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What does a dimension that predicts nothing do to human classification learning?

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Abstract

The six types of elemental category structures (Shepard, Hovland, & Jenkins, 1961) for three binary dimensions are a well-known benchmark in the study of human category learning. We added a non-diagnostic dimension consisting of four possible values with no predictive power. This increases the size of the training set fourfold. Exemplar models successfully account for the SHJ ordering based on stimulus generalization plus selective attention. Accordingly, exemplar models should learn this new task by ignoring the irrelevant dimension and performing nearly as usual. In a behavioral study, we found that Type I (unidimensional rule) was acquired rapidly, but most learners struggled to make any progress over an extended training period for Type IV (unidimensional rule-plus-exception) and Type VI (no regularities). We investigate whether leading formal models can fit this pattern and address implications of these results for theories of category learning.