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The Bilingual Mental Lexicon

Interdisciplinary Approaches

Edited by
Aneta Pavlenko

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Chapter 6

Conceptual Representation in the Bilingual Lexicon and Second Language Vocabulary Learning

ANETA PAVLENKO

Introduction

In the past decades, scholars have made great strides in understanding how cross-linguistic differences play out in orthographic, phonological, morphosyntactic and lexical processing in the bilingual lexicon. There still remains, however, one area where cross-linguistic differences have not been sufficiently explored and integrated, namely the level of conceptual representation. Early studies of bilingualism had asked whether the two lexicons are linked to a shared conceptual store or two separate stores (Keatley, 1992). At present, most bilingual processing and representation models, with the exception of the Distributed Feature Model (DFM) (De Groot, 1992), assume that while phonological and morphosyntactic forms differ across languages, meanings and/or concepts are largely, if not completely, shared (cf. Costa, 2005; Kroll & Stewart, 1994). This assumption is justified by the fact that bilinguals can translate most words from one language to another, by the evidence of cross-linguistic semantic priming and by the interference from one language in picture naming in another (Kroll & Sunderman, 2003). Consequently, a central issue in theories of the bilingual lexicon had been *the mapping of form to meaning* (Kroll & De Groot, 1997: 169). Research on conceptual representation had focused on the links between word forms and meanings and examined factors that affect the speed of conceptual access and the strength of interlingual connections, but not the nature of the representation itself (De Groot, 2002; Kroll & Tokowicz, 2005).

Recently, there emerged a new line of research on concepts in the bilingual lexicon where the focus of attention shifted from links between word forms and concepts to the actual structure of *linguistic categories*, that is mental representations linked to word forms (*lexical concepts*)

and grammatical notions (*grammatical concepts*) (Ameel *et al.*, 2005; Athanasopoulos, 2006, 2007, in press; Cook *et al.*, 2006; Malt & Sloman, 2003; Pavlenko, 2002a, 2003, 2008a; Stepanova Sachs & Coley, 2006; for an overview see Jarvis & Pavlenko, 2008). The key question in this research is not 'Is the conceptual store shared or separate?' but 'What is shared and what is separate in particular lexical concepts?' The central issue in this inquiry is *the mapping of forms to real-world referents*. Studies of lexical concepts in this paradigm ask: what is the structure of linguistic categories in the minds of monolingual speakers? That is, how are words mapped on to objects, events and actions in the real world? What are the similarities and differences between categories linked to translation equivalents? How do bilinguals' categories compare to those of monolingual speakers of their respective languages?

The findings of these studies have important implications for models of the bilingual lexicon, because they challenge the shared store assumption, indicating a much more complex conceptual organization. The purpose of this chapter is to review these studies[1] and to present a model of the bilingual lexicon that reflects their findings. I will begin by explaining why studies using reaction-time-based tasks have failed to produce much information about representation of lexical concepts. Then, I will introduce methods used in the recent studies, synthesize their findings and reflect on their implications for existing models of concepts in the bilingual lexicon. Subsequently, I will put forth a Modified Hierarchical Model (MHM) that incorporates both earlier and more recent findings and aims to facilitate a transition from the first to the second stage of research on bilinguals' concepts. Both the discussion and the model are limited to the bilingual lexicon because empirical studies to date have not yet examined multilinguals' concepts. The terms *bilinguals* and *second language (L2) users* will be used interchangeably to refer to speakers of two languages. The term *L2 learners* will refer to people studying a second language, formally or informally.

1. Methodological Approaches to the Study of Bilinguals' Lexical Concepts

1.1. First stage: Psycholinguistic methods

Psycholinguistic studies of concepts in the bilingual lexicon commonly rely on a variety of reaction-time tasks, such as lexical decision, semantic priming, sentence priming, picture naming, translation, translation equivalent recognition, word association, semantic categorization and the Stroop interference task (De Groot, 1992; Kroll, 1993; Snodgrass, 1993; see also Altarriba & Basnight-Brown, this volume). These tasks have been used to examine whether L1 and L2 words in the bilingual lexicon are linked to a common conceptual representation. In this paradigm, faster reaction times are taken to indicate stronger connections between word forms (*interlingual connections*), in turn stronger connections are attributed to shared meanings.

There exist, however, several problems with these assumptions and the methods used to test them. To begin with, it is not clear whether stronger connections are always – or exclusively – a function of shared meaning. For instance, in translation tasks a longer amount of time needed to translate a particular word is commonly taken to indicate a lower degree of shared meaning between the translation equivalents (De Groot, 1992, 1993, 1995). In reality, however, the strength of interlingual connections may be affected by a host of other factors, including bilinguals' levels of proficiency in the languages in question, the context of their acquisition, the context of their use, the level of activation of respective languages, similarity of word forms and the frequency of coactivation of particular word pairs (De Groot, 1995, 2002; Kroll & Tokowicz, 2005; Marian, this volume). In beginning and intermediate L2 learners, as well as in first language (L1) attriters (see Schmid & Köpke, this volume), connections between translation equivalents may be weak regardless of the objective similarity between their meanings (hence slower translation rate), while in expert bilinguals, such as simultaneous translators, connections may be strong even between partial equivalents (hence faster translation rate).

Consequently, it is not clear whether all reaction-time-based tasks access conceptual representations as they purport to do. Semantic priming constitutes an excellent example of such problematic task. It is often assumed that 'there should only be cross-language priming if both languages access a common conceptual memory representation' (Kroll, 1993: 57). Following this logic, De Groot and Nas (1991) argued that the presence of cross-language priming for English–Dutch cognates (e.g. *rose-roos*) and the absence of priming for noncognates (e.g. *bird-vogel*) suggest that cognates share conceptual representations and noncognates do not (see also De Groot, 1992, 1993). While these results have been replicated in several other studies, some studies also found priming for false cognates, suggesting that facilitation effects may also be a function of form similarity (for an up-to-date review of cognate representation studies, see Sánchez-Casas & García-Albea, 2005).

Finally, it is unclear whether weaker connections, as seen for example in the lack of semantic priming, can unambiguously indicate the lack of

shared meaning. If the Dutch–English bilinguals in De Groot and Nas' (1991) study were asked to name a set of pictures or to sort them into the categories of *bird* and *vogel*, it is quite possible that the same pictures would have been named *bird* and *vogel*, which in turn would have indicated a shared representation. This in turn raises a question of what exactly is meant by a 'shared representation' – is representation 'shared' when the two words are mapped onto the same set of referents even if they do not prime each other?

These questions suggest that instead of inferring the degree of shared meaning from the strength of interlingual connections, future research needs to disambiguate the two and to investigate the relationship between them. Reaction-based tasks, developed for the study of language processing, are well-suited for examining the strength of interlingual connections, but do not offer us any means to examine the contents of linguistic categories and thus to determine the degree to which they are actually shared.

Several possible alternatives have been put forth in the psycholinguistic literature. One such alternative is a word-rating task, where participants rank the closeness of a set of words to a stimulus word (Dong *et al.*, 2005). Unfortunately, in this task as well the strength of the interlingual connection can be attributed to a variety of reasons. For instance, Dong and associates (2005) found that Chinese words *xin liang* (bride) and *hong se* (red) are more strongly linked than their English translation equivalents (because brides wear red in China), while English words *jealousy* and *green* are more strongly linked than their Chinese equivalents (because English speakers talk about turning *green with envy*). These links, however, are of different nature: the first link reflects implicit knowledge about the category and is therefore conceptual, while the second reflects a metaphoric extension of a color term and is therefore semantic (for a discussion of this distinction see section 3.2.2). Metaphoric extensions constitute an important aspect of L2 word knowledge (see also Jarvis, this volume), but do not form part of the actual contents of linguistic categories *jealousy* or *bride*. Thus, word ratings may reveal the strength of interlingual connections, but do not tell us much about the actual structure of linguistic categories (i.e. who counts as a bride? what does a prototypical bride look like? what situations elicit jealousy? etc.).

Another alternative is the similarity judgment task where bilinguals are asked to judge the similarity of meanings of translation equivalents in their respective languages (Moore *et al.*, 1999). This task avoids the problems linked to reaction-time inferencing yet it too displays a major

theoretical flaw – conceptual representations are by their nature implicit, but the participants are engaged in a task that involves a metalinguistic judgment, and thus explicit memory (for a discussion of the implicit/explicit distinction see section 3.2.3). Considering that most lay speakers lack metalinguistic knowledge about particularities of translation equivalence, it is not clear whether their subjective judgments are congruent with ways in which they actually use words. For instance, Dutch–French bilinguals may judge the Dutch *kom* and the French *bol* (both are roughly similar to the English 'bowl') to be near perfect translation equivalents, while their categorization patterns would indicate that the equivalence is only partial: the objects contained in the Dutch category *kom* are systematically divided between two categories in French, *bol* and *plat* (dish) (Ameel *et al.*, 2005; for evidence of dissociation between naming and similarity judgments see Stepanova Sachs & Coley, 2006).

This example leads me to another problem in traditional psycholinguistic research, namely avoidance of cross-linguistic differences in selection of materials for picture naming and semantic categorization tasks, designed to study conceptual access (e.g. Caramazza & Brones, 1980; Chen, 1992; Dufour & Kroll, 1995; McElree *et al.*, 2000). To begin with, researchers commonly eliminate stimuli that do not have clear translation equivalents (e.g. McElree *et al.*, 2000). This elimination ensures stimulus comparability across languages, but distorts the picture of the bilingual lexicon that emerges from studies with such limited stimuli.

Secondly, studies of conceptual access commonly favor words that appear to share meanings (e.g. Caramazza & Brones, 1980) and in particular concrete words, assuming that appearances and functions of the entities they refer to 'will generally be the same in different language communities' (De Groot, 1995: 404). In reality, even when they are similar, linguistic categories linked to these words may not match fully: the category *chair* does not share all members with the categories *silla* (Spanish) or *chaise* (French), nor does the category *cup* share all members with the categories *taza* (Spanish) or *sefel* (Hebrew) (Ameel *et al.*, 2005; Graham & Belnap, 1986; Kronenfeld *et al.*, 1985; Malt *et al.*, 1999, 2003).

Additional problems appear in material selection for the picture-naming task, the only task in the traditional array that involves the actual mapping between words and their real-world referents. These tasks commonly involve single pictures, representing prototypical members of a particular category of objects or animals (e.g. Chen, 1992). The naming of such a picture does constitute evidence of conceptual access, but the use of a single category member, and a prototypical one at that, limits

what we can infer. Since conceptual categories may share some but not all members, we can say that the representation is (partially) shared, but cannot determine the extent to which it is shared.

To sum up, it appears that in the first stage of the study of bilinguals' lexical concepts, the assumed reliability of psycholinguistic tasks may have been achieved at the expense of decreased content validity (Appel, 2000). The reliance on tasks involving decontextualized words and single pictures of prototypical objects, coupled with avoidance of cross-linguistic differences, may have created a somewhat skewed picture of the bilingual lexicon, because these circumstances are most likely to evoke the same representations in bilinguals' respective languages (Kroll & Tokowicz, 2005). This outcome is not surprising, because, with the exception of picture naming, reaction-time-based tasks were developed to examine the relationship between word forms, rather than between words and their real-world referents. Inferences based on reaction times have generated important information about the strength of interlingual connections yet it is not clear whether this strength can be unproblematically equated with the degree of shared meaning – the relationship between the two needs to be established, rather than assumed. Consequently, the time has come to disentangle the two and to examine lexical concepts in their own right.

1.2. Second stage: Cross-cultural research methods

Recent studies of bilinguals' linguistic categories rely on methodologies developed for cross-cultural inquiry in the fields of linguistic anthropology, cognitive and cultural psychology and applied linguistics. These approaches involve naming, categorization, sorting and narrative elicitation tasks that examine ways in which monolinguals and bilinguals' words are mapped to real-world referents.

Naming tasks, in this paradigm, differ from traditional picture-naming tasks in that they contain several pictures or videoclips that may be linked to a single word. Participants may be required to name: (1) colors represented by particular color chips or charts (e.g. Athanasopoulos, in press), (2) objects presented directly or via photographs (e.g. Ameel *et al.*, 2005; Malt *et al.*, 1999), (3) motion events presented via videoclips (e.g. Hohenstein *et al.*, 2006) or (4) abstract concepts or emotions elicited by particular scenarios (e.g. Stepanova Sachs & Coley, 2006). The purpose of these tasks is to establish the range of responses from relatively monolingual speakers of particular languages, to decide which exemplars or scripts may be prototypical for the category in question and

which might be peripheral, and to find out how bilinguals' responses compare to those of monolingual speakers of their respective languages.

Categorization and *sorting tasks* ask participants to judge the similarity between: (1) color chips (e.g. Athanasopoulos, in press), (2) objects (e.g. Malt *et al.*, 1999), (3) objects and substances (e.g. Athanasopoulos, 2007; Cook *et al.*, 2006), (4) pictures (e.g. Athanasopoulos, 2006), (5) motion events (e.g. Gennari *et al.*, 2002) or (6) scripts (e.g. Stepanova Sachs & Coley, 2006). They differ from the semantic categorization task and the similarity judgment task described earlier in their focus on word referents.

Narrative elicitation tasks ask participants to retell a story they read, heard or inferred from a series of pictures or a videoclip (Pavlenko, 2002a, 2003, 2008a; Pavlenko & Driagina, 2007; for a more detailed discussion of narrative elicitation in the study of bilingualism, see Pavlenko, 2008b). Participants may also be asked to narrate while looking at a series of pictures or a videosegment, or to express reactions toward a particular narrative (Panayiotou, 2004). These tasks, traditionally used in the study of first language acquisition, applied linguistics and sociolinguistics, have recently been adopted in the study of the bilingual lexicon. Their purpose is to examine how monolingual and bilingual speakers name particular objects or events in context.

Together, these tasks have several advantages over traditional psycholinguistic tasks in the study of bilinguals' linguistic categories. The first is their ecological validity, which stems from the focus on the use of words in context and on the relationship between words and their real-world referents. The second is the sensitivity to cross-linguistic differences. For instance, using traditional psycholinguistic tasks, we may find that Russian–English bilinguals can easily access translation equivalents *glass/stakan* and *cup/chashka*, appropriately name pictures of prototypical cups and glasses and exhibit semantic priming effects in both directions. For some models, such performance is sufficient to posit semantic/conceptual equivalence within each word pair. A naming task will reveal, however, that this equivalence is limited to the shared prototypical exemplars, such as china *cups/chashki* with handles and *glasses/stakany* made out of glass. In turn, the placement of paper and plastic containers will vary depending on the language of the task. In the trial that uses English-language labels, the participants will place paper and plastic containers into the category of *cups*. In the Russian-language trial, the same objects would be placed into the category of *stakany* (glasses), because [GLASSNESS] in Russian is determined by shape, rather than by material. This task then reveals cross-linguistic differences

where none were seen before and suggests that the representation of these translation equivalents is only partially shared.

The third advantage of these tasks is their ability to differentiate between two types of shared representations: (1) ones that mirror those of monolingual speakers and (2) ones that deviate from those of monolingual speakers and are shared as a result of conceptual transfer or convergence. To return to the example above, we cannot assume that all bilinguals will categorize paper and plastic containers in accordance with the constraints of the respective languages. In an English-language trial, L1 Russian-dominant bilinguals may place these containers into the category labeled *glasses*, rather than *cups*, and thus display L1 conceptual transfer. In turn, L2 English-dominant bilinguals may display L2 transfer in the Russian-language trial, placing the same containers into the category of *chashki* (cups), rather than *stakany* (glasses). In both cases the representations of the Russian and English translation equivalents are shared due to conceptual transfer and do not reflect monolinguals' lexical concepts.

To sum up, when it comes to the study of conceptual representation, tasks derived from cross-cultural inquiry transcend the limitations of reaction-time-based methods and allow us to examine ways in which bilinguals map their words onto real-world referents. Let us now examine the findings of research that employs these methods.

2. Recent Findings

2.1. Concepts

Undoubtedly, there are many more concepts than words and some concepts have no linguistic encoding in any language. The focus of the present discussion is exclusively on lexical concepts, that is linguistic categories linked to words (Malt *et al.*, 1999, 2003), that develop in the process of language socialization, with the aid of autobiographic and episodic memory. In the view adopted here, *lexical concepts* are seen as multimodal mental representations that include visual (mental imagery), auditory (sound), perceptual (texture) and kinesthetic (sensory-motor) information stored in implicit memory. These representations are dynamic and as such are subject to developmental changes and generational and individual differences, that is differences between speakers who may have had different experiences with, knowledge of, or expertise in the area in question (Murphy, 2002). Their distributed nature allows them to function in a context-dependent manner, whereby somewhat different representations may be activated by the same words

in different communicative settings (see also Barsalou, 2003; Malt *et al.*, 2003). In similar settings, they may be quite systematic, allowing speakers of the same language to perform naming, identification, comprehension and inferencing tasks along similar lines (on systematicity of lexical choice in context, see Pavlenko & Driagina, 2007).

Cross-linguistic studies in cognitive psychology, cognitive linguistics and linguistic anthropology show that speakers of different languages rely on linguistic categories that may differ in structure, boundaries or prototypicality of certain category members (e.g. Levinson, 2003; Lucy, 1992a, 1992b; Malt *et al.*, 1999, 2003). This in turn means that translation equivalents are not always conceptual equivalents (cf. Panayiotou, 2006): some words may be in a relationship of partial (non)equivalence, and there are also words that have no conceptual equivalents in the other language. In what follows, I will discuss the consequences of these relationships for bilinguals' linguistic categories, distinguishing between objective differences (as seen in performance of monolingual or at least L1-dominant speakers of respective languages) and subjective representations in the minds of different types of bilingual speakers.

2.2. Conceptual equivalence

In the case of *conceptual equivalence* or *near equivalence*, linguistic categories mediated by languages A and B share both category structure and boundaries. Examples of such near equivalence come from a study by Ameel and associates (2005), where monolingual French and Dutch speakers and simultaneous Dutch–French bilinguals in Belgium performed a series of naming and sorting tasks with pictures of household objects. In experiments with monolingual speakers, the researchers found that all of the objects called *tas* in Dutch were put into the French category *tasse* (both are roughly similar to the English *cup*); this category also included two additional objects that are not called *tas* in Dutch. Similarly, all the objects called *bord* in Dutch were placed in the French category *assiette* (both are roughly similar to the English *plate*), except for one that would not be called *assiette*. The French category also included one object that would not be called *bord* in Dutch. Bilinguals named the same 14 drinking containers *tas* in Dutch and *tasse* in French, and the same 6 dishes *bord* in Dutch and *assiette* in French (one more dish called *bord* in Dutch was referred to as *bol* (bowl) in French).

Pavlenko's studies investigated conceptual equivalence in sequential bilinguals. In Pavlenko's (2002b) study, native speakers of English and Russian systematically used the words *upset* and *rasstroennaia* (upset,

fem) to refer to a female character in narratives elicited by a short film, suggesting that the script portrayed in the film falls in the category of *upset* and *rasstroennaia* (more work is needed however to determine the range of scripts in these linguistic categories). Pavlenko and Driagina (2007) replicated the findings of this study with different groups of native speakers of Russian and English. They also found that American L2 learners of Russian described the character just as native speakers of Russian did, with the adjective *rasstroennaia* (upset, fem) and the corresponding verb *rasstroit'sia* (to become upset).

In a study that used a different short film as an elicitation stimulus, Pavlenko (2008a) found that in describing a character experiencing fear, L1 Russian speakers favored reflexive emotion verbs *ispugat'sia* (to get scared) and *boiat'sia* (to fear, to experience fear). L1 English speakers in the same context favored emotion adjectives or pseudo-participles such as *afraid, frightened* or *terrified*. These choices differed structurally but not conceptually – all belonged to the same domain of fear. Lexical choices made by L2 speakers of Russian and English mirrored for the most part those made by the target language speakers, suggesting that L2 speakers have internalized new structural patterns of emotion description, verbs in the case of L2 Russian and adjectives in the case of L2 English (for similar results see also Pavlenko & Driagina, 2007).

Together, these findings suggest that the relationship of conceptual equivalence or near equivalence presents no difficulties for L2 vocabulary learning, even in the case when the L1 and the L2 favor words from distinct grammatical categories (Pavlenko, 2008a; Pavlenko & Driagina, 2007). All the learners need to do is to link L2 word forms to already established lexical concepts. Provided the speakers subjectively perceive the concepts in question to be similar, positive L1 transfer will facilitate the process.

2.3. Partial (non)equivalence

Not all categories, however, are fully or nearly equivalent. Rather, many are in a relationship of partial (non)equivalence. In what follows, I will focus on one relationship of partial (non)equivalence, nesting, recognizing that there exist many more ways in which categories can partially overlap, such as e.g. cross-cutting (Malt *et al.*, 2003).

2.3.1. Nesting: Type 1

In the case of *nesting*, two or more categories of one language are subsumed, fully or partially, within a larger category in another language. I will differentiate between two types of nesting relationships here. In

the next subsection, I will consider a case of a single category of one language roughly divided between two categories in another language. In what follows, I will examine a case when a smaller category of one language is subsumed within a larger category of another language.

This relationship between the categories can be found across a variety of domains. In the domain of containers, for instance, the English category *jar* is nested within the Spanish category *frasco* that also contains additional objects named *bottle* and *container* in English (Malt *et al.*, 2003). Similarly, the Russian category *chashka* is nested within a larger English-language category *cup* that additionally includes plastic and paper containers without handles used for hot and cold liquids, referred to as *stakanchiki* (little glasses) in Russian. In the domain of emotions, the Russian category *revnost'* is nested within the English category *jealousy* (Stepanova Sachs & Coley, 2006). *Revnost'* refers exclusively to scripts that involve intimate relationships or sibling rivalry, while *jealousy* may also refer to contexts where one experiences envy (e.g. 'I am so jealous of your trip to Hawaii').

Stepanova Sachs and Coley (2006) used naming and sorting tasks with short scripts describing jealousy- and envy-arousing situations to examine the relationship between *revnost'/jealousy* and *zavist'/envy* in monolingual Russian and English speakers and Russian–English bilinguals who learned English as teenagers or adults. On the naming task, monolingual Russian speakers differentiated categorically between scripts describing *revnost'* and *zavist'*, while monolingual English speakers judged both *envy* and *jealousy* as terms appropriate to describe the envy stories. Bilingual speakers responded according to the language of the task: in Russian they differentiated between *revnost'* and *zavist'* and in English they showed no such distinction with the envy stories. On the triad-sorting task, the participants were required to pick any two situations out of three that go together and explain why. In that task, all groups performed similarly except for the triad that included three kinds of situations: envy, jealousy and a control one. Russian monolinguals treated the three as different, while English monolinguals and Russian–English bilinguals grouped envy and jealousy situations together.

Overall, the results of the study showed that both Russian and English speakers can reliably differentiate between romantic jealousy and envy aroused by other people's possessions or good luck. At the same time, the scope of use of the English word *jealousy* was not limited to scripts involving romantic jealousy, as was the case for its Russian translation equivalent *revnost'* – rather this category also subsumed scripts involving

envy. Consequently, English speakers see the boundaries between the two categories as fuzzy, while for Russian speakers *revnost'* and *zavist'* are categorically distinct. Sequential bilinguals displayed an ability to maintain the differences between the two categories and to perform according to the constraints of each language in the naming tasks, but their similarity judgments showed a blurring of the category boundary.

Their performance leads me to suggest that a nesting relationship may facilitate initial L2 learning via positive L1 transfer of the shared meaning. Eventually, L2 learners will need to adjust the boundaries of their linguistic categories, either expanding or narrowing them in accordance with the L2 constraints. Failure to readjust the boundaries appropriately would lead to instances of L1 conceptual transfer, where L2 objects or situations are named in accordance with the L1 category boundaries. This transfer would be particularly apparent in the cases where the L1 has a more expanded category, as for instance in American L2 learners of Russian who would refer to envy-arousing situations with the term *revnost'* (romantic jealousy).

In the case of successful restructuring, the boundaries of the L2 category are modified without changing the boundaries of the corresponding L1 category. As a result, speakers perform in accordance with the constraints of each language, as did bilinguals in Stepanova Sachs and Coley (2006). Alternatively, we may find partial restructuring taking place for some category members but not others, or convergence of two categories. In these two cases, L2 performance will be target-like only in some cases. Finally, with advanced L2 users and L1 attriters, we may also find that the boundaries of the L1 category have shifted under the influence of the L2, as seen on the triad-sorting task in Stepanova Sachs and Coley's (2006) study. Eventually, such boundary shift may lead to L2 conceptual transfer in the L1 performance (cf. Jarvis & Pavlenko, 2008).

2.3.2. Nesting: Type 2

In some cases, a single category of one language may subsume, fully or partially, two or more categories of another language. For instance, in the domain of color, the English category *blue* subsumes the categories differentiated by Russian and Greek speakers, respectively, as *goluboi* (Rus) or *ghalazio* (Gr) (roughly similar to *light blue*) and *sinii* (Rus) and *ble* (Gr) (roughly similar to *dark blue*) (Andrews, 1994; Athanasopoulos, in press). In the domain of containers, Ameel and associates (2005) found that 25 objects placed within the Dutch category *fles* (roughly similar to the English *bottle*) are split almost equally between the French categories *bouteille* (roughly similar to *bottle*) and *flacon* (small bottle). In the domain

of emotions, the English category *to be angry* roughly corresponds to the Russian *zlit'sia* (to be experiencing anger in general) and *serdit'sia* (to be experiencing anger, to be actively cross, angry, mad at someone in particular) (Pavlenko & Driagina, 2007). In the domain of abstract categories, the English *to be* roughly corresponds to Spanish *ser* and *estar*, *to know* to French *savoir* and *connaître*, *to fall* to Finnish *pudota* (to fall from a higher to lower altitude) and *kaatua* (to fall from a vertical to a horizontal position) (Jarvis, 2003). In all of these cases, one language requires its speakers to make more fine-grained distinctions and to pay attention to contrasts not encoded in the other language.

In the minds of bilingual speakers, these linguistic categories may correspond to those of monolingual speakers of the L1 and L2. Alternatively, they may approximate the larger category, if this category is encoded in the dominant language. Several studies offer empirical support for the latter possibility. In the domain of furniture, Graham and Belnap (1986) established that native speakers of Spanish use the word *silla* to refer to objects which were perceived by native speakers of English as either *chairs* or *stools*, and the word *banco* to refer to objects that were differentiated by native speakers of English as either *stools* or *benches*.[2] Spanish-speaking L2 learners of English in the study did not differentiate systematically between *chairs*, *stools* and *benches*, relying instead on conceptual boundaries associated with the categories *silla* and *banco*. In the domain of containers, Ameel and associates (2005) found that Dutch–French bilinguals have a smaller category of *flacon* (small bottle) than monolingual French speakers and a larger category of *bouteille*, corresponding more closely to the category *fles* (both are roughly similar to *bottle*), in Dutch, the dominant language of the speakers.

In the domain of emotions, American L2 learners of Russian in Pavlenko and Driagina's (2007) study consistently described the behavior of a character in a film with the verb *serdit'sia* (to be experiencing anger, to be actively cross, angry, mad at someone in particular), while native speakers of Russian referred to the same character using the verb *zlit'sia* (to be experiencing anger in general), because it was not immediately clear why the main character was angry. The learners' lexical choice suggested that they had not yet internalized the differences between the two categories, whereby *serdit'sia* is a relational term, requiring a clear referent of the action/process of being angry, while *zlit'sia* is a process that is not necessarily directed toward anyone in particular.

Notably, the influence of the dominant language is not limited to that of the L1. Andrews' (1994) study shows that young Russian–English bilinguals living in the USA and dominant in L2 English are losing the

categorical distinction between *sinii* and *goluboi* under the influence of the English *blue*. A somewhat different and intriguing result comes from Athanasopoulos' (in press) study of a similar contrast in Greek. The researcher found that the majority of advanced-level Greek–English bilinguals have shifted the focus (i.e. best example) of one of their L1 categories to the L2 category *blue*. At the same time, they have moved the focus of the other L1 category away from the L2 focus, thus maintaining the perceptual distance between the L1 category foci.

It appears then that in the process of L2 vocabulary learning, going from two or more linguistic categories to one may be relatively easy, even though the process may still require some adjustment (Athanasopoulos, in press; see also Gullberg, this volume). In contrast, going from one to many is a challenging process, whereby L2 learners need to restructure their conceptual representations in order to categorize objects, events and phenomena in accordance with the target-language constraints. Failure to internalize the distinctions required by the L2 would lead to instances of L1 conceptual transfer (Graham & Belnap, 1986; Jarvis & Pavlenko, 2008; Pavlenko & Driagina, 2007). Partial restructuring or convergence may lead to creation of categories that are distinct from those of either language (Ameel *et al.*, 2005). Successful conceptual restructuring allows bilinguals to perform in accordance with language-specific constraints in each language. Finally, bilinguals whose dominance had shifted to the L2 may display a blurring of categorical distinctions required by the L1 (Andrews, 1994; Jarvis, 2003) or a shift away from the L1 category prototypes (Athanasopoulos, in press).

2.4. Conceptual non-equivalence

In the case of *conceptual non-equivalence*, a linguistic category of one language does not have a counterpart in another language. In the domain of artifacts, for instance, American L2 learners of Russian may be unfamiliar with a *fortochka*, a small window pane on top of a window that can be opened to let some air in, common in Russian buildings. In turn, Russian L2 learners of English may have never encountered *rowhouses* or *rowhomes*, adjacent single-family dwellings, common in the Northeast of the USA and Canada. Even familiar objects may be grouped into language-specific categories. In the domain of containers, for instance, the Dutch category *bus* (roughly similar to *can*) does not appear to have a French counterpart, with objects called *bus* in Dutch spread over six French categories (Ameel *et al.*, 2005). In the domain of abstract categories, some languages may lack translation equivalents of the English *privacy* or *personal space* (Karasik *et al.*, 2005; Pavlenko, 2003).

Language-specificity was also found among emotion categories, such as the English *frustration*, the Russian *perezhivat'* (to suffer, to worry, to experience things keenly) (Pavlenko, 2002a, 2002b) or the Greek *stenahoria* (discomfort/sadness/suffocation) (Panayiotou, 2004).

Pavlenko (1997, 2003) used narrative elicitation to investigate the implications of the fact that *privacy* and *personal space* do not have translation equivalents in Russian. The study used two films portraying situations that could be potentially perceived as invasions of privacy or personal space. Four groups of participants recalled the films: (1–2) monolingual speakers of Russian and English, (3) Russian–English bilinguals residing in Russia who had never been to an English-speaking country (Group 1), and (4) Russian–English bilinguals residing in the USA (Group 2), with Group 2 performing recalls in both Russian and English. The researcher found that in English-language narratives, some English monolinguals and bilinguals in Group 2 used the terms *privacy* and *personal space* to describe the contents of the films (for replication of these results with a different stimulus, see Pavlenko, 2002a). In Russian-language narratives, bilinguals in Group 2 conveyed these concepts through lexical borrowing or loan translation, such as *on vtorgaetsia v ee odinochestvo* (he is invading her solitude). In contrast, Russian monolinguals and bilinguals in Group 1 never commented on the spatial proximity of the characters, not even to say that someone sat down too closely to someone else. During the debriefing procedure, several participants from Group 1 were able to define *privacy*, but they also acknowledged that they were not sure when and how to use this term. These results suggested that *privacy* and *personal space* do not have conceptual equivalents in Russian (for a similar argument see Karasik *et al.*, 2005).

In another set of studies, Pavlenko (2002a, 2002b) and Pavlenko and Driagina (2007) used narrative elicitation by two short films to investigate nonequivalent emotion words *frustration* and *perezhivat'* (to suffer, to worry, to experience things keenly). They found that monolingual Russian speakers systematically used the term *perezhivat'* to describe the feelings of the main characters in the films, while American L2 learners of Russian and Russian–English bilinguals residing in the USA did not use the term at all. During the debriefing procedure, several L2 learners recognized the word *perezhivat'* and stated that they 'studied it' but were still not sure how to use it. Some learners borrowed the word *frustration* into Russian to describe the main character, e.g. *kak chto-to ee frastriruet/frastrirovalo* (as if something frustrates/frustrated her) (Pavlenko & Driagina, 2007).

Together, these results suggest that the ability to define the word explicitly is not paramount to having a conceptual representation that allows L2 learners to map the new word onto its real-world referents. The reason for this is the dissociation between two types of memory, implicit and explicit: definitions learned explicitly are stored in explicit memory, while multimodal conceptual representations involving visual, kinesthetic and other types of information, need to be developed in implicit memory (see also section 3.2.3; Paradis, 1994). Consequently, words referring to novel objects, such as *fortochka*, are perhaps the easiest to acquire because they have tangible, easily perceivable referents. Abstract words, such as *privacy*, and emotion words, such as *frustration* or *perezhivat'*, may be more difficult because the learners need to appropriately identify the range of situations and contexts to which these words may apply. Consequently, the first possible L2 learning outcome in the case of conceptual non-equivalence is the presence of an explicit definition in the absence of a multimodal conceptual representation. Eventually, the learners may internalize the category partially, applying the word to a limited range of objects or situations. Finally, they may fully internalize the linguistic category and thus use the word spontaneously in the same range of contexts as native speakers of the target language, as Russian–English bilinguals in Group 2 did with *privacy* and *personal space* (Pavlenko, 2002a, 2003).

The presence of conceptual nonequivalents has implications not only for L2 learning but also for bilingual performance. In the studies discussed here, American L2 learners of Russian borrowed the L1 term *frustration* into their L2 Russian narratives (Pavlenko & Driagina, 2007). In turn, Russian–English bilinguals living in the USA referred to *privacy* and *personal space* not only in L2 English but also in L1 Russian, in the form of lexical borrowing and loan translation (Pavlenko, 2002a, 2003; for discussion of similar borrowing of L2 emotion terms by Greek–English bilinguals, see Panayioutou, 2004). These findings show that while some bilinguals use nonequivalents only in the appropriate language, others may use them as an interpretive category in the other language in the form of codeswitching or lexical borrowing, and yet others may pause, hesitate and stutter, searching for a nonexistent translation (Pavlenko, 1997, 2003).

2.5. Summary

Let us now summarize the findings of the studies discussed. The first finding involves the degree of difference across linguistic categories. Studies, focused on the relationship between words and their real-world

referents, reveal pervasive cross-linguistic differences across all domains, including linguistic categories linked to concrete words (Ameel *et al.*, 2005; Graham & Belnap, 1986; Kronenfeld *et al.*, 1985; Malt *et al.*, 1999, 2003). These findings suggest that bilinguals need to develop partially different categories, if they are to use their languages in a target-like manner.

The second important finding involves the existence of two types of fully shared representations that have different implications for bilingual performance: (1) in the case of conceptual equivalence, they reflect those in the monolingual lexicons and lead to target-like performance (e.g. Pavlenko, 2008a; Pavlenko & Driagina, 2007) and (2) in the case of partial (non)equivalence, they are established as a result of conceptual transfer, convergence or partial restructuring and may lead to deviations from monolingual performance (Ameel *et al.*, 2005; Andrews, 1994; Athanasopoulos, in press; Graham & Belnap, 1986; Pavlenko & Driagina, 2007).

The third and perhaps the most dramatic finding involves the nature of second language learning. Previously, it was commonly assumed that the goal of adult L2 learning was 'not to learn new concepts, but rather to acquire new mappings between concepts and second language words' (Kroll, 1993: 55). In contrast, the studies reviewed here reveal that at the center of L2 vocabulary learning are the processes of *conceptual restructuring*, that is readjustment of the category structure and boundaries in accordance with the constraints of the target linguistic category, and *conceptual development*, that is development of new multimodal representations that allow speakers to map new words onto real-world referents similar to native speakers of the target language.

These processes manifest themselves differently at different stages of bilingual development. In the early stages, L2 learners may acquire an explicit definition or translation of a particular word. In the case of conceptual equivalence, this word will then be linked to its translation equivalent and to an already existing linguistic category. In the case of partial (non)equivalence, however, this linking may lead to erroneous performance (Graham & Belnap, 1986; Pavlenko & Driagina, 2007). In the case of conceptual non-equivalence, an explicit definition may exist in the absence of a multimodal conceptual representation, which means that L2 learners will not be able to use the words in the appropriate contexts (Pavlenko, 1997, 2003; Pavlenko & Driagina, 2007).

Both conceptual restructuring and development of new linguistic categories appear to be gradual processes. In the case of conceptual restructuring, for instance, Malt and Sloman (2003) established that with increases in the length of English language experience (measured both as

the length of formal instruction and the length of time in the target language context), L2 users of English were better able to match native speakers' naming patterns for household objects and displayed more agreement with their object typicality judgments. Approximation of the L2 categories is not the only possible outcome of the process – lexical concepts may also undergo convergence whereby a single representation subserves both translation equivalents.

Given sufficient time and input, however, some L2 users succeed in conceptual restructuring and development, developing *conceptual fluency*, that is performance according to the constraints of the target-language categories. As a result, they may perform in a target-like manner in both languages (Stepanova Sachs & Coley, 2006). Bilinguals who experience a shift in dominance, may eventually exhibit the influence of L2 categories on their L1 performance (Andrews, 1994; Athanasopolos, in press; Pavlenko, 2002a, 2003; Stepanova Sachs & Coley, 2006).

Last but not least, it appears that the use of language-specific linguistic categories is not constrained to the language in which they originated – they may appear as an interpretive category in the bilingual's other language in the form of lexical borrowing, loan translation or code-switching (Panayiotou, 2004; Pavlenko, 2002a, 2003, 2008a; Pavlenko & Driagina, 2007).

3. Models of the Bilingual Lexicon

3.1. Current models of the bilingual lexicon

Let us now examine the implications of the findings summarized above for models of the bilingual lexicon. Take, for instance, the classic example from Weinreich (1953), the word pair *book* (English) and *kniga* (Russian). Weinreich (1953) uses this word pair to illustrate three possible relationships in the bilingual lexicon: a shared conceptual representation (compound), two separate conceptual representations (coordinate) and a representation accessed via L1 (subordinate). The studies reviewed here suggest, however, that the type of representation depends not only on the learning trajectory but also, critically, on the actual relationship between the linguistic categories in question. From this perspective, the pair *book/kniga* can *only* be used to illustrate a single shared representation, or a relationship of conceptual equivalence, because Russian and English speakers name the same objects *books* and *knigi*.

Weinreich's model, however, ceased to be the dominant representation of the bilingual lexicon. To date, two models dominate the discussion of bilinguals' conceptual representations: the Revised Hierarchical Model

(RHM) (Kroll & Stewart, 1994; see Figure 6.1) and the Distributed Feature Model (DFM) (De Groot, 1992; see Figure 6.2). The RHM reflects two important findings in research on interlingual connections: (1) translation from L1 to L2 is faster than picture naming in the L2 and (2) translation from L2 to L1 is faster than from L1 to L2, in particular in novice learners; (e.g. Chen & Leung, 1989; Kroll & Curley, 1988; see also De Groot, 2002; Kroll & De Groot, 1997; Kroll & Tokowicz, 2005, for discussion of conflicting findings). These findings were interpreted to mean that in the early stages L2 words are more strongly connected to their L1 translation equivalents than to concepts and that conceptual access (as seen in the picture-naming task) takes place via the L1 equivalents (lexical mediation). As the L2 proficiency increases, the links between L2 words and concepts become stronger and learners begin to rely more on direct links (conceptual mediation) (for a discussion of the two mediation processes see also Potter *et al.*, 1984).

The unique strength of the RHM is in capturing the developmental change in linking between L2 and L1 word forms and lexical concepts. Unfortunately, this relinking reflects only the case of conceptual equivalence. The unified and stable nature of the conceptual store assumed in the RHM does not accommodate the cases of partial and

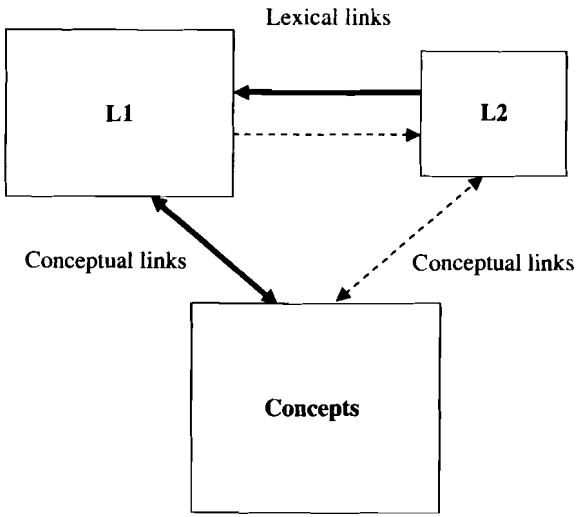

Figure 6.1 The Revised Hierarchical model (adapted from Kroll & Stewart, 1994)

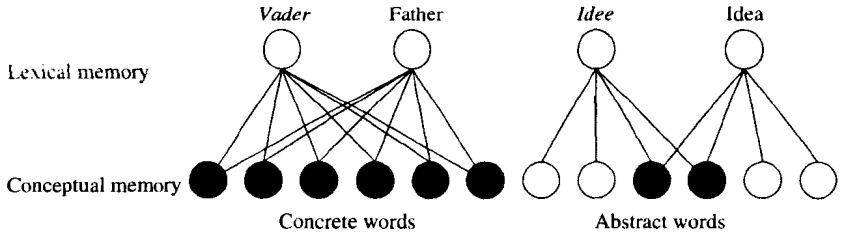

Figure 6.2 The Distributed Feature model (adapted from De Groot, 1992, 1993)

complete non-equivalence and does not allow us to differentiate between target- and non-target-like performance in mapping words to referents.

In turn, the primary strength of the DFM is attention to cross-linguistic differences. The model reflects the finding that bilinguals translate concrete words and cognates faster than abstract words (De Groot, 1992, 1993, 1995; De Groot *et al.*, 1994; Kroll & Stewart, 1994; Van Hell & De Groot, 1998). This finding is taken to mean that representations of concrete words and cognates are largely, if not completely, shared across languages while representations of abstract words share fewer semantic features.

Despite the fact that the model incorporates cross-linguistic differences, it does not easily accommodate the findings summarized above. To begin with, the model lacks a developmental component that would make predictions as to the learning of partial translation equivalents. Its second weakness is the reliance on the feature-based approach, which has been largely cast aside in contemporary cognitive psychology because it does not account for prototype and context-dependence effects (Murphy, 2002; see also De Groot, 1992: 406–408). These effects play an important role in L2 vocabulary learning and use. For instance, Ijaz (1986) demonstrated that in contexts where L1 and L2 words differ in peripheral meanings, L2 learners perform in a target-like manner with prototypical or core meanings, but display L1 transfer in peripheral meanings (see also Aitchison, 1994; Kellerman, 1978, 1983). These prototype effects, as well as differences in category structure and boundaries revealed in the studies discussed above, cannot be accommodated by the feature-based approach.

The third weakness of the DFM is the equation of the strength of interlingual connections with the degree of shared meaning. The problematic nature of this equation has already been discussed in section

1.1, yet one aspect of this issue deserves further discussion, namely conflation of word type and conceptual properties. Research in this paradigm suggests that the degree of overlap in concepts is determined by word frequency, cognate status and concreteness (De Groot, 1992, 1993, 1995, 2002). The first two, however, are lexical, not conceptual properties. Word frequency has no relation to conceptual structure (and vice versa), and neither does the cognate status *per se*. Rather, cognates, depending on the vagaries of their linguistic history, may be full, partial equivalents or nonequivalents, also known as false cognates (for an in-depth discussion of cognates see Jarvis, this volume; Sánchez-Casas & García-Albea, 2005).

At the same time, there is no doubt that cognate status may lead L2 learners to assume a shared meaning, even in the case of partial equivalence or false cognates (for a discussion of semantic priming by false cognates, see Sánchez-Casas & García-Albea, 2005). For instance, many American L2 learners of Spanish assume that *embarazada* (pregnant, fem) is a cognate of *embarrassed* and treat it as such. The DFM, however, offers no means of differentiation between shared representations reflecting similarity between linguistic categories of particular languages, and shared representations that derive from erroneous assumptions. The figure illustrating the model appears to reflect the relationship between particular linguistic categories, yet the studies in this paradigm examine the relationships in the minds of particular speakers, which, as demonstrated earlier, may or may not reflect monolinguals' linguistic categories.

The last weakness of the model is the assumption that concrete words share meanings, because they are translated faster than abstract words. This assumption is in contrast with the findings of studies that reveal numerous cross-linguistic differences in the naming of household objects, such as cups, bottles or dishes, by monolingual and bilingual speakers of French and Dutch (Ameel *et al.*, 2005), English, Spanish and Chinese (Graham & Belnap, 1986; Malt *et al.*, 1999, 2003) and English, Hebrew and Japanese (Kronenfeld *et al.*, 1985). These studies suggest that concrete words may also be linked to partially or completely distinct linguistic categories. These categories are not necessarily easy to readjust. For instance, Malt and Sloman (2003) found that even advanced L2 users of English do not fully approximate native speakers' patterns of naming household objects, a result that would not be predicted – and cannot be explained – by a model that assumes shared meanings of (high-frequency) concrete words.

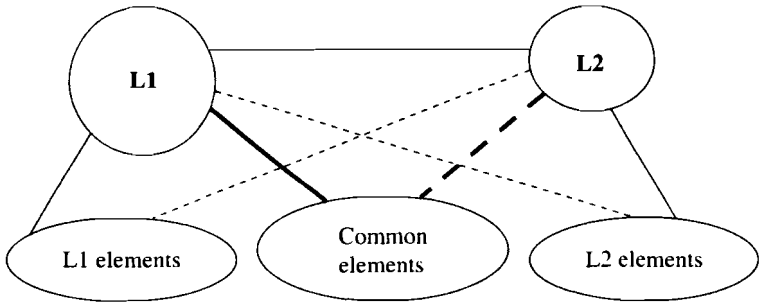

Figure 6.3 The Shared Asymmetrical Model (adapted from Dong *et al.*, 2005)

A more dynamic approach toward modeling L2 vocabulary learning and bilingual performance has been advanced by Dong *et al.* (2005). In the Shared Asymmetrical Model (SAM) put forth by these authors, the L1 and the L2 lexicons are linked to each other as well as to common conceptual elements, L1 elements and L2 elements (see Figure 6.3). The model succeeds in bringing together cross-linguistic differences and the vocabulary learning process, but it lacks clarity with regard to the nature and structure of conceptual representation (see section 1.1).

3.2. The Modified Hierarchical Model (MHM)

The MHM proposed here (see Figure 6.4) differs from the three models above, while attempting to retain their strengths.[3] In doing so, it aims to function as a transitional model, which preserves the earlier findings while asking new questions and positing new hypotheses. Building on the RHM (Kroll & Stewart, 1994), the MHM retains the developmental progression from lexical to conceptual mediation in L2 learning. It also retains the notion of shared and partially shared representations central to the DFM and the SAM. At the same time, the MHM differs from the other models in three important aspects outlined next.

3.2.1. Organization of the conceptual store

The first distinguishing aspect of the MHM is the organization of the conceptual store. While the RHM assumes a unified conceptual store, in the MHM conceptual representations may be fully shared, partially overlapping or fully language-specific: L1 and L2 categories in Figure 6.4 stand for conceptual nonequivalents and for language-specific aspects of partial equivalents. Recognition of language-specific lexical concepts,

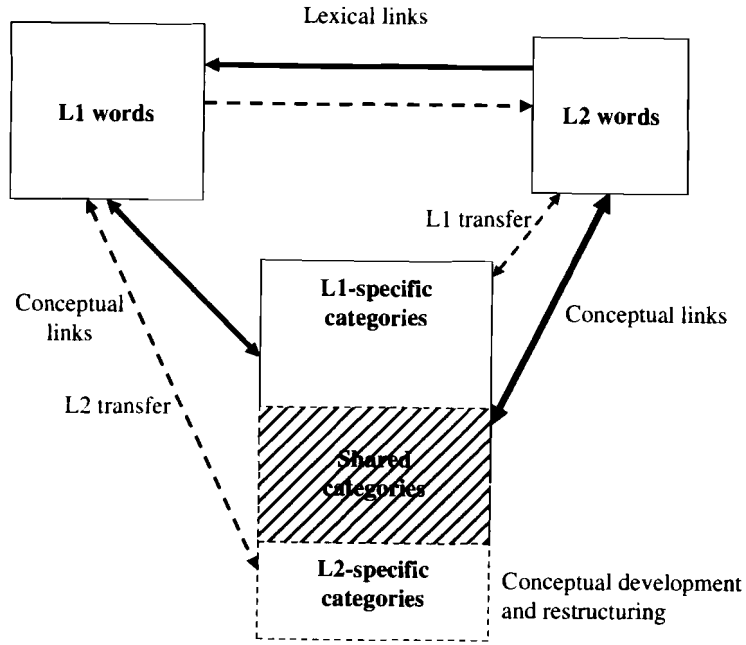

Figure 6.4 The Modified Hierarchical Model

such as *frustration* or *privacy*, differentiates the MHM also from the DFM and the SAM.

The inclusion of language-specific lexical concepts has interesting implications for theories of bilingual processing. It has been commonly assumed that the formulation of a message begins in the conceptualizer or the undifferentiated conceptual system and might activate lexical links in both languages of a bilingual (cf. Costa, 2005; Green, 1998). If we see some linguistic categories as language- and culture-specific, only one language may have the necessary word forms, while activation of lexical links in the other language would fail, producing breakdowns in fluency (Pavlenko, 1997, 2003). To use lexical concepts of one language as interpretive categories in another language, bilinguals may resort to codeswitching, lexical borrowing or loan translation (Panayiotou, 2004; Pavlenko, 1997, 2002a, 2003; Pavlenko & Driagina, 2007).

The activation process, in this view, becomes a two-way interaction between the mind and the environment, where linguistic and social contexts affect the conceptualizer, activating concepts and frames that are linked to one language, while inhibiting others and making them less

relevant or at least less accessible. Several studies in cross-cultural psychology provide evidence of such context-dependent nature of bilingual cognition (e.g. Hong *et al.*, 2000; Ross *et al.*, 2002; Trafimow *et al.*, 1997).

Studies in bilingualism also suggest that bilingual performance varies across tasks, whereby the same speakers may perform in accordance with language-specific constraints on some tasks and display transfer in others (Jarvis, 2003; Stepanova Sachs & Coley, 2006; see also Gullberg's chapter on the discontinuities between verbal and gestural performance). This variation also supports the view of conceptual representation as a dynamic, distributed and emergent phenomenon that functions in a context-dependent manner (Barsalou, 2003; Malt *et al.*, 2003).

3.2.2. Conceptual transfer

The second distinguishing feature of the MHM is the recognition of the phenomenon of conceptual transfer, which in turn is predicated on the differentiation between semantic and conceptual levels of representation. The term *semantic representation* refers here to the largely implicit knowledge of: (1) the mapping between words and concepts determining how many concepts and which particular concepts are expressed by a particular word via polysemy or metaphoric extension and (2) connections between words, which account for phenomena such as collocation, word association, synonymy and antonymy (see also Jarvis, this volume; Jarvis & Pavlenko, 2008). This view locates semantic at the level of links between words and concepts, as well as words and other words, and is undoubtedly more narrow than that assumed in a lot of other work in linguistics and psychology. At the same time, it allows researchers to differentiate between errors made at the level of linking (semantic transfer) and those that involve the structure of conceptual categories (conceptual transfer).

To illustrate this difference, let us consider an example of a Finnish speaker who says in L2 English *He bit himself in the language* (meaning 'He bit himself in the tongue') (Ringbom, 2001: 64). Both the Finnish word *kieli* and the English word *tongue* are polysemic, meaning that they are linked to two distinct concepts, that of a human body part, tongue, and that of a means of communication, language. These concepts are clearly differentiated by the speakers of both languages. The error committed by the Finnish speaker consists in linking the Finnish word *kieli* to the high-frequency English word *language*, which refers only to the means of communication but not to the body part. This error is seen here as semantic transfer, because it occurred at the point of mapping words to

concepts and does not involve the structure of conceptual categories (see also Jarvis & Pavlenko, 2008). In contrast, when an English speaker of L2 Russian asks for a *chashka* (roughly similar to *cup*) in reference to a drinking container made of paper, the transfer is not simply semantic (inappropriate link) but conceptual (inadequate knowledge of the structure of category *chashka*, which does not include plastic and paper containers). This reliance on the L1 linguistic category is viewed here as conceptual transfer because the transfer originates with multimodal conceptual representations.

To account for such non-target-like performance, MHM differentiates between two types of shared conceptual representations. The first, marked 'shared categories' in Figure 6.4, involves representations that are shared – or partially shared – by monolingual speakers of respective languages, and are represented in the same manner in the minds of bilingual speakers leading to target-like performance. No assumptions are made *a priori* as to which representations may be shared, rather the degree of sharedness is established empirically for particular word pairs. For instance, in the case of categories roughly corresponding to the English *cup*, the Dutch *tas* and the French *tasse* share category members (Ameel *et al.*, 2005), while the English *cup*, the Russian *chashka*, the Spanish *taza* and the Hebrew *sefel* overlap only partially (Graham & Belnap, 1986; Kronenfeld *et al.*, 1985).

The second type of shared representations involves those that are shared in the minds of individual bilinguals but do not coincide with monolinguals' representations and lead to non-target-like performance. The use of L2 words in accordance with L1 linguistic categories is seen here as L1 conceptual transfer; similarly, the use of L1 words in accordance with L2 linguistic categories is seen as L2 conceptual transfer.

The differentiation between semantic and conceptual levels of representation allows us to differentiate between the sources of transfer, conceptual versus semantic, and to consider what is involved in L2 acquisition in each case (see also Jarvis & Pavlenko, 2008). In the case of the semantic transfer example, the Finnish L2 learner of English needs to inhibit the link between the word *language* and the concept of the body part (tongue) and to link both lexical concepts (tongue and language) to the polysemic English word *tongue*. This process involves inhibition and relinking, but not conceptual restructuring. In the case of conceptual transfer, the English-speaking L2 learner of Russian needs to restructure linguistic categories corresponding to *chashka* (cup) and *stakan* (glass), transferring paper and plastic containers from the former to the latter.

3.2.3. L2 learning as conceptual restructuring

This restructuring takes us to the third and the most important distinguishing feature of the MHM, namely the view of L2 learning embedded in the model. While the RHM assumes that the goal of L2 vocabulary learning is the development of direct links between L2 words and concepts, the MHM views the main goal of L2 learning as conceptual restructuring and development of target-like linguistic categories (for a discussion of factors affecting conceptual restructuring and development in L2 learning, see Jarvis & Pavlenko, 2008: 150–151, 172–173).

This learning is seen as a gradual process, taking place in implicit memory. The term *implicit* refers here to the knowledge that individuals may not be aware of but which researchers can infer from their systematic verbal and non-verbal performance. This is the knowledge that drives spontaneous speech production. The term *explicit* refers to the metalinguistic knowledge of word definitions, grammar rules or translation equivalents that individuals are aware of and are capable of verbalizing on demand. The distinction between implicit and explicit knowledge and memory is commonly accepted in the fields of second language acquisition and bilingualism (N. Ellis, 1994; R. Ellis, 2006; Paradis, 1994, 2004), but it has not yet been incorporated into models of the bilingual lexicon. Yet it is an important distinction because in a second or additional language learned in the classroom, explicit knowledge may play a central role in verbal performance of beginning and intermediate students (Paradis, 1994).

The studies discussed earlier in the chapter reveal a dissociation between explicit and implicit knowledge in L2 learners, whereby the ability to translate and define language-specific linguistic categories does not automatically lead to the ability to use these words in context (Pavlenko, 1997, 2003; Pavlenko & Driagina, 2007). The same dissociation exists in the case of partial equivalents, such as the Spanish copula verbs *ser* and *estar*, both of which are translated in English as *to be*. These verbs are challenging for English-speaking L2 learners of Spanish, because they require differentiation between two types of being. For instance, *ser* may refer to more permanent states, such as character traits, and *estar* to temporary states, such as moods. Consequently, *ella es alegre* means 'she is happy, joyful' (a character trait), while *ella está alegre* means 'she is in a good mood, content, happy right now' (a temporary state). Early on in the learning process, students memorize the distinctions between the two and the contexts in which the verbs are commonly used. But is memorization of definitions and examples sufficient for target-like performance?

Empirical studies show that L2 learners' performance on the two copulas varies across contexts (De Keyser, 1990). In foreign language classroom tasks, such as fill-in-the-blanks, which allow sufficient time for information retrieval from explicit memory, learners may draw on the rules they memorized and demonstrate more or less target-like performance. In contrast, in spontaneous communication, where performance is time-constrained, *ser* is commonly overgeneralized; studies also show that *ser* is acquired first and used more correctly than *estar* even after several years of instruction (De Keyser, 1990; Geeslin, 2003; Ryan & Lafford, 1992). It appears then that many L2 learners map *ser* onto the L1 category of being and do not differentiate systematically between temporary and permanent states of being. To develop target-like categories corresponding to *ser* and *estar* in implicit memory, L2 learners require prolonged interaction with Spanish speakers. These findings suggest that researchers interested in conceptual representation and processing should not confuse explicit and implicit representations and should employ tasks that reveal implicit conceptual knowledge.

The distinctions between explicit and implicit, as well as semantic and conceptual knowledge, adopted here have three advantages for the study of the bilingual lexicon. First, they illuminate the sources of errors in L2 learners' performance, and in doing so contribute to the model's ecological validity. Second, they allow us to formulate new hypotheses with regard to L2 vocabulary learning and to ask, for instance, whether errors due to negative conceptual transfer may persist longer than errors due to negative semantic transfer because of the challenges involved in restructuring existing conceptual representations and developing new ones. Third, they force us to reconsider the applicability of different methods for the study of conceptual representation. In this view, neither word association tasks nor word similarity judgments access the level of implicit conceptual representation. Word associations reveal semantic links formed through polysemy, synonymy or collocation, while word similarity judgments reveal speakers' beliefs about language that may or may not be congruent with implicitly encoded linguistic categories that drive the naming process.

Conclusions and Implications

To conclude, let me begin by stating what I do not argue for. First, I do not argue that all models of bilingual processing should take into account cross-linguistic differences in linguistic categories. The models that would benefit most from incorporating these differences are developmental

models of L2 vocabulary learning and models of the bilingual lexicon. Secondly, I do not argue that all models of the bilingual lexicon should differentiate between semantic and conceptual levels of representation, in particular according to the definitions presented here. Rather, I argue that lexical properties, such as word frequency, or semantic properties, such as polysemy, should not be confused with conceptual properties, and that tasks that examine interlingual connections do not necessarily illuminate the structure of conceptual representations. Third, I do not argue that all models of the bilingual lexicon should differentiate between explicit and implicit knowledge. Rather, I argue that tasks drawing on explicit knowledge cannot be used to examine implicit representations. Finally and most importantly, I do not argue that research driven by the RHM and the DFM did not contribute to the understanding of the bilingual lexicon. Rather, I argue that this research made important contributions to our understanding of interlingual connections. De Groot (1992, 1993) has also rightly argued that bilinguals' representations need not be of one type (compound, co-ordinate or subordinate), but may contain a mixture of representational formats. Now the time has come to move to the next stage of research on bilinguals' concepts, where the strength of interlingual connections is differentiated from the degree of shared meaning and where sharedness is established empirically, rather than assumed.

To facilitate the transition to this stage, I have put forth the MHM that brings another layer of depth to our understanding of the bilingual mental lexicon, positing that distinct conceptual equivalence relationships have different implications for L2 vocabulary learning:

(1) *conceptual equivalence* facilitates L2 vocabulary learning through positive transfer; the main learning task in this context is the establishment of links between L2 words and already existing concepts;
(2) *partial (non)equivalence* facilitates learning through partial overlap (positive transfer), yet also complicates it when learners assume complete equivalence and display negative transfer; the main L2 learning task in this context is conceptual restructuring;
(3) *non-equivalence* simultaneously complicates learning, as learners have to develop new categories, and facilitates it through the absence of competing representations; the L2 learning task here involves development of a new linguistic category that allows learners to map a new word onto real-world referents; this task may be easier in the case of new objects and more challenging in the case of abstract or emotion categories.

Depending on the nature of the conceptual equivalence relationship and on the learner's trajectory, L2 learners may manifest: (1) positive L1 conceptual transfer (in the case of conceptual equivalence); (2) positive or negative L1 conceptual transfer (in the case of partial (non)equivalence); (3) internalization of new concepts or lack thereof (in the case of conceptual non-equivalence); and (4) conceptual restructuring (in the case of partial (non)equivalence). Conceptual restructuring, in turn, may result in: (1) coexisting representations, where speakers conform to the constraints of each language; (2) partial restructuring; (3) converging representations distinct from the categories mediated by languages A and B; and (4) shift toward the L2 category. Consequently, the shape of bilinguals' conceptual representations is affected by the equivalence relationship and, in the case of partial or complete (non)equivalence, by opportunities for L2 socialization.

This approach offers several productive directions for future inquiry. To begin with, the field can now examine the relationship between the strength of interlingual connections (as seen through priming or translation rates) and the degree of shared meaning between particular translation equivalents (as seen through naming, sorting and categorization tasks). Differentiating between the actual linguistic categories (as seen in monolinguals' performance) and the categories in the bilingual minds, this inquiry will further illuminate factors that affect the strength of interlingual connections and the shape of conceptual representations.

More importantly, we can now expand the focus of inquiry to include conceptual restructuring and development of new linguistic categories. The first direction for such inquiry is empirical study of the structure and boundaries of various linguistic categories, especially those linked to high-frequency words, across a variety of languages. The products of such inquiry, in a dictionary or web-format, would offer an excellent resource for foreign language teachers committed to highlighting areas of partial (non)equivalence. This inquiry could also illuminate areas where native speakers of a particular language are likely to agree and those where individual and generational differences might be particularly apparent.

The second important direction is longitudinal study of conceptual restructuring and development as seen through verbal and non-verbal performance of L2 learners tested regularly over a span of several years. To reach an in-depth understanding, these processes need to be studied

in a variety of learners, classroom versus naturalistic, and in a variety of language combinations. Several hypotheses may be tested in such inquiry. First, we may hypothesize that the learning of conceptual equivalents will proceed faster than that of partial equivalents, and that the rate of learning of nonequivalents will depend on both their referents (i.e. whether they refer to easily identifiable objects, processes and phenomena) and opportunities for L2 socialization. Secondly, in the case of partial (non)equivalence, L2 learners may initially assume full equivalence, and display L1 conceptual transfer in their performance. Third, we may hypothesize that conceptual transfer may persist longer than semantic transfer due to difficulties involved in conceptual restructuring compared to relinking.

The differentiation between the three types of conceptual equivalence also has implications for FL and L2 instruction. More often than not, FL/L2 materials and curricula overlook cross-linguistic differences through their textual focus on translation equivalents and images produced by clip-art manufacturers (Read, 2003). These materials convey a view that L2 vocabulary learning takes place in the context of conceptual equivalence, which is not necessarily the case. Rather, vocabulary instruction should be differentiated depending on the conceptual equivalence relationship between the lexical items in question, as well as on the learners' proficiency level.

In the case of conceptual equivalence, L2 instruction should focus on strengthening the links between L2 words and their L1 translation equivalents through L2 production tasks, translation from L1 to L2 and other tasks that involve recall, rather than recognition, of L2 vocabulary items. Instruction at intermediate and advanced levels could also include metaphoric extensions of particular words that may or may not be the same across languages (Kellerman, 1978, 1983; see also Verspoor & Lowie, 2003).

In the case of partial (non)equivalence, L2 instruction should highlight the areas of similarity and difference and aid in conceptual restructuring. This instruction could involve consciousness-raising activities, such as explanations, discussions and exercises that introduce learners to cross-linguistic differences. It could also involve naming, sorting and categorization activities that allow learners to understand how various category members – be they objects, such as china, plastic, paper, and glass containers, or situations arousing particular feelings, such as jealousy or envy – might be referred to by native speakers of the target language.

Language corpora offer an excellent tool for such instruction, allowing learners to identify the range of contexts where particular words could be used. Thus, to understand how *problem* differs from *question*, Chinese L2 learners of English could consult English-language corpora, such as COBUILD (www.titania.cobuild.collins.co.uk) (Jiang, 2004). Similarly, to understand the difference between *zlit'sia* and *serdit'sia*, American L2 learners of Russian could consult Russian language corpora, such as www.ruscorpora.ru. (For an example of FL teaching materials that involve language corpora and exercises created specifically to advance conceptual restructuring in American L2 learners of Russian, see Pavlenko & Driagina, 2006.) The development of L2 categories could be further aided by exercises that involve visual representations. For instance, the Culturally Authentic Pictorial Lexicon of German (www.washjeff.edu/capl), developed by Shaughnessy (Read, 2003), features numerous pictures of German realia that can be used in naming and sorting activities, and in awareness-raising discussions.

Finally, in the case of conceptual non-equivalence, L2 instruction should facilitate the development of new concepts. This development could be facilitated through tasks that present learners with novel objects or ask them to interpret particular situations. Subsequent awareness-raising discussions could focus on cross-linguistic differences in the ways in which particular objects, events and phenomena are named, conceptualized and interpreted in the learners' respective languages.

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Notes

1. The discussion here will focus on the studies of lexical concepts; for studies of bilinguals' grammatical concepts, see Athanasopoulos (2006, 2007), Cook *et al.* (2006), Jarvis and Pavlenko (2008); for discussion of the interface between structural and conceptual factors in the bilingual lexicon, see Pavlenko (2008a).
2. Due to the difference in tasks and materials, these findings are in stark contrast with those of Caramazza and Brones (1980) who claimed, on the basis of a semantic categorization task, that representations of furniture are shared in English and Spanish.
3. I fully recognize that the visual representation is but a metaphor for the L2 learning process, which cannot be captured in its entirety via boxes, circles and links. As pointed out by De Groot (1992: 389), one cannot help but

wonder whether 'rather than parsimoniously capturing its essence, these few strokes and dashes may do injustice to the complexity of reality'.

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