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Linguistic labels: Conceptual markers or object features?

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ABSTRACT

Linguistic labels affect inductive generalization; however, the mechanism underlying these effects remains unclear. According to one similarity-based model, SINC (similarity, induction, naming, and categorization), early in development labels are features of objects contributing to the overall similarity of compared entities, with early induction being similarity based. If this is the case, then not only identical but also phonologically similar labels may contribute to the overall similarity and thus to induction. These predictions were tested in a series of experiments with 5-year-olds and adults. In Experiments 1–5 participants performed a label extension task, whereas in Experiment 6 they performed a feature induction task. Results indicate that phonological similarity contributes to early induction and support the notion that for young children labels are features of objects.

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Introduction

Words play an important role in directing inductive generalization from known to novel. For example, when two appreciably different entities are referred to as "dogs" and one of the dogs is described as having a particular property (e.g., it has short bones), even young children are more likely to generalize this property to another dog than when the entities are referred to as "a dog" and "a cat" or when no words are introduced (Gelman & Markman, 1986; Sloutsky & Fisher, 2004; Sloutsky, Lo, & Fisher, 2001). However, the mechanism by which words guide young children's induction remains unclear.

Some researchers suggest that young children hold a number of *conceptual* assumptions about the world and language (see Gelman & Coley, 1991; Keil, Smith, Simons, & Levin, 1998; Murphy, 2002, for

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reviews of these assumptions), and words guide induction by invoking this conceptual knowledge. First, young children assume that (a) individuals belong to categories and (b) things belonging to the same category have much in common. Second, they assume that linguistic labels presented as count nouns are symbols denoting categories. Thus, on the basis of these assumptions, young children conclude that things having the same name are likely to have much in common.

Another theoretical position argues that there is no need to posit rich conceptual knowledge to understand effects of words on young children's induction. For example, a similarity-based model of generalization in children, SINC (similarity, induction, naming, and categorization (Sloutsky & Fisher, 2004), argues that (a) young children perform induction on the basis of the overall similarity among compared entities, (b) shared linguistic labels are features contributing to the overall similarity, and (c) the process of computing similarity over visual and auditory features is automatic rather than deliberate (see Sloutsky & Fisher, 2005 for a discussion). In the next section, we present SINC in greater detail.

SINC: Labels as features contributing to similarity

SINC considers labels as features contributing to the overall similarity of compared entities (Sloutsky & Fisher, 2004; Sloutsky & Lo, 1999; Sloutsky et al., 2001; see also Sloutsky & Fisher, 2005 for a discussion). There is evidence supporting this assumption of SINC; when entities share a label, young children tend to consider these entities as looking more alike than when the same entities are presented without labels (Sloutsky & Fisher, 2004; Sloutsky & Lo, 1999). According to the theory underlying SINC, these effects stem from attentional factors such as auditory information overshadowing (or attenuating processing of) corresponding visual information (Napolitano & Sloutsky, 2004; Robinson & Sloutsky, 2004, 2007a, 2007b, 2008; Sloutsky & Napolitano, 2003).

Initial evidence for overshadowing was presented in the Sloutsky and Napolitano (2003) study in which 4-year-olds and adults were presented with an auditory–visual target item followed by a test item. Participants needed to respond "same" if the two compound stimuli had the same auditory and visual components and respond "different" if either the auditory or visual component differed between the target and test items. The auditory components consisted of unfamiliar nonlinguistic sounds, and the visual components consisted of unfamiliar images (e.g., abstract geometric shapes). If participants encode both auditory and visual stimuli, they should correctly accept target items as the same while correctly rejecting items that had either new visual or new auditory components as different. It was found that 4-year-olds failed to report that the visual components changed when visual input was accompanied by auditory input. At the same time, processing of visual stimuli was not difficult per se; in the absence of auditory input, young children ably encoded the visual input (Napolitano & Sloutsky, 2004; Robinson & Sloutsky, 2004; Sloutsky & Napolitano, 2003). Similar effects were found in 8-, 12-, and 16-month-olds (Robinson & Sloutsky, 2004).

To introduce SINC more formally, we first consider its predictions for a class of frequently used induction tasks (Gelman & Markman, 1986; Sloutsky & Fisher, 2004). In these tasks, children are presented with a target item and two test items: A and B. After labels for the target and test items are introduced, children are taught that Test A has a particular quasi-biological property (e.g., has hollow bones) and Test B has a different quasi-biological property (e.g., has solid bones). The task is to decide whether the target has hollow bones like Test A or solid bones like Test B. SINC predicts that the probability of inducing a property from a test item (say Test B) to the target is a function of ratio of the overall similarity of Test A to the target and Test B to the target, which is a consequence of Luce's choice rule. More formally, this probability is presented in Eq. (1):

$$P(B) = \frac{\mathrm{Sim}(B,T)}{\mathrm{Sim}(B,T) + \mathrm{Sim}(A,T)} = \frac{1}{1 + \frac{\mathrm{Sim}(A,T)}{\mathrm{Sim}(B,T)}}, \tag{1}$$

where Sim(*A*,*T*) and Sim(*B*,*T*) are similarities of Test A and Test B to the target, respectively. Furthermore, according to SINC, the overall similarity between each of the test items and the target is a function of visual similarity and the weight of linguistic label:

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