Commentary

Looking Beyond Looks

Comments on Sloutsky, Kloos, and Fisher (2007)

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How do people acquire knowledge about the world? Do the sources of information that underlie knowledge acquisition in young children differ from those in adults? These fundamental questions have permeated scientific inquiry since the time of Socrates and Aristotle.

Following in this tradition, a recent article by Sloutsky, Kloos, and Fisher (SKF; 2007) is ambitious—indeed, classic. Their goal was to uncover the contributions of conceptual and perceptual information in children's categorization and induction about natural kinds. But experimental evidence is only as good as the theory and logic upon which it rests. Unfortunately, SKF's approach to each of the key constructs—concepts, perceptual information, categorization, and induction—misses its mark.

To quickly review: SKF taught children two novel categories of buglike entities, stipulating that the categories could be distinguished by the ratio of buttons to fingers (members of one category had more buttons than fingers, members of the other had more fingers than buttons). SKF introduced novel words (*ziblet* and *flurp*) for these categories. Children successfully extended these names to new instances. SKF then told children that one particular individual had a certain property (e.g., "thick blood"). The children extended that property to items of the same overall appearance, ignoring the ziblet/flurp distinction. SKF interpreted this result as showing that "looks are everything" in children's inductive inferences.

We illustrate our concerns with an analogy. Suppose we aim to study the role of conceptual versus perceptual similarity in reasoning about natural kinds. We teach children two novel categories, stipulating that they are *evensies* (dogs with an even number of whiskers) and *oddsies* (dogs with an odd number of whiskers). We find that children learn these words without difficulty. We then tell the children that one particular dog (e.g., a collie evensy) has a certain kind of blood inside. We find that they extend that property on the basis of appearance, generalizing to perceptually similar dogs, disregarding the evensy/oddsy distinction (e.g., they extend the property to a collie oddsy, but not a Chihuahua evensy).

From this evidence, can we conclude that children use perceptual similarity *rather than* natural-kind membership in their inductive inferences? We think not. The experiment lacks construct validity. The novel categories created for this experiment are not natural kinds, and naming them (evensy or oddsy) does not make them so. The appearance of the items is a better guide to natural-kind membership than are the labels. Our concerns about this hypothetical example apply equally to SKF's study.

ARE THESE NATURAL KINDS?

Although the individual instances SKF used were patterned after living things (bugs), the novel categories (ziblets and flurps) are not natural kinds. Mill (1843) proposed a continuum, with inductively rich groupings (described as *natural kinds*) at one end and *arbitrary* groupings that capture just a single property (e.g., "white things") at the other. We acknowledge that there is little consensus regarding where precisely one might draw the line between natural and arbitrary categories. There is also serious debate concerning whether natural kinds exist in the world or are wholly a product of human cognition (Schwartz, 1977). We do not seek to address this metaphysical concern here. Instead, we assume that natural kinds have a psychological reality: People intuitively attribute more inductive depth to these categories than to arbitrary categories (Medin & Ortony, 1989).

From our perspective, SKF's ziblets and flurps are arbitrary categories. They differ in appearance by only one property: fingers-to-buttons ratio. We know of no account that defines a natural kind by a single ratio (Murphy, 2002), let alone the ratio between the numbers of a body part and a clothing accessory. This seems to us a profoundly arbitrary property. It is important to consider that for children and adults, properties that are arbitrary, accidental, or temporary do not generalize to other instances of a kind and are not predictive of stable, functionally relevant biological properties (Gelman, 1988; Waxman, Lynch, Casey, & Baer, 1997). If the goal is to test children's reasoning about natural kinds—or any category with strong inductive potential—SKF's categories fall short.

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ARE THESE BASIC-LEVEL CATEGORIES?

Whether or not SKF's categories are natural kinds, might they have inductive potential? Basic-level categories stand out for their inductive potential (Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976). When a novel property is attributed to an individual (a collie), children and adults tend to extend this property broadly within the same basic-level category (dogs). Without explicit evidence to the contrary, they do not restrict their extensions within subordinate-level boundaries (collies; Waxman et al., 1997). Because ziblets and flurps were designed as subordinate-level categories (i.e., types of bugs), children's tendency to extend SKF's novel property beyond the ziblet-flurp boundary is not surprising; their extension of this property to both kinds of bugs is likely to have been conceptually, as well as perceptually, motivated.

DOES NAMING CREATE NATURAL KINDS?

We also dispute SKF's assumptions about naming. Naming an arbitrarily defined category cannot transform it into the inductively rich kind of category that SKF purported to study (Davidson & Gelman, 1990). Even novice word learners appreciate that count nouns refer not only to basic-level natural kinds ("dog"), but also to subordinate-level categories ("collie"), relational groupings ("pet"), situation-restricted categories ("passenger"), and so on. Only some of these categories support strong inductive inferences (Hall, 1993; Mandler, 2004; Markman, 1989; Waxman, 1990).

What, then, was the basis of children's inferences in SKF's experiments? SKF claimed to have placed perceptual information in direct conflict with kind information, but this alleged conflict could have arisen only if the children interpreted the labels as referring to kinds. We have offered several reasons to suspect that *ziblet* and *flurp* were unlikely to have been so interpreted. Consequently, appearance was likely the best clue to kind membership in this task (Diesendruck & Bloom, 2003; Gelman & Medin, 1993; Gopnik & Nazzi, 2003). This does not mean that appearances constitute membership for natural kinds, any more than gray hair and wrinkles constitute membership in the category "grandmother" (Armstrong, Gleitman, & Gleitman, 1983).

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