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The Role of Motion and Category Label in Preschoolers' Categorization of Animals

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Dynamic perceptual cues have recently been found to be more important than static perceptual cues for young children to determine category membership (Mak & Vera, in press). Four-year-olds tended to categorize animals and geometric figures based on motion similarity rather than on appearance similarity. For instance, they were more likely to judge a donkey and an antelope, rather than a donkey and a horse, as sharing a given property when they were shown to jump in the same way. Recent studies by Gelman and her colleagues have found that 2-year-old children are able to override perceptual similarity and use category label to make inferences about natural kinds (e.g., Gelman & Coley, 1990). Since motion and category label have individually been demonstrated to have an overriding role in children's categorization, the question then becomes which type of features, motion or category label, is more important.

Research by Barbara Tversky (1985) has shown that although preschool children are able to group objects by category name, their knowledge about categories is rather shallow and, at times, may simply be limited to perceptual information. For instance, 3- and 4-year-olds tended to group a plate with a teapot, instead of a clock, because they were white or they shared similar round shapes, rather than because they were tableware. This seems to suggest that category name is less effective than perceptual information as a cue for children to make categorical choice. Although category labels have been shown to be more important than static perceptual cues, it may not be able to override dynamic perceptual cues, such as motion.

Motion information, among other perceptual cues, has been demonstrated to be important not only in children's object categorization (Mak & Vera, in press) but also in some animals' categorization of potential predators (Evans & Marler, 1995). Infant vervets (a species of small gray African monkey) were found to use motion exclusively to make alarm calls, for example, giving eagle alarms not only to eagles but also to various other birds in motion, and even to leaves falling from trees. Young children, like infant vervets, may also be initially guided by motion to categorize objects.

This study, therefore, was an attempt to determine preschool children's development in the use of motion and category label as well as static appearance to draw inferences about the category membership of animals. We expected that preschool children, particularly 3- and 4-year-olds who have been shown to have limited knowledge about categories, would be more likely to use motion cues over category labels to draw inferences about the category membership of animals.

An inductive methodology was used to test four hundred and eighty children, between 3 and 5 years old. In the experiment, children were required to consider two pairs of animals, each of which consisted of a target and a test (e.g., a horse and a donkey). We showed children one pair of animals at a time. They were first taught a new property

(e.g., having good vision) about the target animal (the horse) and were then asked to infer if the property of the target animal applied to the test animal (the donkey).

To determine children's development in the use of appearance, motion, and category label to indicate category membership, we adopted a 2 (similar & different appearance) x 2 (same & different motion) x 2 (same & different label) x 3 (3-, 4- & 5-year-olds) between-subject factorial design.

Results showed that 3-year-old children tended to ignore category label and use motion to indicate category membership. The data also showed a motion-label developmental shift in children's use of these features. Three-year-olds used motion to make judgments more often than 4- and 5-year-olds, whereas 4- and 5-year-olds used label more often than 3-year-olds. All of these effects were statistically significant at the .01 level. This clearly provides support for our main hypothesis: Children are initially guided by motion in object categorization.

Although Gelman et al.'s and our studies have consistently shown that static perceptual appearance may very well be the least important feature for children to indicate category membership, it is important to note that appearance is not at all irrelevant. There are some instances in which it does play a part. For example, appearance can help 2-year-old children to determine category membership when no label is given (Gelman & Coley, 1990). It can also help 7-year-olds and adults to make categorical judgments about geometric figures when motion cues become relatively irrelevant (Mak & Vera, in press). The significance of appearance is also found in adult vervets' martial eagle (a dangerous predator) alarms. Adult monkeys sometimes make martial eagle alarms mistakenly in response to other species that share not only the general silhouette but also aspects of the ventral marking with martial eagles (Evans & Marler, 1995). These results are not intended to minimize the role of appearance but rather to stress the role of motion that has been given short shrift in the general literature on children's categorization.

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