

# The Influence of Lexical Association on Young Children's Inductive Inference

Bryan J. Matlen and Anna V. Fisher

**Abstract**—We investigated young children's ability to rely on semantically similar labels during the course of inductive generalization when labels were strongly and weakly associated. Children were asked to generalize an unobservable property of a target object to an object referred to either by a semantically similar word or by an unrelated word. Results suggest that important changes in the development of inductive generalizations occur between four and five years of age.

**Index Terms**—Synonyms, Young Children, Induction,

CHILDREN readily generalize unobservable properties to objects referred to by the same labels. For example, when told that a squirrel 'eats bugs,' children are more likely to say that another squirrel 'eats bugs' than a visually similar animal that is referred to by a different label [1, 2]. But while children are capable of inducing properties to objects with identical labels, it is unclear the extent to which they can rely on labels that are semantically similar to perform induction, such as synonyms (e.g. *rock-stone*).

One study by Gelman and Markman [1] found that 4-year-old children performed above chance when making generalizations to synonymous labels. However, some label-pairs in this study were strongly associated in the lexicon (e.g., *bunny-rabbit*, *puppy-dog*, etc.), providing a potential confounding variable. To assess the extent to which young children are influenced by lexical association during inductive generalization, 4- and 5-year-olds were given a triad induction task in which a target object was said to have a real-world property unfamiliar to young children, and children were asked to generalize the property to an object referred either by a synonym of the target word, or by an unrelated word.

A between subjects 2 (age: 4- and 5-year-olds) by 2 (lexical association strength: Strong and Weak) experimental design was used. To isolate the effect of labels on young children's induction, three pictures of identical trees or doors were presented and children were told objects were hiding behind the trees or doors. The free association database developed by

Nelson et al [3] was used to assess the strength of lexical association of the chosen semantically similar word pairs. On average, the strength of association was 0.44 in the Strong Association condition (which included such word pairs as *bunny-rabbit*, *puppy-dog*, *kitty-cat*, etc.) and 0.04 in the Weak Association condition (which included such word pairs as *rock-stone*, *cake-pie*, *cup-mug*, etc.).

Five-year-old children performed above chance, choosing objects referred to by synonymous labels at the rate of 74% in both conditions ( $p < .01$ ). Four-year-olds performed above chance in the Strong Association condition ( $M = .69$ ,  $p < .01$ ). However, their performance in the Weak Association condition did not differ from chance ( $M = .57$ ,  $p = .23$ ).

We conducted a second experiment to assess whether these effects would replicate when blank predicates are used as properties and when the stimulus word pairs refer to artifacts as well as natural kind objects. The task was identical to Experiment 1 except that 16 semantically similar word-pairs were used, half were natural kinds (e.g. *dolphin-whale*) and half were artifacts (e.g. *shoe-boot*). Four- and 5-year-olds were tested in two separate sessions a week apart with either natural kinds or artifacts first in a counterbalanced order. All semantically similar words were weakly associated.

We found no differences between the proportion of semantically similar responses for natural kinds and artifacts for either 4- or 5-year-olds ( $p$ 's  $> .45$ ). Experiment 2 replicated our results from the Weak Association condition in Experiment 1: 4-year-olds performed at chance ( $M = .52$ ,  $p = .79$ ) and 5-year-olds performed above chance ( $M = .68$ ,  $p < .005$ ).

Our results provide evidence that lexical association contributes to young children's inductive inference. These results are inconsistent with the theoretical position arguing that effects of labels on induction early in development are conceptually-driven [1]. At the same time, these results highlight important developmental changes that occur in preschool-age children's generalization behavior.

## REFERENCES

- [1] S. A. Gelman, E. M. Markman (1986). Categories and induction in young children. *Cognition*, 23(3), 183-209.
- [2] V. M. Sloutsky, A. V. Fisher (2004-a). Induction and categorization in young children: A similarity-based model. *Journal of Experimental Psychology: General*, 133(2), 166-188.
- [3] D. L. Nelson, C. L. McEvoy, and T. A. Schreiber (1998). The University of South Florida word association, rhyme, and word fragment norms. <http://www.usf.edu/FreeAssociation/>

Manuscript received June 11th, 2008. This work was supported by the Institute of Education Sciences, U.S. Department of Education, under Grant R305B040063 to Carnegie Mellon University.

B. J. Matlen is a graduate student in the Department of Psychology at Carnegie Mellon University, Pittsburgh, PA 15213 USA (phone: 412-268-8112; fax: 412-268-2798; e-mail: bmatlen@andrew.cmu.edu).

A. V. Fisher is an Assistant Professor in the Department of Psychology at Carnegie Mellon University, Pittsburgh, PA 15213 USA. (e-mail: fisher49@andrew.cmu.edu).