Over 30 years of Discrete-Choice Experiment Studies in Health Economics: Systematic Review of Current Practice and Reflections on Evolving Practice

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BACKGROUND

- Discrete-choice experiments (DCEs) were introduced to health economics in the 1990s. Four previous systematic reviews have reviewed papers published up to 2017.[1,4]

- Since 2017, there has been a rapid growth in the number of DCE studies and the breadth of topics for which preferences have been elicited. State of practice has evolved substantially. Data extracted by past reviews no longer reflect current practice.

- The last review appealed for better study reporting. Given numerous guidelines and checklists, a review of the current state of practice is timely.

OBJECTIVES

The objectives of this study were to:

- Update and expand on previous reviews (1990-2017) to identify all health-related DCE studies published between 2018 and 2023

- Describe current practice and reporting standards in DCEs

- Identify new trends in the state of practice of DCE studies

METHODS

- We conducted a systematic literature review of health-related DCE studies published between 2018-2023. The search strategy and data extraction replicated previous reviews to show how the method has evolved.

- We also extracted new data to show the current state of practice for issues not included in previous reviews, including (clinical) area of application; reporting of qualitative data; and additional details on survey administration, design, and analysis.

- The following inclusion and exclusion criteria were applied:

  Inclusion criteria:
  – Peer-reviewed papers written in English
  – Empirical DCE study, including studies using Best-Worst Scaling (BWS) Case 3, to elicit preferences relating to the provision of healthcare, valuation of health states, and healthcare professional jobs

  Exclusion criteria:
  – Studies that elicit preferences for nutrition (e.g., food choices and diet)
  – Studies that elicit preferences for health consequences associated with environmental impacts (e.g., air quality or pollution)
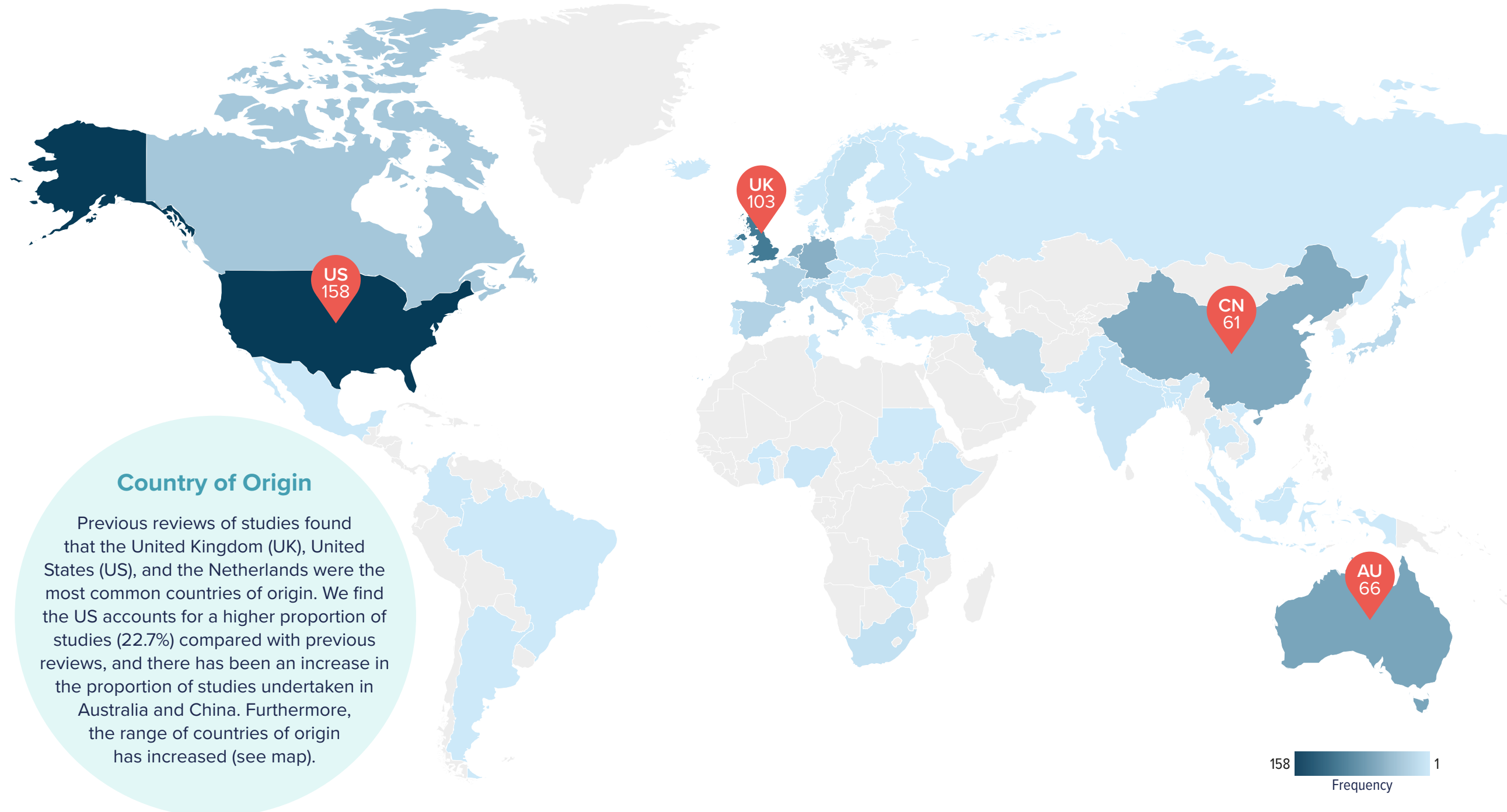 – Studies that applied BWS Case 1 and 2

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6. Ride J, et al. Pharmacoeconomics. 2024 Oct;42(10):1161-75.

RESULTS

The search strategy identified 7,563 titles and abstracts. After screening, 1,477 full-text articles were retrieved. Data have been extracted for 795 articles, of which 695 meet the inclusion criteria and are included in this review.

Over 96% of studies were "classic" DCE studies rather than BWS Case 3, 60% of studies presented a forced-choice task (no opt-out), and over 60% of studies elicited patient or public preferences for healthcare or public health.

Also, the move to online modes of data collection continues: more than 60% of studies were self-completed online surveys, and around 36% of studies recruited respondents through commercial panel providers.

Country of Origin

Previous reviews of studies found that the United Kingdom (UK), United States (US), and the Netherlands were the most common countries of origin. We find the US accounts for a higher proportion of studies (22.7%) compared with previous reviews, and there has been an increase in the proportion of studies undertaken in Australia and China. Furthermore, the range of countries of origin has increased (see map).

US 158 | UK 103 | CN 61 | AU 66

Frequency: 158 — 1

Study Reporting Quality

Previous reviews highlighted that many studies reported the methods applied with insufficient detail. We find the same for all stages of study design.
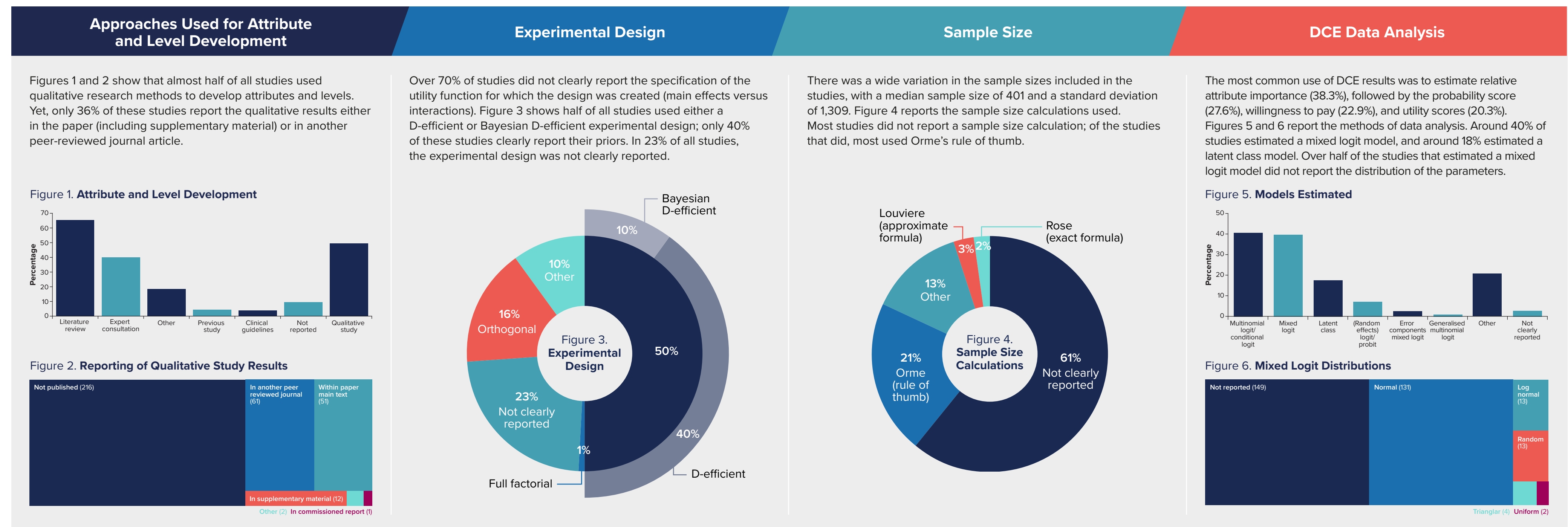
DISCUSSION & CONCLUSIONS

- DCEs were introduced in health economics to elicit preferences for non-health outcomes of interventions.[5] This review finds that, although the range of applications has increased, around 60% of DCE applications elicit patient or public preferences for health(care) interventions.

  – Around 40% of studies have different purposes, such as eliciting job preferences from healthcare professionals or health state valuation. These study types have different design and analysis requirements.

  – Given the heterogeneity of purpose, a review of study design by study type would be informative.

- Despite calls for better study reporting in previous reviews, many aspects of study design are poorly reported. Future reviews should assess whether recently published reporting guidelines improve this.[6]

POORLY REPORTED

Approaches Used for Attribute and Level Development	Experimental Design	Sample Size	DCE Data Analysis

Approaches Used for Attribute and Level Development

Figures 1 and 2 show that almost half of all studies used qualitative research methods to develop attributes and levels. Yet, only 36% of these studies report the qualitative results either in the paper (including supplementary material) or in another peer-reviewed journal article.

Figure 1. Attribute and Level Development

Figure 2. Reporting of Qualitative Study Results

Not published (216) | In another peer reviewed journal (61) | Within paper main text (51) | In supplementary material (12) | Other (2) | In commissioned report (1)

Experimental Design

Over 70% of studies did not clearly report the specification of the utility function for which the design was created (main effects versus interactions). Figure 3 shows half of all studies used either a D-efficient or Bayesian D-efficient experimental design; only 40% of these clearly report their priors. In 23% of all studies, the experimental design was not clearly reported.

Figure 3. Experimental Design

Bayesian D-efficient 10% | Other 10% | Orthogonal 16% | Not clearly reported 23% | Full factorial 1% | D-efficient 40% | 50%

Sample Size

There was a wide variation in the sample sizes included in the studies, with a median sample size of 401 and a standard deviation of 1,309. Figure 4 reports the sample size calculations used. Most studies did not report a sample size calculation; of the studies that did, most used Orme's rule of thumb.

Figure 4. Sample Size Calculations

Louviere (approximate formula) 3% | Rose (exact formula) 2% | Other 13% | Orme (rule of thumb) 21% | Not clearly reported 61%

DCE Data Analysis

The most common use of DCE results was to estimate relative attribute importance (38.3%), followed by the probability score (27.6%), willingness to pay (22.9%), and utility scores (20.3%). Figures 5 and 6 report the methods of data analysis. Around 40% of studies estimated a mixed logit model, and around 18% estimated a latent class model. Over half of the studies that estimated a mixed logit model did not report the distribution of the parameters.

Figure 5. Models Estimated

Multinomial logit/ conditional logit | Mixed logit | Latent class | (Random effects) logit/ probit | Error components mixed logit | Generalised multinomial logit | Other | Not clearly reported

Figure 6. Mixed Logit Distributions

Not reported (149) | Normal (131) | Log normal (13) | Random (13) | Triangular (4) | Uniform (2)

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