Perception Matters: Effects of Perceptual Richness on Categorization

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Abstract

Research presented here examines effects of perceptual and non-perceptual information on categorization as a function of perceptual properties of presented information. In Experiment 1, triads of perceptually-rich and perceptually impoverished stimuli were calibrated to equate discriminability of both kinds of stimuli. In Experiment 2, participants were presented with categorization task under two conditions, one, in which stimuli were not labeled and another, in which linguistic labels were provided. In the first condition, participants relied solely on perceptual information, and there was no difference between perceptually-rich and perceptually-impoverished stimuli. However, in the second condition, where linguistic labels were provided, there were dramatic differences across different stimuli types: perceptually-impoverished stimuli elicited mostly label-based responses, whereas perceptually-rich stimuli elicited mostly perceptually-based responses.

Introduction

It has been often argued that similarity is an insufficiently constrained rule to guide categorization decisions and that there is often a dissociation between similarity and categorization. For example, Rips (1989) presented participants with stories about animals undergoing appearance transformation. Participants were asked to rate similarity of the transformed organism, and to determine its category. While they judged the transformed animal to be more similar to the new category, they considered the transformed animal to be more likely a member of the old category (i.e., reptile). However, there is evidence (Johnson & Mervis, 1997; Sloutsky, Lo, & Fisher, 2001) perceptual information plays an important role in categorization. Therefore, one might counter argue that the transformational studies used only verbal descriptions or perceptually-impoverished pictures to demonstrate that perceptual similarity is of secondary (if any) importance for categorization. At the same time, it is possible that the role of perception is not fixed, such that contribution of perceptual information to categorization varies with variance in perceptual richness of presented information. This possibility was addressed in the present research.

Experiment: Categorization and perceptual richness

A total of 125 undergraduate students took part in the experiment. The experiment had a 3 (stimuli type: Perceptually-rich vs. Perceptually-impoverished) by 2 (Labeling condition: Label vs. No-Label) by 2 (similarity ratio: Test items are equally similar to the Target vs. Test A is more similar than Test B to the Target) mixed design with stimuli type and labeling conditions as between-subject variables and similarity ratio as a within-subject variable. In the label condition, pictures were accompanied with artificial two-syllable linguistic labels that were presented as count nouns (e.g., a bala, a gula). Participants were presented with triads of stimuli and asked to select from the two bottom pictures (i.e. Test A and Test B) the one that was the same kind of animal as the upper picture in the center (i.e. the Target).

Proportions of categorization choices were subjected to a three-way (Stimuli Type by Labeling condition by Similarity ratio) mixed ANOVA. As expected there was a significant stimuli type by labeling interaction, F (1,119) = 4.08, MSE = 0.11, $p < .05$, indicating that there were no differences among stimuli types in the no label condition, while there were significant differences in the label condition. This interaction is the most critical as it indicates that differences in the label condition do not stem from different discriminability of perceptually-rich and perceptually-impoverished stimuli. The results clearly indicate that reliance on perceptual and non-perceptual information for categorization is mediated by perceptual richness of information.

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