

Looking beyond looks: Comments on Sloutsky, Kloos, and Fisher

Susan A. Gelman

University of Michigan – Ann Arbor

Sandra R. Waxman

Northwestern University

Acknowledgements. This research was supported by NICHD grants HD-36043 (Gelman) and HD-030410 (Waxman). We thank Liza Ware and Andrzej Tarlowski for comments, and James Cutting, Rebecca Gómez, Nora Newcombe, and Vladimir Sloutsky for insightful reviews. Author correspondence: [gelman@umich.edu](mailto:gelman@umich.edu).

Word count: 999 (excluding references)

## Looking beyond looks: Comments on Sloutsky, Kloos, and Fisher

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

Following in this tradition, a recent paper by Sloutsky, Kloos, and Fisher (SKF) (2006) 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, induction—misses its mark.

To quickly review: SKF taught children two novel categories of bug-like entities, stipulating that the categories could be distinguished by the ratio of buttons to fingers (members of one category had more buttons, members of the other had more fingers). 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”). 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 will be “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 children that one particular dog (e.g., a collie evensy) has a certain kind of blood inside. We find that children extend that property on the basis of appearance, generalizing to perceptually similar dogs, disregarding the evensy/oddsy distinction (e.g., to a collie oddsy, not a chihuahua evensy).

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.

*Are these natural kinds?* Although the individual *instances* were patterned after living things (bugs), the novel *categories* (ziblets and flurps) are not natural kinds. John Stuart 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 at the other (e.g., “white things”). 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. Importantly, 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 et al., 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.

*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 et al., 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 purport 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”), etc. Among these categories, only some support strong inductive inferences (Hall, 1993; Mandler, 2004; Markman, 1989; Waxman, 1990).

How, then, were children to perform in SKF’s experiments? SKF claim to have placed perceptual information *in direct conflict with* kind information, but this alleged conflict could arise *only* if children interpreted the labels as kind-referring. 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 on 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).

## References

- Armstrong, S. L., Gleitman, L. R., & Gleitman, H. G. (1983). On what some concepts might not be. *Cognition*, *13*, 263-308.
- Davidson, N. S., & Gelman, S. A. (1990). Inductions from novel categories: The role of language and conceptual structure. *Cognitive Development*, *5*, 151-176.
- Diesendruck, G., & Bloom, P. (2003). How specific is the shape bias? *Child Development*, *74*, 168-178.
- Gelman, S. A. (1988). The development of induction within natural kind and artifact categories. *Cognitive Psychology*, *20*, 65-96.
- Gelman, S. A., & Medin, D. L. (1993). What's so essential about essentialism? A different perspective on the interaction of perception, language, and conceptual knowledge. *Cognitive Development*, *8*, 157-167.
- Gopnik, A., & Nazzi, T. (2003). Word, kinds and causal powers: A theory theory perspective on early naming and categorization. In D. H. Rakison & L. M. Oakes (Eds.), *Early category and concept development: Making sense of the blooming, buzzing confusion* (pp. 303-329). New York: Oxford University Press.
- Hall, D. G. (1993). Basic-level individuals. *Cognition*, *48*, 199-221.
- Mandler, J. M. (2004). *The foundations of mind: origins of conceptual thought*. Oxford University Press.
- Markman, E. M. (1989). *Categorization and naming in children: Problems in induction*. Cambridge, MA: Bradford Book/MIT Press.

- Medin, D. L., and Ortony, A. (1989). Psychological essentialism. In S. Vosniadou & A. Ortony (Eds.), *Similarity and analogical reasoning* (pp. 179-195). Cambridge: Cambridge University Press.
- Mill, J. S. (1843). *A system of logic, ratiocinative and inductive*. London: Longmans.
- Murphy, G. L. (2002). *The big book of concepts*. Cambridge, MA: MIT Press.
- Rosch, E., Mervis, C. B., Gray, W. D., Johnson, D. M., & Boyes-Braem, P. (1976). Basic objects in natural categories. *Cognitive Psychology*, 8, 382-439.
- Schwartz, S. P. (1977). (Ed.). *Naming, necessity, and natural kinds*. Ithaca: Cornell University Press.
- Sloutsky, V. M., Kloos, H., & Fisher, A. V. (In press). When looks are everything: Appearance similarity versus kind information in early induction. *Psychological Science*.
- Waxman, S. R. (1990). Linguistic biases and the establishment of conceptual hierarchies: Evidence from preschool children. *Cognitive Development*, 5, 123-150.
- Waxman, S. R., Lynch, E. B., Casey, K. L., & Baer, L. (1997). Setters and samoyeds: The emergence of subordinate level categories as a basis for inductive inference. *Developmental Psychology*, 33, 1074-1090.