Journal of Experimental Child Psychology 134 (2015) 1–11

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp

Young children retain fast mapped object labels better than shape, color, and texture words

Amanda Holland [a], Andrew Simpson [b], Kevin J. Riggs [c,*]

[a] School of Psychology, London Metropolitan University, London E1 7NT, UK
[b] Department of Psychology, University of Essex, Colchester CO4 3SQ, UK
[c] Department of Psychology, University of Hull, Hull HU6 7RX, UK

ARTICLE INFO

Article history:
Received 13 June 2014
Revised 29 January 2015
Available online 10 March 2015

Keywords:
Word learning
Fast mapping
Long-term retention
Object bias
Shape bias
Rate of forgetting

ABSTRACT

We compared short- and long-term retention of fast mapped color, shape, and texture words as well as object labels. In an exposure session, 354 3- and 4-year-old children were shown a set of two familiar and three novel stimuli. One of the novel stimuli was labeled with a new object label, color, shape, or texture word. Retention of the mapping between the new word and the novel object or property was measured either 5 min or 1 week later. After 5 min, retention was significantly above chance in all conditions. However, after 1 week, only the mappings for object labels were retained above chance levels. Our findings suggest that fast mapped object labels are retained long term better than color, shape, and texture words. The results also highlight the importance of comparing short- and long-term retention when studying children's word learning.

Introduction

Children are prodigious word learners. By the age of 17 years, the average English speaker knows more than 60,000 words (Bloom, 2000). Yet, learning a word is far from easy and involves several steps. On hearing a novel word for the first time, a child needs to separate it out from the stream of

* Corresponding author.
E-mail address: k.riggs@hull.ac.uk (K.J. Riggs).

http://dx.doi.org/10.1016/j.jecp.2015.01.014
0022-0965/

speech and determine its referent or meaning. The sound of the word also needs to be mapped to the referent, and this representation must be stored in long-term memory.

Carey and Bartlett (1978) claimed that quick incidental learning enabled words to be acquired from only one or two exposures and coined the term "fast mapping" to describe such learning. They tested young children's ability to learn a novel color word from a single exposure. Children aged 3 or 4 years were shown two colored trays, blue and "chromium" (actually an unusual olive color), and asked to "bring me the chromium tray, not the blue one, the chromium one." In this lexical contrast task, children correctly inferred "chromium" as referring to the olive tray. Heibeck and Markman (1987) extended Carey and Bartlett's (1978) study and tested children's ability to fast map unfamiliar shape and texture words as well as color words. Using a similar procedure, they found that fast mapped color and shape words were retained after 10 min, although texture words were not retained above chance levels.

It is worth noting that in the two studies above, children used the novel word to select the appropriate referent (the novel object). However, as a growing number of researchers have emphasized, word learning involves more than referent selection; it also involves retention (Bloom, 2000; Horst & Samuelson, 2008; Swingley, 2010; Vlach & Sandhofer, 2012). In the research reported here, we investigate both the short- and long-term retention of different fast mapped words.

Interestingly, Carey and Bartlett (1978) did test retention after a long-term delay, but it is difficult to interpret their data because a control group, whose members did not have prior exposure to the novel word, performed no worse than the experimental group. Recently, however, a number of studies have investigated the relationship between reference selection and retention more convincingly. Horst and Samuelson (2008) tested 2-year-old children and found that although they could readily select the target novel object on hearing a new word, retention after just 5 min was poor. After reviewing the literature, Horst and Samuelson argued that there is very little evidence for retention of fast mapped words in either younger (2-year-old) or older (3- and 4-year-old) children. They went on to claim that, although a number of studies report good retention of fast mapped words, their methodological limitations make it unclear whether good performance reflected fast mapping. For example, Mervis and Bertrand (1994) recapitulated the object–label link with children prior to testing. Participants may have performed well by accessing an object–label representation formed during this recapitulation rather than from rapid incidental learning. In another study, Waxman and Booth (2000) used a procedure where the new word and its referent were accentuated (e.g., "Look at this one. This one is SO special to me. It is called a koba"), whereas Childers and Tomasello (2002) introduced children to the mapping repeatedly over an extended period of many weeks.

One study with 3- and 4-year-old children that did report good long-term retention of fast mapped words is Markson and Bloom (1997). Young children and adults were presented with a set of four familiar and six novel objects and were given novel information about one of the novel objects. There were three different conditions: object labeling ("let's use the koba"), a linguistically presented fact ("let's use the thing my uncle gave me"), and a visually presented fact (a sticker placed on a particular object). At test, participants were shown the same objects and asked to either "Find the koba," "Find the one my uncle gave me," or "Put the sticker where it should go." When tested after a few minutes (it is unclear exactly how long from the procedure), children and adults performed extremely well in all three conditions, suggesting that they had fast mapped the novel information to the novel object. One month later, both children and adults recognized the object associated with the label and the linguistically presented fact. Interestingly, however, performance significantly deteriorated in the "sticker" condition, with children selecting the correct object no better than chance after the month delay.

More recently, Vlach and Sandhofer (2012) found that short-term retention does not guarantee good long-term retention. They failed to find any long-term retention of fast mapped object labels in 3-year-olds or adults even though short-term retention was good. The pattern of performance across time appeared to be similar to that of a standard forgetting curve; the rate of forgetting was rapid initially but slowed over time.

To recap, a clear picture emerges with 2-year-olds. They can select the appropriate novel referent on hearing a novel object label, but retention is poor even in the short term. With older children of around 3 or 4 years, the story is more mixed. Evidence for long-term retention of fast mapped object labels was reported by Markson and Bloom (1997) but not by Vlach and Sandhofer (2012). It appears