Statistical Methods for the Analysis of Discrete-Choice Experiments: An Interview with A. Brett Hauber, PhD

on behalf of the ISPOR Conjoint Analysis Good Research Practices Task Force

ISPOR TASK FORCES

Value & Outcomes Spotlight had the opportunity to catch up with A. Brett Hauber, PhD, on the recent article, "Methods for the Statistical Analysis of Discrete-Choice Experiments: A Report of the ISPOR Conjoint Analysis Good Research Practices Task Force," to appear in the June 2016 issue of *Value in Health*. Our conversation on this intriguing subject of discrete-choice experiments follows.

Brett Hauber AB, González JM, Groothuis-Oudshoorn CGM, et al. Methods for the Statistical Analysis Good Research Practices Task Force: A Report of the ISPOR Conjoint Analysis Good Research Practices Task Force. Value Health 2016 Vol. 19: 300-315.

Value & Outcomes Spotlight: This is the third report from the Conjoint Analysis Good Research Practices Task Force. How does it differ from first two reports?

Hauber: The Statistical Methods for the Analysis of Discrete-Choice Experiments Task Force Report builds on the first task force report, Conjoint Analysis Applications in Health—a Checklist (2011) that outlines the steps to take for the development, analysis, and publication of conjoint analyses. The second report, Constructing Experimental Designs for Discrete-Choice Experiments, focused on one of these steps.

This good research practice guidance tackles another important step – statistical analysis. It will aid in understanding the fundamentals of discrete-choice experiments (DCE) data and the range of statistical analysis methods commonly used in applications of DCEs in outcomes research. It includes a checklist: ESTIMATE – a list of questions that researchers should consider when selecting an analysis method, describing the analysis, and interpreting their results.

VOS: Aren't there already a number of resources out there for researchers who want to learn about conjoint analysis?

Hauber: Yes. There are several other key methodological references that are useful to experienced researchers. Our target audience is less-experienced outcomes researchers who may be less familiar with conjoint analysis and DCEs. Our goal was to provide researchers with an understanding of the methods so that they can make informed decisions about the type of analysis method to use and to interpret the results accurately.

To achieve this goal, the Task Force determined that a pragmatic introduction to different statistical analysis methods was needed – highlighting the differences among methods and identifying the strengths and limitations of each method.

The foundation of good research practices in DCE data analysis is to start with a good understanding of the fundamentals of DCE data (i.e., how to set up the data, the properties, advantages, and limitations of the different methods, etc.). Only after providing this information do we present the ESTIMATE checklist of aspects to consider when selecting an analysis method.

VOS: What inspired you to develop and lead this Task Force?

Hauber: Honestly, some of my colleagues and I noticed that a number of the journal manuscripts that we were reviewing revealed some misunderstanding of DCE data properties and analysis. Perhaps in part this was because there are some really good software packages out there that do much of the analysis for you.

This lack of understanding stood out when I read incorrect interpretations of results. This is not to say that the research was bad. In fact, much of it was quite good; but, it was clear that there was a real need for a resource to help researchers understand how these models work.

VOS: What's next for the ISPOR Good Research Practices Conjoint Analysis Task Force?

Hauber: Interest in patient-preference methods, such as conjoint analysis and DCEs, is growing among outcomes researchers and health care decision makers. As this interest grows, we believe that the need for good guidance will grow. We are weighing several

options. The Task Force co-authors are considering an update to the 2011 task force report to reflect advances in practice that have emerged over the past few years. Survey design is a key component to this research and is also being considered as a topic. The ISPOR Stated Preference Methods Special Interest Group is considering several projects as well. ∎

Additional information:

You can access, "Methods for the Statistical Analysis of Discrete-Choice Experiments: A Report of the ISPOR Conjoint Analysis Good Research Practices Task Force," and other articles in this issue of Value in Health at: http://www.ispor.org/valueinhealth_index.asp.

To learn more about the Conjoint Analysis: Statistical Analyses – Good Research Practices Task Force, go to: http://www.ispor.org/Conjoint-Analysis-Statistical-Methods-Guidelines.asp

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ISPOR Task Force Report: Statistical Methods for the Analysis of Discrete-Choice Experiments

The ISPOR Task Force Report, "Statistical Methods for the Analysis of Discrete Choice Experiments: A Report of the ISPOR Conjoint Analysis Good Research Practices Task Force Group," was published in the June 2016 issue (Volume 19, Issue 4) of *Value in Health.*

Conjoint analysis is a survey method used to capture people's preferences for individual features associated with health care interventions or services. Conjoint-analysis methods, particularly discrete-choice experiments (DCEs), have been increasingly used to quantify preferences of patients, caregivers, physicians, and other health care decision makers. Most notably, the Center for Devices and Radiological Health at the US Food and Drug Administration commissioned a DCE study of preferences for weight-loss devices among overweight and obese people in the US [1] which was subsequently used to support the approval of the Maestro® Rechargeable System, a new weight loss treatment. Therefore, understanding the key features of different methods used to analyze data from this type of survey is becoming increasingly important.

Understanding the characteristics and appropriate analysis of preference data generated by DCE surveys is critical to conducting a well-designed DCE. Good research practices for the statistical analysis of DCE data involve understanding the characteristics of alternative methods and ensuring that interpretation of the results is accurate. Despite the growing use of conjoint-analysis methods in outcomes research, there remains inconsistency in the statistical methods used to analyze data from DCEs. Given this inconsistency, the task force agreed that good research practices in the analysis of DCE data must start with ensuring that researchers have a good understanding of the fundamentals of DCE data and the range of statistical analysis methods commonly used in applications of DCEs in outcomes research.

This report starts with the basic idea behind estimating preferences using a DCE, helping readers understand some of the basic properties of this type of data. We then describe alternative approaches to setting up the data for analysis. We then describe the analysis of data using four commonly used statistical methods – conditional logit, random parameters logit, hierarchical Bayes, and latent-class finite-mixture models. We, we present the results

of each method as applied to a common simulated data set to demonstrate the differences in the properties of each of these analysis methods. The report concludes with a summary of the strengths and limitations of each method described in the report and provides the ESTIMATE checklist, a series of questions to consider when justifying the choice of analysis method, describing the analysis, and interpreting the results.

The ISPOR Conjoint Analysis Statistical Analysis: Statistical Analysis—Good Research Practices Task Force is the third ISPOR Conjoint Analysis Task Force and this report builds on two previous Task Force Reports, "Conjoint Analysis Applications in Health—A Checklist: A Report of the ISPOR Good Research Practices for Conjoint Analysis Task Force" and "Constructing Experimental Designs for Discrete-Choice Experiments: Report of the ISPOR Conjoint Analysis Experimental Design Good Research Practices Task Force."

Reference

[1] HoMP, Gonzales JM, Lerner HP, et al. Incorporating patient-preference evidence into regulatory decision making. Surg Endosc 2015,29:2984-93. ∎

Additional information:

To view this task force report, go to: http://www.ispor.org/Conjoint-Analysis-Statistical-Methods-Guidelines.asp

To view, ", "Conjoint Analysis Applications in Health—A Checklist: A Report of the ISPOR Good Research Practices for Conjoint Analysis Task Force," go to: http://www.ispor.org/workpaper/ConjointAnalysisGRP.asp

To view, "Constructing Experimental Designs for Discrete-Choice Experiments: Report of the ISPOR Conjoint Analysis Experimental Design Good Research Practices Task Force," go to: http://www.ispor.org/conjoint-analysis-experimental-design-guidelines.asp