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**Using hierarchical Bayesian modeling to help understand the generation and representation of categories**

**Abstract: We demonstrate the potential of using hierarchical Bayesian methods to help understand the generation and representation of categories. We do this using a worked example, considering an existing model of category representation, the Varying Abstraction Model (VAM), which attempts to infer the representations people use from their behavior in category learning tasks. The VAM allows for a wide variety of category representations to be inferred, but we show how a hierarchical Bayesian analysis can provide a unifying explanation of the representational possibilities using two parameters. One parameter controls the emphasis on abstraction in category representations, and the other controls the emphasis on similarity. Using 30 previously published data sets, we show how inferences about these parameters, and about the category representations they generate, can be used to evaluate data in terms of the ongoing exemplar versus prototype and similarity versus rules debates in the literature. We emphasize the advantages of hierarchical Bayesian models in converting representation selection problems to estimation problems, and providing one way of specifying theoretically-based priors for possible representations.**