

Learning Relational Concepts from
Within- vs. Between-Category Comparisons

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Word count: 13,975

BETWEEN- AND WITHIN-CATEGORY COMPARISON

Abstract

According to current dominant theories of analogy, comparing two instances of a relational concept enables alignment of their elements and reveals their shared relational structure. Therefore, learning to classify relationally defined categories should be faster when comparing items of the same category than when comparing items of different categories. By contrast, classification learning of feature-based categories should benefit from between-category comparisons, because such comparisons direct attention to the features that discriminate the categories. The present experiments test these predictions using a two-category classification-learning task in which two items are presented on every trial: either in the same category (match condition) or in different categories (contrast condition). We found that subjects in the contrast condition outperformed those in the match condition for feature-based categories as predicted. However, we also found a contrast advantage for relational categories, across four different types of relational stimuli. The latter finding is not consistent with the predictions of structure-mapping theory. We suggest two possibilities to account for this finding. First, impediments to alignment might facilitate learning in a way comparable or even superior to successful alignment. Second, some relational categories might be learnable based solely on which relations are present in the stimulus, rather than requiring explicitly compositional representations based on binding objects to relational roles. Such categories could thus be processed and represented similarly to feature-based categories, without the need for structural alignment. The latter hypothesis suggests an important psychological distinction between atomic relations and structured relational systems.

Keywords: Analogy, Relational Category Learning, Comparison, Concept Representation, Compositional Representation