Issue Spotter - Prototypes

Background

Part of cognitive psychology explores the concept of concepts. What cognitive events happen when you think about a chair? How is the concept of chair represented in the cognitive system? This is a subtle issue.

For example, surely a seat at a formal dining table is chair, but what about a recliner, a stool, a couch, or a tree stump? The issue is important because the representation of concepts is the basis of everything else we can mentally do with concepts. In a very real sense how we think and what we can learn is largely determined by how we represent concepts.

An efficient way to represent concepts would be to keep only the critical properties of a concept. This set of critical properties is sometimes called a **prototype** or schema. The idea of prototypes is that a person has a mental construct that identifies typical characteristics of various categories. When a person encounters a new object he/she compares it to the prototypes in memory. If it matches the prototype for a chair well enough the new object will be classified and treated as a chair. This approach allows new objects to be interpreted on the basis of previously learned information. It is a powerful approach because one does not
need to store all previously seen chairs in long term memory. Instead, only the prototype needs to be kept.

Experiment

Mervin and Ed would like to investigate the creation and storage of concepts, so they decide to replicate a method used by Posner and Keele in 1968, one of the earliest studies to systematically explore concept representation in a controlled way. Like Posner and Keele, Mervin and Ed would like their participants to learn patterns of dots rather than using an already well-known concept like a chair.

They create three dot-pattern prototypes and derive from them three sets. Each set includes the given prototype and two variations. During the training phase, they ask the only participant they found (Ed, one of the experimenter) to learn to classify each set, with the underlying prototype being the basis for correct classifications.

After learning to classify the three sets, the participant was shown a variety of dot patterns. In particular, he was shown patterns that were shown during the training phase and new variant patterns. At the end of the training phase, classification and reaction time performance were nearly equal for the previously seen variants and the prototypes. During testing, performance was slightly worse for the new variants.

Mervin and Ed agreed that this is significant because the new variants were never seen during testing. To classify dot patterns that were not previously seen, the participant

must be using a mental concept of what corresponds to the different categories. Since performance is better for the prototype patterns than for the new variants, the mental concept is similar to the prototype patterns.

The experimenters concluded that people create a mental representation that is a mixture of the variant patterns used during training, that is, a prototype.

References

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