The Time Course of Overall Similarity Sorting in Free Classification.

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Previous work has shown that when participants are asked to sort a set of stimuli in the way that seems most natural, without any feedback from the experimenter, they have a preference to sort by a single dimension (e.g. Medin et al., 1987). This is perhaps surprising given that many natural categories are believed to be organized around a family resemblance structure in which categories are made up of a number of characteristic but not defining features (e.g. Rosch & Mervis, 1975). Overall similarity sorting has often been characterized as a primitive, non-analytic process whilst single dimension sorting has been viewed as a verbal, analytic process (e.g. Kemler Nelson, 1984). According to this theory, the experimental setting in which free classification is often studied encourages a more deliberate, analytic approach and hence single dimension sorting dominates. In contrast, when individuals are encouraged to classify non-analytically there is evidence that overall similarity sorting can be increased. For instance, in speeded triad classification tasks (e.g. Ward, 1983), participants sort by overall similarity more frequently at high time pressure than low time pressure. The increase in time pressure is assumed to disrupt analytic processes and cause participants to fall back on a holistic, non-analytic strategy.

More recently, however, it has been proposed that, at least under certain conditions, overall similarity sorting can be due to an analytic, dimensional summation strategy. Milton and Wills (2004) showed that overall similarity sorting was more prevalent for stimuli of greater spatial separability than for stimuli in which dimensions were spaced adjacently to create a recognizable object. They explained this surprising finding by suggesting that separating out the dimensions makes an analytic, "majority features" rule easier to perform. In contrast, there is no obvious explanation for the integration effect under a non-analytic process and indeed, it might be expected that, under a non-analytic process, there would be a reversal in results.

One prediction derivable from this account is that where overall similarity sorting is the result of an analytic process, time pressure should reduce overall similarity sorting and increase single dimension sorting. In contrast, where overall similarity is due to a non-analytic process, time pressure should increase overall similarity sorting (e.g. Ward, 1983).

The current series of studies provides evidence for both results and hence for the idea that overall similarity sorting can result from both analytic and non-analytic processes. Experiments 1 and 2 demonstrated that increasing time pressure can reduce the prevalence of overall similarity sorting (and can correspondingly increase the prevalence of single dimension sorting). This was taken as providing evidence that overall similarity sorting can be due to an effortful, analytic strategy. Experiment 3 explored the possibility that further increasing the time constraint could encourage a non-analytic strategy. Results (see Figure 1) showed that under very high time pressure (256ms presentation time) overall similarity sorting was significantly higher than at a lower time constraint (384ms). Furthermore, overall similarity sorting was also significantly higher at the lowest level of time pressure (640ms) than at the intermediate level. It appears that any single process account would have difficulty explaining this non-monotonic time course of overall similarity sorting, and hence our data support the increasing case for multi-process accounts of categorization (cf. COVIS, Ashby et al., 1998).

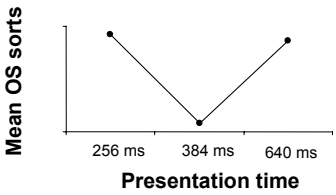

Figure 1.

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