Scope Tests in Health Care Discrete Choice Experiments

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BACKGROUND

- Discrete choice experiments (DCEs) are widely used to understand and quantify preferences and the values individuals place on health and health care interventions by looking at tradeoffs between benefits, safety concerns, and (sometimes) costs.[1]
  - However, there have been concerns about the validity and reliability of data generated using hypothetical methodology[2]
- Methods for evaluating the robustness of the survey include internal validity tests.
- This study reviews the use of one of these internal validity tests—the scope test—in health preference studies using a DCE.

OBJECTIVE

- The objectives of this study were to:
  - Review how scope tests are defined and understand the origins of the scope test in health preference research
  - Determine how often health DCE studies conduct scope tests
  - Describe the design and statistical analysis of the test data
  - Understand how researchers interpret and use the results of scope tests

METHODS

- A traditional systematic literature review of titles and abstracts may be a poor fit because:
  - The terminology and concepts used to assess internal validity are not consistent.[3]
  - Scope tests may not be primary objectives and thus may be excluded from titles and abstracts and instead be reported in the main text of the manuscript or supplementary appendices.[4]
  - Some of the relevant literature is published in the environmental valuation literature.
- Consequently, several literature review approaches were adopted to identify relevant publications (Figure 1).

Figure 1. Literature Review Methods

Pearl-Growing Literature Review

A literature review using a form of pearl growing was conducted to identify health care DCE studies using scope tests.

- Pearl growing literature reviews[5] use citations to identify relevant studies by searching:
  (1) bibliographies
  (2) citing articles

A compilation of existing systematic reviews of DCEs[6-8] in health care was used as an original source to identify initial pearls to be grown.

Key terms (scope test[s], test[s] for scope) were initially searched in the full texts of articles included in the existing reviews of health DCEs.

Targeted Literature Review

In addition to the pearl-growing review, literature was hand-searched including searches for and in:

- Published manuscripts and supplementary materials
- Unpublished working papers and study reports
- Theses and dissertations
- Committee reports
- Government reports

RESULTS

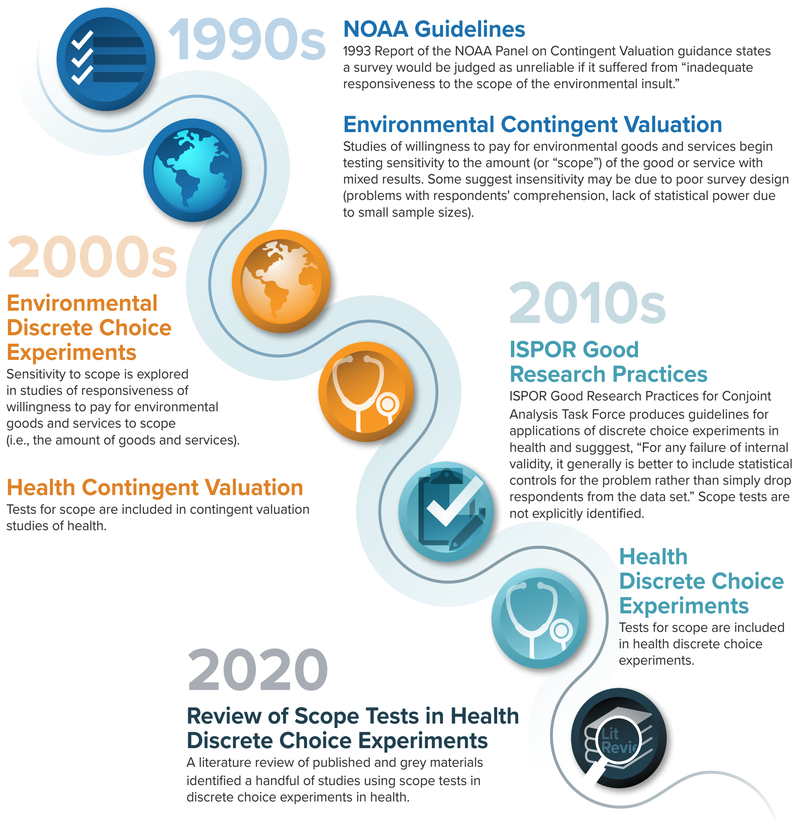
Origins

- The scope test was proposed by the National Oceanic and Atmospheric Administration (NOAA) Panel convened to evaluate the reliability of contingent valuation estimates of environmental values.[9]
- The report states that reliable estimates of willingness to pay (WTP) require that WTP estimates are "adequately" responsive to the scope of the environmental change.
- Researchers acknowledge the importance of how both the commodity is defined and the study design features.
- Scope tests were adapted and applied to DCEs of WTP for environmental goods.[3,10,11]
- As the use of stated preference methods in health grew, scope tests were conducted in contingent valuation and DCE studies of WTP.
  - Guidelines for health DCE studies address internal validity generally but do not explicitly mention scope tests.[12]
- One expert commentary on improving the quality of DCEs in health suggests scope tests for numeric attributes as an assessment method.[13]

Definition

- The environmental literature identifies within-subject (internal) and between-subject (external) scope tests.
  - In the environmental literature, responsiveness to scope is defined in terms of an adequate responsiveness to the scope of the environmental insult.
- The concept referred to as a scope test in health DCEs is usually a between-subject test of whether respondents are making choices based on the absolute values of the numeric attribute levels or if the participants are recoding the numeric values.
- For example, are respondents recoding quantitative attribute levels from the absolute numeric values to qualitative levels such as "low" or "high?"
- A sample does not pass a between-subject scope test when the utility difference, or importance, associated with two numeric attribute levels varies with the range of numeric levels in the experimental design.

Figure 2. A Chronology of Scope Tests in Stated Preference Research



ISPOR = International Society for Pharmacoeconomics and Outcomes Research.

Table 1. Summary of Health DCE Studies With Scope Tests

Authors (Publication Year)	Country	Disease Area	Sample Size	Attributes Tested	Scope Test Results
Ho et al. (2015)[14]	United States	Obesity	540	Risk (mortality)[a]	Failed[a]
Hauber et al. (2017)[15]	United States	Atopic dermatitis	599	Risk (suicidal thoughts)	Failed; data kept separated in the models
Mühlbacher and Bethge (2016)[16]	Germany	Diabetes	626	Cost, life span (additional healthy years)	Passed; data pooled in the model; effect-coded separated
Poulos et al. (2018)[17]	Germany	Adult travel vaccination	603	Cost	Passed; data pooled together in the model
Poulos et al. (2018)[18]	Poland	Pediatric rotavirus vaccination	350 in Poland	Cost	Passed; data pooled together in the post hoc analysis
Poulos et al. (2018)[18]	Hungary	Pediatric rotavirus vaccination	350 in Hungary	Cost	Failed[a]; data pooled together in the post hoc analysis
Poulos et al. (2019)[19]	United States	Endometriosis	250	Risk (hot flashes)	Passed[a]; data pooled together in the model
Boeri et al. (2019)[20]	United Kingdom	Self-injection device, arthritis	323	Cost	Passed; data pooled together in the model

[a]Reported in the article's supplementary materials, not the main text.

Scope Tests in Health DCEs

- The original source for the targeted literature review comprised 628 health care DCE studies published between 1990 and 2018.
  - Searching for key terms yielded eight relevant results, including two empirical examples of scope tests.
  - Searching the reference lists and citations of the eight initial pearls yielded a further four empirical examples in subsequent waves (review in process).
  - This review covers these six empirical studies identified in the early waves (Table 1).
- Studies were conducted in Europe and the United States, reflecting the location of stated preference research more generally.[1]
- The studies investigated responsiveness to scope in a range of therapeutic areas.

Design and Statistical Analysis

- Authors used scope tests for cost (n = 4), risk attributes (n = 3), and healthy years (n = 1).
- Tests for scope most commonly involved tests for statistical difference between preference weights or relative importance (n = 6).
  - Additionally, one study tested for differences in the rank ordering of attribute levels, and one study did not report the statistical approach for testing sensitivity to scope.
- The scope test was reported as successfully passed in four studies and failed in two studies.
- When the sample passed the scope test, all data were pooled for the analysis.
  - One study conducted in two countries found one sample was responsive to scope and one sample was not.
- When the sample failed the scope test:
  - One article reported post-estimation calculations (maximum acceptable risk) for each sample separately.
  - One article reported results for the whole sample as tests for differences in post-estimation calculations were not statistically significant.

Interpretation

- Details about the scope test results and interpretation were frequently absent from the main text of the article and instead reported in supplementary appendices.
- Most studies "passed," so little interpretation is necessary.

CONCLUSIONS

- There are few guidelines and empirical examples of how to conduct, analyze, and interpret scope tests in health DCEs.
- More attention should be paid to the scope test in health DCEs, particularly where DCE studies support decision making.

DISCUSSION

- Pearl growing was combined successfully with other literature review techniques to identify studies with scope tests that were not reported in the title or abstract of an article.
- The review (in progress) found six studies that included different ranges for the cost and risk attributes.
  - Researchers may be conducting scope tests in their preference research but not reporting details in the article or only in supplementary appendices.
- Some details about the scope test (analysis and results) were unreported in the main text of the article.
- Scope tests were originally applied to WTP estimated using contingent valuation to value natural resource damages.
- Health DCEs explore responsiveness to and/or recoding of a single attribute used as a numeraire (i.e., cost or risk), but most have not evaluated responsiveness of WTP to the scope of treatment benefits.
- Unlike environmental applications, health DCEs have expanded scope tests to evaluate concepts of value in which risk is the numeraire.
- There are few guidelines for best practice in conducting scope tests in health DCEs.

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