How to Make a Proceedings Paper Submission

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Abstract

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Introduction

Categorization is one of the most well-studied topics in cognitive psychology. One of our most intriguing cognitive capabilities is the ability to generate new ideas and concepts. Work in the field has systematically explored the difficulty with which classifications are acquired, generalization of category knowledge, and the relation between similarity and categorization. However, the creative use of conceptual knowledge has been has scarcely been the subject of scientific inquiry.

In an early investigation of creative cognition, Ward & colleagues (Marsh, Ward, & Landau, 1999; Smith, Ward, & Schumacher, 1993; Ward, 1994; Ward, Patterson, Sifonis, Dodds, & Saunders, 2002) explored the influence of prior knowledge on generation of novel concepts. Participants in these studies were asked to draw and describe objects from particular categories that might exist on other planets (e.g., "Draw an animal from another planet"). Broadly speaking, these studies show that creative capacity is sharply constrained by prior knowledge: whereas Smith et al. (1993) and Marsh et al. (1999) observed that participants often used properties of provided examples in their drawings, Ward (1994) observed that generated examples often possess the same structural forms as real examples (e.g., alien animals has eyes, legs, arms, and so on).

In more recent work, Jern and Kemp (2013) proposed a hierarchical model of category and exemplar generation. Observed exemplars are thought to be sampled from a category distribution, which in turn is thought to be sampled from a domain distribution. More specifically, Jern and Kemp (2013) modeled each category as a multivariate normal distribution in feature space, and the distribution of categories (the distribution of category means and variances) was also modeled using a normal distribution. Novel categories are generated by sampling from the domain distribution, and exemplars from those categories are sampled from the category distribution. Their model successfully explained the results of an artificial classification learning experiment in which participants were asked to generate a new class following learning.

Both lines of research reviewed above characterize the manner in which prior knowledge influences generation of novel concepts. However, this work does not speak to the inverse – how do creatively generated concepts *differ* from what is already known? Taken as a starting point, Jern and Kemp (2013) suggest that, within the artificial category learning paradigm, generated categories will emulate the distributional structure of known categories in the domain (i.e., within-class feature variances, correlations), and will randomly differ from known categories at along one or more features.

Behavioral Experiment

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