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Alternative Explanations for Changes in Similarity Judgments and MDS Structure

Michael D. Johnson
Cornell University School of Hotel Administration, mdj27@cornell.edu

Donald R. Lehmann
Columbia University

David A. Horne
University of Michigan

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Abstract
[Excerpt] The basic purpose of our paper (Johnson et al., 1990) was to see if the repetitive task of providing similarity judgments affects the cognitive structure evidenced by those judgments. The data clearly indicate that the structure changed through the course of the task. Moreover, this change is consistent with a categorization-based response to task fatigue. Three primary criticisms have been raised in response to our paper (Malhotra, 1990): (1) fatigue is not directly measured, (2) our hypotheses do not follow from our categorization framework, and (3) our hypotheses and findings are more consistent with a learning framework.

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task repetition, fatigue, adaptation, learning

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ALTERNATIVE EXPLANATIONS FOR CHANGES IN SIMILARITY JUDGMENTS AND MDS STRUCTURE

Michael D. Johnson

Donald R. Lehmann

Daniel R. Horne

1. Introduction

The basic purpose of our paper (Johnson et al., 1990) was to see if the repetitive task of providing similarity judgments affects the cognitive structure evidenced by those judgments. The data clearly indicate that the structure changed through the course of the task. Moreover, this change is consistent with a categorization-based response to task fatigue. Three primary criticisms have been raised in response to our paper (Malhotra, 1990): (1) fatigue is not directly measured, (2) our hypotheses do not follow from our categorization framework, and (3) our hypotheses and findings are more consistent with a learning framework.

2. Task repetition and fatigue

Although indirect, our operationalization of fatigue is based on a fitting description of the subjects' task environment. Similarity subjects to produce repeated judgments for familiar products or services. Two general factors may affect the subjects' repeated

responses in this task environment, adaptation and fatigue. Figure 1 illustrates these factors and how they ultimately influence the fit of an MDS solution (described later).

Adaptation in this case captures any increase in familiarity with the range of stimuli being rated or the rating scale. The main effect of adaptation should be to increase or decrease the simplicity (complexity) of the subjects' cognitive representations and resulting judgments. Importantly, adaptation should occur very early for the familiar packaged goods used in our study (e.g., beverages and snack foods). It should also be minimized through prior exposure to the scale and stimulus set. In following this procedure, our experience is that subjects do adapt very quickly and easily to such a task.

Any subsequent change in the subjects approach to the task should reflect fatigue or some closely related construct. In fact, we may have captured the effect of boredom as much as fatigue, but clearly fatigue is a common reaction to boredom and may be treated as synonymous for our purposes. The subjects in our task provided 66 paired comparison similarity judgments. It seems obvious that such a task is boring

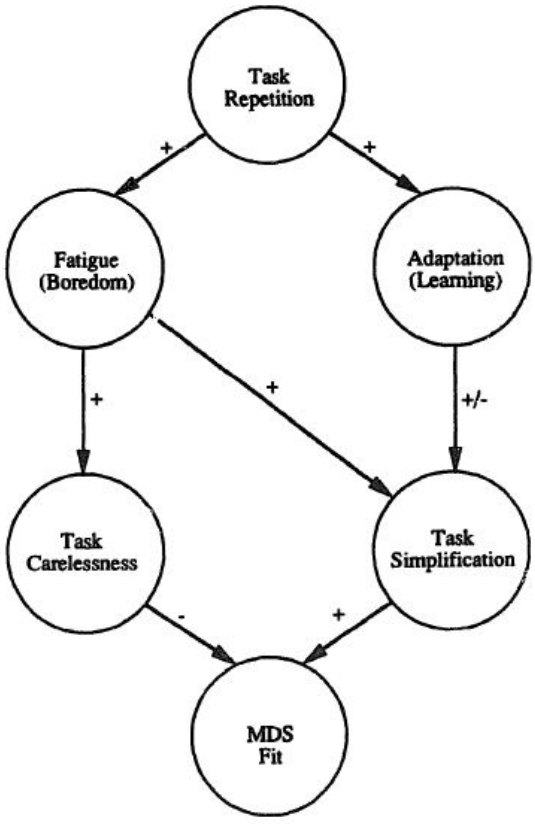

Fig. 1. The effects of task repetition on similarity judgments.

and tedious and likely to lead to reduced attention and effort. All we presume is that a comparison of later judgments with earlier judgments should reflect fatigue. Although more direct measures of fatigue are desirable, we feel that our conceptualization of the task environment is sound. Whether learning occurs seems more problematic. Subjects were aware in advance of the 12 familiar products to be rated and were provided no response feedback during the course of the task.

3. Revised fatigue hypotheses

We argue that one natural response to fatigue is to adopt simpler cognitive representations and rely on basic level category similarities and differences to finish the rating task. When a stimulus set crosses basic level category boundaries, this results in an increase in judgment variance over time. Thus we state: “When judging products from a more superordinate level, involving more than one traditional category or basic level distinction (e.g., beverages), judgment variance should increase as subjects progress through the task.” (p. 37)

As a simple example, consider four of our beverage stimuli: soft drink, diet soft drink, milk, and chocolate milk. These stimuli cross the soft drink and milk product categories. Early in a proximity judgment task, consumers are more likely to consider similarities across the categories (e.g., both the chocolate milk and the soft drinks are sweet). They are also more likely to consider differences within the categories (e.g., the diet versus non-diet nature of the

soft drinks). As the task drags on, the consumer is likely to focus more exclusively on basic level category membership (e.g., soft drink products versus milk products). Within the soft drink and milk product categories, products should be judged as more similar. Across these categories, products should be judged as more dissimilar. Thus we predict that judgment variance increases for our category level stimuli.

The proposed alternative interpretation of our categorization framework introduces an important restriction on the task environment which results in a very different prediction. It presumes that each category level stimulus represents a separate and distinct basic level category. Thus when subjects come to rely more on similarities and differences in category membership, there are no salient similarities to consider; the stimuli should become more universally dissimilar. However, this argument and revised fatigue hypotheses FH1 and FH3 apply more to those situations where each category level stimulus is drawn from a distinctly different category.

This does point out how the predictions of a categorization framework depend on the nature of the stimulus set. Yet our discussion and empirical study focus on products that cross category boundaries rather than represent completely separate basic level categories. As a result, our initial hypothesis HI is correct for our study and stimuli. Importantly, the type of stimuli underlying revised hypotheses FH1 and FH3 appear to represent the exception rather than the rule for category level judgment tasks.

Our second hypothesis (H2) states that the fit of scaling techniques should improve as consumers progress through a similarity rating task for both brand and category level stimuli. As shown in Fig. 1, scaling fits should improve as consumers adopt simpler cognitive representations in response to fatigue. This follows directly from our categorization framework. An alternative argument, mentioned in our paper and captured in Fig. 1, is that subjects may become careless in response to fatigue. This would cause an increase in error variance and a resulting decrease in the fit of scaling techniques (i.e., revised hypothesis FH2). Notably, this argument is not based on categorization. The two arguments represent qualitatively different, though not mutually exclusive, ways in which fatigue may affect judgments.

It is inappropriate to associate the “careless judgment” or error variance argument with our “simple judgment” or cognitive categorization argument. Our initial hypothesis H2 is consistent with our overall view that subjects respond to fatigue by relying on simpler, more categorical representations. We also fail to see the relevance of work on simple versus complex individuals, a between-subjects variable, on our within-subjects analysis. In our case, the fit of an MDS routine is used mainly as an indicator of the dimensionality or complexity of a cognitive representation.

4. Alternative explanation based on learning

Our predictions and results are consistent with a categorization perspective. Keep in mind that there are no empirical findings for which some alternative explanation can not be produced. However, our findings are more difficult to explain within a learning framework. The proposed learning framework presumes that the focus of category learning is on common features. This is an overly micro view of the categorization process. More generally, categorization is on ongoing process of grouping and distinguishing which occurs at both subordinate and superordinate category levels (Murphy and Medin, 1985).

The learning explanation also presumes that our data was collected with a primary emphasis on similarities or common features. As mentioned in our article, however, we actually used a neutral similarity-dissimilarity scale (scale ranged from very dissimilar to very similar). This was by design. Research suggests that a strictly similarity-oriented scale increases the salience of common product features while a dissimilarity-oriented scale increases the salience of distinctive product features (Johnson, 1986). Therefore, we employed a scale that emphasized both common and distinctive features.

The common features assumption underlying the learning explanation and hypotheses seems inappropriate in our subjects' task environment. Indeed, learning hypothesis LH3 suggests that mean similarity judgments should increase, which is inconsistent with the reported results. Thus, the data appears to reject the learning explanation.

The question of just when learning takes place and when fatigue or boredom occurs in a similarity judgment task is indeed an open issue. In closing we re-iterate Brunswik's (1956) observation with regard to psychological interpretations of research results. Any alternative view or explanation must take the task environment into consideration. Our task environment involved repeated judgments among familiar products. To suggest that our results represent learning rather than a response to fatigue ignores this basic observation

References

1. Brunswik, E„ 1956. Perception and the representative design of experiments. Berkeley, CA: University of California Press.
2. Johnson, M D., 1986. Consumer similarity judgments: A test of the contrast model. Psychology and Marketing 3, 47-60.
3. Johnson, M.D., D.R. Lehmann and D.R. Horne, 1990. The effects of fatigue on judgments of interproduct similarity. International Journal of Research in Marketing 7, 35-43 *(this issue).*
4. Malhotra, N.K., 1990. Comment on “The effects of fatigue on judgments of interproduct similarity”. International Journal of Research in Marketing 7, 45-51 (this issue).
5. Murphy, G.L. and D.L. Medin, 1985. The role of theories in conceptual coherence. Psychological Review 92, 289-316.