Category Labels in Similarity Judgment

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Abstract

When two objects carry the same category label, we tend to perceive that these objects are similar. When two objects carry different category labels, we perceive that these objects are dissimilar. How does this happen? In an attempt to clarify the effect of category labels on similarity judgments, pictures of animal tissues were presented with fictitious labels and participants judged the similarity of the pictures. The perceived similarity increased when the labels highlighted the interrelatedness of features; the effect of labels was absent when the labels did not highlight the interrelatedness of features. The results indicate that category labels help clarify inter-relationships of features, and modify our perception of similarity.

When two objects carry the same category labels, people tend to think that they have features in common. When they carry different labels, people perceive that these objects have different features. How does this happen? One theory claims that verbal labels attract extra attention, and because of the attention they attract, *verbal labels* are particularly diagnostic in human induction (Sloutsky & Fisher, 2004). Another theory argues that *category labels*, unlike other feature labels, have special properties and provoke implicit assumptions about category members; as a result, category labels help integrate underlying features (Gelman & Markman, 1986; Yamauchi & Yu, 2008). In this brief article, we propose another explanation. We argue that category labels help make the interrelatedness of features transparent; in so doing, category labels modify perceived similarities. The interrelatedness among features has been known to affect various cognitive judgments, such as classification and feature inference (Goldstone, 1996). We think that category labels are special in similarity judgment because they clarify the extent to which features are inter-related.

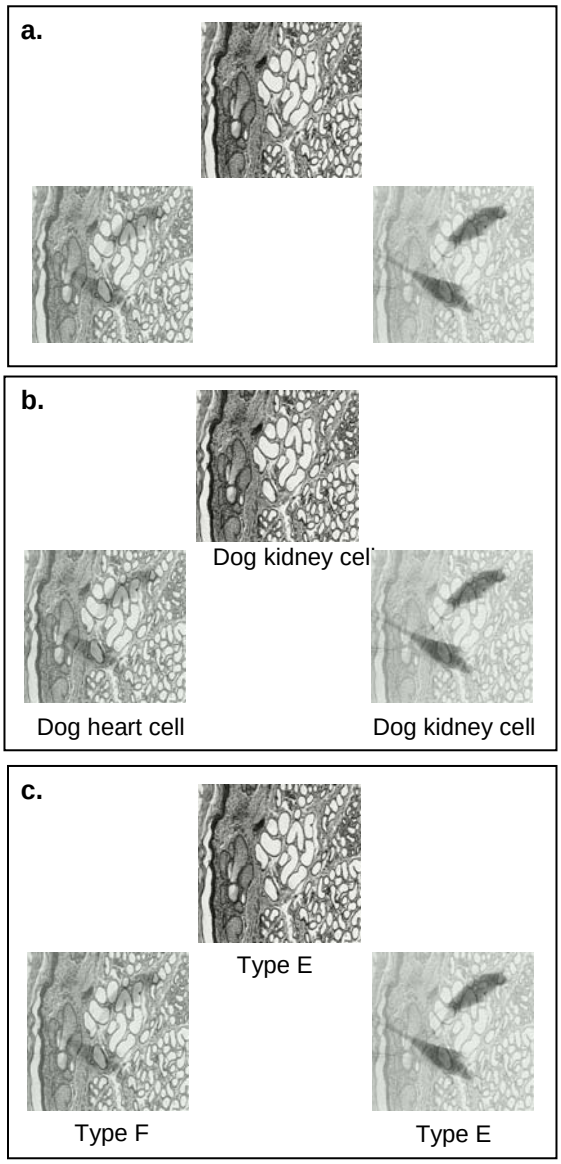

Figure 1: Sample stimuli (**a.** no-label, **b.** alphabet-label, **c.** cell-label conditions)

To test this idea, we conducted two experiments using descriptive labels as a means of illustrating feature interrelatedness in a similarity judgment task. Figures 1a-c show three degrees of *interrelatedness* of novel concepts. The three pictures were presented without labels (Figure 1a), with more descriptive labels (Figure 1b), or with less descriptive alphabetic labels (Figure 1c). Although participants may be uncertain what exactly a dog kidney cell or a dog heart cell is, these fictitious concepts could be interpreted in relation to other known concepts, such as dog, kidney, or heart. In this manner, the fictitious cell labels enhance the possibility of the given pictures having interrelated features more than alphabetic labels do. We hypothesized that the interrelated labels—dog kidney cell and dog heart cell—should influence similarity judgment (Figure 1b), but alphabetic labels—type E and type F—should not (Figure 1c).

To measure the effect of category labels on similarity judgment, participants were presented with three pictures of animal tissue —a target placed at the top and two base pictures placed at the bottom (Figure 1)—and judged which base picture, left or right, was more similar to the target. The target was an original picture of animal tissues. The two base pictures were selected from morphed images of two original pictures created using MorphMan 4.0 (2003) software. Based on the degree of merging of the two original pictures, two base pictures were selected controlling for physical difference among the pictures.

As predicted, when the target and base pictures had the same cell label, the proportion of selecting dissimilar base picture increased significantly compared to the no-label condition (Figure 2a); when the pictures had different cell labels, the proportion decreased considerably: F (2, 136) = 16.46, MSE = .07, p < .001, η^2 = .20. In contrast, the effect of alphabetic labels was statistically negligible in both same and different alphabet-label conditions (Figure 2b): F (2, 133) = 2.11, MSE = .04, p = .13, η^2 = .03.

Our follow-up studies showed that the effect of interrelatedness is quite robust. We contrasted unfamiliar labels representing the names of diseases to unfamiliar labels representing the names of people. Even using unfamiliar labels,

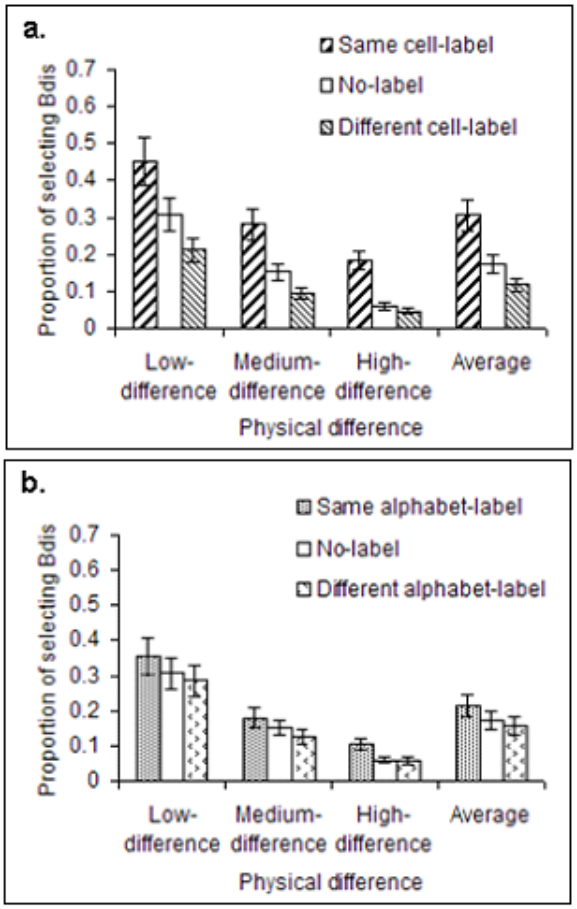

Figure 2: Results from the Experiment (**a**. Cell labels vs. no labels, **b**. alphabetic labels vs. no labels)

participants tend to judge the pictures carrying the same labels as more similar while pictures carrying different labels as dissimilar, only when the labels evoked the interrelatedness of features. We think that the interrelatedness that labels express makes the contrast between features salient, and accentuates the similarities and differences between objects.

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