THE JOURNAL OF THE LEARNING SCIENCES, *14*(2), 311–314

Word Learning, Intentions, and Discourse

Response by Paul Bloom
Department of Psychology
Yale University

I am very grateful to Aaron Cicourel, Penelope Brown, Max Louwerse, and Matthew Ventrura for their constructive comments. Aaron Cicourel provides a helpful summary of my book and his commentary offers a good place to enter the discussion for readers who have not yet read *How Children Learn the Meanings of Words*. Brown and Louwerse and Ventura raise some critical questions with regard to the text to which I will speak in turn.

FORMS, CONCEPTS, AND CONTEXTS

Penelope Brown and I disagree over how words are represented in the child's mind. I see learning the meaning of a word as a process of relating a form (the English word "dog", for example) to a concept (a concept of dogs). Inferences about the intentions of a speaker aid the child in establishing the form-concept mapping, but they are not part of the meaning itself. They are a means to an end. In contrast, Brown sees learning the meaning of a word, at least initially, as the process of establishing a mapping from a form to a *context* – this context includes the "speakers' intentions, previous utterances, and the activity language is embedded in." From this perspective, the speaker's intention is part of how children understand the meaning of the world. More generally, Brown suggests that word meanings are not concepts, instead they involve the appreciation of usages and practices.

This is a popular view, and many philosophers and psychologists, sympathetic to Wittgensteinian or behaviorist theories, find much appeal to it. As Brown illustrates, it makes certain strong and interesting empirical claims. In particular, this theory entails that children should start off with an understanding of a new word

Correspondence and requests for reprints should be sent to Paul Bloom, Department of Psychology, Yale University, P.O. Box 208205, New Haven, CT 06520–8205. E-mail: paul.bloom@yale.edu

that is rooted in the specific social context in which the word is used. Only after more experience with the word will children be able to make "the mental step" of mapping a word to a more general and abstract concept.

This is a perfectly coherent conception of word learning. But it does not fit the facts. As I review in Chapter 2 of my book (see also Bloom, in press), even children who are just starting to use language will extend words beyond the specific social contexts in which they have heard them. This sort of productivity shows up in both experimental and observational studies (e.g., Huttenlocher and Smiley, 1987), and it meshes well with the experience of parents. Consider what happens when a father points to an airplane and says to his daughter, with great excitement "Look, an airplane!" A usage-based theory would predict that the girl would associate the word with her fathers' excitement, or his pointing to the sky, or the experience of being outside. This does not occur. Instead she is likely to interpret the word much as an adult would—as referring to a certain kind of object—and would later have no hesitation using the word in a different context, such as commenting on a picture of an airplane in a book. Children do sometimes make mistakes but these are not because their interpretations of words are overly usage-based. On the contrary, errors often occur because children *overextend* the word, as when a child calls a grapefruit "moon," or a cat "dog."

This productive use of language poses a problem for any theory that assumes that the child's understanding of words is linked tightly with usage and practice. Instead, the data suggest that words really are mapped onto categories. For a child, the word "airplane" does not correspond to the context in which it was taught. Instead, it corresponds to the child's understanding of airplanes.

Brown's other main point concerns cross-linguistic and cross-cultural diversity. She describes the profound structural differences across languages in the ways in which morphemes are formed into words and in the sorts of meanings that words encode. She stresses that any adequate theory of word learning must apply to these languages as well. I entirely agree. Although I tried my best to incorporate research from other languages when developing my theory of word learning, it is unfortunately true that most experimental and observational studies concern the acquisition of English. There is some research on languages such as French, Spanish, Japanese, and Chinese but there is little or no data on the sorts of languages that Brown discusses. (Brown's own pioneering research on Tzeltal is an important exception to this.) My hope is that my theory can apply universally (see Bloom, 1999, 2001), but I do agree with Brown that we just do not yet know, and that any adequate theory of word learning must account for the sorts of linguistic and cultural diversity that she describes.

LSA AND VOCABULARY DEVELOPMENT

Although Brown approaches word learning from a cultural standpoint, Max Louwerse and Matthew Ventura take a computational perspective, exploring whether Latent Se-

mantic Analysis (LSA) can capture certain core facts about word learning. This is an important enterprise, particularly given the quite striking successes that LSA has had in other domains. I will restrict myself here to three comments about the limitations of LSA, and conclude with a suggestion for future research.

First, LSA is solipsistic –it makes no connection with the external world. Words are defined solely in terms of their textual relationships with other words. Because of this, LSA has nothing to say about how children make sense of actual reference. It has nothing to say, for instance, about how a child who sees his mother point and say "That's a dog" will come to understand that the word refers to that animal, as opposed to referring to a rock, or a color, or an action.

Second, LSA can only exploit information available from text. But surely most of what we know about, for instance, dogs and mortgages and love is through real-world experience. We observe dogs, we study physics, we fall in love, and we can do these things without being exposed to the words "dogs," "physics" and "love."

Third, certain biases in how we form concepts – and word meanings – cannot be captured by LSA. Children tend to generalize object names on the basis of shape, for instance, and when they form categories they tend to favor the basic-level. But neither of these phenomena can be captured by LSA, because neither is intrinsically about words. A shape bias and a basic-level bias can be demonstrated in situations in which no words are used. As discussed in my book, these are biases in how we categorize entities in the world; they apply to words only insofar as words are labels for these categories.

One temptation here is to respond to the objections above by expanding the scope of LSA so as to include the world – to treat the visual environment as a "text," say, and thereby put perceived objects and events into the co-occurrence matrix along with words. But if one does this, LSA reduces to a hard-core associationist theory of word learning, and, as I review in my book, such a theory is just not tenable.

I think the best strategy for a proponent of LSA is to choose one's battles. LSA is not going to explain how children learn that "dog" refers to dogs. It is not going to explain how they know what dogs look like, or why they take shape so seriously when categorizing objects, or why the basic-level is so primary. (And it is has nothing to say about two other issues that Louverse & Ventura raise but do not discuss: theory of mind and essentialism.)

What LSA is really about is the process of learning about words by observing their usage in linguistic contexts. This is not small potatoes. Most of the words that people come to learn are acquired this way. Literacy is how some people come to have such enormous vocabularies—around 60,000 for the average English speaking 17-year-old, much larger for some. It is an interesting question how much of this learning can be explained by LSA.

The means to begin exploring this is suggested by Louwerse and Ventura's Figure 1, where they illustrate the predicted trend of vocabulary growth according to

LSA. At first blush, this is not so promising, because Figure 1 looks nothing like the actual pattern of children's vocabulary growth (see Chapter 2 of my book for discussion). But this figure was created without any assumptions about the input. What if Louwerse and Venture used actual data about the words that children are exposed to, and used LSA to predict what sort of vocabulary growth would ensue? This might be a promising direction for future research.

REFERENCES

Bloom, P. (1999). The role of semantics in solving the bootstrapping problem. In Jackendoff, R., Bloom, P., and Wynn, K. *Language, logic, and concepts: Essays in honor of John Macnamara.* Cambridge, MA: MIT Press.

Bloom, P. (2001). Controversies in the study of word learning [Author's reply to commentary on "How children learn the meanings of words"]. *Behavioral and Brain Sciences*, *24*, 1124–1134.

Bloom, P. (in press). Myths of word learning. In D.G. Hall & S.R. Waxman (Eds.) *Weaving a lexicon*, Cambridge, MA: MIT Press

Huttenlocher, J. & Smiley, P. (1987). Early word meanings: The case of object names. *Cognitive Psychology*, *19*, 63–89.