis of prior knowledge – either theoretical or empirical – can potentially reduce design error. However, one must exercise caution not to introduce bias.

### WTP means and 95% confidence intervals - 500 simulations with different design characteristics



## [Conclusions]

Simulations can provide a tool for optimizing and understanding design choices. The literature on DCE design is complex and sometimes divergent. We illustrate how simulations can

- supplement software design routines and
- provide a more intuitive understanding of design properties and how it will likely affect the DCE results to e.g. include more respondents, blocks or questions.

Simulations are not reality – the “respondents” behave the way they are specified to behave. However, this methodology enables the researcher to isolate effects. We believe that the simulation framework can be a useful tool for practitioners to think systematically about DCE design decisions given actual study characteristics and constraints.

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