Bilingualism: Language and Cognition 3 (1), 2000, 25–27 © 2000 Cambridge University Press

Word meanings and concepts: what do the findings from aphasia and language specificity really say?

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Pavlenko argues that contemporary models of the bilingual lexicon (e.g., Kroll & De Groot, 1997) confuse word meanings and concepts. A new approach to concepts in bilingual memory is advocated in which meanings and concepts have separate representations. "The evidence for a distinction between word meanings and concepts comes from the study of aphasia: it has been demonstrated that global and paroxysmal aphasics exhibit a complete loss of language (lack of production and comprehension) in the presence of self-regulated and communicative behavior, based on well-controlled non-linguistic conceptual representations". For example, the patients may be able to tell the difference between a cat and a dog but producing or understanding the words "cat" and "dog" is impossible. According to Pavlenko, such findings suggest that word meanings and concepts have separate representations in the brain (cf. Paradis, 1997).

In this commentary, I argue that the assumption of separate representations for meanings and concepts is not required by the aphasia data – in fact, the standard account of global aphasia and anomia does not make this distinction (e.g., Caplan, 1992). Furthermore, the findings on bilingual performance do not require the separation either. Instead, a single, conceptual level suffices and provides an even better account of the available evidence. I lay out my arguments using the WEAVER++ model of word production (Roelofs, 1992, 1993; Levelt, Roelofs, & Meyer, 1999a) but they hold for most "one-level" models in the literature. WEAVER++ is a model for monolingual word production in which conceptual representations also code word meanings. So, if Pavlenko is right, the model should have great difficulty accounting for the patient data and it should be hard to extend the model to bilingual production.

In the model, a distinction is made between conceptual preparation, lemma retrieval, and word-form encoding. During conceptual preparation, a speaker decides on the conceptual information to be verbally expressed, called the "message" concepts. In lemma retrieval, a message concept is used to retrieve a lemma from memory, which is a representation of the syntactic properties of a word, crucial for its use in sentences. For example, an English verb lemma specifies the word's syntactic class and what kind of complements the word takes. A verb lemma also contains morphosyntactic slots for the specification of tense, aspect, mood, person, and number. The slots are given values using information from the message or are set by agreement. So, it is certainly not the case that a one-level model "narrows the scope of investigation to lexicalized concepts only, making it impossible to entertain any other kind, such as grammaticized concepts (encoded morphosyntactically)" as claimed by Pavlenko. A noun lemma specifies the syntactic class, has a number slot (for count nouns), and, for languages like Dutch, French, and German, specifies the grammatical gender. Lemma retrieval makes these properties available for syntactic encoding processes. In word-form encoding, the lemma information and the morphosyntactic slot values are used to retrieve the appropriate form properties from memory in order to construct an articulatory program.

Information about words is represented in a network that is accessed by spreading activation (Roelofs, 1992, 1993). There are three major strata, corresponding to the stages of conceptual preparation, lemma retrieval, and form encoding. The conceptual stratum represents concepts as nodes in a labeled associative network, following Collins & Loftus (1975) and many others. For example, the concept DOG is represented by the node DOG(X), connected by an IS-A link to its superordinate ANIMAL(X) and by HAS and CAN links, among others, to properties such as TAIL(X) and BARK(X) and other background knowledge. Each lexical concept in the language is represented by an independent node. Of course, there are more concepts than words in a language, so lexical concepts constitute only a subset of all concepts represented. For example, DEAD BODY corresponds to a lexical concept in English, CORPSE, but DEAD TREE does not. The syntactic stratum contains lemma nodes for words (e.g., *dog*), which are connected to lexical concept nodes and to nodes for the syntactic class (e.g., noun) and other syntactic properties. Finally, there is a form stratum, which is irrelevant for now.

These claims about concepts and lexical access differ from other proposals in the literature (e.g., Bierwisch & Schreuder, 1992). These latter proposals hold that lemmas contain semantic tests that are applied to a message concept in word retrieval (see Roelofs, 1996, for a review). Thus, they make the distinction between meanings and concepts that Pavlenko advocates. It is important to be clear about the difference between the two views. In the one-level view, word meanings are a subset of the conceptual representations (which constitute one of the "languages of thought", cf. Levelt, 1989). Concepts and word meanings are represented by overlapping sets of mental tokens. Of course, the set of lexical concepts may be called "semantic" and the remainder "non-linguistic concepts" but this is not what Pavlenko means by claiming that

different *levels* of representation are involved. Impairment of such "semantic" representations would affect both thinking and language production, contrary to what is found in the aphasia data. In contrast, in the two-level view, word meanings and concepts are represented by disjoint sets of mental tokens. Typically, the same information is represented twice, once as a conceptual token (outside the mental lexicon) and once as a semantic token (part of lexical entries). Thus, impairment of the semantic representation of the word "dog" affects the production of "dog" but not thought processes involving the concept DOG.

How could a model without a separation between meanings and concepts explain the data on aphasia? In a one-level model, there is one obvious locus for impairment that is relevant here, namely concept-to-lemma connections. If these connections become impaired by brain damage, difficulties with language production and comprehension should occur but purely conceptual problems are not expected. For example, a patient should have difficulty naming a dog, but the capacity to perceptually identify the dog and to infer that it can bark should be spared. This is, of course, exactly what is observed with patients. But Pavlenko argues that the finding requires a two-level model. In conclusion, to explain the data on aphasia, one does not have to assume separate mental tokens for meanings and concepts. Since a one-level model provides a simpler account, it is to be preferred over the two-level approach that Pavlenko defends.

There are a number of important implications of this one-level view, several of which have been described by Pavlenko, but are said to require a two-level model. Most importantly, the one-level view implies effects of language on thinking (e.g., Lucy, 1996) and "thinking for speaking" because many, or perhaps even most, lexical concepts are language specific (e.g., Levelt, Roelofs, & Meyer, 1999b; Levinson, 1997; Roelofs, 1997; Slobin, 1996). That is, to the extent that languages differ in their lexical concepts, language should influence thinking and conceptual preparation of speaking should depend on the language of expression. For example, English has a word for the concept SIBLING whereas Dutch has not. This means that the node SIBLING(X) may be included in the message when speaking English but not when speaking Dutch, where a speaker has to resort to the phrase "broer of zus" ("brother or sister"). Furthermore, grammaticized concepts often need to be conceptually prepared even when the information is irrelevant for what a speaker wants to convey (cf. Levelt, 1989). For example, when it is obligatory to express tense in a language, temporal information has to be made explicit in the message even when it is irrelevant for the communicative intention. As described by Pavlenko, the empirical evidence for thinking for speaking is rapidly increasing (e.g., Levinson, 1997; Slobin, 1996). As concerns bilingualism, the context of acquisition may play an important role in determining whether, and to what extent, language-specific representations are developed. It may be that, for example, a "natural-environment" English–French bilingual acquires different lexical concepts for "chien" and "dog", whereas a "classroom" bilingual employs only one lexical concept representation for both languages. Furthermore, interactions in natural environments may supplement classroom learning by connecting lexical concepts to imagery and other background knowledge. This would account for the difference in performance between foreign-language and second-language learners discussed by Pavlenko. So, it is not the case that one-level models do "not allow us to investigate contexts where meanings and concepts are at maximal contrast, such as foreign (FL) vs. second language learning" as Pavlenko maintains.

However, whereas thinking for speaking is implied by the one-level view, it needs to be postulated in the two-level approach that Pavlenko advocates. In the one-level view, the representation SIBLING(X) is accessible for both thinking and speaking. But there is nothing in the two-level view that entails thinking for speaking. Bierwisch and Schreuder (1992) advocate the two-level view precisely because it allows for the independence of language and thinking. In this view, the language-dependent semantic representation of "sibling" is not accessible for conceptualization. Pavlenko argues that the two-level view does not imply that "conceptual representations are universally shared. Most of them – except for a few, possibly innate, universals – are linguistically and sensorily acquired and are, thus, molded by a unique configuration of linguistic, cultural and sociohistoric factors at play at a particular time in a particular speech community". In this way, the two-level view may perhaps account for thinking for speaking. But note that semantic representations do not play any role in this account. The language- and culture-specific conceptual representations do all the explanatory work. Thus, given the growing evidence for the influence of language on thinking and thinking for speaking from cross-linguistic and cross-cultural comparisons (e.g., Levinson, 1997; Lucy, 1996; Slobin, 1996), the one-level view should be preferred because it explains the data in a more principled and parsimonious way.

To conclude, Pavlenko's case for language-specific representation and processing in bilingual speakers is important, but the conclusions concerning the levels of mental representation involved are not warranted. Models without separate representations for meanings and concepts explain the aphasia data. Furthermore, they account for the findings on the influence of language on thinking and thinking for speaking obtained from monolingual speakers of different languages and from bilingual speakers.

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