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Learning Words from Context: A Powerful Associative Mechanism of Early Word Learning

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Word learning consists of several very difficult problems. First, when presented with a novel word, the young word learner has to solve a mapping problem – how to map the word in question onto the world. And second, the word learner has to solve a generalization problem – given that most of the time words can be extended to multiple individuals, it is necessary to determine the class of entities the word refers to. Both problems are massively underdetermined by the input. Given this massive uncertainty, how do young children acquire meanings of new words?

Several ideas have been proposed to explain the word learner's ability to handle this word-world indeterminacy. According to one approach, the problem of word learning requires reasoning and problem solving skills (see Bloom, 2000, for a review). One proposal within this approach is that young word learners use their knowledge about the language and the world to select a correct word-world mapping and this knowledge helps them to zero in on a correct hypothesis (Markman, 1989; Xu & Tenenbaum, 2007).

Under a different view, there are multiple mutually reinforcing correlations among language, perceptual properties and category structure (i.e., distribution of perceptual features within and between categories) and reliance on these correlations may help solving the mapping and generalization problems (e.g., Samuelson & Smith, 1999; Colunga & Smith, 2005).

In this work, we suggest that there is another source of statistical information that can help the learner to solve the mapping and generalization problems. It has been known for some time that statistical regularities in linguistic input are often reflected in associations between words: early in development words that co-occur in sentences and have high transitional probabilities (e.g., dog and bark) tend to be highly associated (Brown & Berko, 1960; Nelson, 1977). At the same time, associations among taxonomically related words (e.g., cat and dog) are not present until later in development. If words are associated, then presence of one word can prime the associated words.

If this is the case, then the semantic context, in which a novel word is introduced, may provide additional guidance as to what this word might mean by triggering semantic associations. For example, in a sentence “look at this dax, he is very cute”, the words *cute* and *he* could

activate properties associated with animacy, thus guiding learning of the word *dax*. Although this associative mechanism does not offer a complete solution to the mapping or generalization problems, it presents evidence that reasoning and problem solving are not necessary for word learning.

This ability to learn words from a semantic context was tested in the five experiments with 4-5 year-olds. In all these experiments participants were presented with a modified word learning task, in which a novel count noun was embedded in a list of familiar words (either nouns or adjectives). Participants were then asked to extend this novel word to either animals or artifacts. In some conditions, the words on the list were semantic associates of the word *animal*, whereas in other the words were animals, but had no forward associative strength with the word *animal*.

It was found that word learning was successful in those conditions where, according to reasoning accounts, it should fail. These results support the proposed associative mechanism of word learning, while posing problems for reasoning accounts.

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