On the source and nature of semantic and conceptual knowledge

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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.

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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