

Running Head: WHAT'S BEYOND LOOKS?

What's beyond looks? Reply to Gelman and Waxman

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Abstract

In the target article, Sloutsky, Kloos, and Fisher (SKF) presented evidence that young children perform induction based on appearance even when categories are not grounded in similarity. In their comment, Gelman and Waxman argue that evidence presented by SKF can be discounted because their stimuli are inadequate. This response focuses on two issues: (1) whether the criticism of SKF stimuli is principled or post-hoc and (2) what would advance a broader debate about mechanisms of early induction.

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In the target article, Sloutsky, Kloos, and Fisher (SKF) presented evidence that when category information is in conflict with appearance similarity, early induction is based on similarity and not on category information. These findings challenge a central tenet of the knowledge-based approach – the idea that even early in development induction is category-based. Gelman and Waxman (G&W) argue that because SKF use arbitrary groupings, SKF's findings tell us little about induction with real natural kinds. In what follows, we first respond to G&W's arguments. We then return to a broader debate, arguing that the knowledge-based approach is under-specified and thus has too much flexibility when dealing with disconfirming evidence.

*G&W arguments: Are they post-hoc or principled?*

Although G&W acknowledge that “there is little consensus regarding where precisely one might draw the line between natural and arbitrary categories” (p. 3), they argue that SKF categories are arbitrary groupings rather than natural kinds. This criticism implies that children somehow know where and how to draw this line. While this implication is questionable, we will focus on the content of the argument.

G&W's analogy with “evensies” and “oddsies” suggests that “ziblets” and “flurps” are arbitrary groupings because (1) they differ on a single feature (i.e., fingers-to-buttons ratio) and (2) the feature is arbitrary. “We know of no account that defines a natural kind by a single ratio ... This seems to us a profoundly arbitrary property.” (p. 4)<sup>1</sup>. However, as we show below the analogy is misleading because 1 and 2 are factually wrong.

First, ziblets and flurps differ on many properties. Specifically, these creatures were introduced as different kinds of animals that differ in their habitat (i.e., pets vs. wild animals), behavior (i.e.,

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<sup>1</sup> Contrary to G&W's intuitions, researchers of wildlife describe the ratio of dorsal tail stripes to tail circumference to be a feature differentiating between two biological species (Fargo & Laudenslayer, 1995). Given how easy it was to find this example, it is unlikely that this example is unique.

friendly vs. vicious), chemical in their blood, and the way of catching food. They were also referred to by different count nouns. The latter is especially important given the claim that children “assume that every object belongs to a natural kind and that common nouns convey natural kind status (as well their accompanying properties)” (Gelman & Coley, 1991, p. 190).

Second, the observable category-inclusion property was causally determined rather than arbitrary: ziblets were said to have more fingers than body buttons because they catch their food with fingers (a chemical in the blood makes their fingers sticky), while they do not use their buttons<sup>2</sup>. The presence of causal and casually-determined properties has been claimed to be an especially important characteristics of the natural kind construal (e.g., Gelman, 2003).

In our view, if children hold beliefs about the inductive potential of natural kinds, the provided information should be sufficient to trigger these beliefs; otherwise it is unclear how children assign completely novel entities to natural kinds. Our expectations could be wrong, but the knowledge-based approach does not specify what information about novel animals would be sufficient. Given that the psychological reality of natural kinds is so central to the knowledge-based position, this lack of specificity is striking.

Another G&W's concern is that ziblets and flurps are subordinate-level categories of “bug,” and therefore, a property could be generalized to both ziblets and flurps. The main problem with this argument is that it is inconsistent with SKF's data: If children interpreted ziblets and flurps as subordinate-level categories, then when given a fact about a ziblet they should have generalized it to either a ziblet or a flurp, which would have resulted in chance performance. Yet their performance was not at chance.

In addition, G&W offer no principled or empirical account as to why different kinds of bugs should be considered (or in fact are considered by young children) as subordinate- and not as basic-

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<sup>2</sup> It is unlikely that children merely ignored these explanations, given the accurate recall at the end of the experiment (see the follow-up to Experiment 1 on p. 11).

level categories. For example, Waxman, Lynch, Casey, & Baer (1997) treated different species of butterflies as different basic-level categories. If different species of butterflies are different basic-level categories, why would different species of bugs be subordinate-level categories? In the absence of a clear and uniformly applied principle (or empirical evidence), this criticism becomes too arbitrary to be informative. Thus, the criticisms of SKF stimuli are either inconsistent with the facts or post-hoc rather than principled.

*How to advance the debate?*

The target article and the comment should be considered within a broader debate about mechanisms of early induction. SKF's findings support a broader position that various generalization processes, including induction of properties, are driven by low-level perceptual and attentional mechanisms (e.g., French, Mareschal, Mermillod, & Quinn, 2004; Rogers & McClelland, 2004; Sloutsky & Fisher, 2004; Smith, Jones, & Landau, 1996). The knowledge-based account does not dispute the role of low-level mechanisms, but argues that these mechanisms are "mediated through conceptual knowledge" (Booth, Waxman, & Huang, 2005, p. 493; see also Booth & Waxman, 2002; Gelman, 2003), such as a belief that things belong to natural kinds.

Given that conceptual knowledge is the principal difference between the two positions, the debate could be substantially advanced only by evidence that either supports or disputes the role of conceptual knowledge. However, while the knowledge-based account argues that conceptual knowledge is important, it offers little detail as to what conceptual knowledge is, where it comes from, under what conditions it gets deployed, and how it mediates associative mechanisms. Specifically, it leaves it open whether conceptual knowledge is acquired by means of low-level mechanisms or whether it always mediates these mechanisms. In our view, a lack of answers to these questions gives the knowledge-based approach too much flexibility in dealing with

disconfirming evidence. At the same time, even hypothetical answers to these questions would flesh out the underlying theory, thus reducing the flexibility and potentially advancing the debate.

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