New approaches to concepts in bilingual memory

ANETA PAVLENKO
Temple University

Summary

In the last decade there has been a significant surge of interest in the psycholinguistics of bilingual memory which has resulted in a number of models of the relationship between words and concepts in the bilingual lexicon. Recently, authors such as Paradis (1997) and Grosjean (1998) have pointed out that many of these models do not distinguish between the semantic and the conceptual level, and that they suffer from confusion between processing and representation.

The article that appeared in the preceding issue has two parts. In the first part, the problems that account for why our understanding of bilingual conceptual representation is not yet sufficiently advanced are examined. In the second part, more advanced and comprehensive approaches to the study of concepts in bilingual memory are proposed.

The first problem identified with the study of concepts in bilingual memory is the continuous confusion between the semantic and conceptual levels of representation. For example, equating the conceptual level with the semantic level is immediately rendered problematic by the study of aphasia, in particular, global aphasia, whereby patients exhibit language loss but preserve conceptual representations (Lecours & Joanette, 1980; Paradis, 1997). Another example comes from the study of language and cognition where conflation of word meanings and concepts narrows the scope of investigation to lexicalized concepts only, making it impossible to entertain any other kind, such as grammaticized concepts (encoded morphosyntactically) or conventionalized concepts (evident in non-verbal pragmatic behaviors). Most importantly, in the study of bilingualism, conflation of semantic and conceptual levels does not allow us to investigate contexts where meanings and concepts are at maximal contrast, such as foreign (FL) vs. second language (L2) learning and use. To illustrate this point, I discuss my own study (Pavlenko, 1997) where FL and L2 Russian learners of English were able to define the language- and culture-specific American English notions of ''privacy'' and ''personal space'', providing evidence that both groups have semantic representations of the two words. However, only L2 users whose classroom learning was supplemented by interactions in a naturalistic environment used these words in a manner similar to that of native speakers of American English. This, in turn, suggested that they were the only group that had non-linguistic mental representations (in this case, imagery and scripts) of what the concepts of privacy, personal space and their invasion may entail, and that they were able to access the concepts for the purposes of inferencing and categorization. The differentiation between semantic and conceptual levels of representation has important theoretical and methodological implications for research on the bilingual lexicon. From a theoretical point of view, it indicates that models of conceptual representation have to be based on concepts (such as linguistic and cultural specificity or animacy) and not on word properties (such as cognate status). This, in turn, will allow us to consider conceptual domains as opposed to cognates or ''translation equivalents'', and to discuss concepts encoded in grammar on a par with those encoded in the lexicon. On the other hand, having a separate level of semantic representation will allow us to pay more attention to important semantic phenomena: (1) polysemy, and (2) the distinction between core and peripheral or literal and metaphoric meanings, shown to be critical in the study of semantic transfer (Kellerman, 1986).

The second and related problem in research on bilingual memory is the scarcity of methodologies that target conceptual representation: in many cases, methodologies developed to address both semantic representation and language processing issues have also been applied to the study of concepts. I do not wish to suggest that processing and representation should be treated as fully separate phenomena: clearly, the two are linked and many psycholinguistic tasks investigate processing as based on representation. Nevertheless, the view of concepts as mental representations, assumed in this paper, suggests that some priming tasks, lexical decision tasks, release from proactive inhibition, and the Stroop test aim at

Address for correspondence
CITE Department, College of Education, Ritter Hall, Temple University, Philadelphia, PA 19122
E-mail: apavlenk@astro.ocis.temple.edu

https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

lexical processing and – partially – semantic representation but do not provide much information about conceptual representation (also see Grosjean, 1998, 143). Picture naming, word association, word translation and semantic differential tasks are seen as accessing a semantic level, but only a narrowly defined conceptual one. I suggest that in order to fully access conceptual representations in bilingual speakers, we should supplement the tasks mentioned above with methodologies developed uniquely for this purpose in the fields of cognitive linguistics and linguistic anthropology. A number of recent studies have demonstrated that the best access to conceptual representation is offered through a carefully coordinated investigation of contextualized language use (such as elicited language production or role play) and non-linguistic behaviors (such as object categorization) of the populations in question (Lucy, 1992a, b, 1996; Becker & Carroll, 1997; Pederson, Danziger, Wilkins, Levinson, Kita & Senft, 1998).

The third problem linked to our limited understanding of bilingual conceptual representation is the implicit assumption of the static nature of the bilingual's conceptual store. Following Weinreich (1953) and Ervin & Osgood (1954), many researchers present conceptual stores as static "black boxes" and focus on linguistic but not conceptual development. The whole discussion of "one or two stores" is predicated on this misguided assumption of immutable and unchangeable conceptual stores, whereby the question "one or two?" can be answered once and for all. I argue for the view of concepts as dynamic and subject to change in language contact situations. With regard to theory, this view enables us to create not just a "point-in-time state" but also developmental models of the interaction between linguistic and conceptual knowledge, while with regard to methodology it forces us to pay close attention to context of acquisition, degree of biculturalism and patterns of language use. As pointed out by Grosjean (1998), our findings may differ significantly based on our bilinguals' history of language learning and use: in diglossic contexts, speakers' linguistic and conceptual knowledge may be limited to particular – and different – domains in each language. In future studies, we may also consider looking at concepts diachronically and not just synchronically and engage in longitudinal studies of conceptual interaction and development in various types of bi- and multilingualism.

The fourth problem identified with current research on concepts in bilingual memory is the lack of any but superficial acknowledgment of the linguistic and cultural specificity of conceptual representations. Recent research in linguistic anthropology and cognitive linguistics, inspired by the renewed interest in linguistic relativity, often referred to as the Sapir and Whorf hypothesis, demonstrates a wide range of cross-linguistic and cross-cultural differences in conceptual representation and categorization of abstract notions as well as concrete objects (Lucy, 1992a, b, 1996; Pederson, Danziger, Wilkins, Levinson, Kita & Senft, 1998). The view that lexicalized and grammaticized concepts are both language- and culture-specific has important implications for the modeling of bilingual memory. Theory-wise, the specificity must be reflected both at the semantic level and at the conceptual level. Methodology-wise, the field will benefit significantly from taking degrees of acculturation and biculturalism into consideration and distinguishing between – however proficient and fluent – language learners engaged in decontextualized classroom learning and bilinguals who use their two languages in their everyday lives and often in different cultures (Pavlenko, 1997). Consequently, the implicitly monolingual idealized models of the interaction between two languages/conceptual systems should be balanced by models reflecting degrees and aspects of this interaction in the minds of various types of bilinguals.

In the second part of the article, I discuss new approaches to the study of concepts in bilingual memory which take into consideration the factors discussed above. These approaches are based on Paradis' (1997) three-level model, with the difference that I also include grammaticized concepts in a model of bilingual memory. In this view, a *lexicalized* concept consists of the following components:

- *a lexical component*: a word form with its phonological and morphosyntactic properties, which is usually stored in the language areas of the left cerebral hemisphere;
- *a semantic component*: explicitly available information, which relates the word to other words, idioms and conventionalized expressions in the language; it is characterized by polysemy; this part is encoded in the hippocampus and anatomically related structures in the medial temporal lobe and diencephalon *(explicit* or *declarative* memory); it is vulnerable to aphasia;
- *a conceptual component*: non-linguistic multimodal information, which includes imagery, schemas, motor programs, auditory, tactile and somatosensory representations, based on experiential world knowledge; it is generally stored in various brain systems outside of the medial temporal lobe and diencephalon (*implicit* or *non-declarative* memory) and is not vulnerable to aphasia.

https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

Taking this model as a point of departure, a first suggestion that I make is that a possible theoretically and empirically informed way to study conceptual representations in a particular conceptual domain of a group of bilingual participants could combine two notions that have already proved useful in research on conceptual structure and development: *concept comparability* (comparable vs. language-specific concepts) and *concept encoding* (lexicalized vs. grammaticized concepts). Language-comparable concepts share a common core and – in the case of the grammaticized concepts – mark some of the same contrasts; judgments about their similarity are based on the number of shared features or contrasts. For example, according to Slobin (1996), comparable but not identical grammaticized concepts include aspect in English vs. Spanish. While both languages mark durativity, Spanish also makes a contrast between perfective and imperfective aspect, marking punctual or completed outcomes. Language-specific lexicalized concepts delineate notions salient and important in a particular speech community which may not be shared by other communities (such as the Anglo concept of privacy). Language-specific grammaticized concepts mark contrasts that may go structurally unmarked in some other languages such as definiteness/indefiniteness, encoded in the English determiner system but not in Russian, or distinct marking of witnessed and non-witnessed events as encoded in Turkish past-tense inflections – but not in German or English (Slobin, 1996). My own research (Pavlenko, 1997) indicates that within a particular domain, the distinction between language-specific and comparable concepts is a useful one: due to the lack of competition, language-specific concepts may be easier to internalize and operate with, but harder to translate. These concepts need to be reflected in future models, which should differentiate between comparable concepts (often leading to transfer) and language-specific concepts (which may be acquired and represented in the memory very early in the process). In the future it may also be informative to look into the outcomes of different ways of linguistically encoding otherwise comparable concepts. What happens when a concept lexicalized in one language is grammaticized in the other? And what about if a concept that is a noun in one language is encoded in another as a verb or a particle? Becker & Carroll (1997) suggest that in L2 learning this distinction may be overriden by concept comparability.

My second suggestion is that concepts may interact with each other in a number of ways depending on their way of encoding and their comparability, as well as on the speaker's learning history. The lack of such interaction would be exhibited either as *coexistence* of two conceptual domains, which are oftentimes drawn upon in different contexts or, in the case of a single L1-based conceptual system, as *L1 conceptual transfer*. The interaction of two languages and cultures may result in *conceptual change*, exhibited as one or more of the following processes, which may take place – at times independently and simultaneously – in one or more conceptual domains:

- *internalization* of new concepts;
- *shift* from an L1 to an L2 conceptual domain which may be evidenced as a shift of category prototypes or category boundaries;
- *convergence*, whereby a unitary domain is created, distinct from both L1 and L2;
- *restructuring*, whereby new elements are incorporated in previously existing concepts;
- *attrition* of previously learned concepts not relevant for one's daily interactions; this can often be accompanied by *substitution* of the previous concepts by the new ones.

I also posit six constraints on the development and use of bilinguals' conceptual representations, which may be subdivided into three clusters:

- *individual* factors (bilinguals' language learning history; language dominance and/or proficiency; degree of biculturalism and/or acculturation);
- *interactional* factors (domains of language use; contexts of language interaction);
- *linguistic and psycholinguistic* factors (type of encoding and concept comparability).

In sum, I argue that in the study of bilingualism, conceptual representations should be treated as related but not equivalent to word meanings, as knowledge-based, dynamic and language- and culture-specific. While some concepts may overlap partially or even completely between any two languages/cultures in question, any claim of correspondence requires evidence and cannot be implicitly assumed. It is my hope that future studies will support, extend or modify these suggestions and result in multiple models which can account for a variety of interactions between linguistic and conceptual systems in bilingual minds.

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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

PEER COMMENTARIES

Language, concepts and culture: old wine in new bottles?

RENÉ APPEL
Faculty of Humanities, University of Amsterdam, Spuistraat 210, 1012 VT Amsterdam, The Netherlands
E-mail: r.appel@hum.uva.nl

In *New approaches to concepts in bilingual memory* Aneta Pavlenko argues convincingly that in the main body of research on the mental bilingual lexicon, semantic and conceptual levels are conflated, while they should be considered as different levels of representation. One of the consequences of this approach, which characterizes work of researchers like Annette de Groot and Judith Kroll, is that word meaning (the semantic level) dominates at the cost of the conceptual level. Disregarding the conceptual level, in turn, leads to disregarding culture and cultural differences which might be associated with language differences. The ultimate consequence is that the social and cultural context of bilingualism is also neglected, resulting in a reduced view of bilingualism.

Pavlenko assumes that this approach is influenced by trends in linguistics and cognitive psychology. She writes that "[i]n the best tradition of monolingual Chomskian linguistics, languages were reduced to interchangeable codes linked to presumably language-independent – but in reality English-based – concepts. The fields of linguistics and psychology, dominated by generative and cognitive approaches to language, shifted the focus of attention away from the initial questioning of the relation between language, culture and thought to issues of language processing." In my opinion, this is only partly true. The rise of Chomskian linguistics was paralleled by the rise of sociolinguistics, as can be seen in the work of linguists like John Gumperz, Dell Hymes and William Labov. Still a sociolinguistic view on the bilingual lexicon is largely absent. The reason for this has to do with methodology. The methodological demands on scientific research have become much stronger in the last few decades, especially in the fields of psychology and psycholinguistics. Researchers opt for highly controlled situations, often in laboratory settings, in order to collect enough data for sophisticated statistical procedures and to promote the reliability of their results. Social and cultural factors which are important in the acquisition of bilingualism and in the actual use of the bilingual's languages are seen as interfering variables.

However, as many researchers realize, increasing reliability generally means decreasing validity, especially content validity. Research on the bilingual lexicon does not really give any insight into the content and the functioning of the bilingual lexicon, only into the performance of a selected group of bilinguals (in most cases with English as one of the languages involved) on highly artificial tasks in a laboratory setting which has nothing to do with real-life contexts for speaking and listening. I know of one study conducted in the Netherlands in which a group of Turkish–Dutch bilinguals (with only limited education, unlike the often used first-year university students) performed more or less randomly on one of these artificial tasks. The results were never published, because these bilinguals did not fit nicely into the experimental format. To summarize: a restricted or narrow view of the bilingual lexicon, as exemplified in the work of De Groot and Kroll, among many others, originates more in (often implicit) methodological than in theoretical considerations.

Psycholinguistic research encompasses much more than research on the bilingual lexicon. In other fields, the conceptual level is not neglected. In most studies on language production, the existence of a conceptual level is fully acknowledged. For instance the title of an article by Manfred Bierwisch and Robert Schreuder in Levelt (1991) is *From concepts to lexical items*. I think this title speaks for itself. Aitchison (1987, 41) also deals with concepts and words:

> People argue as to whether there is an abstract layer of concepts which is separate from word meaning or whether the word meanings and the concepts are identical . . . In this book we will assume, first, that people translate the real world into "concepts" . . . Second we will treat the "meaning" of a word as overlapping with the concept to a large extent, though not necessarily totally: the overall concept may extend beyond the sections labelled with a word.

In much of the psycholinguistic literature, the nature or mental status of the notion of "concept" is never very clear, and unfortunately, on this point, Pavlenko also seems to have problems. Probably everybody has a common sense idea of what concepts are, but common sense is often not enough in order to do sound scientific research, especially if one wants to gain insight into culturally differentiated concepts, related to different languages.

Pavlenko states again and again that the semantic level and the conceptual level should be distinguished. Her own paper can be seen as a kind of test: is it always possible to differentiate between these levels? For instance, Pavlenko writes about "the conceptual transfer from L1 to L2". How can conceptual transfer take place from one *language* to the other? In Pavlenko's view it should be transfer from Conceptual System 1 to Conceptual System 2, both systems probably partly associated with different languages. She also writes that "some concepts will belong to one language . . . and others to the other". But if Pavlenko is consistent then concepts never "belong" to a language. They are part of a conceptual system, and this system can be culturally differentiated. To substantiate her claims, Pavlenko also summarizes the results of a study by Jaspaert and Kroon

https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

(1992) on the Dutch language proficiency of an 83-year-old man who was born in the Netherlands, but who has lived in the USA for over 60 years. His (written) Dutch was influenced by English. He used many loan words, loan shifts and loan translations: "The authors explained these items as adaptation of the semantic and conceptual structure of the informant's lexicon to the semantic and conceptual structure of people he interacted with on a daily basis" (i.e. people in the USA). Here again the semantic and the conceptual level are mixed up. What is the "conceptual structure of the lexicon"? Furthermore, one of Pavlenko's examples in this case is the use by the informant of the Dutch word *oproepen*, a more or less literal translation of *to call up* in place of the Dutch word *opbellen* ("to telephone"; the Dutch word *oproepen* means "to summon"). The question is: What is the relation between a loanshift like this one and conceptual structure? Is it the differences that exist in the Dutch and the American culture with respect to the telephone or to the way people talk about telephones and the act of calling somebody? Pavlenko tries to find evidence to support the assumed difference between the semantic and the conceptual level, but by doing it in the way described above, she undermines her own position.

Culture is an important notion in Pavlenko's contribution, and of course bilingualism should indeed be studied in a social and cultural context and not in a social and cultural vacuum. Concepts are partly shaped by cultural experiences and social norms. For instance, the concept of "dog" is quite different for Arabic people, in general, and for West-Europeans. For most Arabic people, a dog is an unclean animal, while for most (or many) West-Europeans a dog is a domestic animal and even "man's best friend". This seems to be a clear case. However, in West-European countries one can also find people who hate dogs, who think that dogs are dirty animals or who perhaps hold the opinion that dogs are "man's worst enemy". Are they still part of something which we can call "West-European culture"? Another example: music. Many young people will associate this word with music styles like *hip hop*, *trance* and *drum and bass*, while other (often older) people will have Bach, Beethoven and Mozart in their minds when thinking about "music". The conclusion must be that they don't have the same concept for "music". Do they then belong to different cultures? Pavlenko seems to have a monolithic view of culture such as Russian versus American culture (leading to different concepts) but that is a gross simplification.

According to Pavlenko, more research is what we need. To illustrate her plea for a new approach in the study of concepts in bilingualism she quotes from Eva Hoffman's (1989) *Lost in translation: a life in a new language*: "The words I learn now don't stand in the same unquestioned way they did in my native tongue. 'River' in Polish was a vital sound, energized with the essence of riverhood, of my rivers, of being immersed in rivers. 'River' in English is cold – a word without an aura." In a subjective, personal way this might be an interesting view, but it can hardly be used for the empirical validation of claims about culturally differentiated conceptual levels. Are Eva Hoffmann's associations the same as those of other English–Polish bilinguals? What does it mean to be "immersed in rivers"? What is a cold word, "a word without an aura"? What is a word *with* an aura? Hoffmann's feelings about the word (or the concept?) "river" raise more questions than they give answers.

Pavlenko also summarizes some older studies, especially the famous studies done by Susan Ervin-Tripp. It is strange that Pavlenko does not refer to work by Szalay and his associates, for instance *Subjective meaning and culture: an assessment through word associations* (Szalay & Deese, 1978). They used word association tasks and they point to differences in "subjective meaning" (in "concepts", Pavlenko would probably say) relating to cultural differences. Based on these results (and those of Ervin-Tripp in studies done in the 1960s) and on Pavlenko's research proposals, I come away rather disappointed. The "new approaches" promised by Pavlenko do not seem that new; instead they look very much like Ervin-Tripp and Szalay (and others) revisited: old wine in new bottles.

The main merit of Pavlenko's contribution is that she thoroughly criticizes the reductionist paradigm in the study of the bilingual lexicon, even though researchers in the field would perhaps state that they are not interested in the conceptual level, or the mental encyclopaedia. They have used the term "concept" as a synonym for "semantic meaning" or "word meaning", and their claims concern the storage, retrieval and meaning of words in bilinguals, and not concepts as the term is used by Pavlenko. I empathize fully with Pavlenko's proposal for the socially and culturally contextualized study of bilingualism. If I have understood her well, she proposes a model in which culture shapes (or influences) conceptualizations, and concepts influence word meanings. But if we do not really know how culture is to be defined (or conceptualized; the use of this word in this context might be confusing), if we do not really know how to understand the notion of "concept", and if we do not know how to study these relations in a new, fruitful way, then Pavlenko's approach will not shed much light on the complex relation between language, culture and concepts.

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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

On the source and nature of semantic and conceptual knowledge

ANNETTE M. B. DE GROOT
Department of Psychology, University of Amsterdam, Roetersstraat 15, 1018 WB Amsterdam, The Netherlands
E-mail: pn_groot@macmail.psy.uva.nl

As one of the representatives of the research community practicing the "old" approach to concepts in bilingual memory I may be expected to disagree with and oppose many of the components of the "new" approach proposed by Aneta Pavlenko. Yet I find myself agreeing with many of her views regarding the nature of bilingual memory. Two of these concern the changing nature and the culture specificity of the contents of conceptual memory.

Maybe excepting the occasional human being who is willfully deprived of an experientially rich environment by malicious relatives (Curtiss, 1977) and also excepting multiply sensorily handicapped people, all of us are gaining new experiences continuously and at a rapid pace in an ever-changing world. Each of these new experiences leaves its trace in memory, enriching our knowledge base. On the other hand, memory traces of long-past experiences that are not reactivated once in a while will become weaker over time, and, consequently, the knowledge stored in them will gradually become inaccessible. These two processes, learning and forgetting, will cause the content of conceptual memory to evolve constantly, both adding new concepts to memory and changing the content of others. In other words, our conceptual memory store is indeed dynamic, as Pavlenko suggests it is, and any model of memory, monolingual or bilingual, that suggests it to be static is implausible and likely to be flawed. Unlike Pavlenko I believe the representative models of the old approach to bilingual memory do not necessarily presuppose static representations, but, focussing on other aspects of representation and processing, most of them are simply not explicit about the dynamics of conceptual representation. My own work on distributed bilingual conceptual memory (De Groot, 1992) is an exception in that I *did* discuss conceptual change, especially Barsalou's views on this process (e.g., Barsalou, 1987). That I did do so was a direct consequence of the primary purpose of that article, that is to zoom in on conceptual memory and reveal its contents. A discussion of conceptual change is not opportune when, instead, the goal of an investigation is to become informed on the overall architecture of the memory system of a particular type of bilingual and on the process of access to conceptual memory that ensues from this architecture – as was the purpose of many other studies instantiating the old approach (e.g., Kroll & Stewart, 1994; Potter, So, Von Eckardt, & Feldman, 1984).

The content of conceptual memory will vary between individuals because (1) experience underlies it and (2) the summed total of an individual's experiences constitutes a set of experiences unique to that particular individual. This holds for individuals belonging to one and the same cultural group, but even more so for members of different cultures, because obviously the latter share fewer experiences than do members of the same cultural group. The following example illustrates the notion of culture-specific experience and how it causes cross-cultural diversity in conceptual representation. Due to the culture-specificity of Chinese tea ceremonies, Spanish bullfights and North American Thanksgiving celebrations, and the resulting differential experience of the Chinese, the Spaniards and the North Americans with these events, the concepts for the words "tea ceremony", "bullfight", and "Thanksgiving" will differ substantially between the speakers of these three languages. It is likely, for example, that a turkey features as the focal object around which all festivities revolve only in North Americans' conceptual representation of "Thanksgiving". For newcomers to North America the concept of "Thanksgiving" will develop over a series of Thanksgiving experiences towards one that includes the focal turkey. Thus indeed, as Pavlenko suggests, conceptual representations will often be culture specific, and a particular conceptual representation of a bilingual (here, the "Thanksgiving" concept) will shift over time (experience) from L1 to L2 in a culture where L2 is the dominant language. Again I doubt that many (if any) representatives of the old approach to conceptual memory would want to refute the view that conceptual representation differs between individuals, and especially between individuals who do not share one and the same culture. The reason that it is not often discussed explicitly in that line of work presumably is, again, that the content of conceptual representations was not the research issue addressed in those studies.

Two of the problems that Pavlenko associates with the old approach, namely, the assumption of conceptual memory as a static knowledge store and the denial of the language- and culture-specific nature of concepts, may thus, in fact, be red herrings. A third point of critique that she raises is that the representatives of the old approach do not distinguish between semantic and conceptual memory representations but that they conflate them instead. This point certainly holds. In fact, the authors of some of the papers to which the critique applies acknowledge themselves that not distinguishing the two types of memory representation may turn out to be an omission. The reason they nevertheless opt for the simpler model is that their data do not force them to distinguish between semantic and conceptual memory. To make the distinction without substantiating the existence of both types of representation with data would be little more than paying lip service to the more complete models.

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But there may also be a reluctance to separate out semantic and conceptual representation for more principled reasons such as that it turns out to be a tedious task to actually define the crucial difference between the two types of representation, and especially, to pinpoint the essence of a semantic representation. As pointed out above, the content of conceptual representations is built up from experiences, where the term "experiences" covers interactions of individuals with their external environment as well as internal thought processes that may lead to new knowledge. Each experience leaves a trace in memory. Depending on the type of memory assumed, non-associative or associative, the new experience is always stored in a new trace, independent from other traces, or the place of storage depends on whether the experience is a new one or repeats (to a large extent) an earlier one. In the latter case the information in the new experience is stored with the trace of the earlier, similar, experience.

If experiences provide the building material of conceptual representations, what then is the stuff semantic representations are made of? It has been proposed that they contain the linguistic meaning specific to a word, a solution that just shunts the problem to the next, which is to define what that linguistic meaning actually is. The assumption that a word's linguistic meaning consists of the subset of its semantic features that jointly define the word is not tenable for the simple reason that a satisfactory definition – one that includes all members of the category the word refers to, at the same time excluding all non-members – can be provided for very few words only. What exactly semantic representations consist of, if they exist at all, thus remains unclear.

More consensus exists regarding the *origin* of semantic representations. The dominant view is that whatever information there is is abstracted from all of an individual's experiences with the words concerned. Ultimately then, experience may underlie both conceptual and semantic representations. This awareness can easily be taken as a first step to conflating the two types of memory representation. The temptation to do so becomes stronger when one gets acquainted with Hintzman's (1986) view on concept representation. This author proposes an extreme version of the view that abstract concepts (say the "bird" concept) are represented in terms of a number of its concrete exemplars (e.g. "sparrow", "robin" and "starling"; see Smith & Medin, 1981). Hintzman's version of this idea is that abstract knowledge (i.e. semantic representation) does not reside permanently in memory, nor does it exist separately from conceptual knowledge. His is an experientially based approach, where memory consists solely of the traces left by our past experiences. Individual traces represent a set of "primitive" features of the experience that it stores (like colour and smell). Every single one of our experiences with a particular example of a conceptual category imprints such a trace in memory, and the complete set of traces that represent encounters with exemplars of that category is regarded as the representation of the category. The important point to stress is that such a representational system no longer distinguishes between experience-based (episodic) knowledge and semantic knowledge that is abstracted from individual experiences.

But where then does our abstract, semantic knowledge come from if it is not separately represented in the memory system? How can we perform simple tasks such as trying to describe what a "flower" is, or what the word "love" means? According to Hintzman, a test stimulus, say the word "love", communicates simultaneously with all memory traces, activating those that contain information that corresponds to the stimulus. In other words, all traces that store the word "love" are activated by the stimulus "love". The common information in these traces, that is, those parts of the activated traces that represent "love", are foregrounded and, conversely, the information not shared by a substantial number of the activated traces (the trace-specific information) is pushed into the background. Only the foregrounded information, which constitutes an abstraction of the information on the activated traces, enters consciousness, enabling a response to a question of what "love" means. In other words, abstract, semantic knowledge is not represented as permanent knowledge structures in the memory system, but emerges from the cooperation of sets of traces following the presentation of a stimulus. Gone is the difference between semantic and conceptual memory; what remains are experience-based memory traces and nothing else.

Hintzman's (1986) model provides a parsimonious alternative to the hybrid memory models that distinguish between conceptual and semantic memory. Ultimately, its tenability will depend on how irrefutable the assumed support for the hybrid models turns out to be. Pavlenko describes a number of sources of support for the latter, most importantly, the dissociation patterns observed in aphasics. What I picked up from these sections was that representations of lexical forms clearly must be distinguished from semantic/conceptual representations. However, I found myself struggling with the arguments in defense of a position that semantic representations should be distinguished from conceptual representations. An unambiguous "definition" of what constitutes the content of either memory store – a semantic memory store or a conceptual memory store – should be available in order to be sure that the former, and not the latter, is affected in a particular aphasic person, or vice versa in another aphasic person. At the same time, this would provide the evidence that indeed the two types of knowledge reside in memory. And this is exactly what seems to be missing, as was argued above.

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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

Bilingual minds

SUSAN ERVIN-TRIPP
Psychology Department, 3210 Tolman, University of California, Berkeley, Berkeley, CA 94720–1650, USA
E-mail: ervintrp@socrates.berkeley.edu

The extensive paper by Aneta Pavlenko is so rich with important ideas that it is possible to address only a few of them. She identifies a number of major problems in the field. I have attributed my own distress, even boredom, with much work on bilingual cognition to the small size of the overlap set of three areas of knowledge: experimental psycholinguistics, realistic experience of the ethnographic and sociolinguistic setting of bilingualism and of the variations in bilingual histories, and enough linguistics to make a richer exploration of the relation of language to memory possible than just studying lexicon. This is a field calling for multi-disciplinary experience.

The centerpiece of Pavlenko's analysis is the contrast between the semantic and conceptual levels of analysis. The term "semantic" has at least two other meanings, leading to some possible confusion. The term is used in cognitive research to contrast "semantic" memory with episodic memory. It was used in yet another contrast in linguistics and psycholinguistics, as stated clearly by Charles Morris (1938), in regard to sign systems, differentiating between sign–sign relations (e.g. syntax, word associations), sign–behavior relations (pragmatics), and sign–signified relations (semantics). In this usage, semantic was the aspect of language having to do with designation. In the contrast set taken up by Pavlenko, the term shifts slightly again, to one within the conceptual area. The semantic subset is of concepts indexed by lexical or grammatical contrasts, the residue concepts including images, sensory memories, and emotions. While at the extremes this contrast seems clear enough, the boundary is surely fuzzy and there must be considerable individual variation. What is stored as semantic involves regularities in experience at the time language forms are used, and surely that varies a good deal. Thus, looking at semantics from concepts narrows its size; looking at it from language enlarges it because of the broad reach of linguistic correlations with meanings.

We know that children are capable of observing statistical correspondences between contextual features and forms. Andersen (Andersen, Brizeula, DuPuy & Gonnerman, 1999), for example, has shown that children in role-play in several languages use *well* more frequently in high status roles like doctor and teacher, so it appears to index status in some way for them. Shall we consider social status a semantic feature of *well*?

These correspondences may include verbal contexts which create associations, social features of the context of use, emotions at the time linguistic forms are heard, even features of users. Lambert's matched guise test (Lambert, Anisfeld & Yeni-Komshian, 1965) has identified a contrast between conscious attitudes and judgments about the forms or accents of speakers. These kinds of associations are sometimes called connotative meaning. They are important features of meaning which affect oratory and poetry, but would not be included in this use of the term semantic. Yet they can be measurably consistent, and they are language-related, so they seem to be in some middle ground.

The contrast between semantic and conceptual re-aligns an earlier contrast between verbal and non-verbal. In the 1950s, when the field called psycholinguistics was new, many behaviorist experimental psychologists made responses a key component. Osgood's Hullian approach, for instance, was just one remove from Skinnerian operant conditioning, with a construct called a "mediating response" that could involve any kind of association between mental "responses", such as associations between images, between kinesthetic responses and motoric impulses, between sounds, and so on. Word associations were a popular way to tap into the lexical, verbal part of this network. There was also considerable research by experimenters on adult non-verbal processes, studies of images, studies of skills, studies of classes, using methods like sorting, grouping, drawing, recognizing, and transfer of training.

The contrast between verbal and non-verbal response modalities also affected research on the relation of "language and thought". In the Southwest Project in Comparative Psycholinguistics in the mid-1950s, John B. Carroll and Joseph Casagrande put Whorfian theory to the test on Navaho children (Carroll & Casagrande, 1958). They reasoned that Whorf's theory that covert or overt language categories can have an influence on thought can only be tested by using non-verbal means to assess thought. In the Carroll–Casagrande studies, yellow and blue cubes and sticks were given to young children to sort. Typically, children sort by color at the youngest ages. Navahos were chosen for this study because the Navaho verb stem is different for "it's there" and for verbs of handling, depending on the momentary shape of the object involved – flat flexible, long rigid, chunky, piecemeal and so on. Of course these are very frequent verbs in here-and-now interaction with children. What this study showed was that Navaho children in the reservation area sorted earlier by form if they spoke Navaho; at the same age, also on or near the reservation, their English monolingual cousins sorted by color. In two other urban samples it was shown that middle-class English speaking children who are likely to play with geometric painted blocks sort by form earlier than Harlem children (Casagrande in Fishman, 1960, p. 335 n.4). Thus the semantics of the Navaho verb system has an effect similar to another form of stimulation in early learning to attend to form in non-verbal situations.

https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

There was a large body of research on whether "verbal mediation" altered what appeared on the surface to be non-verbal performance – on non-verbal intelligence measures, for example. If one is shown a color chip, and asked to remember it for hours, for later recognition, does internal naming and rehearsal of the name occur, even if it does not occur in a simultaneous matching task with no or a short time delay? Efforts were made to find indicators of this mediation, such as a bilingual color naming study and a bilingual memory study, with complex results relying on mediation and naming response times (Ervin, 1961a, b). Current cognitive theories are organized not around response modalities but around representation and locus of activation, as a result, in part, of research on brain imaging.

Research on bilingual memory has been primarily attentive to the lexicon. Since language is rarely encountered in the form of single words, the lexical research focus appears to be a residue of the long history of memory research with syllables on tachistoscopes, and to be influenced by psychologists' desire to simplify. In addition, for many years, word associations were a major way of accessing contrasts in meaning. Yet memories do not usually occur in isolated lexical form either, and a serious program of research on bilingual memory which has a claim to ecological validity will need to go beyond this mode of study. Pavlenko's film narrative method is one approach; one could also address syntactic issues in such data. The contrasts in bilingual syntax raise important cognitive questions. Slobin's recent work on the effect of typologically varying verb types is a good example of a study of syntax and memory (Slobin, in press).

We need a model capable of dealing with natural discourse. The recent flowering of studies of code-switching (Milroy & Muysken,1995; Myers-Scotton, 1992; Poplack, 1981) clearly needs to be linked with the issues in bilingual cognition, since switching involves both lexical access and processing issues and memory. Pavlenko alludes to a related topic when she points out that the ethnic location in which talk occurs can shift recall and alter what is said. In my view, code-switching is the mirror image of content shift when output language is constrained. Code-switching commonly occurs in dialogue, where the complexity of types of meanings is most evident, whether in ideational reference, action inferences, social indexing, or emotional associations. All of these aspects of meaning are potentially different in organization in each language, and are at issue when accessed during code-switching, or during recall of dialogue. It is encouraging that Pavlenko is including in her assessment of concepts the analysis of films, since larger discourse is data in such a study.

On the topic of bilingual culture, Pavlenko rightly points out that bilinguals are not just a combination in one body of two monolinguals. The environment of bilinguals varies depending on their isolation or participation in a bilingual community. An immigrant may be in a disadvantaged minority as an immigrant; his social status has shifted so he is not what he was before. Even in the families in which bilingual children hear the first language of their parents, this shift is going on through time in all the ways that Pavlenko describes. Such a family may be undergoing shifts of meaning of the first language, and beginning to use a second language in the home. American Nisei have not learned Japanese speech etiquette and are seen as rude in Japan, and American Lebanese may lack classical Arabic allusions for formal situations. Sociological research on immigrant communities typically finds that social change in the source country has distanced the immigrants from those in their homeland, as they develop their own local culture. For this reason, we cannot expect to find a simple match between bilingual and monolingual cognitive or semantic features – even though we try.

Some of these differences are quite particular. I found that the connotative evaluation of doctors though high by both monolingual groups, was low by Navaho bilinguals. The bilinguals had silently overheard and understood the derogatory jokes by the medical staff. Bilinguals have a different access to experience; they can observe in more than one community, so we cannot expect their concepts to be matched to monolinguals at all times.

Pavlenko rightly points out that the particular concepts of childhood, the smells and tastes of an infant, cannot be acquired by an adult in a new culture because experience is different for an adult. But I did notice that the women who had raised children in a different society (in the era of stay-at-home mothers) had to some degree identified with their children enough to have a deeper cultural experience than the adults without this experience. This possibility of vicarious socialization to new concepts merits investigation.

Finally, a few words on concept types. Hues are sensory, can be compared when being named, and are on continua. Because they are available to immediate perception, there are many tasks involving comparison, sorting, and short-term memory which may very well not call upon semantic categories at all. If we compare emotions, sounds, motions, and scenes, we will find different conceptual properties, which affect both the ease of semantic organization and mapping, and the organization of concepts in memory. The dimensions or types of concepts are going to affect their history of change, convergence, and so on. So it will be necessary to go beyond a few easy and favorite types in order to explore bilingual memory more fully. It is reassuring to see these issues once more being taken up and that there is at last the prospect of full exploration.

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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

Clarifying the cognitive experimental approach to bilingual research

WENDY S. FRANCIS
Department of Psychology, University of Texas at El Paso, 500 W. University, El Paso, TX 79968, USA
E-mail: wfrancis@miners.utep.edu

In her article, Pavlenko has raised a number of important issues for bilingual research. My comments are limited to a subset of the issues of particular relevance to cognitive psychology. First, I discuss the use of developmental models, the relevance of the concept "culture", and the impact of cross-language typicality differences on cognitive tasks. Second, I evaluate the necessity of a distinction between semantic and conceptual representations. Finally, I discuss distinctions among types of research that are often confused.

As Pavlenko correctly argues, developmental models of bilingual language acquisition are likely to be important in the future of bilingual research, because they allow for changes in representation with learning. While cognitive psychologists have studied extensively the organization of bilingual lexical and semantic representation in proficient bilinguals, we have paid far less attention to how the representation got to that point (with the notable exception of Kroll's Revised Hierarchical Model, e.g., Dufour & Kroll, 1995). What does it mean cognitively for a person to go from being monolingual to being bilingual? It is difficult to say at this time, because the data on appropriate cognitive tasks across different levels of learning are sparse. There are very few cross-sectional studies of bilinguals at several different stages of language acquisition (notable exceptions being Mägiste, 1992; Chen, 1990). And longitudinal studies of bilingual language acquisition, as far as I know, are non-existent among researchers taking a cognitive approach, except for a handful of short-term training studies (e.g., Chen, 1990). Therefore, the existing data are insufficient to provide empirical support to build a more comprehensive model of bilingual language development.

There is a large body of developmental or second language acquisition research that *does* describe the patterns of language performance exhibited by second language learners at different levels of proficiency, at different ages, and in different situations. However, they shed virtually no light on the cognitive processes underlying the observed effects. For example, many studies have been interpreted as supporting a critical period for language learning, even at times alluding to biological constraints, yet not one that I know of attempts to explain what cognitive processes or mechanisms might be relatively problematic for older learners. Without a cognitive mechanism for the differences observed, it seems premature to conclude that the differences observed are purely maturational.

Pavlenko argues also that cognitive psychologists tend to ignore the potential influences of culture on cognition and language representation. As with other known effects of non-cognitive variables on cognition, like the effects of emotion on memory, we conduct our studies as if those variables did not exist, relying on random assignment or on keeping such variables constant across conditions. The reason that these variables are ignored is not because we do not believe they exist, but because it is very difficult to define culture and measure it, let alone manipulate it in an experiment. In the experimental tradition, such variables are difficult to accommodate and come under heavy criticism because of disagreement on how to measure them and the inability to draw causal conclusions. For the same reasons, even using language proficiency as a variable (something I do advocate and practice) tends to put the bilingual research outside the mainstream of cognitive psychology.

In spite of my own reluctance to introduce culture *per se* as a variable in my research on bilingual language processing, there is a possibility that if an appropriate measure could be agreed upon, it could become more useful. Awareness of culture ought to be present in thinking about bilingualism and in constructing appropriate experimental materials, but what is an appropriate operational definition for culture? Culture appears to be a catch-all term to explain all unmeasured differences among people with different ways of life and different belief systems. Determining the underlying components of culture that are relevant to language organization may be of more interest. Related to these components are the questions that researchers typically ask bilingual participants in screening or language background questionnaires. Most cognitive bilingual researchers do collect such measures even if the intention is merely to report summary statistics on a subset of the variables. Perhaps we should look more closely at how these variables are associated with the experimental outcomes.

Pavlenko reminds us that across different cultures we should expect to find differences in category member typicality. In fact, typicality of category members can differ substantially even among geographic regions within a single monolingual country (Battig & Montague, 1969), probably because of differences in animal life, vegetation, weather, etc. However, differences in typicality do not necessarily compromise cognitive research, as long as appropriate experimental controls are used. To illustrate, Pavlenko criticizes the Caramazza and Brones (1980) study on the grounds that they assumed that Rosch's typicality norms for English also applied in Spanish. My reading suggests that they did not make this assumption, because they had a native Spanish speaker verify the high and low typicality of the items in Spanish; the absolute rankings of

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the particular category members were not of interest. Further, the assumption is not necessary for the main conclusions drawn. The goal of the study was to compare within-language and between-language category membership judgments. The typicality levels were used merely as a blocking variable that served to account for some of the variability in response times. Any differences in typicality would be balanced across same-language and different-language conditions and would therefore not compromise the interpretation that the two languages accessed a common semantic or conceptual system.

A major goal in Pavlenko's article is to build a case for making a distinction between semantic and conceptual representations. My first reaction to this recommendation is that it is a lot to expect given the failure in the literature to distinguish clearly even between lexical and conceptual/semantic levels of representation (Francis, 1999). Some researchers clearly separate the lexicon from a semantic or conceptual store, whereas others clearly include semantic information in the lexicon, and most leave this relationship ambiguous. Similarly, there are inconsistencies in inclusion or exclusion of phonology, orthography, morphology, and syntactic properties in the lexicon. For example, some put the "phonological level" below a "lexical level" that serves only to coordinate phonological sequences with their meanings. On the other hand, some researchers who model the acquisition of language propose systems in which there is no direct representation of meaning; instead there is a large database consisting purely of co-occurrence frequencies for different words.

I do agree that the intended relationship between the terms *semantic* and *conceptual* is ambiguous. In most articles, the relationship assumed by the authors is not specified; in some articles, the terms are used interchangeably, but in others only one term or the other is used exclusively. One possibility is that word meanings, or semantic representations, are a particular type of concept. This subset relationship would be consistent with the position of many linguists. One of the leading researchers on semantics, Ray Jackendoff (1994, 131), gives the following definition: "a word meaning is a fragment of conceptual structure that is linked in long-term memory with a phonological structure (its pronunciation) and a syntactic structure (its part of speech and other syntactic properties such as grammatical gender and case-marking characteristics). That is, the words one knows consist of stored concepts linked with stored elements of linguistic expression." Of course we also have numerous concepts that are not associated with any particular word. Another way to think about this is that semantic representations or word meanings are the mappings of verbal labels to their concepts.

The evidence cited in support of the semantic/conceptual distinction can be satisfactorily explained under a model that does not make such a distinction. First, to clarify the framework for my reasoning about semantic or conceptual systems, a semantic/conceptual system consists of an innumerable set of possible semantic components, of which any word meaning is identified with a subset of those components (as in de Groot, 1992). This subset is identified by a particular pattern of activation or connection weights across the entire system. For example, within the framework of multi-componential semantic/conceptual representations, the reason why L2 words are not as meaningful to the learner as L1 words could be that the L2 words are not yet as strongly associated with their concepts as are L1 words. That is, when a new word in L2 is first added to the vocabulary, only some components of the concept are acquired (i.e., a subset of the L1 conceptual representation), and with more experience more components are acquired (Dufour & Kroll, 1995). When a person learns two languages simultaneously, the components could become associated with the different language labels in different orders, resulting in only partial overlap in the representations, which with increased fluency in both languages should stabilize as a common merged representation.

A second source of evidence cited by Pavlenko in support of the separation of semantic and conceptual levels is the existence of aphasia patients who lose access to language, with non-linguistic categorization and object recognition remaining intact. Clearly, these findings support separate levels of representation for the concepts and their verbal labels. However, we cannot say that the semantic level is impaired, because once the lexical-level representations are eliminated for both comprehension and production, verbal access routes to access the semantic representation are lost. Determining whether the "semantic" aspects of language are indeed impaired or intact in aphasic patients will be extremely difficult.

Pavlenko cites a variety of findings from cross-cultural studies of monolinguals, as if the results were expected to be similar in studies of bilinguals. It seems important to clarify the differences among three types of research that can be easily confused. One type is the cross-linguistic or cross-cultural study of monolinguals, with the issue being the extent to which monolingual speakers of different languages have different conceptual or semantic representations. A second type is whether bilinguals (at different stages or with different backgrounds) have representations more consistent with native speakers of their L1, native speakers of their L2, or some hybrid representation. The third type, and the most common among cognitive experimental psychologists, addresses the relationships among the concepts or languages within an individual bilingual mind. The answers in one area do not necessarily agree with findings in the other. For example, in a study of picture naming, monolingual English and Spanish speakers and Spanish–English bilinguals exhibited differences in their modal responses (Goggin, Estrada, & Villarreal, 1994). Similarly, typicality differences across any two languages are likely larger across monolingual speakers of each language than within bilingual speakers of the two languages. Results from the cross-cultural study of monolinguals are not always relevant in making inferences about bilinguals.

A final point I would like to make is that there is a common misconception in the literature, implied by Pavlenko and stated explicitly by many others, that Weinreich's (1953) foundational work introduced the labels *coordinate*,

https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

compound, and *subordinate* to describe different contexts of language acquisition. While the book includes a chapter on the socio-cultural setting of language contact, the three terms were not used to describe these effects. In the second chapter of his book, Weinreich proposed three models of the relationship among words learned in two languages of a bilingual. The coordinate model corresponds to the modern ''separate-concept model'', the compound model to the ''shared-concept, concept-association model'', and the subordinate model to the ''shared-concept, word-association model''. Weinreich fully acknowledged that the representations could be different for different individuals and for different words within an individual's vocabulary. However, he made no claims about the language-learning histories leading to these representations; that extension was made by Ervin and Osgood (1954), who applied Weinreich's labels for mental representations to particular language-learning histories. They did not merely expand on his work – they changed the definitions of his terms, and their usage of the terms is by far the more common usage of those terms today. Nevertheless, Weinreich's book lays out ideas that set the stage for many of the major issues in bilingual research today.

In summary, Pavlenko's article is thought-provoking and deals with complex and controversial issues in a detailed manner. I especially applaud her effort to integrate literature from psychology, linguistics, and education. Although I disagree with some of the reasoning or conclusions drawn, it certainly made me examine my own views more carefully, and I will look forward to hearing the results of bilingual research that uses the new approaches proposed.

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 Bilingualism: Language and Cognition 3 (1), 2000, 16–18 © 2000 Cambridge University Press

Concepts, experiments and mechanisms

DAVID W. GREEN
Department of Psychology, Bedford Way Building, 26 Bedford Way, London WC1H 0AP, United Kingdom
E-mail: d.w.green@ucl.ac.uk

Pavlenko argues convincingly for the critical role of language in the construction of concepts and in conceptual change in bilingual speakers. In contrast to the tenor of parts of Pavlenko's paper, I believe that only careful experimental and modelling efforts will allow us to understand this role.

We cannot directly infer underlying concepts from the words used. Identical words can express different thoughts. Imagine the different intended referents of the term "animals" in the utterance "I saw some animals in the park" if an English or an African park is assumed. The use of a word on a given occasion leads the addressee to construct a novel concept for an *ad hoc* category (Barsalou, 1983) and so there is no obligatory link between a word and the concept conveyed by it (Clark, 1996): conceptual representations and semantic representations are distinct (see also Levinson, 1997). Nonetheless, different languages could lead individuals to construct different perceptual and conceptual representations. We need to use suitable non-verbal procedures as Pavlenko notes but we also need to recognize the pragmatic context of our research. We consider this issue first.

In a set of studies by Ervin-Tripp (1961a), mentioned by Pavlenko, individuals disclosed different themes when discussing TAT pictures in different languages. But without knowing how different their stories might be when required to discuss the same TAT picture more than once in the same language we can make no claims about how language affects the classification of stimuli or the recall of life experiences. Informally, I find that when asked to describe their life histories, individuals tell different stories (disclose different themes) on repeated retellings within the same language. Bilinguals have the capacity to simulate the content of what they might say in another language (as Ervin-Tripp noted). Without grasping how individuals understand the pragmatic demands of the situation, we cannot draw inferences from their language about the concepts being expressed. The same observation applies to data gathered from word association tests – these also offer opportunities for individuals to adapt their speech to the presumed pragmatic demands.

In her own work, Pavlenko asked individuals to describe/interpret a standard non-verbal interaction. The interpretations provided by different bilingual groups are interesting but can only indirectly signal the kinds of concepts actually evoked. The complementary approach advocated by Pavlenko, namely to use a non-verbal testing procedure is also required and would be a useful extension to her research. The work of Lucy (1992) and Levinson and colleagues (Levinson, 1997) on unilingual speakers indicates how to proceed but such work also has interpretative problems.

Levinson (1997) examined conceptual representations of space in languages such as Tzeltal (a Mayan language) that lack terms such as "left", "right" and "front", "back". In these languages, individuals must refer to objects in terms of their cardinal direction (e.g., A is to the east of B) if they are to communicate successfully. Coding the location of an object in terms of "to the left of" does not allow recovery of its cardinal direction. Nor does specification of a cardinal direction allow recovery of the object's position relative to the speaker. In one procedure (Levinson, 1997, 36) participants look at an arrow facing left (e.g., east) on one table and are then turned round 180 degrees and have to make the arrow point in the same direction on a second table. If they make the arrow point left, then this indicates that they coded the arrow in terms of a relative frame of reference (i.e., with respect to themselves). If they make the arrow point right (i.e., to the east) then they have coded the arrow in terms of its cardinal direction. Tzeltal speakers more often align the arrow in terms of its cardinal direction whereas Dutch speakers align it in terms of a relative frame of reference.

This testing procedure establishes that speakers of different natural languages may code spatial relations in different ways but it does not allow us to make the strong claim that operations that code spatial relations have become **autonomous** of language. Individuals could have described the scene to themselves. Only further experimental and clinical research can establish this. It is plausible that there are a number of different functional representations guiding non-verbal behaviour. For instance, Schooler & Engstler-Schooler (1990) found that restricting the use of a verbal description improved colour recognition. Restricting or blocking the use of language could therefore reveal the nature of the representations guiding non-verbal performance in the domain of space or colour.

Consider colour where we do have some evidence of the way in which language use and conceptual knowledge interact. First, by way of background, colour judgements can be reached in one of two ways: by perceptual similarity or by colour category. When individuals have to decide which of two colour differences is the larger, their judgements reflect the perceptual similarity of the colours rather than any category boundaries. In contrast, in a task requiring individuals to judge which of three stimuli is the odd-one out, judgements are influenced by category labels (Kay & Kempton, 1984). Furthermore, and contrary to the research of Rosch-Heider & Olivier (1972), speakers of different natural languages do show different patterns of performance. Roberson, Davies & Davidoff (in press) contrasted responses to Munsell colour chips straddling the

https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

blue–green boundary for both native English speakers and unilingual Berinmo speakers. In Berinmo, there are no separate terms for green and blue. *Nol* covers green, blue and purple and *wor* covers yellow, orange, brown and khaki. Berinmo speakers showed categorical perception effects for the *nol–wor* boundary but not for the green–blue boundary.

How do individuals with colour anomia perform on tasks requiring that colours be sorted into different categories? The patient (LEW), studied by Roberson, Davidoff & Braisby (in press) was unable to sort colours into different categories in a free sorting task. He could only compare items pairwise in terms of their similarity. In contrast, in an odd-one out task, he showed categorical perception. So, it seems that the explicit use of colour category information requires intact linguistic abilities whereas its implicit use in the odd-one out task does not. When category information has to be used explicitly, anomia disrupts non-verbal task performance. Non-verbal tasks do not simply reflect conceptual representations.

Can we at least conclude that we should use implicit tasks to explore the concepts in bilingual speakers? If so, we could then see if bilingual speakers of two languages which differ in their colour boundaries show categorical perception effects in both languages (e.g., between green and blue and between *nol* and *wor*). Earlier results of Ervin-Tripp (1961b) on Navaho–English speakers do not establish this point since her work was restricted to how such speakers labelled colours. Without further experiment we cannot conclude that performance in a categorical perception task really is achieved without any linguistic mediation. If articulatory suppression abolishes categorical perception effects in the odd-one out task then the categorical representation of colour is contingent on the use of language: there is a distinct level of representation, constrained by language, and so activated in the contexts of "thinking for speaking" (Slobin, 1996), but not autonomous of it.

A further related question concerns how language comes to exert its effects on perceptual and conceptual processes. We need an account of the mechanisms. In the case of perceptual dimensions, Wierzbicka (1990) proposed that categories arise when two similar items need to be distinguished for some physical or cultural reason (see Wierzbicka, 1990; Goldstone, 1998). Roberson, Davies, & Davidoff (in press) cite the example of Berinmo speakers for whom tulip leaves are a prized vegetable. Apparently, the leaves are bright green when fresh and good to eat but they yellow quickly. Agreement over the boundary of the colour terms *nol* and *wor* [nol – green/blue/purple and *wor* – yellow/orange/brown/khaki] coincides with this important functional distinction. In the case of languages that enforce the use of cardinal directions, one might also be able to construct a functional argument for the emergence of such classification.

What then of the interesting socio-intentional concepts such as "privacy" explored by Pavlenko? Given that these more abstract concepts may nonetheless retain or include some perceptual grounding (how else could individuals construe a scene as involving invasion of privacy?) it would be useful to determine the range and variety of scenes to which such terms can be applied. We might then be able to develop accounts of the acquisition of such terms. Certainly the contexts of use (classroom setting vs. immersion environment) are important. But we do not have an adequate theory of how acquisition is achieved in these different contexts. They vary in terms of practice (massed vs. spaced) as well as in terms of the range and opportunities to test out understandings in a communicative context. If an immersion context elicits multi-modal concepts and these are critical to the usage, how do these concepts become selected and used?

In general, we may say that the presence of lexical concepts serves to direct attention to relevant aspects of the world (e.g., Green, 1998) and such direction may lead to sensitisation to certain dimensions of experience rather than to the others and decrease sensitivity to dimensions irrelevant to the category (see Goldstone, 1998). Presumably, the consequence of acquiring an L2 that makes finer conceptual distinctions in one domain compared to another or makes distinctions that are not relevant to another will depend both on the relative usage of these concepts and on their obligatory nature. The various different kinds of conceptual effect noted by Pavlenko should be emergent properties of a mechanism that maps word forms onto lexical concepts and so onto mental categories. In certain circumstances, immersion environments should lead to catastrophic forgetting of L1 (cf. Ratcliff, 1990). Competition to code conceptual features may also underlie the subjective state reported by Hoffman (1989) cited in Pavlenko.

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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

Semantic and conceptual transfer

SCOTT JARVIS
Department of Linguistics, Ohio University, Gordy Hall 363, Athens, OH 45701, U.S.A.
E-mail: jarvis@ohiou.edu

I am always encouraged when I see scholarly work that both draws from and draws together the fields of second language research and bilingualism, as Pavlenko has done, and as other scholars have done in the recent past (e.g., de Groot & Kroll, 1997). After all, the subjects of investigation who are referred to in one field as learners and in the other as bilinguals are often the very same people, and the two fields share common concerns about how these people acquire, process, use language and perform culture. Whereas the two fields share common concerns, however, they often differ in their emphases. Bilingualism has traditionally had its hands more deeply in issues related to the mind, brain, and identity (e.g., aphasia, code-switching, language–concept associations), whereas second language researchers have been more concerned with issues related to the acquisition of target-language forms and functions (e.g., syntax, functional morphology, pragmatics).

Two of the areas of greatest overlap between the two fields are lexical acquisition and crosslinguistic influence – the two areas that Pavlenko's article addresses most directly. The primary implication of Pavlenko's work for the field of bilingualism, as I see it, is that, despite all of the studies that purport to investigate the structure of bilinguals' mental concepts, many of these studies do not use suitable methods or generate the necessary evidence to support their conclusions or to truly elucidate the nature of a bilingual's system of concepts. To the field of second language research, the primary implication of Pavlenko's work, as I see it, is the need, in the first place, to even recognize the interconnectedness of language and concepts, and then to actively investigate the potential effects that language learners' underlying mental concepts may have on their acquisition and use of a second language (cf. Jarvis, 1998). As I consider myself to be aligned most closely with the field of second language research, I will proceed by addressing mainly this audience, further interpreting the implications of Pavlenko's framework for future necessary work in this field.

Among the issues addressed by Pavlenko, I suggest that two are particularly deserving of attention in second language research. They include the notions of conceptual transfer and conceptual development (or concept mutability). The term *conceptual transfer*, to my knowledge, was first introduced by Pavlenko (1998), even though the foundation for this notion had already been laid in previous work, often under the label of *concept-based transfer* or *concept-based influence* (cf., e.g., Hinkel, 1992; Jarvis, 1997; Pavlenko, 1997). The significance of the studies that fall under this framework arises from their commitment to exploring the effects of underlying non-linguistic (or extralinguistic) conceptual representations on a learner's or bilingual's use of both the first and second language. Unfortunately, this has been a hard selling point in second language research. For example, a manuscript on conceptual transfer that I recently submitted to a leading SLA journal (Jarvis, 1999) elicited comments such as the following from anonymous reviewers: "I am not totally convinced that there is anything new in Conceptual Transfer"; "I think that all kinds of references to conceptual transfer have always been found in the literature"; "Again I really do not see why the proposed model of transfer . . . is any better at predicting the . . . transfer patterns than a good old CA [contrastive analysis]". I have included these comments here because I believe that some of Pavlenko's audience may have similar concerns.

The notion of conceptual transfer is new. After all, it was not until very recently that Kellerman (1995) acknowledged "that the first language can influence the second at a level where cognition and language touch" (p. 143). Although there are others who made similar claims much earlier (e.g., Rivers, 1983), it is clear that the effects of L1-based concepts on second language acquisition were not explicitly or actively investigated until relatively recently (see, e.g., Jarvis, 1998), and they remain grossly neglected even now. The idea that the literature spanning the past several decades is replete with references to conceptual transfer – a claim made both by Pavlenko and by one of the anonymous reviewers mentioned earlier – is true only when the literature is looked at in retrospect and through the lens of the explicit models of language and concepts (e.g., Lakoff, 1987; de Groot & Kroll, 1997) that have only recently surfaced. Thus, while studies such as Graham and Belnap (1986), James (1980), and Kellerman (1978) clearly do provide evidence of conceptual transfer, this evidence is drawn out only through retrospective re-interpretation of their results. The claims made by the authors of these studies involve issues related to polysemy, semantic boundaries, and semantic coreness – notions that were used outside of a theoretical model that recognized the separateness of linguistic and conceptual representations.

The idea that conceptual transfer is nothing more than a return to the Contrastive Analysis Hypothesis (CAH) is also unfounded. While conceptual transfer will inevitably involve some degree of contrastive methodology, as Pavlenko discusses, it does not rely solely or even primarily on the contrasting of external languages, as CAH did, but rather focuses more on the contrast between internal languages, and especially on the interaction between internal languages and internal concepts. E-language, as described by Jackendoff (1990), is external language, or language seen as an external artifact, whereas I-language is internal language, or language as it exists in the mind of a

https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

living, breathing individual. It is reflected in the performance of individuals, not in the abstracted language of the speech community. I-concepts, likewise, are concepts that represent thoughts, notions, or mental representations existing in the minds of individuals – not existing as external artifacts to be analyzed apart from actual human intention, communication, and behavior. Whereas CAH was tested through an examination of L2 performance vis-à-vis the areas of greatest contrast between the L1 and L2 E-languages (cf. Lado, 1957), the methodology most representative of the conceptual transfer framework involves identifying individuals' I-concepts through an examination of their linguistic or non-linguistic performance, and then determining whether the I-concepts encoded through one I-language influence a learner's acquisition or use of a second I-language. As Pavlenko points out, the studies performed in accordance with this latter methodology have provided more consistent results and have provided a better framework for understanding acquisitional difficulty.

The second issue discussed by Pavlenko that I think is particularly deserving of attention in second language research is the notion of conceptual development, or concept mutability. Just as researchers in the area of interlanguage pragmatics have recently been urged to begin shifting their focus from crosslinguistic pragmatics (especially pragmatic transfer) to learners' development of L2 pragmatic competence (e.g., stages and sequences of acquisition) (Bardovi-Harlig, 1998), so too should researchers who investigate the relationship between language and concepts begin looking more carefully at the changes that take place in a learner's (or bilingual's) language–concept associations as time passes and as language experience increases. Pavlenko points out that her own research (i.e., Pavlenko, 1997) is perhaps the only detailed investigation of conceptual development to date. We are therefore still in need of much more information concerning, among other things, (a) how learners acquire new concepts in the second language, (b) how they modify existing concepts to conform with L2-based experience, (c) whether there are identifiable acquisitional stages in concept mutation, (d) whether fossilization may occur in conceptual development, (e) what the precise role of L1-based concepts is in learners' use of a second language and whether it diminishes, (f) how L2-based concepts might affect L1 use, and (g) what the precise nature of the interface between the conceptual and linguistic levels is.

Again, I find Pavlenko's discussion of conceptual transfer and conceptual development to be very timely for second language research. On the other hand, I see her three-level model of bilingual memory – consisting of a surface, semantic, and conceptual level – as further complexifying a model that is already highly problematic. First, while Pavlenko claims that her model is based on the work of Paradis, who also distinguishes between lexical semantics and non-linguistic conceptual representations, a close reading of Paradis (1995, 1997) shows that he does not go so far as to suggest that word meanings and mental concepts belong to separate *levels* of competence – e.g., that a word's meaning can be separated from the imagistic conceptual representation that corresponds to its denotation. Moreover, nearly all of the major theories of language and meaning for the past two centuries have assumed that the meaning of a word (its semantics) crucially includes a mental representation of its denotation (cf., e.g., Frege, 1892; de Saussure, 1916; Peirce, 1902; Lakoff, 1987; Jackendoff, 1990), whether referred to as a concept (e.g., Lakoff, 1987), signatum (de Saussure, 1916), or interpretant (Peirce, 1902). Second, Paradis (1995) defines lexical meaning as "part of the speaker's linguistic competence (a component of the lexical item, together with its syntactic features and phonological form)" (p. 5). This definition, along with the fact that Paradis' examples of lexical semantics (e.g., the possible meanings of *big sister* vs. *large sister*; Paradis, 1997, 336) relate primarily to syntagmatic – i.e., formal and collocational – constraints, suggests two things: (a) that Paradis' distinction is still largely between the linguistic level and the conceptual level, without the separate semantic level that Pavlenko posits; and (b) that Paradis' use of the terms *semantic* and *conceptual* is not representative of how most researchers use these terms. Grosjean (1998) concurs on this second point, giving yet another interpretation of what Paradis means by these terms (p. 145).

Grosjean's work on levels of bilingual memory is also fundamentally different from Pavlenko's, even though she cites him as support for her own model. Building on the work of de Groot & Kroll (1997), Grosjean (1998) proposes the following four-level distinction: (a) a lexeme level, (b) a lemma level, (c) a conceptual level, and (d) a world knowledge level (p. 145). Here, too, however, it seems that the essential distinction is still between a general linguistic level (with two sublevels: lexemes and lemmas) and a general conceptual level (with two sublevels: concepts and world knowledge). Crucially, in Grosjean's model, word meanings are not disassociated from their denotational and connotational values, as they are in Pavlenko's model.

Of course, Pavlenko's three-way distinction between language, semantics, and concepts may be tenable if it is embedded in a more explicit model of bilingual memory in which the definition for each of these components is not merely operationalized (in a potentially unconventional way) but can be derived from the model itself. In this paper, Pavlenko defines lexical semantics in terms of explicitly available information about word use and about the relationship between different words. She includes knowledge of collocations, idioms, polysemy, and word definitions in this category. The problems with this view of semantics are that (a) it is purely operational, (b) it relates only to explicit knowledge (or alternatively violates Paradis' (1995) distinction between explicit and implicit knowledge), and (c) it excludes a word's denotation and connotation from its semantics. Crucially, concerning her example of the Russian–English bilinguals and the Russian FL learners of English, having learned the definition for *privacy* does not mean that they have acquired (i.e., implicitly) its semantics. Thus, the existence of separate linguistic, semantic, and conceptual levels, I think, is still an open question. The *sine qua non* of a separate semantic level

https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

would be an aphasic patient's retention of lexical semantics after having lost both language and concepts. Is this possible? If not, is it not better to view semantics as the interface between the linguistic and conceptual levels, rather than as a separate level?

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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

Bilingualism: Language and Cognition 3 (1), 2000, 22–24 © 2000 Cambridge University Press

Cerebral representation of bilingual concepts

MICHEL PARADIS
Department of Linguistics, McGill University, 1085 Dr. Penfield Avenue, Montreal H3A 1A7, Canada
E-mail: mparad@po-box.mcgill.ca

In this commentary, I use *mental representations* to refer to images in the mind, mental patterns that can be modality-specific or multisensory. I use *cerebral representations* to refer to patterns of neural activation that correspond to mental representations, as an emergent property of neural activity (Bunge, 1980), though how images emerge from neural patterns (presumably a high-level biological process) is a problem that neurobiology has not yet resolved (Damasio, 1999).

It is worth noting that conceptual mental representations ontogenetically precede the acquisition of words, and that they are not coextensive with the meaning of words. There are many concepts for which individuals have no words. Given that we have many more concepts than words to express them, we cannot assume that there is a one-to-one correspondence between concepts and words (in one, two, or *n* languages represented in a person's mind/brain).

Concepts, in a neurolinguistic context, refer to the cerebral representations corresponding to basic ontological objects (events, properties, objects). Conceptual meaning is best seen as a portion of a network where everything can eventually be linked to everything else, but where, around any representation, there are certain zones of relations, from constituent, to closely related, to peripherally related.

A concept is really an abstraction that, in neurolinguistics, stands for the representation of units of meaning (events, objects, properties) as portions of connected conceptual networks (Lamb, 1999). To the extent that "concept" includes all the knowledge that an individual has about a thing or event, a concept is never activated in its entirety at any given time; only those aspects that are relevant to the particular situation are activated (Damasio, 1989) as the various components are scanned by working memory (i.e., are in awareness). Only the aspects relevant to the situation in which a concept is evoked (i.e., portions of the relevant neural network) reach the activation threshold. Hence, the exact same portion of the network is not always activated every time a given word is heard or uttered. Not just different connotations, but different denotative aspects of the referent are activated in each context. In other words, concepts are not only dynamic, i.e., changing over time, as Pavlenko rightly claims, but they are also fractionable in that only those portions of a concept relevant in the particular situation of its use are activated (i.e., present in consciousness).

Irrespective of the means by which a concept has been acquired, its relevant components will be equally activated by auditory, visual, somesthetic, olfactory, or verbal stimuli. The sight of a cat, the sound of a cat, the smell of a cat, or the spoken or written word *cat* will all activate the relevant portions of the concept {cat}. In English, the word *cat*, given the appropriate context (e.g., the big cats of the African wildlife reserves), may refer to and evoke the concept of a lion or a cheetah. *Chat*, the French translation equivalent of *cat*, would not and could not – unless in the context of a statement such as, "this tiger looks like a cat". (Note that it would be the same if one said, "this puppy looks like a cat"; *chat* could not refer literally to a tiger any more than to a puppy.) Language is only one way to access concepts, i.e., non-linguistic mental representations. The conceptual network exists independently of language. Words have dedicated connections to portions of the conceptual network, but so do odors, sounds, tastes, etc.

Some connotations are idiosyncratic and are not part of the meaning of a word (inasmuch as the word is part of a shared language system); others are conventional within a linguistic community, and thus are figurative meanings of the word, listed as such in dictionaries.

English–French bilinguals do not have a concept {ball} and a concept {balle} but a set of conceptual features (or portions of a conceptual network) that corresponds to the lexeme *ball* and a different set (with overlapping features) that corresponds to the lexeme *balle*. One speaks of the concept "*ball*" only as a shortcut. What we mean is, the particular conceptual features that are activated when the word *ball* is used. Hence, when language is no longer available to a patient with global aphasia, the concept for the word *mug*, as such, is no longer available, but the conceptual features that correspond to the patient's perceptions and needs will make him select a mug rather than a cup in a store, based on his familiarity with the object (for which he has a non-verbal multisensory mental representation). Persons who speak a language other than English do not have a word corresponding to *mug* in their language but they might nevertheless select this item in the store, on the basis of its perceived usefulness or esthetic value. Thus, the semantic constraints on possible referents (balle/ball – their lexical meanings) are not to be confused with conceptual representations (multisensory units of meaning, independent of whether a corresponding word exists).

The concept corresponding to the meaning of a word in L1 and that corresponding to its translation equivalent in L2 (i.e., that portion of the conceptual network that may be activated when a word is used) overlap more or less extensively; that is, some of the same components (features, for short) correspond to both words, some to the L1 word only, others to the L2 word only.

We must also be careful not to confuse levels of description and domains of discourse (Paradis, 1995). What is true at the linguistic level (description of the grammar – in this

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case, of the constraints on the meanings of words, their lexical semantics) is orthogonal to the structure at the psycholinguistic level (how words and their semantic contents are organized in the mind) and at the neurolinguistic level (how the lexical meaning and corresponding conceptual representations are materialized in the brain).

It is also important to be aware of the level of abstraction at which the discussion takes place. A concept is an idealized abstraction referring to the mental representation that can be activated at various times. As it is generally used, the term refers to everything that relates to a particular concept (all parts of which cannot be activated synchronically, since one is aware of only what can be entertained in working memory). One cannot be aware of all possible components of most concepts at the same time. Since each portion of the concept that will be selected for activation is a function of the circumstances in which the concept is evoked, for a Japanese–English bilingual speaker we may expect that in a Japanese context the specifically Japanese connections will be activated, whereas English connections will be activated in an English environment. The cultural background of both the individual's daily life at the time and particular circumstances of the event will determine which portions of a concept come to mind (as a result of the activation of the relevant cerebral substrate).

Following the activation threshold assumption, the cultural impact on the selection of the focal parts of concepts will be proportional to the frequency and recency of exposure to a particular cultural setting. Russians in Russia will interpret an event in accordance with concepts corresponding to customary Russian ways of thinking; Anglo-Americans will interpret the event in accordance with common Anglo-American ways of thinking; whereas Russian immigrants will interpret the same event in ways that will depend on their degree of acculturation, that is, the extent to which they have been exposed to and have adopted American ways of looking at things, as Pavlenko demonstrates.

With respect to the Three-Store Hypothesis, lexical items determine the way conceptual properties are grouped to form a corresponding mental representation. To the extent that all speakers of a linguistic community refer to the same concept when using a particular word, the speaker and the hearer will evoke the same mental representation. A speaker of that language as an L2 may evoke a slightly (or not so slightly) different set of conceptual representations. Some concepts do not have a direct linguistic counterpart in a particular language, though attempts may be made to verbalize them by elaborate descriptions. New connotations, even entirely new meanings, may develop through acculturation, as demonstrated by some of Pavlenko's clever experiments (Pavlenko, 1997).

Note that all three modes of organization at the linguistic level (coordinate, compound, and subordinate) are compatible with the three-store model. The difference between the three "types" of bilinguals (or rather, the three types of organization of their grammars) lies in the conceptual features (or portions of the conceptual network) that correspond to the lexical meanings of words in each of a speaker's languages. These corresponding conceptual representations will differ in accordance with the lexical constraints associated with the actual meanings of a word and of its translation equivalent (coordinate), a blend of the two meanings (compound) or the L1 meaning for an L2 word (subordinate) and all the possible gradations in between. That is, for each L2 word, as well as for the L2 lexicon at large, there may be portions of the meaning that correspond to the L1 meaning, portions that are blended (i.e., used in both languages though inaccurate in each), and portions that correspond to the L2 norm. It is clear that these organization patterns also exist at the phonological, morphological, and syntactic levels of representation, and that they may change over time (Paradis, 1978). But the principle of how a word and its conceptual representation are stored in the brain is the same – only the contents of the representations may differ.

At the neurolinguistic level of description, the constructs that have been proposed (Paradis, 1981) are the extended system, the dual system, the tripartite system, and the subsystems. Each of the three modes of organization (coordinate, compound, subordinate) is compatible with each of the hypothesized cerebral systems. The former refers to the contents (*what* is stored), the latter to the manner in which they are represented (*how* they are stored).

The coordinate–compound–subordinate distinction admits of changes over time and differences at every level of linguistic structure (phonology, morphology, syntax, semantics (Paradis, 1978)). There are also differences related to the influence of kinds of clues to utterance interpretation (Wulfeck, Juarez, Bates & Kilborn, 1986) and cultural influences on the interpretation of events (Pavlenko, this issue).

There is no doubt that bilinguals (whatever the definition of the term) form a heterogeneous group within which we can distinguish subgroups, using the same kind of abstraction that linguists do when they speak of the idealized speaker-hearer. Even then, the individuals within each subgroup probably differ from each other to a greater extent than do the unilingual, unicultural individual speakers from whom the idealized speaker is abstracted (Paradis, 1998b). In fact, no two individuals in any sample are identical, whatever the domain of study. The researcher must decide which differences are relevant, and which are negligible for the purposes of the study. This may be a little more difficult with bilinguals because they present numerous dimensions of qualitative differences (manner of acquisition and use, degree of proficiency and automatism, degree of reliance on declarative memory, structural distance between the languages, sociolinguistic and sociocultural variables), each on a quantitative continuum (Paradis, 1987, Table 1.1). When it comes to cerebral representation, however, the differences relate not to the qualitative differences in the contents of the representations but to the extent of use of the same mechanisms available to all, unilinguals and various types of bilinguals alike (Paradis, 1998a).

I assume that by *grammaticized concept* Pavlenko refers to a concept that has found a grammatical expression (be it a

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specific word order, a case marker, or an aspectual marker), just as a lexicalized concept is one for which there is a corresponding word in the language. In my view, therefore, the lexical and semantic components of a lexicalized concept are not part of the concept but of the language system. The phonological and morphosyntactic properties are not part of a grammaticized concept either; they too are part of the language system. This is what the Three-Store Hypothesis is about. Language properties are not components of concepts, and conceptual properties are not part of the language system. They map onto each other, but are distinct entities, each susceptible to selective inhibition or pathological damage. Individuals with genetic dysphasia have been shown to have the concept of time and plurality, though not the corresponding implicit grammatical notions of tense and plural, respectively (Gopnik, 1994).

The explicitly available information on the meanings of various forms, part of metalinguistic knowledge and thus subserved by declarative memory, is not part of the language system, but of the stored (consciously retrievable) knowledge of the individual. As such, one may have a concept (i.e., an explicit representation) of a linguistic construct, but the construct for which one has a concept may not correspond to the actual procedures (algorithms or parallel distributed processes) that covertly give rise to the observable output on the basis of which the overt conceptual knowledge is obtained.

Phonological and morphosyntactic properties are hypothetical constructs devised by linguists on the basis of the observed systematic verbal behavior of individuals. No one – including linguists – is directly aware of these implicit underlying properties. All one can observe is the actual use of utterances; and from such observations one may infer some underlying structure. This is what linguists do. The very fact that linguists disagree among themselves as to the form or even nature of these underlying systems attests to their opacity.

Linguists may be said to have a concept of a generative syntactic rule, as a second language learner may have a concept corresponding to a pedagogical rule, that is, a piece of conscious knowledge that can be mentally represented and, in this case, verbalized. But this concept does not correspond to the actual phonological and morphosyntactic properties of the (implicit) underlying system, which, like lexical constraints, are part of the linguistic system, not the conceptual system. This is a necessary consequence of the three-store model, i.e., the independent storage of conceptual entities and the linguistic entities to which they are connected – differentially for each language – and with which they do not entirely overlap (there are more possible concepts – i.e., connections between conceptual features – than actual words in any language).

Concepts are thus, strictly speaking, not "in the bilingual lexicon" but outside it; connections from the lexicon allow the activation of the concept that corresponds to a word. The same concept may be activated by impulses coming from non-verbal multisensory experiences, or may be self-activated during an act of thinking in the absence of any stimuli. Even in unilinguals, lexical representations and their corresponding conceptual representations are stored independently, since the concepts remain when language is lost, as in the case of paroxysmal aphasia (Lecours & Joanette, 1980) and global aphasia (Hécaen, 1968; Zurif & Blumstein, 1978).

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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

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

ARDI ROELOFS
Max Planck Institute for Psycholinguistics, P.O. Box 310, 6500 AH Nijmegen, The Netherlands
E-mail: ardi@mpi.nl

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

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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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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

 Bilingualism: Language and Cognition 3 (1), 2000, 28–30 © 2000 Cambridge University Press

New approaches to conceptual representations in bilingual memory: the case for studying humor interpretation

JYOTSNA VAID
Department of Psychology, Texas A & M University, College Station, TX 77843–4235, USA
E-mail: jxv@psyc.tamu.edu

In her critique of how concepts have been theorized in the bilingual memory literature, particularly over the last two decades, Pavlenko identifies a number of problems. One of them is that bilingual memory models have conflated lexical–semantic and conceptual levels of representation, resulting in a narrowing of the scope of investigation to lexicalized concepts per se. As a result, very little research has targeted grammaticized concepts or conventionalized (pragmatically influenced) concepts. Moreover, there has been little examination of how cultural knowledge (in the form of schemas or frames) shapes conceptual representation and organization in bilingual memory. With respect to the semantic level, research in bilingual memory has tended to focus on the processing and representation of single words varying only in such dimensions as their frequency, cognate status, and concreteness. With few exceptions, hardly any research in bilingualism has been directed at contextualized uses of language, in particular, on such phenomena as polysemy, metaphor, irony and other non-literal aspects of language use. A further consequence of the conflation of the semantic and the conceptual level in the study of bilingual memory has been that very little attention has been paid to contexts where lexical and conceptual knowledge might be at variance. Pavlenko cites her own prior work with Russian–English bilinguals in illustrating how knowledge of word meanings does not in itself confer knowledge of the conceptual underpinnings of particular words such as "privacy." Such understanding is hard to come by in foreign or second language adult learners whose exposure to that language has primarily been in decontextualized classroom contexts rather than through meaningful social interaction with native speakers in varied natural settings.

Drawing on current theorizing of concepts in the mainstream cognitive literature, Pavlenko advances a view of concepts as flexible, dynamic, and theory- or knowledge-based. This view contrasts with the view implicitly held in prevailing bilingual memory models in which concepts are rigid, static, and universally shared. She further notes that current bilingual models give short shrift to notions of language- or cultural-specificity in the development and organization of concepts. Surprisingly, an acknowledgement of cultural influences on conceptual organization (as indexed by differences in the context of second language acquisition context) and a concern with Whorfian issues of linguistic or conceptual relativity characterized some of the earliest approaches to the cognitive study of bilingualism (e.g., the work of Ervin-Tripp and W. E. Lambert). Pavlenko's reinstatement and expansion of these notions stands in contrast to prevailing approaches in which languages are viewed primarily as interchangeable codes and where questions regarding the relationship between language, culture, and thought are no longer foregrounded. As Pavlenko aptly notes: "The puzzle of bilingualism, once vibrant and colorful, lost the speaker, then the social context of acquisition and finally its fascination with meaning."

In what follows, we propose, in the spirit of Pavlenko's call for renewed research on conceptual representations in bilinguals, a research agenda directed at a relatively unexplored yet theoretically rich area of study, namely, humor interpretation in bilinguals (e.g., Reyna & Herrera-Sobek, 1998). From a cognitive perspective, humor is viewed as a special case of figurative language use that may incorporate metaphor, irony, hyperbole, and other forms of expression in the service of creating a pleasurable experience by temporarily creating, and then resolving, an incongruity between two or more scripts or frames. We may think of frames here in the sense described by Agar (1991, 176): "Frames are structures of interrelated expectations into which a particular expression fits." In creating humor, then, at least two frames are strategically juxtaposed in such a way that the listener is led to expect one thing only to be surprised when a rather different scenario turns out to be the case (Vaid, 1999; Hull & Vaid, 1999). The nature of the competing frames is likely to reflect culturally influenced conceptual representations whereas the particular ways in which the frames are set up in juxtaposition, i.e., how the incongruity is constructed and ultimately resolved, may reflect semantic representations as when, for example, core versus peripheral word meanings are placed in competition with one another. Whatever the relative contribution of semantic and conceptual properties (and these can be empirically determined), in order for the humor to be successful, the beliefs they activate in the listener's mind have to be salient and shared in order that their violation then produces the pleasantly disruptive effect experienced as humorous.

When applied to bilinguals, the study of humor generation, perception, and translation offers a unique window into the study of a range of research issues highlighted by Pavlenko. Requiring as it does successful mastery of linguistic and conceptual knowledge, one can study the ability to comprehend the humor conveyed in a particular language and about a particular cultural group as an index of relative mastery of the language or culture in question.

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Humor would seem to be a paradigmatic case for the study of semantic versus conceptual representations since both these levels are enlisted separately and in combination to varying degrees in humor construction, and the success of the humor will depend on whether the listener has attained a requisite level of mastery of both these components. It is suggested that studying humor interpretation by bilinguals or second language learners in a particular language (viewed separately from the other language) or in contrast to another language (in the case of specifically bilingual humor, which draws on beliefs about two languages, e.g., Leeds, 1992) will prove to be a fertile testing ground for a variety of questions of interest highlighted by Pavlenko as being worthy of examination.

One of the possible research questions that could be addressed concerns L2 linguistic vs. L2 cultural knowledge. Pavlenko has proposed that concepts are best viewed as being dynamic and knowledge-based. One can examine this view in the context of humor by comparing how humor interpretation in a second language user improves with growing linguistic and/or conceptual knowledge. Folk wisdom would hold that the test of real fluency for L2 speakers is their ability to understand jokes in their second language. One can test this claim by comparing users with varying L2 proficiency. One can, further, contrast proficiency on a purely linguistic level with cultural proficiency, or degree of familiarity with cultural beliefs held by native speakers of that language for, as Agar (1991, 173) reminds us, "acquisition of another culture isn't a necessary part of learning another language". One could also compare bilinguals varying in their level of second language proficiency to test the view articulated by Beardsmore (1982, 20) that the bicultural element may become more important "[t]he further one progresses in bilingual ability . . . since higher proficiency increases the expectancy rate of sensitivity towards the cultural implications of language use".

A second possible research question concerns the interactions between L1 and L2 figurative knowledge. Although there is a growing body of literature on the understanding of figurative language by adults in their native language, the processing of figurative language by L2 speakers has hardly been studied. Some previous research on the nature of metaphoric comprehension in L2 learners is of relevance here. For example, Johnson & Rosano (1993) found that interpretations of metaphors such as "my sister is a butterfly" vs. "my shirt is a butterfly" by native English speakers versus Asian ESL users suggested that "for the English-speaking subjects, the butterfly vehicle signified mostly softness and fragility; for the Asian ESL subjects, however, it seemed more to signify beauty, color and activity". They further noted that while cultural or linguistic factors may have affected the content of metaphor interpretations, linguistic proficiency appeared to be unrelated to the level of complexity in metaphor interpretation, as measured by the number of different metaphor interpretations generated (Johnson & Rosano, 1993, 172). Clearly, though, additional work is needed. With respect to humor interpretation, the question of interest here would be to determine how figurative language processing in the first language affects processing of non-literal aspects of the second language. Will bilinguals interpret metaphoric or other figurative forms in the second language through the screen of their first language or will each language be interpreted without reference to the other? Clearly, degree of facility with figurative language processing in each language will be a relevant variable here and may turn out to be independent of degree of linguistic aptitude viewed in more traditional terms (Irujo, 1986).

Finally, a host of additional research questions arise when one considers the task of translating humor from one language to another. In one of the few existing analyses of this issue, Laurian (1992, 112) notes that while there have been many studies on the process of translation, the very special kind of discourse that is humor has not been thoroughly studied yet, especially not from the point of view of its translation (see also Ciaro, 1992). In some cases the translation will be effortless and unproblematic, particularly when the humor does not make special linguistic or conceptual demands that are specific to one or the other language. However, in other cases the humor will be quite difficult to translate. The difficulty in turn could reflect a difficulty arising from linguistic considerations, as when there are not comparable constructions in the two languages, or when the humor depends on exploitation of phonetic or semantic properties unique to a particular language. Alternatively, the difficulty could arise from the lack of existence of comparable conceptual equivalents. Bassnet-McGuire (1980) notes that "sameness" is an unrealistic goal in translation; what is needed is talk in terms of loss and gain. Expanding on this point, Gass (1999, 89) points out in the context of translations of the poetry of Rilke that

> For every poet we attempt to translate, certain adjustments will have to be made, equivalences found, sacrifices accepted; and we shall have to decide in each instance (. . . whether the issue is rhythm, verse form, figures, sound, or wordplay – ambiguity, syntax, idea, or tone – diction, subject, weight, ambition – secret grief, overmastering obsession) just what element is so essential that a literal transcription must be aimed at; what we dare to seek certain equivalences for instead; when we can afford to settle for similar general impressions and effect; how to unpack the overly compacted; and what must be let go, unless luck is with us, in order to achieve the rest – that rest which must add up to greatness.

With respect to humor translation in particular, a useful approach may be to apply Agar's (1991) notion of rich points of contact between languages. Agar (p. 176) notes that, " when two languages are brought into contact, some connections are fairly simple to forge. Others, in contrast, are striking by their difficulty". The difficult points of contact are what Agar calls rich points, defined as, "surface forms that tap deeply into the world that accompanies language, where the world can be represented by systems of interpretive frames" (p. 177). Laurian (1992, 122) proposes that humor translation can be a useful pedagogical tool in the second language learning classroom (see also Tamaoka & Takahashi, 1994): "A good exercise in a language class, at its advanced level, could be to make out the implicit

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elements among explicit features. The notion of the implicit is fundamental in humor. It is also one of the hardest senses to acquire when learning a foreign language."

To conclude, it is suggested that there is much scope in the study of humor interpretation in bilinguals, and that this topic is likely to exemplify and clarify various theoretical concerns identified by Pavlenko in her discussion of the study of conceptual representations in the bilingual mental lexicon.

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https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

AUTHOR'S RESPONSE

What's in a concept?

ANETA PAVLENKO
CITE Department, College of Education, Ritter Hall, Temple University, Philadelphia, PA 19122, USA
E-mail: apavlenk@astro.ocis.temple.edu

I would like to begin this reply by thanking everyone who contributed to the high quality and professional tone of the discussion on concepts in bilingual memory – my colleagues, my anonymous reviewers, the commentators, and above all, the editors of *Bilingualism: Language and Cognition* who created on the pages of their journal a unique format for friendly and productive discussions that further progress in the field of bilingualism. I also have to admit that the outcome of what I hope is one of many discussions on the future of bilingual memory research exceeded all my expectations: not only have we been able to agree on several shortcomings of current research on the bilingual mental lexicon but we have also moved forward by further clarifying the use of the terms "semantic" and "conceptual" (Ervin-Tripp, Paradis) and by mapping out new areas and directions for future research (Ervin-Tripp, Green, Jarvis, Vaid). I was particularly delighted to see that – whether they agree or disagree with my proposals – my colleagues share the three concerns raised in my paper: the need to disambiguate the semantic/conceptual distinction, the need to create more dynamic models of bilingual memory, and the need to acknowledge linguistic and cultural influences in the study of bilingual memory. At the same time, while we may have reached a certain consensus, there is no unanimity with regard to how we should move toward more ecologically valid models of what Appel intriguingly termed "the sociolinguistics of the bilingual mental lexicon". In what follows I will further elucidate my own position on the three issues of major concern to the reviewers and myself: the semantic/conceptual distinction, culture in the study of bilingual memory, and methodological approaches to the study of the bilingual mental lexicon.

The semantic/conceptual distinction

My main aim in this section is to clarify that the focus of my argument is *not* the merits of distinguishing between the conceptual and semantic levels of representation per se. While this distinction may be an appealing discussion topic, I fear that focusing on this secondary issue will distract us from the central premise of the proposed argument, i.e. that many models of bilingual memory take a reductive and ethnocentric approach to representation – whether semantic, conceptual or both – by implicitly assuming concepts to be universal (and more often than not Anglo) and leaving out language- and culture-specific aspects of conceptual representations. While several commentators suggest that the reasons behind this reductionist approach are purely methodological, I suspect that they are also ideological, stemming from the tendency of mainstream monolingual linguistics and psychology to examine mental processes "in vacuo", without their historic, social, and cultural underpinnings (Wertsch, 1991). The marginal role of linguistic and cultural diversity in the relationship between conceptual and lexical stores is continuously underscored by Chomsky who states that "there is no clear alternative to the assumption that acquisition of vocabulary is guided by a rich and invariant conceptual system, which is prior to any experience" (Chomsky, 1987, 22). In her scathing critique of Chomsky's and Pinker's (Pinker, 1994) theoretical assumptions, Wierzbicka (1997) argues that this perspective leads to the ethnocentric bias: "when someone asserts that thought is independent of language, this usually means in practice that the words of his or her native language are absolutized and treated as adequate labels for supposed human 'categories of thought'" (p. 7). In their comments on my paper, several colleagues suggested that the researchers in the field may have assumed linguistic and cultural specificity implicitly but deemed it irrelevant for their research focus. On my part, I fail to see evidence of any such assumptions, and thus doubly applaud the efforts of De Groot whose work brought linguistic and cultural differences back into the lexicon. My main concern is that research on bilingualism that skirts the issue of linguistic and cultural specificity as irrelevant ends up reproducing monolingual and ethnocentric biases of the Chomskian paradigm.

Having said all of the above, I fully agree with Green who suggests that linguistic relativity is an empirical issue to explore, rather than an established fact. I support Green's call for research on linguistic relativity, in particular, in the area of bilingualism, which may serve as a litmus test for many issues raised by Sapir and Whorf. At the same time, I suggest that we need to distinguish between cross-linguistic and cross-cultural differences in conceptual representations and the linguistic relativity proposal about the consequences of these differences. In other words, the lack of agreement on the outcomes of differences should not prevent us from incorporating them into our models and research agendas. In this regard, I particularly welcome the pioneering work of Bowerman and associates (Choi & Bowerman, 1991; Bowerman, 1996a, b) which illuminates cross-linguistic differences in the process of conceptual development in childhood. Looking at spontaneous speech samples, collected longitudinally from children learning various languages by means of videotaping and tape recording, as well as at samples collected from children and adults through elicita-

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tion procedures, the researchers established that utterances of 18-month-old children already reflect a profoundly language-specific spatial organization. For instance, English-learning children used the preposition "in" both when they climbed into the bathtub and put magnetic letters into a small box; in contrast, children acquiring Korean as a first language used the verbs *tule* (enter) and *nehta* (put loosely in or around) in comparable situations, making a distinction between motion paths required by Korean. Similarly, English learners distinguished systematically between putting things into containers of all sorts (in) and putting them onto surfaces (on), but were indifferent to whether the figure fit the container tightly or loosely; in contrast, Korean-speaking children distinguished between tight and loose containment, using appropriate verbs *kkita* (fit tightly) and *nehta* (put loosely in or around). My hope is that future studies of bilingual and multilingual acquisition will pay more attention to concept acquisition and use, in particular, with regard to concepts, established as different between specific language pairs. Bowerman's research, for instance, raises the question of how concepts of motion and space are acquired by children growing up as bilingual in English and Korean. Some glimpses of answers can be gathered from existing longitudinal studies of bilingual acquisition, which suggest that bilingual children do not always develop parallel conceptualizations, but engage in conceptual transfer and change instead. Vihman's three-year-old Raivo, for instance, said in English that he could read and demonstrated this by counting, as in Estonian the word *lugema* stands for both counting and reading (Vihman & McLaughlin, 1982).

I also hope that longitudinal studies of conceptual change will take place in the field of second language acquisition, where we will see how the interaction between competing concepts plays out in adult language learning. To date, this field provides most information about competition between alternative conceptual representations which, in turn, often results in conceptual transfer (Jarvis, 1998). This evidence, summarized in my paper, directly contradicts Appel's (1996) view of second language learning as unproblematic mapping: "we do not have to assume that learning a new language necessarily coincides with new conceptualizations. Most concepts are already present in the mental encyclopedia, only a new label must be learned" (p. 390). Recent research suggests that, if anything, linking "referents", "labels', and "concepts" in L2 learning is a highly complex process which requires one to develop alternative conceptualizations in order to be understood by the speakers of the target language (Aitchison, 1994; Graham & Belnap, 1986; Hatch & Brown, 1995; Jarvis, 1998; Kellerman, 1978, 1986; Krzeszowski, 1990; Pavlenko, 1997). It is particularly difficult for adults, since, as Jarvis and Green rightly point out, their new concepts are in competition with the concepts already in use. Thus, it is not surprising that L2 users agree less and less on translation and use of particular items, as the use becomes less literal (Kellerman, 1978, 1986) or prototypic (Krzeszowski, 1990). Just as we cannot assume similarities between conceptualizations, we cannot assume that different conceptualizations refer to the same unproblematic referents. For instance, Russian *ruka* refers to both English "hand" and "arm", which leads Russian users of English to complain at times that their "hand hurts somewhere above the elbow". At the same time, Russian distinguishes between the human leg (*noga*) and an animal leg (*lapa*), whereas in English both humans and animals have legs, and thus English learners of Russian may elicit a few laughs talking about dogs' *nogi* (legs). Oftentimes, even the relationship between what we see as a single referent and two labels is quite complex, since, while some aspects of conceptual representation may overlap, prototypes and category boundaries may differ across speech communities (see Paradis' discussion of "cats" and "balls"), resulting in categorization differences between speakers of different languages (Kronenfeld, 1996) and in L1-based categorization by speakers of an L2 (Graham & Belnap, 1986; Jarvis, 1998). Thus, to go back to Appel's "dog" example, the issue is not simply to learn a new label for "the same referent" but to develop a new conceptualization, since members of speech communities, such as those represented by American English or Russian, where dogs are seen as friendly and valuable, and members of speech communities, such as Chinese or Arabic, that view dogs as food, or as impure animals, may categorize dogs differently in a number of contexts. Consequently, in order to become a member of a target speech community, language users will have to develop new ways of categorizing and inferencing. My suggestion is that to establish similarity/overlap in referents and concepts, we need to take a closer look at category boundaries and at language use across contexts.

Another important issue raised in the comments is that of individual variation in conceptual representation and typicality judgments (Appel, Francis). While such variation indeed exists and should be recognized, it is my understanding that as psycholinguists we mainly deal with a subset of all concepts possessed by an individual: concepts acquired and accessed through language. These lexicalized, grammaticized, and conventionalized concepts, which I call *language based*, are both social and indexical; as such, they require most agreement among members of a particular speech community in order to achieve an amount of shared understanding in linguistic interaction and joint activity. As a result, they are subject to limited variation, whereby the range of variation for grammaticized concepts may be relatively narrow, and the range of variation for lexicalized and conventionalized concepts a bit less so. At the same time, all language-based concepts of different individuals in a particular community will be in significant overlap with each other, in order for communication to take place. Thus, while individuals may vary in what they perceive as the best exemplars of music (see Appel's comments), all members of a particular community will categorize specific instances, be it a Bach symphony or a country song, along similar lines. Research with monolingual informants will allow us insights into the amount of consistency and the range of variation in representation of a particular concept, so that we can see if our bilingual subjects' representations fall within this range or outside it.

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Last but not least, Roelofs argues against a model that differentiates between concepts and word meanings, suggesting that a one-level model can explain the evidence presented for differentiation between the semantic and conceptual levels. Following his example, I will apply the term "one-level" to models that do not distinguish between semantic and conceptual levels of representation, and the term "two-level" to models that do (such as the Three-Store Hypothesis). I agree with Roelofs on two main advantages of the one-level model: simplicity and the built-in-assumption of "thinking for speaking". At the same time, I suggest that the time has come to privilege ecological and explanatory validity that come with complexity over parsimony. Leaving further discussion of the aphasia data to my colleagues in neurolinguistics, I argue that when it comes to language learning and use by bilinguals, a one-level model where conceptual representations also encode word meanings, continues to conflate concepts with word meanings, thus oversimplifying conceptual representations and focusing the inquiry on the lexicalized concepts. In order to achieve ecological and explanatory validity, any model of the bilingual memory has to offer a principled means of distinguishing between the following:

- language-related (or language-based) concepts and concepts not related to language, for which language users may have a mental representation, but no linguistic means of encoding; in the two-level model such concepts form a part of the general conceptual store but do not have any direct links to the lexicon, or at least exist in the store prior to acquiring a particular label, such as the famous "feminine mystique" or "the problem that has no name" in American feminist discourse (see also the discussion in Appel, 1996);
- lexicalized and grammaticized concepts, in particular, in cases where a concept is lexicalized in one language (as an adverb of time) and grammaticized in another (as aspect or tense); in the two-level model there will be one representation at the conceptual level linked to two distinct sets of semantic constraints;
- conceptual representations which correspond to polysemic meanings of one word.

Most importantly, while I see how a one-level model accounts for cases in which L1 and L2 concepts are in partial overlap – and the L2 learners thus start out by attaching L2 labels to L1 concepts – I fail to see how the model incorporates concepts that are specific to one language and culture only. In other words, models that equate word meanings and concepts and models that incorporate word meanings as parts of concepts don't offer any means to account for performance differences in maximally contrastive cases such as the one I discussed, where foreign language (FL) learners are able to provide an explicit definition of a particular word (semantic level, in my view) but possess no episodic knowledge (conceptual level) (Pavlenko, 1997). According to a one-level model, both FL and L2 learners should be able to use a particular concept/word meaning in "thinking for speaking"; however, only the latter group does so systematically, precisely because it is the only group that does have a concept of privacy.

Ultimately, I believe that the choice between a one-level and two-level model is an empirically testable issue. The model that differentiates between a *conceptual level*, i.e. experientially acquired conceptual representations, stored in implicit memory and called upon in "thinking for speaking", and a basic *semantic level*, which encompasses definitions of words, as well as explicitly stated grammatical rules and conventions of linguistic usage, stored in explicit memory, predicts the following:

- bicultural bilinguals, who use their two languages in socially and culturally appropriate ways and thus possess both conceptual and semantic representations, will exhibit differences in both verbal and non-verbal tasks, when the concepts in question differ in their two languages (i.e. the ways in which they will describe or categorize particular entities will differ depending on the language being spoken); these differences will be particularly visible in the case of obligatory (most often structurally encoded) concepts; where the tasks elicit variation in monolingual performance, bilinguals' performance will fall within the range of variation; at the same time, bilinguals who live and carry out their daily business in multilingual contexts, in interactions with other bilinguals, may have certain conceptual representations typical only for this particular community;
- FL users who possess declarative, but not experiential, lexical or grammatical knowledge will be able to perform similarly to speakers of an L2 and/or balanced bilinguals on linguistic and semantic tasks, such as translation and word association, which involve explicit knowledge, but will fail to engage their semantic knowledge in "thinking for speaking", relying on concepts acquired through L1 instead (Jarvis, 1998; Pavlenko, 1997).

In contrast, a one-level model that does not differentiate between a semantic level (at which both groups have a representation) and a conceptual level (at which one group lacks an appropriate representation) will not predict any difference in performance between these two categories of language users. Although Roelofs suggests that there is a way to account for contexts of acquisition in a one-level model, I fail to see how this may be done in cases such as the Anglo "privacy", where the FL users' propositional knowledge is not linked to any mental image or episodic knowledge (Pavlenko, 1997). At the same time, I acknowledge that many of my colleagues do not refer to the same simplified level of explicitly available rules and definitions as I do when talking about semantics. Alternatively, it is possible to state that FL users who are able to define or translate a particular word, or name a particular picture, and who turn out to be unable to categorize or to use the word appropriately, have an impoverished semantic representation of the word. Ultimately the distinction important to me is between two types of knowledge,

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not two levels of representation, and I will welcome any alternative model that captures it as well as the one by Paradis (see this issue).

Culture in the study of bilingual memory

The next area where some well-founded concerns were raised is that of the operationalization of "culture" in the study of bilingual memory. I fully empathize with Appel's and Francis's concerns about "fuzzy" definitions of culture and the need for operational definitions, measures, and units of analysis that can be introduced in empirical research. While I do not claim to have a privileged perspective on such a fuzzy term as "culture", I find particularly useful recent approaches which deconstruct the monolithic notions of "culture" and "community", suggesting that while communication relies on common ground, "this common ground is distributed in a complex way through social networks. Such networks may constitute effective "subcultures", nested communities within communities; but they can also cross-cut linguistic and social boundaries of all sorts, creating regional and even global patterns of shared, similar communicative strategies in specialist networks" (Gumperz & Levinson, 1996, 12). While acknowledging sociohistorical transmission of meanings, this view also allows for negotiation and conceptual change whereby meanings are challenged and redefined and people end up socialized into different sociocultural selves. As a result, current research in cultural psychology, linguistic and cognitive anthropology no longer approaches the culture of a particular speech community as a "seamless web", unitary and internally coherent across groups and situations (Di Maggio, 1997). Instead, in order to operate at the level of abstraction below a monolithic notion of culture and above the individual, two notions are proposed: a "community of practice" (Lave & Wenger, 1991; Wenger, 1998), productively used in sociolinguistics (Eckert & McConnell-Ginet, 1992, 1999), and an "interpretive community" (Fish, 1980), productively used in linguistic anthropology (Clark, 1996; Gumperz & Levinson, 1996). Both, in addition to the language(s) used, take into consideration social, economic, and generational stratification. Thus, the participants' conceptual representations may be representative of the whole speech community when grammaticized concepts such as aspect or tense are involved, and of a specific community of practice when particular lexicalized concepts are involved. In my own work, in descriptions of a particular ambiguous scene, the concept of "privacy" was invoked by white middle-class Anglo students but not by students from other ethnic/cultural groups or by Americans over 50 who were interviewed in the pilot study. This indicates that, at least with regard to privacy, these groups form different "interpretive communities" whose concepts embody distinct scripts or "interpretive frames". Not surprisingly, young Russian–English bilinguals, who are in the process of negotiating membership in the white middle-class Anglo community, patterned with this particular group in their use of the concept of "privacy" in narrative performance (Pavlenko, 1997).

Units of cultural analysis compatible with the "interpretive community" approach include another set of overlapping notions: mental models (Holland & Quinn, 1987), cultural scripts (Edwards, 1997; Hatch & Brown, 1995; Wierzbicka, 1994), and "interpretive frames" (Tannen, 1993), applied in my own research and that of Vaid (see this issue). All of these are based on the notion of schemata and can be defined as "knowledge structures that represent objects or events and provide default assumptions about their characteristics, relationships, and entailments under conditions of incomplete information" (Di Maggio, 1997, 269). This view is fully compatible with my general approach to concepts as culture-specific and knowledge-based. The notion of alternative and competing interpretive frames also allows us to distinguish between shared and individualized aspects of conceptual representation: it is not the case that everyone shares the "same" concept, but rather that members of the same interpretive community have enough overlap in conceptual representations/interpretive frames to coordinate their practices and activities. Thus, the fact that in American English discourse dogs are generally seen as friendly and are often anthropomorphized is reflected in a high number of TV commercials which use dogs to endorse a wide range of products from Taco Bell chelupas to Busch's beans to Sedans. Whether a particular individual finds dogs indeed appealing and friendly or dirty and disgusting does not prevent them from interpreting the intent of the commercials; the same commercials may be puzzling when aired in a community where dogs are seen as unclean or are treated as food. Similarly, in the study of humor (see Vaid, this issue), the focus is not on what particular individuals find funny (individual level), but on whether they have a means – i.e. a particular script or frame – for deciding why something may be seen as funny by other members of their community.

This discussion would not be complete without indicating how one may go about separating linguistic and cultural influences on conceptual representation. One of the few studies that address this issue in the area of the bilingual mental lexicon is Jarvis (1998). In his study, Jarvis compared narratives elicited by a silent Chaplin film from monolingual Finns and Swedes, and from Finnish and Swedish learners of English, all living in Finland. His data analysis demonstrated that while the participants were very similar in terms of age, language proficiency, and socioeconomic and cultural background, they clearly differed in terms of concepts evoked by different objects and events in the film. When referring to a scene where a vehicle collision was shown, both groups used the verb "crash". In contrast, when referring to a scene where a young woman accidentally runs into Chaplin and knocks him down, the Finns showed a statistical preference for saying that the young woman "crashed" with Chaplin, while the Swedes showed a preference for saying that the woman "ran on" Chaplin. These choices parallel the ones made by the L1 control groups, which, in turn, suggest that for Finnish speakers, human and vehicle collisions belong to the same conceptual category, while for Swedes they constitute separate con-

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cepts; and it is these conceptualizations that underlie word choices in their L2.

Methodological approaches to the study of the bilingual mental lexicon

A few words of clarification are due with regard to methodological approaches I deem useful in the study of bilingual memory. While I do believe in the superior quality of old wine (see Appel, this issue), I revisited Ervin-Tripp's work not in order to emulate, but in order to interpret it through a new theoretical lens, as rightly indicated by Jarvis, and to take inspiration from her contextualized studies of bilingualism. It is for the same reason that I opted against any discussion of Szalay and associates, mentioned by Appel: I generally see the word association methodologies used in these experiments as decontextualized and not particularly informative when it comes to explaining language use. As a result, I consider problematic studies that conflate picture naming with "concept access" such as Chen (1992), where the subjects were asked to name a picture of a duck as a means of assessing "concept retrieval". The information these studies really provide is about picture naming ability only; this ability may be a part of conceptual competence but it does not equal full "concept access". With studies like this, we remain in the dark as to whether L2 users would be able to perform appropriately on categorization tasks with real-life ducks (on L2 users' categorization difficulties with fowl, see Aitchison, 1994) or talk about ducks in ways acceptable in the target language community. Similarly, word association tasks and typicality judgments may elicit mentions of robins and sparrows, but they do not reflect the fact that neither robins nor sparrows come to the minds of language users when they are greeted at the door with "I've just put the bird in the oven" (Edwards, 1997, 236). My suggestion is that in order to create models capable of dealing with natural discourse (Ervin-Tripp, this issue) we need to move above and beyond single word tasks to socially and culturally contextualized tasks that elicit verbal and non-verbal performance representative of what goes on in everyday language use, or "what people mean by what they say, and what they do, interactionally, with words" (Edwards, 1997, 22). As Wierzbicka (1996, 227) points out, children acquiring word meanings and conceptual distinctions and adults learning them in a new language must do significantly more than simply observe how particular words are used in one type of situation; they must also figure out how to extend the initial use to new situations and to new, unfamiliar types of referents, making leaps from objects to construals.

Francis has also expressed doubt concerning the potential usefulness of the type of research with monolingual informants that I discussed. In my view, this research remains crucial in establishing overlapping and non-overlapping aspects of particular language-based concepts, as well as the range of variation within a monolingual speech community with regard to the structure and use of particular conceptual representations. While I clearly do not expect a one-to-one correspondence between bilinguals' and monolinguals' performance, only comparisons of monolingual populations can provide us with the information about potential cross-linguistic and cross-cultural differences.

Green and Ervin-Tripp focused on the importance of context in the study of conceptual representation. Ervin-Tripp indicated that particular aspects of context, such as speaker status, may also have a bearing on which aspects of concepts will be accessed in language use. I fully agree with this perspective, well illustrated in Sharpe (1989), where it is demonstrated that the split of English "knowing" into Japanese *shiru* and *wakaru* cannot be explained as corresponding to knowing and understanding: to determine which verb to use, the speaker must consider pragmatic information on status and politeness. Green reminded us that different aspects of concepts are deployed differently in distinct contexts. This, in turn, makes me ponder over the trend in cognitive psychology, recently exposed by Edwards (1997), to create fully coherent models of word meaning and conceptual representation. It is quite possible that, as Edwards suggests, conceptual representations are not fully coherent and "different parts or potentials of meaning, even contrasting ones, may be worked up and deployed, on and for occasions" (p. 193).

Finally, as I have argued previously (also see Vaid, this issue), future studies of the bilingual memory need to pay more attention to contexts where lexical and conceptual knowledge are at variance. To date, many conclusions about the bilingual lexicon and semantic categorization are drawn based on contexts which involve overlapping prototypes and core meanings, and not on contexts which contrast non-overlapping category boundaries and typicality ratings. Even in the Stroop task and in other color term studies where a discussion of possible differences would be critical, we never get a glimpse of how the meanings of color terms may differ between two particular languages or how these differences play or do not play out in bilinguals' performance (on color terms also see Green, this issue).

Conclusion

In sum, I have reiterated and attempted to clarify the three concerns expressed in my paper. To begin with, I argue that in order to avoid the ethnocentric bias, the cross-linguistic and cross-cultural specificity of semantic and conceptual representations needs to be taken into account in research on bilingual memory, regardless of whether researchers see conceptual and semantic levels of representation as overlapping or separate. I am similarly concerned about the lack of distinction between different types of bilinguals, whereby claims are made about generic "bilingual memory" or "bilingual lexicon"; alternatively, models of bilingual "memories" and "lexicons" may be a more sophisticated approach, reflecting differences between different types of bilinguals. Finally, I suggest that methodologies such as word translation, picture naming or word association are not sensitive enough to differentiate between various types of bilinguals, and thus may present us with skewed results. It is only through the highly

https://doi.org/10.1017/S1366728900230113 Published online by Cambridge University Press

contextualized study of language use and of second language learning in a variety of contexts that we will be able to better understand and model language- and culture-appropriate conceptual representations which allow language users to participate and be understood in a variety of linguistic interactions.

In the end, I would also like to acknowledge the comments about professional gatekeeping made by Jarvis, Appel, and Francis, who point out that journals in particular fields may not be interested in issues of bilingualism to begin with, or may consider contextualized methodologies unreliable and the issues of conceptual transfer trivial. I see the appearance of new conferences, such as the international symposia on bilingualism in Newcastle upon Tyne and in Vigo, and of new journals, such as *Bilingualism: Language and Cognition*, *The International Journal of Bilingualism*, and *The International Journal of Bilingual Education and Bilingualism*, as the new forums which allow for discussions such as this one. They will allow us to renegotiate the boundaries and constraints operating explicitly and implicitly in our field, promoting the creation of a more independent and self-defined field of bilingualism, no longer on the margins of cognitive psychology or sociolinguistics.

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