The Use of Categorization for Classification and Reasoning

One of the most critical skills that develop during early childhood is the ability to categorize—the ability to assign distinct objects to groups or categories. Being able to categorize is useful to children in a number of ways. It helps them to make sense of their complex environment. It facilitates language acquisition. Knowing about categories also helps children to reason about their environment and make inferences. For example, if a child learns that a cat has a heart then they might infer that other animals like dogs and cows also have this attribute.

By two years of age children can certainly categorize and can use their knowledge about categories to draw inferences. Conventional theories of categorization and conceptual development, however, have treated these two processes as quite separate. Conventionally, using your mental concept of “cat” to make an inference about which properties of cats might be shared by other animals, would not affect your understanding of this concept.

A recent series of studies in our laboratory challenges this view and suggests that when children put concepts to use in tasks such as inductive reasoning, their understanding of those concepts may change. In these studies, 6- and 10-year-old children learned about two novel categories (extraterrestrial creatures). First, children carried out a classification task in which they learned to assign pictures of these creatures to the correct category. Each extraterrestrial was made up of a number of visual features (e.g., shape of their ears, shape of their feet and so on), and children gradually learned which features were associated with each category. They then carried out a simple reasoning task in which they tried to predict a novel attribute for each of the category members (favorite leisure activity).

Critically, some of the features that children could use in the classification task were also helpful in the reasoning task. Other features were useful for classification but not for reasoning. Final tests of children’s understanding of the categories showed that children in both age groups learned more about the features that could be used for both classification and reasoning than they did about the features that could be used only for one task.

These findings show that even after children have learned which items belong to a novel concept, their understanding of the concept continues to evolve as the child applies it in tasks such as inductive reasoning. This means that children might acquire new concepts via a number of different routes—by learning to identify concept members or by learning which features of the concept are useful for solving particular problems. From the child’s point of view, for example, being able to discriminate bicycles from skateboards might be seen as only the first part of the more critical process of learning how to operate each type of transport. More broadly, our results suggest that when educators teach new concepts, they should focus not just on discriminating between concept members and non-members but also on how these concepts might be used.