



JOURNAL OF THE INSTITUTE FOR OPERATIONS RESEARCH AND THE MANAGEMENT SCIENCES

# MARKETING SCIENCE

Volume:

Number:

Year:

Title:

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# MDS Maps for Product Attributes and Market Response: An Application to Scanner Panel Data

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## Abstract

There is theoretical and empirical evidence that consumers have limited cognitive resources and thus cannot maintain direct preferences for each choice alternative on the store shelves. Instead, they likely form their overall preferences for choice alternatives by evaluating the attributes describing each item. Rather than mapping the locations of and preferences for all choice alternatives in a multidimensional space, as is the current practice in marketing research, it is insightful to map the locations of and preferences for the attributes consumers use to evaluate the choice alternatives. The model proposed in this study unifies latent class preference models (choice models or conjoint models) with latent class multidimensional scaling (MDS) analysis. Dimensional restrictions are imposed on latent class preference models such that the locations of attribute levels and market response parameters can be mapped in reduced-dimension

spaces. Interactions between attributes can be graphically examined, which is not feasible with the traditional MDS approach. Also, the effects of price reductions and promotions on the locations of attribute levels can be graphically examined. An empirical application with scanner panel data shows the capabilities and limitations of the proposed model. In addition to the managerial insights provided by the model, it is also much more parsimonious than existing methods, and it forecasts holdout choices significantly better. In the empirical application, a model with two-dimensional attribute maps has 50 fewer parameters than the best unrestricted latent class choice model, yet the fit is comparable. The predictive performance of our model is shown to be superior to that of latent class MDS approaches and latent class conjoint approaches.

*(Brand Choice; Choice Models; Marketing Mix; Scaling Methods; Segmentation Research)*