New approaches to concepts in bilingual memory*

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In this paper, I argue that current approaches to modeling of concepts in bilingual memory privilege word representation at the expense of concept representation. I identify four problems with the study of concepts in bilingual memory: conflation of semantic and conceptual levels of representation; scarcity of methods targeting conceptual representation; assumption of the static nature of the conceptual store; and insufficient acknowledgment of linguistic and cultural specificity of concepts. Basing my arguments on recent developments in the fields of neurolinguistics, linguistics, psychology, linguistic anthropology, and second language acquisition, I suggest new approaches to the study of concepts in bilingualism, based on notions of concept comparability and concept encoding. Subsequently, I discuss various ways in which concepts could develop and interact with each other in bilingual memory and address possible individual, psycholinguistic, and sociolinguistic constraints on conceptual representation and interaction in bilingual memory.

In the last decade there has been a significant surge of interest in the psycholinguistics of bilingual memory (Harris, 1992; Schreuder & Weltens, 1993; De Groot & Kroll, 1997) which has resulted in a number of models of the relationship between words and concepts in the bilingual lexicon (De Groot, 1992, 1993, 1995; Kroll, 1993; Kroll & De Groot, 1997). Recently, Paradis (1997a, b) and Grosjean (1998) 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. In this paper, I will extend their argument and suggest four reasons why our understanding of bilingual conceptual representation is not yet sufficiently advanced and what we can do to remedy the situation. The first reason posited is the continuous confusion between semantic and conceptual levels of representation. The second is the scarcity of methodologies that target conceptual representation: in many cases, methodologies developed to address semantic representation and language processing issues have also been applied to the study of concepts. The third reason is the implicit assumption of the static nature of the bilingual's conceptual store, which underlies the "one vs. two stores" debate. And, finally, the fourth is the lack of any but superficial acknowledgment of linguistic and conceptual relativity, i.e. the linguistic and cultural specificity of conceptual representations.

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In what follows, I will present evidence for each reason, drawing on recent developments in the fields of neurolinguistics, linguistics, psychology, linguistic anthropology, and second language acquisition (SLA). Following the trend in the field (e.g. De Groot, 1995; Paradis, 1997b), I will use the terms "bilingual memory" and "bilingual lexicon" interchangeably, assuming a comprehensive view of bilingual memory which includes both lexicalized and grammaticized concepts. Arguing for new approaches that investigate concepts in bilingual memory as knowledge-based, dynamic, and language- and culture-specific, I will present a way of comparing conceptual representations cross-linguistically, combining investigations of contextualized language use with the study of non-verbal behaviors. Then, I will look at various ways in which concepts could develop and interact with each other in bilingual memory. Finally, I will contemplate possible individual, psycholinguistic, and sociolinguistic constraints on conceptual representation and interaction in bilingual minds.

Five decades of modeling the bilingual lexicon

Organization of the bilingual lexicon has proved to be one of the most controversial topics in the field of bilingualism, ever since it was introduced by Weinreich (1953) and expanded upon by Ervin and Osgood (1954). Initially, culture – conceptualized as the context of language acquisition – appeared as a crucial variable in this work, with distinctions made between: (1) *coordinate* bilinguals, who acquired their languages in distinct environments and were assumed

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to have two conceptual systems associated with the two lexicons; (2) *compound* bilinguals, who learned and used their languages interchangeably in the same environment and were assumed to have a single undifferentiated conceptual system associated with their lexicons; and (3) *subordinate* bilinguals, who learned their second language (L2) as a foreign language, with L2 words attached to conceptual representations through the first language (L1) lexicon.

Early studies, which investigated semantic and conceptual representations through word associations, semantic connotations and mental imagery tasks, supported these distinctions. Lambert, Havelka and Crosby (1958, reprinted 1972) found that coordinate bilinguals differed from their compound counterparts in three important ways: (1) they made more semantic distinctions between a word and its translation equivalent; (2) they had two relatively independent association networks for translation equivalents; and (3) they had greater difficulty with translation. The authors emphasized that "the difference in meanings of translated equivalents is not simply a function of experience in separated acquisition contexts" (1972, p. 57), but rather a function of a bicultural experience whereby language learners are faced with different referents for their "translation equivalents". These results were supported by other studies which indicated performance differences between the two types of bilinguals and cross-linguistic differences in the semantic connotations of various words for coordinate bilinguals (Jacobovits & Lambert, 1961; Lambert & Rawlings, 1969; Ruke-Dravina, 1971). Culture-specific differences in the mental images triggered by the "translation equivalents" were demonstrated and/or argued for by Lambert, Havelka and Crosby (1958), Winograd, Cohen and Barresi (1976), and Paivio and Desrochers (1980). Bugelski (1977), who was born in Poland and spoke Polish before moving to America, also reported autobiographic/chronological effects in the imagery evoked by stimulus words in his two languages: Polish words evoked images of objects and scenes from his childhood whereas English words elicited images of objects and events experienced in a North American setting.

Soon, however, some scholars started claiming that the coordinate/compound distinction was not always evident, and that they found no significant differences in the associations produced by the two types of bilinguals (e.g., Dillon, McCormack, Petrusic, Cook & Lafleur, 1973). Diller (1974) wrote a scathing attack on the compound/coordinate distinction, calling it a "conceptual artifact". These claims, as well as events in the larger fields of psychology and linguistics, resulted in a paradigm shift from the bilingual as a person, with a unique history, to a bilingual viewed as a "depository" or a "processing container" for the two or more languages in question: subsequent research lumped together all acquisition contexts, in an implicit assumption that "all bilinguals look alike for research purposes" (for a refutation of such an assumption, see Grosjean, 1998). The puzzle of bilingualism, once vibrant and colorful, lost the speaker, then the social context of language acquisition, and, finally, its fascination with meaning. In 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 relationship between language, culture and thought to issues of language processing (for a more detailed analysis of this shift in general, see Lakoff, 1987, Lucy, 1992a; for a discussion of the history of bilingual memory research see Keatley, 1992). As a result of this paradigm change, new methodological approaches in the study of bilingualism privileged statistical validity and controllability of artificial tasks over ecological validity of "fuzzy" work conducted outside psychological laboratories. Consequently, contemporary models of bilingual memory are insightful and revealing in their treatment of surface word- and/or language-processing, but inadequate – for several reasons, discussed below – as treatments of such a multi-faceted phenomenon as conceptual representation in bilingual memory, where words are embedded in intricate semantic networks and linked to culture-specific imagery and episodic memory. In his review of research on lexical and conceptual representation in bilinguals, Paradis (1997b) points out the following problems with current research on bilingual memory: lack of a shared definition of "bilingual memory"; lack of attention to various types of bilingualism; lack of distinction between short-term and long-term memory (as a result, the studies only investigate short-term memory effects); and lack of distinction between semantic (language-specific) and conceptual (non-linguistic) representations. Similar issues are raised by Grosjean (1998) who questions both the lack of attention to biculturalism of the bilingual subjects, the non differentiation of the semantic and conceptual levels and the use of identical tasks – such as priming, lexical decision or Stroop test – to study both processing and representation. In short, it appears that, while the field has gained a significant body of knowledge about how multiple languages

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may be processed by one brain, it still has a way to go toward discovering how linguistic and conceptual systems interact in one mind.

Below, I will discuss existing problems in current modeling of the bilingual lexicon and propose some possible solutions. Acknowledging that a variety of interactions between languages and cultures in multilingual minds may result in diverse outcomes, I will limit my own discussion to bilingualism, with the focus on post-puberty or late bilingualism, while encouraging future exploration of other types of interactions between languages and conceptual systems such as simultaneous or childhood bilingualism, trilingualism and other types of multilingualism.

Concepts in the bilingual mental lexicon: separateness, flexibility, and specificity

To discuss a theoretical term such as a concept, first of all, one needs to provide a definition of the subject matter. Is there a plausible unit that can be defined as a concept and if so, what is it and how can it be described? It is widely agreed that the comprehension of words, utterances, and speech acts requires that the visual or auditory forms be connected to meaningful constructs – at least partially shared by the interlocutors – in order to allow for negotiation of meaning to take place in communication. These constructs – lexicalized or grammaticized – allow for understanding, explanation, and classification of the objects, events, or abstractions that they stand for. Thus, it will be assumed in the paper that *concepts* are mental representations which allow members of specific language and culture groups to conduct identification, comprehension, inferencing and categorization along similar lines, even in extreme cases when an individual's access to language per se is lost.

Levels of representation: lexical, semantic, and conceptual

Many contemporary models and discussions of the bilingual lexicon conflate semantic and conceptual levels of representation (Kroll, 1993; Kroll & Stewart, 1994; De Groot, 1992, 1993, 1995; Kroll & De Groot, 1997; Francis, 1999). Green (1993) points out that this confusion originates from the early views of Ervin and Osgood (1954) who equated meanings and ideas. I suggest that it also stems from the monolingual bias exhibited in contemporary psychology and linguistics. Since both fields study predominantly monolingual and monocultural individuals who exhibit a narrow range of variation in correspondence between word meanings and concepts, the differentiation between the two levels is usually deemed unnecessary. This variation, which may be influenced by a number of factors such as age, socioeducational background, and cultural membership, becomes significantly greater in the study of bilingual – and especially bicultural – individuals for whom the relationship between word meanings and concepts may exhibit a number of different patterns (discussed later on in the paper), some of which do not surface in the study of monolingual individuals.

Over the years, Paradis (1997a,b) repeatedly stated that the distinction between three levels of processing and representation – lexical, semantic and conceptual – is warranted by neurolinguistics and that concepts should not be indiscriminately lumped together with word meanings. The evidence for a distinction between word forms vs. semantic and/or conceptual levels comes from research on modality-specific semantic deficits (Warrington & Shallice, 1984; Baddeley, 1990; Caplan, 1992) and on double dissociations that occur in patients with various linguistic and cognitive impairments (Baddeley, 1990; Caplan, 1992; Damasio & Damasio, 1993). 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 (Lecours & Joanette, 1980; Paradis, 1997b). A subject with such an impairment is able to categorize along the linguistically internalized lines and buy a "mug" as opposed to a "cup", but has no way of processing words and accessing their meanings. To a lesser degree the same pattern is exhibited in various anomias (naming deficits), when patients, who are unable to name objects, can nevertheless categorize them properly and use them accordingly (Caplan, 1992; Damasio & Damasio, 1993). With regard to representation of concepts in the brain, the research on anomias and category-specific impairments led Caramazza (1999) to postulate the domain-specificity principle, whereby concepts are seen as encoded (and impaired) in domains, such as animate/inanimate.

The distinctions assumed in the present paper are based on Paradis's (1997a, b) 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 are usually stored in the language areas of the left cerebral hemisphere;

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– *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, and auditory, tactile and somatosensory representations, based on experiential world knowledge; it is generally stored in various brain systems outside the medial temporal lobe and diencephalon (*implicit* or *nondeclarative* memory) and is not vulnerable to aphasia.

In his comprehensive discussion of issues in linguistic categorization, Taylor (1995) underscores the importance of recognizing that not only do linguistic forms stand symbolically for conceptual categories but also that linguistic forms themselves constitute categories, whereby a category of *noun* would also have representative and marginal members (see Andersen and Shirai, 1996, for a discussion of a prototype view of tense and aspect). Thus, a *grammaticized* concept, such as gender or aspect, will consist of the following levels:

– *surface* level: phonological and morphosyntactic properties;

– *semantic* level: explicitly available information on the meaning of various forms such as prescriptive grammar rules many learners memorize in foreign language classes;

– *conceptual* level: multi-modal mental representations.

Paradis (1997a, b) succinctly theorizes the relationship between semantic and conceptual levels of representation: semantic constraints, which are part of linguistic competence, activate conceptual features to obtain a mental representation of the referent (object, quality, event, etc.). Consequently, ''translation equivalents'' that differ in semantic constraints will activate distinct conceptual representations. Moreover, many words are also polysemous, which, in turn, will lead to distinct conceptual representations for different meanings. In short, the *semantic* level of representation in this view refers to lexical meaning of words, part of the speaker's linguistic competence, vulnerable to aphasia, while the *conceptual* level refers to non-linguistic representation (imagery, scripts, etc.), available to aphasic patients. The fact that this model of the mental lexicon with separate lexical/surface, semantic and conceptual levels describes the latter as ''non-linguistic'', does not imply, however, 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 the case of aphasia, when linguistic forms and meanings are lost or become ''inaccessible'', the concepts underlying these structures remain intact, guiding a person's behavior and allowing for inferencing and categorization along the lines deemed appropriate in a particular speech community.

It is clear that individuals with no linguistic or cognitive impairments experience a significant amount of interaction between word meanings and concepts: acquisition and use of many concepts is predicated on communication, whereby mental representations are constructed in and through verbal exchanges. However, using the terms ''semantic'' and ''conceptual'' interchangeably – as it was most recently done in Francis's (1999) review of research on bilingual memory – seems theoretically unsound and unsatisfactory for a number of reasons. To begin with, equating the conceptual level with the semantic level is immediately rendered problematic by the study of aphasia, in particular, global aphasia (Lecours & Joanette, 1980; Paradis, 1997a). Second, in the study of language and cognition, 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 ones (evident in non-verbal pragmatic behaviors). Most importantly, in the study of bilingualism, conflation of semantic and conceptual does not allow us to investigate contexts where meanings and concepts are at maximal contrast, such as foreign (FL) vs. second language learning. To illustrate this point, I will discuss below my own study (Pavlenko, 1997), when FL and L2 Russian learners of English were able to define the words ''privacy'' and ''personal space'', providing evidence that both groups have semantic representations of the two words. However, only L2 learners 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 were able to access the concepts for purposes of inferencing and categorization.

Distinguishing between the semantic and the conceptual level is crucial for the study of bilingualism,

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as it will help us to differentiate between bilinguals who acquired their languages in different contexts and who have different degrees of language proficiency and cultural competence. For example, word meanings acquired in decontextualized classroom environments are often attached to L1 conceptual representations and, thus, lead to conceptual transfer and categorization along the lines of the first language and culture (Graham & Belnap, 1986). For language-specific concepts, such as ''privacy'', classroom learners' word meanings may be attached to an impoverished mental representation; as a result, their non-linguistic behaviors do not correspond to the non-linguistic behaviors of learners who acquired the concept through meaningful social interaction and thus developed a full mental representation (Pavlenko, 1997). Similarly, language-appropriate meanings and conceptual representations may be dissociated for grammaticized concepts. As any language teacher knows, the fact that American learners can produce a definition of a French subjunctive does not necessarily entail any deeper understanding or ability to use it, just as the ability to define and exemplify grammatical gender does not imply that a learner is fully able to categorize it along the grammatical lines of French, Spanish or Russian. The stage in second-language learning where word meanings and mental representations are dissociated is beautifully described in Eva Hoffman's (1989) ''language learning memoir'' *Lost in Translation: A Life in a New Language*: ''The words I learn now don't stand for things 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 my being immersed in rivers. 'River' in English is cold – a word without an aura. It has no accumulated associations for me, and it does not give off the radiating haze of connotation. It does not evoke'' (p. 106).

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 concept (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 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, an issue that can no longer be ignored in the study of the mental lexicon (Lakoff, 1987; Wierzbicka, 1996); and (2) the distinction between core vs. peripheral or literal vs. metaphoric meanings, shown to be critical in the study of semantic transfer (Kellerman, 1978, 1986).

From a methodological point of view, the three-level model enables us to continue the discussion, revived recently by Grosjean (1998), on the usefulness and comparative merits of various tasks with regard to focus (processing, representation or both) and access to various levels of representation (lexical, semantic, or conceptual). 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 lexical processing and – partially – semantic representation, but do not provide much information about conceptual representations (also see Grosjean, 1998, p. 143). Picture naming, word association, word translation and semantic differential tasks are seen as accessing the semantic level but only a narrowly defined conceptual one. Most importantly, as Macnamara (1967) pointed out as long as 30 years ago, studies with isolated words are not likely to describe adequately a process as complicated as the relationship between language and thought. The problem (the second one after the semantic-conceptual conflation issue) is that research conducted with decontextualized words may untangle many interesting processing characteristics but it is clearly insufficient when it comes to the astonishing variety and multiplicity of connections arising when the meaning of the same words is constructed in context. Similar arguments have been raised recently by Hummel (1993) and Francis (1999). I suggest that in order to access fully conceptual representations of 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 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; Nuyts & Pederson, 1997; Pederson, Danziger, Wilkins, Levinson, Kita & Senft, 1998). In the remainder of the paper I will provide several examples of studies which employ such research designs.

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The dynamic nature of the bilingual lexicon

Another problem in modeling of the bilingual lexicon is the disregard for the dynamic nature of conceptual representations. Following Weinreich (1953) and Ervin and 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. While conceptual change is usually assumed to be an important part of the development of any monolingual individual (see also a discussion in De Groot, 1995), I will demonstrate later that adult second language learning and late bilingualism provide a particularly rich soil for the study of conceptual change and interaction between competing concepts in bicultural bilinguals.

How can one theorize concepts in ways both compatible with and productive for the study of bilingualism? In a discussion of the relationship between language and conceptualization, Pederson and Nuyts (1997, p. 2) point out that "the differences of opinion regarding the nature and format of linguistic representation are not nearly as diverse as views regarding the nature of 'conceptual representation' and the organization of 'conceptual knowledge'". There may be nearly as many answers as researchers addressing the issues. In the last decade, plagued by problems with feature-, exemplar- and typicality-based approaches to concepts (see Hampton, 1997, for an up-to-date review), a number of researchers have put forth a view that the organization of concepts is *theory-* or *knowledge-based* rather than feature-based and is driven by intuitive theories about the world (Carey, 1985; Murphy & Medin, 1985; Keil, 1986, 1989a, b; Lakoff, 1987, 1989). This approach is a significant shift away from traditional but highly problematic theories that assume well-defined sets of concepts and categories, which can be differentiated from each other according to particular features. According to this view concepts are construed not as isolated entities, but as intrinsically relational things, and many of them as partial theories in themselves embodying explanations of the relations between their constituents, origins, and relations to other such clusters (Keil, 1989a, b). Individual concepts cannot, therefore, be understood without some understanding of how they relate to other concepts. Differing from a general "web of knowledge", lexicalized concepts "bear nonarbitrary relations to feature frequencies and correlations, as well as providing explanations of those frequencies and correlations" and embodying systematic sets of beliefs (Keil, 1989a:1). While almost all concepts are assumed to be composites of associations and theory, their structure is seen as significantly different across types: artifacts, nominal kinds, natural kinds, social concepts, etc. Some concepts may be prototype- or exemplar-based, others dimensional, and still others composed of discrete features.

The most important reason for the use of knowledge-based theory in bilingualism research is its explanatory potential with regard to change. In contrast to approaches which treat concepts as "stable separate entities", knowledge-based theory views them as highly dynamic and flexible, providing a strong theoretical basis for conceptual change continuously taking place within speech communities (see a discussion of prototype shifts and splits in Ungerer & Schmid, 1996, pp. 260–267) and for conceptual development in individual language users. The "knowledge-based concepts" framework is also fully compatible with the neurolinguistic principle of domain-specificity of the organization of conceptual knowledge (Caramazza, 1999). Thus, when a concept undergoes restructuring, this change may involve not only a reorganization of the structure of the specific concept, but also a reorganization of the whole conceptual domain. Keil's (1989a,b) work with children and adults is a thorough investigation of such changes in individual expertise. With regard to society, restructuring can be illustrated, for example, by changes imposed on American culture by the appearance of new concepts such as "sexual harassment" and the ensuing on-going societal debate of behaviors the term could possibly refer to.

The dynamic view of concepts as knowledge-based has important implications for bilingualism research. With regard to theory, it 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.

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Linguistic and cultural specificity of concepts

The last and the most important problem with many of the models is the lack of proper attention to linguistic and cultural specificity of concepts. In her pioneering work on aspects of conceptual representation in the bilingual lexicon, De Groot (1992, 1993, 1995) did acknowledge this specificity, suggesting, however, that it is more of a characteristic of abstract and emotion concepts. This limitation has been criticized by Paradis (1997a,b), who pointed out that differences can be found in cross-linguistic comparisons of many concrete concepts such as English-French "translation equivalents" chair/*chaise* or ball/*ball*e. Depending on what language the command was issued in, bilinguals may bring you back a different set of objects: to the French command "*apporte-moi toutes les balles*", they will gather tennis balls, cricket balls and small rubber balls; if the command "bring me all the balls" were issued in English, they would also include volleyballs, basketballs and footballs (Paradis, 1979). Thus, "ballness", "chairness", or "birdiness" is not something that is universally shared – for example, the counterpart of an English "bird" in the Australian language Nunggubuyu includes bats and grasshoppers (Wierzbicka, 1996).

The cross-linguistic and cross-cultural differences in conceptual representations are demonstrated in a wide range of studies in linguistic anthropology and cognitive linguistics, inspired by the renewed interest in linguistic relativity, often referred to as the Sapir-Whorf hypothesis (Lucy, 1992a,b, 1996; Gumperz & Levinson, 1996; Nuyts & Pederson, 1997). The lexicalized and grammaticized conceptual differences documented in these studies range from the conceptualization of self (Markus & Kitayama, 1994; Triandis, 1995) to concepts of time (Malotki, 1983; Lucy, 1996), space and location in space (Brugman, 1981; Talmy, 1983; Bowerman, 1989, 1996a,b; Carroll, 1993, 1997; Levinson, 1996; Becker & Carroll, 1997; Pederson, Danziger, Wilkins, Levinson, Kita & Senft, 1998), color (Lucy, 1997), number (Miura, 1987; Miura & Okamoto, 1989; Lucy, 1992b), categorization of everyday objects such as cups and glasses (Kronenfeld, 1996; Lucy, 1992b, 1996) and prototypes for basic and superordinate categories (Kempton, 1981; Schwanenflugel & Rey, 1986).

Several research methodologies for investigation of conceptual differences have been advocated in the field: I will discuss three distinct approaches which will hopefully inspire similar investigations in the field of bilingualism. One of the most careful and ingenious studies of divergent conceptualizations was carried out by Lucy (1992b), who explored the effects of structural differences (i.e. grammaticized concepts) between American English and Yucatec Maya on the cognition of speakers of the two languages. His research focused on several distinctions in the grammatical treatment of number in the two languages, showing their consequences for "habitual thought" in a number of classification and memory tasks. The first difference between the two languages lies in the plural marking. While in English the plural is signaled obligatorily for a large number of lexical nouns, in Yucatec it is signaled optionally for a comparatively small number of lexical nouns. In addition, English speakers mark plural for nouns referring to animate entities and ordinary objects but not for amorphous substances, whereas Yucatec speakers sometimes mark plural for animate entities and rarely for any other type of referent. As a result, in memory tasks involving complex pictures, English speakers turned out to be sensitive to number for both animate entities and objects but not for substances, as opposed to Yucatec speakers who were sensitive to number for animate entities only, but not for objects (precisely where the two grammars are at maximal contrast).

A second distinction explored by Lucy derives from the fact that numerals in English directly modify their associated nouns, whereas in Yucatec they must be accompanied by a "numeral classifier", which typically provides crucial information about the shape or material properties of the referent (e.g., "un-*tz'iit*-kib" "one *long thin* candle"). Lucy interprets this as suggesting that all lexical nouns in Yucatec are semantically unspecified for any essential quantificational unit, as if nouns refer to unformed substances (wax) rather than objects (candle). In contrast, in English many concrete nouns include the notion of "unit" as part of their basic meaning. As a result of this distinction, the two groups of subjects differed in their performance on classifying tasks. Speakers of English – a language in which nouns habitually encode "unit" or "form" as part of their basic meaning – showed a preference for shape-based classification, e.g., grouping together plastic and cardboard boxes. In contrast, Yucatec speakers – whose language requires additional forms to provide information about shape – preferred material-based classification, e.g., grouping together a cardboard box and a piece of cardboard, but not the plastic box. Other studies of non-linguistic behaviors influenced by linguistically encoded conceptual differences include Kronenfeld (1996), Becker & Carroll (1997), and Pederson, Danziger, Wilkins, Levinson, Kita & Senft (1998).

An equally interesting approach, which focuses on

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contextualized language use, was initiated by Lakoff and Johnson (1980) who suggested that languages as conceptual systems differ primarily in conceptual metaphors which underlie abstract concepts and provide explanations of experiences and behaviors. For example, the American English conceptual metaphor ARGUMENT IS WAR organizes and permits us to understand idiomatic expressions such as *to win or lose an argument*, *to demolish an argument, to have an indefensible claim*, *to attack someone's weak points,* and to create new expressions along the same lines. If in another language an underlying metaphor for "argument" were a DANCE, it would undoubtedly capture an entirely different set of beliefs and causal relationships, therefore representing a different "folk" theory and constructing a different concept of "argument". This line of thought has led to productive work on culture-specific models of anger, pride, love, marriage, mind and other concepts (Kovecses, 1986; Holland & Quinn, 1987; Lakoff, 1987).

An ethnolinguistic approach to the study of concepts in language and culture was undertaken by Wierzbicka (1991, 1992, 1994, 1997) who problematized the notion of "translation equivalents", oftentimes assumed in models of the bilingual lexicon. Wierzbicka's cross-linguistic and cross-cultural analysis of a variety of terms, including "soul", "mind", "destiny" and "freedom", demonstrates what type of scripts and schemas they entail in each culture, and how culture-specific and ultimately untranslatable such concepts really are. For example, contrasting Russian "*dusha*" (soul) and English "soul", Wierzbicka (1992) shows how "soul" can always be translated into Russian as "*dusha*", whereas the reverse is not true: in English translations "*dusha*" is often omitted or replaced by either "heart" or "mind". The core of the difference, according to Wierzbicka, lies in distinct ethnotheories embodied in dichotomies offered by the two languages: mind/body in English, soul/body in Russian. Consequently, "*dusha*" in Russian signifies the moral and emotional core of a person; an extremely salient term, it is widely used to refer to all aspects of one's personality: feelings, thoughts, will, knowledge, inner speech, the ability to think. The contrasting dichotomies, suggests Wierzbicka, also result in behavior differences between Russians and Anglo-Saxons: while Russians behave as if indeed they were composed of two parts, one of which is the subjective, unpredictable, spontaneous and emotional "*dusha*", the Anglo-Saxons attempt to conform to the view of people composed of body and mind, inhibiting overt displays of emotion and inner life. From the point of view of Russian culture, emotions constitute a person's normal state: their absence indicates that a person's "*dusha*" is dead.

Surprisingly, so far not much has been done to test the ideas of linguistic relativity in the field of bilingualism. The lone empirical investigation of bilingualism and linguistic relativity was conducted by Susan Ervin-Tripp (1954, 1964, 1967, all reprinted in 1973), who developed a research design in which the same bilingual subjects were tested twice on the same sets of materials – Thematic Apperception Test (TAT) cards, semantic differentials, word associations, and sentence and story completion tasks – with the sessions in their two respective languages taking place six weeks apart. One such study was conducted with 64 French–English late bilinguals who were raised in France and had lived in the US for more than four years (Ervin-Tripp, 1964). The researcher found that these bilinguals told different stories in each language when asked to relate what they saw on the TAT cards with an interval of six weeks between language sessions. For example, the picture, which in French elicited a variety of themes of aggression and striving for autonomy, in English led the same subject to talk about family support and striving for achievement. Ervin-Tripp offered several alternative explanations of the fact that the content of the narratives changed with language, where one of the possibilities considered was language influence on classification of the stimuli and resulting differences in recall of past experiences in the two languages. The results of the previous studies were also partially confirmed by a series of experiments with Japanese-American women in the USA (Ervin-Tripp, 1967). The subjects in the study were first-generation Japanese women (Issei), war brides married to Americans and mostly assimilated to American culture, and second-generation women (Nisei), members of the Japanese American community who returned to Japan for education. The study also employed monolingual controls for both groups. The most clear-cut language effects were demonstrated on the word associations and sentence completion tasks. When speaking Japanese, both Issei and Nisei gave associations more typical of women in Japan: *tea*, for example, was associated with Japanese utensils for the tea ceremony. When speaking English, the Issei gave typically American associations, such as *lemon* and *cookies* in association with *tea*. In completing the sentence "When my wishes conflict with my family's . . ." one woman responded with ". . . it is a time of great unhappiness" in Japanese. But when speaking English, she answered ". . . I do what I want." The overall effect was that content and affect shifted with language for both groups. However, there were also subjects who showed preference for Japanese or American solutions irrespective of the language used. Ervin-Tripp suggested that these preferences corre-

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lated with the subjects' cultural self-identification: modern (American) values as opposed to traditional (Japanese) cultural beliefs.

In the thirty years that followed Ervin-Tripp's studies, there was very little work done on the relationship between bilingualism, culture, and thought. It is only recently that researchers have started discussing once again the implications of linguistic relativity for the relationship between bilingualism and thought, possibly the best testing grounds for the Sapir-Whorf hypothesis (Macnamara, 1970, 1991; Paradis, 1979; Hunt & Agnoli, 1991; Green, 1993, 1998; De Groot & Kroll, 1997; Pavlenko, 1997; Koven, 1998). The applications of this theoretical discussion to empirical research remain to be seen.

The view that lexicalized and grammaticized concepts are both language- and culture-specific has important implications for 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. 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. While some bilinguals may be using their two languages in either an L1 or L2 monocultural environment, others may be part of bilingual subcultures (e.g. the Chicano community in the United States), and yet others may indeed use their languages in two completely separate monocultural contexts. As a result, patterns of language use and conceptual representations linked to them may greatly differ for varieties of the same language. In addition, language variation and fuzzy and permeable culture boundaries also need to be acknowledged both in theory and in our choice of control groups. If indeed our subjects are monolinguals who are currently learning and using an L2 in a predominantly monolingual target language environment, monolingual speakers of L1 and L2 may indeed be optimal controls. However, when dealing with bilingual subjects who use their languages in predominantly bilingual/bicultural communities, we may prefer other fluent bilinguals as controls for the two languages in question: we may see that their lexicalized – and at times even grammaticized – concepts may be distinct from the monolingual and monocultural norms.

New approaches to research: concept status and development

Concept status

Based on the discussion above, I suggest that in order to capture the richness of conceptual representations in bilingual minds we need to study these representations across a variety of conceptual domains and develop models in which concept characteristics are not confused with word properties. The importance of this shift of focus has recently been emphasized by Becker & Carroll (1997) in their discussion of the results of the European Science Foundation study of second language acquisition by adult immigrants. Analyzing acquisition of spatial relations, the researchers concluded that the key predicting factor of successful acquisition was "the degree of overlap between the source and target language in the way *concepts* are used to structure space (as opposed to the formal *categories* in which they are encoded)" (Becker & Carroll, 1997, p. 193).

I suggest that a possible theoretically and empirically informed way of studying 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) (Wierzbicka, 1991, 1992, 1994, 1997; Lucy, 1992a, b, 1996, 1997; Berman & Slobin, 1994; Hatch & Brown, 1995; Taylor, 1995; Slobin, 1996; Becker & Carroll, 1997; Pavlenko, 1997; Pederson, Danziger, Wilkins, Levinson, Kita & Senft, 1998). Clear discussions of ways to conduct contrastive analysis of the lexicon are presented in Hatch and Brown (1995), while examples of cross-linguistic and cross-cultural analysis of lexicalized and grammaticized concepts abound in work of Berman and Slobin (1994), Becker and Carroll (1997), Wierzbicka (1991, 1992, 1994, 1997) and Pederson, Danziger, Wilkins, Levinson, Kita and Senft (1998). A detailed discussion of the analysis of ways of encoding can be found in Taylor (1995). Finally, later on I will exemplify this approach discussing my own study of conceptual domains of private and personal of Russian–English bilinguals (Pavlenko, 1997). The proposed approach is summarized in Table 1.

In this theoretical framework, *lexicalized* concepts refer to lexical items: their use is not obligatory and involves choice on the part of the speaker between competing items in a lexical range (Jarvis, 1998). As such lexicalized concepts may be easier to acquire, at least with regard to the referential

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Table 1. *Comparison of concepts in the two languages of a bilingual*

Type of concept encoding	Concept comparability		
	Language-comparable concepts		Language-specific concepts
	Relatively similar	Relatively different	
Lexicalized	e.g. *private* & *personal* in English vs. Russian	e.g. *soul* & *emotions* in English vs. Russian	e.g. *privacy* & *personal space* in English vs. Russian
Grammaticized	e.g. transitivity in English vs. French	e.g. tense in English vs. Japanese	e.g. definiteness in English vs. Korean

meaning. *Grammaticized* concepts refer to the domain of morphosyntax and encompass a variety of grammatical categories – such as aspect or tense – which may vary cross-linguistically and thus lead to a variety of ways of encoding experiences (Lucy, 1992a,b, 1996; Berman & Slobin, 1994; Taylor, 1995; Slobin, 1996; Ungerer & Schmid, 1996). These concepts are usually obligatory: their use involves minimal choice and positioning on the part of the speaker. As such, they may often co-exist in the two languages of a bilingual individual. On the other hand, they are also transparent and as such may be hard to change in L2 learning in adulthood: SLA research documents conceptual transfer in acquisition of such diverse grammaticized concepts as spatial relations (Ijaz, 1986; Becker & Carroll, 1997; Jarvis & Odlin, 1998), tense and aspect (Hinkel, 1992, 1997; Wenzell, 1989) and modality (Hinkel, 1995). Hard to change, however, does not mean impossible: many late bilinguals do use their two languages in grammatically and conceptually appropriate ways (Birdsong, 1992; Ioup, Boustagui, El Tigi & Mosel, 1994; Pavlenko, 1998a). Moreover, research on L1 attrition and loss has documented many cases in which L1 grammar is reinterpreted by adult immigrants in terms of L2 (Seliger & Vago, 1991). Future cross-linguistic and cross-cultural comparisons of acquisition and interaction between grammaticized concepts in bilingual lexicons may draw on the research above, on theoretical applications of prototype theory to tense and aspect (Andersen and Shirai, 1996) and on the large body of cross-linguistic empirical data on the conceptual domain of spatial encoding and categorization (Talmy, 1983; Bowerman, 1989, 1996a,b; Carroll, 1993, 1997; Levinson, 1996; Becker & Carroll, 1997; Pederson, Danziger, Wilkins, Levinson, Kita & Senft, 1998).

The studies mentioned above provide us with a number of ways of making comparability and similarity judgements, even though such judgements would clearly vary depending on a position taken by a particular researcher. 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 – but not German or English – past-tense inflections (Slobin, 1996). My own research, discussed below, 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 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? Or if the concept that is a noun in one language is encoded in another as a verb or a particle? Becker and Carroll

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(1997) suggest that in L2 learning this distinction may be overridden by concept comparability. The implications for other types of bilingualism await investigation.

Clearly, the framework presented above is not the only possible way to look at concepts. With regard to distinctions between ways of encoding, another possibility would be to include an additional category of *conventionalized* concepts which refers to the domain of pragmatics and ways of performing speech acts (e.g. requests or apologies). Since at times a speech act may be embodied in a single term/concept, it may make sense to create a separate category for these terms, which have very concrete manifestations in pragmalinguistic behaviors. Some may be completely conventionalized and as such transparent (i.e. presumed to be universal by the speakers) and others may involve positioning on the part of the speaker. Such concepts may also be difficult to change in second language learning and may lead to conceptual transfer in pragmatic behavior, documented in SLA (Kasper, 1992; Hinkel, 1995).

With regard to comparability, another possibility is to introduce a column, "identical" concepts, based on the assumption that concepts are fully shared by cognates and "translation equivalents". However, vast empirical research on conceptual differences and lack of agreement on which concepts may be fully shared by any two speech communities in question, and which may be considered universal, prevents me from doing so at this point (for an illuminating discussion of possible semantic and conceptual universals, based on a thorough cross-linguistic investigation, see Goddard & Wierzbicka, 1994; Wierzbicka, 1996).

Conceptual development and interaction

My second suggestion is that, depending on their way of encoding and comparability, as well as on the speaker's learning history, concepts may interact with each other in a number of ways. The lack of such interaction would be exhibited either as *co-existence* of two conceptual domains, which are oftentimes drawn upon in different contexts or, in 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; it can often be accompanied by *substitution* of the previous concepts by the new ones.

Co-existence. Co-existence of alternative conceptual representations is most typical for bilinguals who use their languages in different contexts. This possibility finds indirect support in work by Ervin-Tripp (1954, 1964, 1967) discussed earlier in the paper, as well as in a recent study by Koven (1998), who elicited narratives of personal experience from French–Portuguese bilinguals, once in French and once in Portuguese. Analyzing both the bilinguals' performance in the two languages and the perceptions of their performance by other French–Portuguese bilinguals, Koven (1998) found that the speakers drew on different concepts, discourses and repertoires when telling the "same" stories in their two languages and, as a result, projected very different personalities.

An indication of how episodic memory may contextualize and support co-existing conceptual representations is found in studies which demonstrate that for bicultural bilinguals cultural imagery and autobiographic memories differ as a function of language of presentation (Bugelski, 1977; Paivio & Desrochers, 1980; Otoya, 1987; Marian & Neisser, forthcoming). In a series of studies with late Russian–English bilinguals, Marian and Neisser (forthcoming) demonstrated that English word prompts such as "birthday" were more likely to elicit recent memories of events that took place in a North American context, while Russian retrieval cues such as "*den' rozhdenia*" (birthday) elicited memories of earlier celebrations that took place in Russia.

In future, it would be important to conduct research on both language use and non-linguistic behavior of such bilinguals, looking, for example, at whether their categorization patterns differ depending on what language is used in the task. It is also very important to acknowledge the role played by the context of data collection and by language mode (Grosjean, 1998). Even in the case of co-existing systems, one cannot make an assumption that conceptual structure of language A will always underlie performance in language A. As demonstrated by Otheguy and Garcia (1993), conversations in Spanish by the same participants, late Spanish–English bilinguals, speaking with the same interlocutors and dealing with the same set of topics, exhibited

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low levels of L2 conceptual transfer when situated in a Latin American context, and high levels when in a North American one.

L1 conceptual transfer A very different relationship between linguistic and conceptual system is L1 conceptual transfer, whereby, for many FL and L2 users, L1-based concepts underlie competence and performance both in L1 and L2. L1 transfer is a process well documented in SLA research (Gass & Selinker, 1983, 1992; Kellerman & Sharwood Smith, 1986; Ringbom, 1987; Dechert & Raupach, 1989; Odlin, 1989). Recently, Jarvis (1997, 1998, 1999) and Pavlenko (1997, 1998b) presented a unified account of many of the identified phenomena under the umbrella of conceptual transfer. It is argued that conceptual transfer takes place for lexicalized (Ringbom, 1978, 1987, 1992; Kellerman, 1978, 1986; Pavlenko, 1997; Jarvis, 1997, 1998) and for grammaticized concepts (Ijaz, 1986; Wenzell, 1989; Krzeszowski, 1990; Hinkel, 1992, 1995, 1997; Becker & Carroll, 1997; Jarvis & Odlin, 1998), as well as for prototypicality judgements and categorization (Graham & Belnap, 1986; Aitchison, 1994).

The prototypicality studies deserve a special discussion, as they point to problematic methodological assumptions in previous psycholinguistic studies of the bilingual lexicon. In the oft-cited study of semantic categorization, Caramazza & Brones (1980) suggested that bilinguals categorize exemplars as members of specific categories rapidly and accurately in both languages. Paradoxically enough, the baseline typicality for the study was taken from Rosch's (1975) norms for English-speakers and simply assumed to apply in Spanish as well. In contrast, Graham and Belnap (1986) considered possible differences in categorization patterns, typicality, and prototype saliency between English and Spanish. Adopting the technique used originally by Labov (1973), they provided the participants with ten sets of related pictures that varied according to size or shape (cups to glasses, bowls to plates, chairs to benches, shoes to boots etc.). The subjects of the study were 133 native English speakers and 40 native speakers of Spanish in intermediate and advanced ESL classes, all of them students at Brigham Young University. The ESL learners had studied English for four years on average, had resided in the US for less than a year and had provided both the Spanish and the ESL data for the study. The results of the study demonstrated that there were major boundary differences between the English *chair*, *stool* and *bench* and the Spanish *silla* and *banco*, as well as between *boot* and *shoe* in English and *bota* and *zapato* in Spanish. In cases where such boundary differences existed, the Spanish learners of English consistently followed the L1 pattern of categorization in their L2, suggesting a strong L1 influence on the acquisition of lexical boundaries in the L2. The study also suggests that in future categorization research we need to consider the possibility of different patterns and that for bicultural bilinguals to categorize accurately may mean to exhibit different categorization patterns in their two languages.

Previous work has also shown that L1 conceptual transfer is a wide ranging as well as a complex phenomenon: the degree of conceptual transfer may depend not only on the degree of relatedness between languages and cultures (Aitchison, 1994) and the learner's proficiency (Kellerman, 1978, 1986), but also on concept complexity and perceived differences between languages (Biskup, 1992). Studies that focused on semantic transfer demonstrated that central (or prototypical) and literal meanings were more transferable than noncentral (or peripheral) and metaphoric ones (Kellerman, 1978, 1986; Ijaz, 1986; Hartford, 1987; Jarvis, 1997, 1998).

One finding in particular deserves further investigation – the fact that L2 learners experience particular difficulty with the use of cognates and other terms that are closely related. Instead of overtly transferring the L1 meaning, they often appeal to avoidance and underrepresentation of particular L2 meanings (Kellerman, 1978, 1983; Ijaz, 1986). In order to account fully for the differential transfer status of various lexicalized concept categories, in particular cognates, processing studies need to be balanced out by production studies. Studies of single words used in their core meanings also need to be supplemented by research on words in context, used both in their central and literal, as well as peripheral and metaphoric meanings. While in laboratory conditions cognate words from different languages may appear indistinguishable, outside the psycholinguistic lab a world of difference can separate some, seemingly close, cognates. Thus, even though it has been convincingly demonstrated that cognate status facilitates bilingual memorization, recall and comprehension, it can also have an adverse influence on learning and production outside the range of core or prototypical meanings (Ringbom, 1978, 1987; Kotsinas, 1983; Ijaz, 1986; Hasselgren, 1994). Meara (1993), in his review of studies in SLA, suggested that L2 learners "have a tendency to avoid cognates, or at least that they are more reluctant to use cognates than one might have expected them to be on the basis of the research reported [in the bilingual processing literature]" (p. 283). Kotsinas (1983) points out that learners may also overuse and extend cognates instead of learning other more precise synonyms.

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Ringbom (1987) warns against "false cognates" which may mislead the learners into assuming full overlap of meanings which in reality may be only partially equivalent or even completely distinct (e.g. the English *embarrassed* and the Spanish *embarazada*/pregnant).

With regard to models of bilingual memory, L1 conceptual transfer is reflected at present only in the Revised Hierarchical Model (Kroll, 1993; Kroll & Stewart, 1994) which, in the perspective taken in this paper, accounts for FL learning/subordinate bilingualism. The model proposes that the L1 lexicon is larger than the L2 lexicon and that there is an asymmetric relationship between the two lexicons and the conceptual store: in the beginning every L2 word is first mapped onto its translation equivalent, and only later will it access a concept directly. The strength of connections between the three stores varies as a function of the L2 learner's relative fluency in L2 and language dominance. While nicely capturing language learning in the classroom environment, in future the model could be modified to account for language learning in language and culture contact situations, where language-specific concepts may be internalized by learners at the very early stages, often in the form of lexical borrowing.

Conceptual change. While conceptual transfer has been well attested in the literature, more detailed discussion is needed with regard to changes in the bilingual conceptual store. Below I will discuss the only detailed investigation of the interaction between conceptual systems of two languages known to me – my own study of concept development and use by Russian–English bilinguals (Pavlenko, 1997). This investigation focused on two specific conceptual domains – that of private and personal and that of emotions – in Russian and in American English. I based my research design on the previously discussed assumption that in any cross-linguistic comparison some concepts are comparable and some are language-specific. Thus, four concepts under consideration were assigned to the "comparable" category: "private" and "personal" as relatively similar, and "soul" and "emotions" as relatively different. The other two concepts, "privacy" and "personal space", were assumed to be language-specific (see Table 1). The categorization of the concepts under investigation was based on previous research (Wierzbicka, 1991) and on my own contrastive analysis (Pavlenko, 1997). For example, with regard to "privacy" I considered the fact that while the word has three "translation equivalents" in Russian – *uedinenie* (seclusion), *secretnost'* (secrecy), and *intimnost'* (intimacy) – none of them refers to privacy as a whole or accurately renders its conceptual meaning: that of a natural state of affairs and a human right (Wierzbicka, 1991; Pavlenko, 1997). The study did not include an investigation of concepts unique to Russian due to the fact that language attitudes and proficiency of members of the small American expatriate community in Russia at the time of the investigation were not comparable to those of Russian immigrants in the US.

Two tasks were carried out in the study: written definition and exemplification of the concepts in question, and tape-recorded oral recall of four 3-minute films. The films, which had a sound track but no dialog, evoked for many native speakers of English an "invasion of privacy" or "personal space", and for many speakers of Russian an emotional (or "soul") upheaval. A total of 280 subjects participated in the study. First, narratives, based on the films, were elicited from the subjects; in order to avoid carry-over effects each subject watched one film only. Therefore, the following groups (all with an equal number of males and females) watched and recalled each film: (1) 20 monolingual speakers of Russian, students at the University of St Petersburg, (2) 20 monolingual speakers of English, students at Cornell University, (3) 10 advanced FL Russian learners of English, (4) 20 late Russian–English bilinguals, who learned their English post-puberty upon arrival in the US and spent four to seven years living in the US; half performed the recall in English and half in Russian. Subsequently, written definitions and exemplifications of the concepts were elicited from (1) 40 monolingual speakers of Russian, students at the University of St Petersburg, (2) 40 monolingual speakers of English, students at Cornell University, (3) 20 advanced FL Russian learners of English, (4) 40 late Russian-English bilinguals.

The comparison of the performance of these groups on all tasks demonstrated that there was high intra-group consistency and that monolingual speakers of Russian and English differed significantly due to differences in the conceptualization of "soul", "emotions", "private" and "personal" in their respective languages and cultures. These differences were particularly evident in the oral narratives. Discussing the first set of films, American informants emphasized the "invasion of privacy" and "personal space", while Russian participants focused on male–female interaction. Emotions also received a differential treatment in the two sets of narratives, predicated on differences in conceptual metaphors between the two cultures (Pavlenko, 1997). In the second set of films, Americans presented the main character as going away to deal with her feelings, get control, get a grip, an implication being that one needs to be in charge of one's emotions. In contrast, Russian

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narratives emphasized the importance of feeling and suffering "through", suggesting that the woman in the film wanted to be alone to *perezhivat'* (i.e. to give in to her feelings, to feel/suffer through them).

Russian FL learners of English patterned consistently with Russian monolinguals, which indicates that their performance is L1 concept-based. When privacy was concerned, several – but not all – of these advanced learners of English were able to provide some definition of the concept of privacy and/or to exemplify it; none of them, however, used it spontaneously in their narratives. In contrast, late Russian–English bilinguals resembled the speakers of their L2: first, their definitions of "privacy" and "personal space" were in the same range as those of monolingual speakers of English and their examples of the "invasion of privacy" were very similar; and, second, in elicited language production, they referred to "privacy" and "personal space" both in their Russian and English narratives. In the English narratives, they used the concept of "privacy" appropriately; at the same time many of their Russian narratives exhibited L2 conceptual transfer, i.e. attempts to use Anglo concepts of privacy and personal space in Russian, which resulted in lexical transfer and violations of L1 morphosyntactic and semantic constraints. In what follows I will discuss several processes in conceptual change illustrated in the study.

The first process in conceptual change, *internalization*, in particular that of language-specific concepts, doesn't require introduction in the study of bilingualism. Conceptually driven lexical borrowing in language contact situations is a phenomenon extremely well documented in the literature on bilingualism (Haugen, 1953; Weinreich, 1953; Grosjean, 1982; Appel & Muysken, 1987; Otheguy & Garcia, 1993; Romaine, 1995). In particular, loanwords and loanblends are typical for "immigrant bilingualism", whereby L2 users adopt readily available words to refer to new objects and concepts specific to the L2 environment and culture.

Kecskes and Papp (forthcoming) suggest that language-specific concepts may be easier to acquire, as they don't have any competition in the conceptual store. My study supports this suggestion and indicates that this distinction needs to be further fine-tuned with regard to different contexts of acquisition. A proper – but limited – comprehension of an L2-specific concept (or, in case of grammaticized concepts, syntactic structure) can be assured by learners' acquisition of its prototypical meaning. In many cases, this meaning can be acquired by FL learners through classroom practices, reading and/or media. However, the lack of contextualized interactions with members of the L2 community leads to the fact that the meaning of the word is stored in declarative memory only, is connected to an impoverished mental representation, and does not entail non-linguistic application. In other words, FL Russian learners of English, familiar with the notion of privacy, do not categorize the situation on the screen in terms of privacy in a way that late Russian–English bilinguals do. The FL learners don't have enough context to form an experiential multi-modal representation which goes beyond the word definition and forms a concept. Due to the scarcity of associations and the weakness of their links, such a word may be better available for recognition than for recall (what was long ago in SLA deemed to be "passive knowledge"). On the other hand, natural environment learners acquire new concepts contextually, interactively and experientially, and, as a result, incorporate them into their restructured conceptual systems, whereby they can be available for both recognition and recall ("active knowledge and use"). Thus, it is crucial to make the distinction between the knowledge *of* a concept and the knowledge *about* a concept (often coinciding with the knowledge of a word meaning), long ago argued for by Wierzbicka (1985). Finally, it is also necessary to point out that not all concepts may be available for internalization by adult speakers: for example, those belonging to the domain of childhood and teenage or school years may be learned only declaratively and not experientially.

Another possible process due to the interaction between two conceptual systems is a *shift* from L1 to L2. The narratives elicited in my study provided evidence that for many of the L2 learners or late bilinguals the experience of learning English in a naturalistic environment led to a shift of the whole conceptual domain of "private" and "personal". In particular, this shift was evident in semantic extensions of Russian "translation equivalents" "*chastnoye*" (private) and "*lichnoye*" (personal): L2 conceptual structures underlie instances of erroneous use of the words in the L1 (Pavlenko, 1997)

These findings are echoed in a study by Shimron and Chernitsky (1995) who compared typicality ratings for items in several categories (sport, fruit, food, science, vegetable, vehicle, beverage, disease) provided by native speakers of Spanish in Argentina, Hebrew in Israel and Jewish immigrants from Argentina currently residing in Israel. They found that a typicality shift took place among immigrant subjects, reflecting the change and adaptation processes that result from cultural transition. Typicality strengthening – for items ranging from *chemistry*, *geology*, and *avocado* to *malaria*, *basketball*, and *weight lifting*

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– was found to be more common than typicality weakening; it was explained by particular assimilation strategies and desire to become fully-fledged members of the host society.

Clearly, it is not surprising that we find conceptual shift in immigrant communities. Our first language is acquired by engaging in natural meaningful communication whereby conceptual knowledge is stored, activated and expanded upon. In a similar vein, language learners who learn and use their second language in the country where it is spoken, are engaged in a variety of meaningful interactions and social practices through which they become acculturated. If the interactions are to be successful, a certain amount of "shared meaning" must exist, which can be ensured only by the appropriate use of concepts since "the person can only be a meaningful entity, both to himself or herself and to others, by being 'read' in terms of the discourses available in that society" (Burr, 1995: 142). Thus, as a result of linguistic assimilation and acculturation, the learners-participants in the second culture may develop multi-modal conceptual representations similar to those of the members of the target culture, often without being consciously aware of this change. This assimilation is clarified from a neurolinguistic point of view by Paradis (1994): the fact that in immersion contexts learners' utterances have a dialogic orientation and intentionality, leads to the involvement of implicit memory and subcortical structures (in particular, those parts of the limbic system responsible for emotions, drives, desires, and motivation) and, thus, results in the same processes that govern first language learning and use.

Yet another possible contact process is *convergence* between two systems, whereby a unitary system is created, distinct both from L1 and L2. The idea of convergence – oftentimes referred to as shift – is not new: it has been discussed by both Weinreich (1953) and Haugen (1953) and documented by Lenneberg and Roberts (1956) who noticed in their contrastive study of the English and Zuni color systems that bilingual Zuni terminology differed from that of the Zuni monolinguals. What is different here, however, is the claim that convergence, just like internalization or restructuring, is a dynamic process which may take place for some concepts or domains only, while other domains or concepts would, for example, coexist or shift.

The first detailed examination of convergence, termed "semantic shift", was conducted by Ervin-Tripp (1961), who found that color categories used by the Navaho–English bilinguals differed systematically from the monolingual norms in the respective languages. These differences resulted in four outcomes, based on the interaction between language categorization and language dominance. In case of the language-specific terms, when one language had a single high-probability term and the other had none, the term (and its translation) dominated in both languages. Where the two languages differed in boundary between two categories, both of which had translational terms, the bilinguals' dominant language determined the boundary in both languages. Where a category in one language covered the domain of two categories in another language, the boundary point in the latter language was variable and reflected the degree of proficiency in that language. Finally, when a domain was divided into two categories in one language and three in the other, the bilinguals tended to reduce the size of the middle category when using the latter language.

Ervin-Tripp's (1961) findings were supported in a study by Caskey-Sirmons and Hickerson (1977), who compared the color categories in the speech of monolingual speakers of Korean, Japanese, Hindi, Cantonese, and Mandarin to the use of the same categories by speakers of these languages who learned English as their L2 in adulthood. The researchers found that late bilinguals mapped larger total color areas, had less stable color category boundaries and more variable category foci than monolingual speakers. The results included instances of convergence in the semantic domain, shift in the range of a particular color area, as well as loss and addition of categories. They led the authors to suggest that semantic differences between the speakers' L1 and L2 led them to restructure and, in some cases, shift their L1 semantics of color.

Another case of convergence, in the domain of professional concepts, is documented by Monti-Belkaoui and Belkaoui (1983). The authors found that similarity judgments of various accounting concepts, offered by French and English monolinguals in their accounting course, differed from each other, and that judgments made by French–English bilinguals differed from those made by the two monolingual groups.

A fourth contact process is *restructuring*. In their insightful discussion of conceptual development, Kecskes and Papp (forthcoming) point out that the real challenge for the language learner is the reconceptualization or restructuring of an already existing concept or the modification of a particular conceptual domain, as concepts with some degree of overlap may be leading the learner to think that he or she is understanding and using them correctly. This prediction was also born out by my study: it was found that the L2 learners used the concept of "emotions" in a less native-like way than "privacy", suggesting that it

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was the protagonist's emotional state that was intruded upon or blending two aspects of intrusion, emotional and spatial, as in "she had some personal emotions, and she felt she was intruded upon, her personal space was intruded". While in Russian *vmeshivatsia v chuzhiye chuvstva* (invading/interfering with someone's feelings) is a common way of discussing what to Americans is known as an "invasion of privacy", no discussion of invasion of emotions was found in American narratives. Assuming the dynamic nature of L2 learning, such blends may indicate that a conceptual shift is under way and that the concept is currently under restructuring, but still far from its L2 target. Alternately, this type of performance may be interpreted as convergence, whereby we could assume that for some people, most often members of bilingual Russian–English communities, conceptual domains will include elements of both concepts.

Finally, the last possible outcome of the interaction between competing conceptual systems may be the process of *attrition* of certain concepts, at times accompanied by *substitution*, evident in Caskey-Sirmons and Hickerson's (1977) study. This phenomenon is well documented in the literature on non-pathological L1 attrition, in particular, attrition and substitution of lexicalized concepts (Olshtain & Barzilay, 1991; Waas, 1996). A good example is a study by Jaspaert and Kroon (1992) which looked at written language production of A.L., an 83-year-old man who has lived in the US for over 60 years. A native speaker of Dutch, over the years A.L. switched to English both in his oral communication and in writing, continuing to write in Dutch to his relatives and friends in the Netherlands. The analysis of these letters demonstrated that about 5 per cent of open category words (i.e. nouns, adjectives, and verbs) were marked in some way. The marked items consisted of two main categories: (1) loanwords and loanblends (e.g. *bekomen*, instead of *worden*, consisted of English "become" with the Dutch ending *-en*); (2) loanshifts and loan translations, (e.g. *oproepen,* a literal translation of the English "to call up", was used instead of the Dutch *opbellen*, "to telephone"). 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.

Possible constraints on bilingual conceptual development

My argument would not be complete without a discussion of possible constraints on the development and use of bilinguals' conceptual representations. I posit six constraints, 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).

(1) *Bilinguals' language learning history*: the studies discussed above indicate that the context of language learning and use is the key factor in formation of conceptual representations: FL learning or subordinate bilingualism leads to conceptual transfer from L1 to L2 (Graham & Belnap, 1986; Pavlenko, 1997; Jarvis, 1997, 1998), while varying degrees of exposure to a naturalistic environment may lead to internalization of new concepts and restructuring or substitution of the previous ones (Caskey-Sirmons & Hickerson, 1977; Jaspaert & Kroon, 1992; Shimron & Chernitsky, 1995; Pavlenko, 1997).

(2) *Language dominance and/or proficiency*: while language dominance and proficiency remain important factors (Ervin-Tripp, 1961; Kellerman, 1978, 1986), studies of lexical borrowing in language contact situations suggest that the relationship between language proficiency and conceptual development is not necessarily a straightforward one: some concepts salient in the new culture may be internalized by beginning learners and users with low degrees of proficiency (Haugen, 1953; Weinreich, 1953; Romaine, 1995).

(3) *Degree of biculturalism and/or acculturation*: the representation of concepts in the lexicon is predicated on the degree of the speaker's biculturalism: acculturation may lead to restructuring, shift, convergence and/or substitution and attrition (Caskey-Sirmons & Hickerson, 1977; Monti-Belkaoui & Belkaoui, 1983; Jaspaert and Kroon, 1992; Shimron & Chernitsky, 1995; Pavlenko, 1997); membership in mixed communities/subcultures may lead to the development and use of concepts divergent from the ones used in the monolingual and monocultural environments; the use of the two languages in two monolingual contexts may lead to co-existing systems (Ervin-Tripp, 1954, 1964, 1967; Otheguy & Garcia, 1993; Koven, 1998).

(4) *Domains of language use*: a certain degree of diglossia or simply the use of two languages for different purposes and in different domains, recently termed by Grosjean (1998, p. 132) the *complementarity principle*, may result in complementarity with regard to concepts: some concepts will belong to one language (e.g. home, religion) and others to the other (e.g. school, work).

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(5) *Context of language interaction*: this variable is important to consider from a methodological point of view: it is possible that when speaking different languages, bicultural bilinguals may rely on alternative conceptual representations (Ervin-Tripp, 1954, 1964, 1967; Koven, 1998); moreover, it has been demonstrated that depending on the context of interaction (or language mode) some bilinguals shift their conceptualizations – through code-switching and use of loan-words – even when speaking the same language (Otheguy & Garcia, 1993).

(6) *Type of encoding and concept comparability*: the degree and type of overlap between the two concepts may be an important predictor of a type of conceptual change (Ervin-Tripp, 1961; Caskey-Sirmons & Hickerson, 1977). In the case of lexicalized concepts, language- and culture-specific concepts may be easier to internalize than comparable ones (Pavlenko, 1997). In contrast, in the case of grammaticized concepts, comparable concepts may ease acquisition and restructuring; for concept development in SLA, concept comparability may be more important than type of encoding (Becker & Carroll, 1997).

Conclusion

To conclude, I have argued 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 (as demonstrated in the discussion of Caramazza & Brones, 1980). This view has several theoretical and methodological implications for investigations of bilingual memory.

To begin with, theoretical approaches which distinguish between semantic and conceptual levels will have a much greater explanatory potential, as they will be able to focus on different issues for each level and to resolve any possible confusions; an example discussed in the paper involved FL learners who are able to supply meanings of particular words but are unable to use the words for description and categorization of real life events. In terms of semantic representation, we will be able to investigate polysemy and the distinction between core and peripheral meanings, both of which were shown to be important factors in second language acquisition. In terms of conceptual representation, we will be able to entertain both lexicalized and grammaticized concepts and to create models based on concept – and not word – properties. To initiate such an investigation in the field, I proposed a possible way of comparing concepts within a particular domain with regard to comparability and type of encoding and illustrated this comparison through a number of studies, including my own (Pavlenko, 1997).

I have also argued that future research needs to acknowledge the dynamic nature of the bilingual conceptual store and suggested several ways in which concepts could develop and interact with each other in bilingual memory: co-existence, transfer, and change (the latter includes internalization, shift, convergence, restructuring, substitution, and attrition). The view of concepts as dynamic will enable us not only to investigate conceptual change but also to create diachronic as well as synchronic models of bilingual memory (the only developmental model at this point is the Revised Hierarchical Model, Kroll, 1993; Kroll & Stewart, 1994). It is up to future studies to uncover other possible outcomes of conceptual development in bi- and multilingualism (for a discussion of conceptual development in late bilingualism from a Vygotskian perspective see Lantolf, 1999).

A third implication of existing research in linguistic anthropology and SLA is that we need to pay far more attention to cross-linguistic and cross-cultural differences in conceptualization of different phenomena, prototypicality and categorization. While on the semantic level these differences may be exhibited in differential semantic constraints, on the conceptual level they will be exhibited in differential linguistic and non-linguistic behaviors. Consequently, with regard to methodology, I proposed that the best access to conceptual representations is offered through a carefully coordinated study of contextualized language use (such as elicited language production, inferencing or role play) and non-linguistic behaviors (such as object categorization). Acknowledging language- and culture-specificity will also force us to pay closer attention to bilinguals' history of language learning, in particular, contexts of acquisition, degrees of biculturalism and patterns of language use, all of which have been shown to be important factors in bilingual conceptual development. I have also indicated possible individual, psycholinguistic and sociolinguistic constraints on conceptual representation and interaction in bilingual language development and use. It is my hope that future studies will support, extend or modify these suggestions and result in multiple models which would account for a variety of interactions between linguistic and conceptual systems in bilingual minds.

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