The Relationship between Learned Categories and Structural Alignment

Daisuke Tanaka (daisuke@srt.L.u-tokyo.ac.jp)
Department of Psychology, University of Tokyo; 7-3-1 Hongo Bunkyo-ku
Tokyo, 113-0033 Japan

Recent researches suggest that similarity is well characterized as a comparison of structured representations and two kinds of differences yielded through the alignment process were influenced on similarity judgement differently (Markman, & Gentner, 1996). This study applied structural alignment view to category learning and tested the hypothesis that features of categories with alignability between categories are more important than features without alignability in classification of exemplars.

Method

Subjects

18 university students participated in the experiment.

Materials & Procedure

Subjects learned a pair of categories in the learning phase. Category structure composed of short descriptions as features (Table 1). Those features could classified into 3 groups; alignable features (AF), non-alignable features (NF), and common features (CF). AF had a relation to other features composed alternative category as alignable differences. NF did not make alignable differences and were characteristic of one category. CF are in common with two categories. In the learning phase, learning exemplars were used and one learning exemplar had 3 features; one of AF, one of NF, and one of CF. Subjects were presented with the exemplars one at a time and identified them as being in category 1 or 2. After each choice, subjects were given feedback. This procedure was repeated in blocks of 18 exemplars until the subjects had correctly classified over 90% of 18 exemplars. After reaching criterion, subjects entered the test phase which was similar to the learning phase without feedback. In the test phase, test exemplars were used, which composed of "appropriate" and "inappropriate" exemplars. "appropriate" exemplars, used as fillers, could be classified one category using the knowledge of category structure, like learning exemplars. On the other hand, "inappropriate" exemplars could not be classified correctly, and divided into 3 subtypes, subtype A, subtype B, and subtypes C by the difference of component patterns of features (see Table 2).

Table 1: A part of category structure.

Category 1		Category 2
Summer sports	(AF)	Winter sports
In a group		By oneself
Indoor sports	(NF)	Popular with kids
In fashion		With ease
Need the special education		(CF)

Table 2: Examples of "inappropriate" exemplars

Subtype A	Subtype B	Subtype C
Summer sports	Summer sports	By oneself
By oneself	With ease	In fashion
Need the special education	Need the special education	Need the special education

Results and Discussion

The main result are presented in figure 1. The hypothesis of this study predicted that the subtype A exemplars were classified as members of category 1 or 2 by chance, the subtype B tended to be classified as category 1, and the subtype C as category 2. The choice tendency for category 1 was different among subtypes significantly ($F(2,34)=6.56$, $p<.01$). The percentage to be classified into category 1 in subtype B was higher than in subtype C. This result suggests that alignable features were used for two categories learning and classified exemplars into categories.

References

Markman, A. B., & Gentner, D. (1996). Commonalities and differences in similarity comparisons. Memory & Cognition, 24, 235-249.

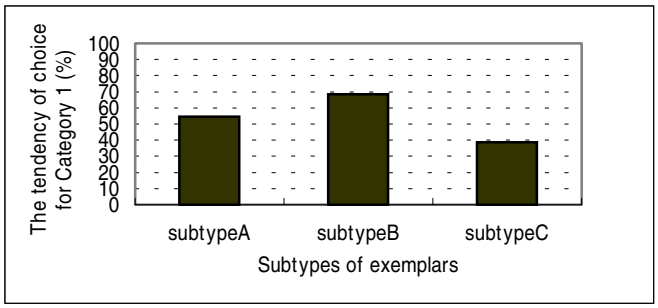

Figure 1: The choice tendency of each subtypes.