ACQUISITION OF L2 SPATIAL PREPOSITIONS: NEW WORDS FOR OLD CONCEPTS?

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Following Jackendoff's Representational Modularity (1996, 1997), if we take conceptual structure (CS) and spatial representation (SR) to be what constitute the 'concept' of a word, then we can take phonological structure (PS) and syntactic structure (SS) to be what are "tacked onto this knowledge to make it linguistically expressible" (Jackendoff, 1996, p. 12). According to Representational Modularity, the lexicon is a learned mapping between levels of representation (such as CS or SS) within the language faculty. For those of us interested in second language acquisition (SLA), this notion, at least in terms of spatial prepositions, provides a very specific means of investigating what learners acquire and transfer when learning L2 spatial prepositions. The ways that SRs and CSs combine to form relational schemata for particular spatial prepositions vary from language to language. This paper argues that learning a new L2 spatial preposition means learning how to combine particular SRs with particular CSs in ways that, perhaps, have never been done before in the L1.

This paper provides a fine-grained analysis of CS-SR mappings for the English polysemic spatial preposition *over* and its Chinese counterparts. Distinctions between several CS-SR mappings for the various relational schemata of English and Chinese OVER[1] are identified. Based on these distinctions, a hypothesis is made, addressing what, exactly, Chinese learners of L2 English both transfer and acquire when learning the various shades of meaning for *over*.

INTRODUCTION

Recent work in linguistics and cognitive science has done much to revitalize the issues surrounding linguistic relativity (Bowerman & Levinson, 1998; Gumperz & Levinson, 1996; Lucy, 1992; Pederson, Danzigier, Wilkins, Levinson, Kita, & Senft, 1998). Linguistic relativity posits that the way humans view reality is influenced by the semantic and grammatical organization of their language. For example, after looking at 13 different languages Pederson, et al. (1998) found that users of different language systems vary their choice of nonlinguistic spatial problem-solving strategies in a way that is analogous to their language use. According to Pederson, et al. (1998), "Cognitive representations of seemingly basic spatial relations are culturally variable in nontrivial ways: people from different groups clearly categorize these relations differently, even when their behavior might initially appear superficially similar..." (p. 585). They conclude that "linguistic coding correlates strongly with the way spatial distinctions are conceptualized for nonlinguistic purposes" (p. 586).

It should come as no surprise that there are cross-linguistic differences in how language users carve up their environment. A concept may be encoded in a systematic way in one language, but downplayed or ignored in another language. What does come as a surprise, though, is the finding that in *non*linguistic tasks, people of different languages conceptualize spatial relations differently. If this is true, then these findings have serious implications for a theory of second language acquisition. A learner of a second language is not only faced with learning new spatial terms and mapping them to previously held concepts but, perhaps, is also faced with constructing new conceptualizations of space as well. The purpose of this paper is to investigate what this process may entail.

Differences in the usage and conceptualizations of OVER (small caps indicate the 'concept' of a word) between Chinese and English are analyzed. The intent is to shed some light on what the second language learner is faced with, at the conceptual level, when learning L2 spatial terms that differ greatly from ones in the L1 with regards to how they carve up space. The first part of the paper is a direct comparison of English *over* and its Chinese counterpart. The second part of the paper is first a brief review of Jackendoff's architecture of the linguistic-spatial interface, and then a hypothesis that L2 learners are not faced with learning new concepts per se, but, instead, are faced with learning new relational schemata of *over*. It is argued that relational schemata are nothing more than new mappings between previously held component-level schemata.

CHINESE AND ENGLISH SENSES OF 'OVER'

In Chinese, the prototypical meaning of the word *shang* is essentially the same as the prototypical meaning of the English word *on*. For example, in the sentence, 'The book is on the table,' the word *on* is meant to represent a relationship between two objects (*table* and *book*) that is static and vertical and where there is contact between the two objects. The Chinese translation of the above sentence would be:

1. *Zhuo shang you yi ben shu.*
   desk on has one (measure word) book

Here, *shang* indicates the same relationship between objects that the prototypical English *on* does. This is not always the case, though. *Shang* can be used in many ways, and not all of its meanings translate perfectly with the English preposition *on*. Take for example the sentence, 'The sky is over our heads.' The Chinese equivalent of this sentence would be:

2. *Tian zai wo men de tou ding* ***shang.***
   sky (preposition marker) our head **on**

The *shang* in this sentence is the same word as in the 'book on the desk' sentence, but the meaning is one where English speakers would feel more comfortable using the preposition *over*.

In English, the prototypical meaning for the preposition *over* is depicted in the above sentence ('The sky is over our heads') or in the sentence: 'The lamp is over the desk.' Here, the preposition *over* indicates a relationship between two objects that is static and vertical and where the two objects are separated; i.e., there is no contact between them. In Chinese, this type of spatial relationship between objects is sometimes indicated by *shang* (as in sentence 2), but there are many cases where a different preposition is needed. Take for instance the English sentence 'The wires over the street are ugly.' Here, the spatial relationship in English is the same as in 'The sky is over our heads,' but in Chinese it is somewhat different. The Chinese equivalent would be:

3. *Jie dao* ***shang kong*** *jie xie dian xian hen nan kan.*
   street **over** these wires very ugly

Here, *shang* is combined with *kong* to achieve a sense that is closer to the prototypical meaning for English *over*. The Chinese prepositions *shang kong* and *shang fang* are used like English *over* to indicate a spatial relationship between two objects that are vertically separated. The difference for the Chinese equivalent, though, is that the vertically higher object is thought of as being 'in space' instead of only in vertical relation to the other object.

There are cases, then, where English indicates vertical separation between objects and where Chinese does not. There are also cases where both English and Chinese indicate separation between objects on a vertical axis, but where the reasons for doing so are different. Just what constitutes these differences requires a closer look at the dimensionalities of these spatial prepositions. In the next section, the several different dimensionalities of English *over* will be mapped out and compared with their counterparts in Chinese.

Relational Schemata of 'over'

The English preposition *over* has many different meanings and uses. Drawing on Anatol Kreitzer's (1997) work on this preposition, I will argue that the many meanings and uses of English *over* can be traced to three relational schemata. These will be referred to as $over_{static}$, $over_{dynamic}$, and $over_{deictic}$.

$over_{static}$

The most prototypical relational schema of the English preposition *over* is expressed in sentences such as:

4. The lamp is over the desk.

In this spatial relation, there are two objects, from now on called *trajector* (or figure) and *landmark* (or ground) (Langacker, 1991). In sentence 4, the trajector (lamp) is 'hovering' above and in static relation to the landmark (desk). In English, this relational schema consists of two component level schemata, which in this case are objects – not paths or trajectories. The relationship between the component schemata is static; the trajector and landmark are points on a single vertical axis; and the trajector and landmark cannot be in contact. If they do come in contact with each other, the relation between the two changes from OVER to ON. The dimensions of the components that this relational schema ($over_{static}$) consists of, in English, at least, are not crucial. In other words, the trajector in the sentence, "The lamp is over the table," is smaller than the landmark (table). In "The sky is over my head," though, the trajector is much larger than the landmark (see Figures 1 and 2). In both sentences the use of English *over* is grammatical, allowing us to say that the dimensions of components for the $over_{static}$ relational schema do not lend to, or take away from, the grammaticality of *over*. In English, then, the *minimal specification* (Lakoff, 1987) for $over_{static}$ is (1) that the components are in vertical alignment with one another, and (2) that there is vertical separation between landmark and trajector.

Because English does not factor dimensionality into its minimal specification of $over_{static}$, Figures 1 and 2 are nothing more than variations of one schematic relationship. This is not the case for Chinese, though, which, in turn, creates two distinct, and grammatically speaking, mutually exclusive $over_{static}$ schematic relationships. The first one, $over_{static1}$, is employed in those cases where the trajector is smaller than the landmark and vertically removed from it (e.g., sentences 3 and 4). Although the dimensionality of the $over_{static}$

schematic relationship does not affect the grammaticality of *over* in English, it does affect the grammaticality of *shang* or *shang kong/shang fang* in Chinese. Take for example the sentence: 'I held a large umbrella over the chief's head.' The Chinese equivalent of this would be:

5. *Wo zai shou ling de tou ding* ***shang*** *da le yi ba da san.*
   I (prep. marker) chief's head on/over hold one large umbrella

The dimensionality of the schematic relationship that this sentence represents is one like that of Figure 2. There, the trajector is larger than the landmark, thus calling for *shang*. When the trajector is small enough to be considered 'in space' (as in Figure 1) instead of encompassing the landmark, then that dimensionality calls for the use of *shang kong* or *shang fang*. Sentence 3 is an example of this.

It is important for the $over_{static1}$ schematic relationship that the trajector be thought of as being 'in space.' The minimal specifications of $over_{static1}$, then, are that the components are (1) in vertical alignment with one another; (2) that there is vertical separation between landmark and trajector; and (3) that the trajector is smaller than the landmark and can be thought of as being 'in space.'

The second $over_{static}$ schematic relationship that Chinese creates, $over_{static2}$, is employed in a wide variety of situations. The possible variations range from the spatial relation expressed in sentence (1) to the spatial relation expressed in sentence (2); i.e., from English ON to English $over_{static}$. The restriction on the latter is such that the trajector is able to encompass the landmark or, at the very least, be larger than the landmark. The minimal specification for Chinese $over_{static2}$ is (1) that the components are in vertical alignment with one another; (2) if there is vertical separation between trajector and landmark, the trajector must be able to encompass the landmark; and (3) if there is no vertical separation, the dimensions of the trajector with respect to the landmark are irrelevant.

At first glance, given that the same spatial preposition is used to mean a wide variety of things, it appears that native speakers of Chinese view the spatial relation in 'The book is on the table,' in the same way that they view the spatial relation in 'The sky is over our heads.' This seems very odd to native speakers of English. On the other hand, it must seem odd to Chinese speakers that there are people who view the spatial relations in 'The lamp is over the desk' and 'I held the umbrella over his head' to be the same. These kinds of observations give life again to the Whorfian hypothesis, which basically states that the way humans view reality is determined by the semantic and grammatical organization of their language (Bowerman, 1996). If, though, this paper argues for anything, it argues against the Whorfian hypothesis. Before delving into that argument, though, let us first discuss $over_{dynamic}$ and $over_{deictic}$.

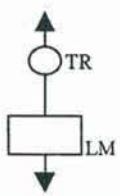

Figure 1. The lamp is over the table.

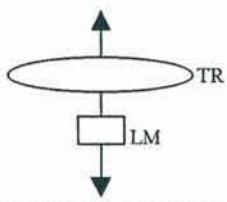

Figure 2. The sky is over my head.

***over*$_{dynamic}$**

A less prototypical relational schema of *over* is expressed in the sentences:

6. We drove over a bad stretch of road.
7. The dog jumped over the fence.

In sentence 6, there is contact between the trajector (car) and the landmark (road); also, the relation between the two is dynamic. In sentence 7, there is no contact between the trajector (dog) and the landmark (fence), but the relation is still dynamic. For this relational schema, then, it is not crucial whether there is contact between trajector and landmark.

The relational schema, *over*$_{dynamic}$, consists of two component schemata: a path schema and an object schema. Because of the path schema, the relationship between the component schemata is necessarily dynamic. The trajector of *over*$_{dynamic}$ is almost always schematized as a point whose movement can be represented as a linear trajectory. The trajector's path is constrained in that it must traverse the boundaries (real or construed) of the landmark. The landmark's schematization is not constrained and does not affect the grammaticality of the preposition *over*. It can be narrowly restricted or widely extended:

8. The dog jumped over the bowl.
9. The dog jumped over the puddle.
10. The plane flew over the ocean.

In addition to the requirement of having to traverse the boundaries of the landmark, the trajectory in *over*$_{dynamic}$ is further constrained in that its position at the point of landmark traversal must be above ground level; also, if contact is made between trajector and landmark, the point of contact cannot drop below the top surface of the landmark. Take for example the sentences:

11. I waded across the stream.
12. *I waded over the stream.
13. I walked across the valley.
14. *I walked over the valley.

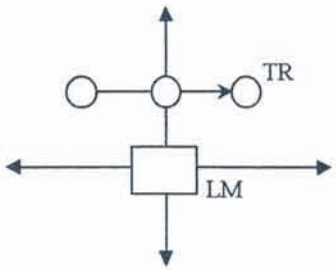

Figure 3. *Over*$_{dynamic}$

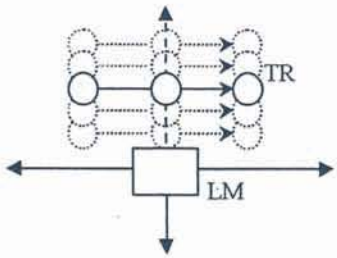

Figure 4. Constraints on the trajector of *over*$_{dynamic}$

The ungrammaticality of sentences (12) and (14) is due to the trajector moving *through* the landmark – literally in (11) and metaphorically in (13). Also, in both (11) and (13), the trajector is located below the ground level of the surrounding area, making (12) and (14) ungrammatical. Compare sentence (14) with (15) and (16):

15. I walked over the hill.
16. I drove over the mountains.

Both 'hill' and 'mountains' extend vertically above ground level causing the trajector's path at the point of traversal to also be above ground level. Thus the sentence is grammatical.

It is not always the case, though, that the landmark extends vertically above ground level. Take for example sentence (6), restated here as (17), and the following:

17. We drove over a bad stretch of road.
18. Getting him over the border was a dangerous ordeal.
19. The pioneers struggled to make it over the desert.

Here, even though the landmark does not extend vertically above ground level, the use of *over* is still grammatical because the landmark is being construed as a surmountable obstacle. Kreitzer (1997), making use of Talmy's (1988) work on force dynamics, says that, "...we conceptualize the dynamic *over* relation not only in terms of a dynamic geometric relation, but also in terms of a force dynamic relation in which a landmark provides a resistance to motion ..." (p. 312).

Other cases where it appears that the trajectory is not above ground level are in sentences like the following:

20. We drove over the bridge.

In this case, the landmark is at ground level and the trajector is in contact with the surface of the landmark. It appears, then, that at the point of traversal, the trajector is not above ground level. Yet sentence (20) is grammatical. A possible explanation for this is taken from the fact that a bridge spans some depression in the ground; e.g., a canyon, river, wash, etc. In other words, crossing the bridge means moving *across* the bridge (where ACROSS is constrained in that its landmark can *not* extend above ground level) but *over* a linear depression. Via a metonymy, then, *bridge* is able to be used for both OVER and ACROSS, allowing a grammatical use of *over* in a seemingly ungrammatical context (see Figure 5). Evidence for this comes from the fact that we can say, 'I drove over the canyon' (see Figure 6), which leaves out bridge and *across* altogether. Sentence (20) means 'across the bridge' and 'over the canyon.'

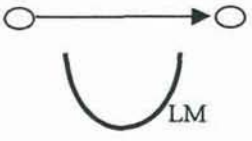

Figure 5. I drove over the river/canyon.

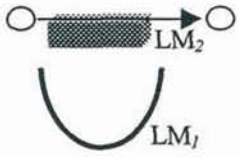

Figure 6. I drove across/over the bridge.

Summarizing *over*$_{dynamic}$, we can say that its minimal specification is that: (1) its components consist of a path schema and an object schema; (2) the relationship between trajector and landmark is dynamic; (3) the trajector's path must traverse the boundaries (real or construed) of the landmark; and (4) the trajectory's position at the point of traversing the landmark must be above ground level.

Whereas the English spatial relation *over*$_{dynamic}$ tightly constrains the position of the trajectory with respect to ground level and landmark, Chinese does not. In English, if the trajector's path at the point of traversing the landmark is at ground level or below the surface of the landmark the spatial relation between trajector and landmark changes from OVER to ACROSS or THROUGH. Chinese does not make a verticality constraint, though, meaning that the same spatial preposition can be used where English would choose either *over* or *across*. Take for example the following sentences:

21. We drove over the bridge.
22. *Women kai che* ***guo*** *qiao*
    we drive car **across** bridge
23. The dog jumped over the fence.
24. *Gou tiao* ***guo*** *le li ba*
    dog jump **across** fence

In sentences (22) and (23), *guo*, seems to be indicating the same spatial relations that English *over*$_{dynamic}$ does. Looking further, though, we can see that the usage of Chinese *guo* is much broader than English's *over*.

25. I walked across the field.
26. *Wo zou guo tian ye*
27. I walk across field

28. I waded across the stream.
29. *Wo she shui zou guo le xiao he*
30. I wade walk across stream

In sentences (25) and (28), it would be ungrammatical in English to use *over*; yet in Chinese it is grammatical to use *guo*, indicating that Chinese *guo* does not share the same verticality constraint that makes distinct English OVER from English ACROSS. In fact, the only constraint on Chinese *guo* appears to be that there is a path schema in dynamic relation to a landmark. It does not matter where the trajectory is in relation to the landmark at the point of traversal. For example, Chinese translations of the following sentences would also employ *guo*:

31. She rode her bicycle past my window.
32. The plane flew over the city.
33. The subway passed below us.
34. I made it through finals week.

A relational schema for Chinese *guo* is difficult to illustrate two dimensionally, but Figure 7 presents a fairly accurate picture.

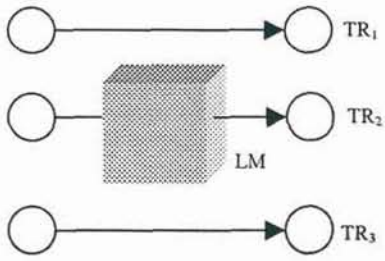

Figure 7. Relational schema for Chinese *guo* (Trajectors 1 and 3 can be above, below, in front of or behind the landmark).

***over*$_{deictic}$**

The third relational schema for English *over* is what I have chosen to call *over*$_{deictic}$. This schema is represented in sentences such as:

35. The tablecloth is over the table.
36. The clouds are over the sun.

In this spatial relation, there are two component schemata, one of which must be able to occlude the other from an observer, or deictic center. The landmark object schematization is not constrained. The trajector, on the other hand, must have a surface sufficiently large enough to obstruct the view of the landmark. The relationship between the two is what Kreitzer (1997) calls, "egocentric and static." As evidenced from sentences (35) and (36), the grammaticality of *over* is not dependent upon whether or not there is contact between the landmark and trajector (see Figure 8).

An interesting extension of this relational schema is derived through what Lakoff (1987) calls the *multiplex-mass* transformation. This transformation allows for many discrete objects (or paths) to be construed as a mass, which can then occlude a landmark. For example:

37. There are empty beer bottles all over my front yard.
38. There are tattoos over his entire body.
39. I have walked all over this city.

It is not clear that Chinese has an equivalent for English's *over*$_{deictic}$ relational schema.

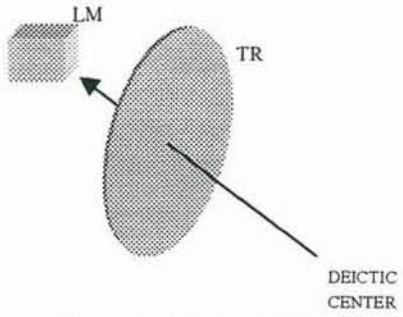

Figure 8. Relational Schema of *Over*$_{deictic}$

For example, the Chinese translation of sentence (35), restated here as (40), would use *shang* or *on*.

40. The tablecloth is over the table.
41. zhuo bu zai zhuo shang
    tablecloth (prep. marker) table on

In other words, where there is contact between trajector and landmark, Chinese chooses to use *shang*, ignoring the distinction made in English with regards to landmark occlusion. It should be noted, though, that in this context, it is grammatical in English to say, 'The tablecloth is *on* the table.' It should also be noted that Chinese is perfectly capable of expressing landmark occlusion, it just chooses to do so with a verb (*zhe* 'cover') instead of a preposition.

Summary of relational schemata for 'over'

We have seen in this section that there are differences between how speakers of English and Chinese choose to construe spatial relationships with regards to OVER. Where English speakers feel that there are clear differences between OVER and ACROSS, Chinese speakers are quite comfortable with no distinction. Where Chinese speakers feel that differences in the dimensionality of $over_{static}$ call for distinct lexical representations, English speakers use the $over_{static}$ relational schema to represent a full gamut of dimensionalities. And where English speakers employ the relational schema $over_{deictic}$ to represent occlusion of a landmark from an observer's perspective (deictic center), Chinese speakers do not. In Chinese, when there is contact between an occluding trajector and its landmark, the spatial preposition closest to English *on* (*shang*) is opted for.

These differences indicate that the ways in which Chinese and English speakers choose to 'carve up the world' are very dissimilar. Observations of this kind point strongly to a notion of linguistic relativity, begging the question that Peterson, Nadel, Bloom, & Garrett (1996) asked: "...do such findings imply that the conceptual representations at the interface between language and thought are themselves different [between languages]" (p. 570)? In order to answer these questions (at least with respect to the conceptual representation for OVER), a close look at Jackendoff's proposed architecture of the interface between language and thought is necessary.

Jackendoff's Architecture of the Linguistic-Spatial Interface

Jackendoff (1996) proposes a theory of Representational Modularity, where each level of representation constitutes a module. For instance, phonological structure and syntactic structure are distinct levels of representation; and Jackendoff (1996) says, "Representational Modularity ... posits that the architecture of the mind/brain devotes separate modules to these two encodings" (p. 1). Representational modules are different from Fodorian modules "in that they are individuated by the representations they process rather than by their function as faculties for input or output; that is, they are at the scale of individual levels of representation, rather than being entire faculties such as language perception" (p. 2).

Jackendoff (1996) proposes that *representational modules* are not entirely informationally encapsulated: they communicate with each other via *interface modules*.

Interface modules are domain-specific in that they carry information between two, and only those two, distinct levels of encoding (say phonology and syntax). The nature of the communication between representational modules is partial, only passing certain aspects of information from one level of representation on to the next. For example, looking at the phonology and syntax levels of representation, segmental and stress information is unnecessary and thus invisible to the syntax representation module, just as different syntactic categories (N, V, PP, etc.) and case, gender and number are invisible to the phonology representation module. The information that gets passed on from the phonology module to the syntax module, then, is only the information that the syntax module can make use of. In addition to these general principles of mapping, Jackendoff says that:

> ...an interface module can also make use of specialized learned mappings. The clearest instances of such mappings are *lexical items*. For instance, the lexical item *cat* stipulates that the phonological structure /kæt/ can be mapped simultaneously into a syntactic noun and into a conceptual structure that encodes the word's meaning. In other words, the theory of Representational Modularity leads us to regard the lexicon as a learned component of the interface modules... (p. 5)

In Figure 9, each label stands for a level of representation. The arrows represent interface modules. Because this paper is concerned with spatial prepositions, the levels of representation and corresponding interface module that this paper focuses on are conceptual structure and spatial representation. Conceptual structure (CS) is, Jackendoff (1996) says, "an encoding of linguistic meaning that is independent of the particular language whose meaning it encodes. It is an 'algebraic' representation, in the sense that conceptual structures are built up out of discrete primitive features and functions" (p. 5). CS expressions do not point to the real world but to our conceptualizations of it. Jackendoff (1996) employs an example taken from Talmy:

> 42. The light flashed until dawn.

In sentence (42), there is a sense of repeated flashes; but this sense is not derived from the verb *flash*. 'The light flashed' is usually meant to indicate a single flash. But the sense of repeated flashes is not derived from *until dawn* either: 'I slept until dawn' does not imply repeated acts of sleeping. The sense of repetition comes from the temporal boundedness provided by *until dawn* for an action (*flash*) that is normally thought of as a point in time. Jackendoff (1996) says that 'to make these compatible, a principle of construal...interprets the flashing as stretched out in time by repetition" (p. 7). In other

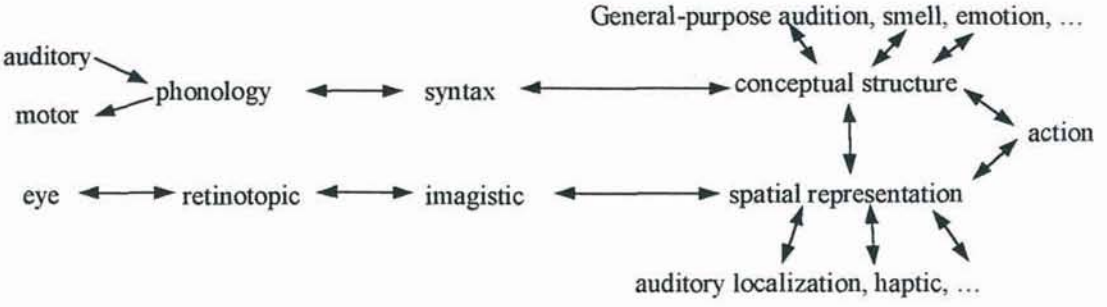

Figure 9. Levels of representation (adapted from Jackendoff, 1996, p. 3)

words, the sense of repeated flashes for (42) was in the CS of the sentence and not in any of the individual words.

Also central to conceptual structure is the notion of physical motion. Jackendoff (1996) says that notions of path (or trajectory) and place (or location) play a basic role in CS. Because locations and paths can be given spatial counterparts, "it is a good bet that these constituents are shared between CS and SR" (p. 11).

Spatial representation (SR) encodes the shape of objects. It is 'geometric' rather than algebraic. But Jackendoff (1996) is clear in pointing out that it is not 'imagistic' because an image is restricted to a particular point of view, and SR is not. He states that "even though SRs are not themselves imagistic, it makes sense to think of them as encoding *image schemas*: abstract representations from which a variety of images can be generated" (p. 9).

The type of information that gets passed between SR and CS, like the information passed between all representational modules, is partial. CS encodes information that is invisible to SR, such as token vs. type distinctions, quantificational relations, and taxonomic relations. SR also encodes information that is invisible to CS, such as details of object shapes. The information that does get mapped between CS and SR, though, is the notion of path and place from CS and image schemas from SR. How these features map with each other is the focus of the next section of this paper.

Representational Modularity in Second Language Acquisition

For those of us interested in second language acquisition (SLA), Jackendoff's (1996, 1997) notion that lexical items are specialized learned mappings between interface modules is exciting. This notion, in terms of spatial prepositions, at least, offers us with a very specific means of investigating the possibility that L2 learners are learning more than just new words for old concepts. It also offers us the means by which we can claim that L2 learners are not learning new concepts per se (after all, *over* as in $over_{static}$ must exist in some form or another in all languages), but, rather, are learning new shades of meaning and constraints on usage for a given preposition. These new shades of meaning are dependent upon either the formation of new mappings between CS and SR or upon the imposition of new constraints upon already-present mappings. The ways that SRs and CSs combine to form relational schemata of particular spatial prepositions vary from language to language. Learning how to use a new L2 spatial preposition correctly, then, is more than just learning the new word and using it like it had been used in the L1. Learning a new L2 spatial preposition means learning how to combine particular SRs with particular CSs in ways that perhaps have never been done before in the L1.

Looking back at the relational schemata for English *over*, it is possible to locate the different components of $over_{static}$, $over_{dynamic}$, and $over_{deictic}$ in either CS or SR. English $over_{static}$ consists of two component-level schemata, which are objects. These objects are real things in the world, but become schemata in SR. The dimensions of the component-level schemata in SR for $over_{static}$ are not, as we saw earlier, constrained in English. That is, the dimensionality of $over_{static}$ is not crucial to the grammaticality of English *over* (except, of course, that the two objects cannot be in contact with each other). In addition to there being two schematized objects in $over_{static}$, this relational schema is further constrained in that the relation between them is static, the two objects are aligned on a vertical axis and there is vertical separation between them. Motion (or, in this case, lack of it) is located in CS, as is

the sense of verticality. The 'learned mapping' for the English lexical item *over* (i.e., $over_{static}$), then, consists of (1) stasis and (2) verticality from CS, as well as two component-level schemata whose dimensions are unconstrained from SR. The resultant mapping, then, looks something like Figure 1 or 2.

English learners of L2 Chinese would, it is presumed, want to transfer this 'learned mapping' or relational schema when referring to two things that are in vertical alignment and separated from each other. These learners would likely never consider that the dimensions of the component-level objects lend to the grammaticality of *shang* or *shang kong*. What learners of L2 Chinese acquire with respect to *over*, then, is not a new concept of OVER, but two new relational schemata ($over_{static1}$ and $over_{static2}$), which are distinct from each other due to the dimensions of the trajector in relation to the landmark.

Chinese learners of L2 English also must learn to make a distinction that does not exist in their own language: namely the English distinction between *over* (i.e., $over_{dynamic}$) and *across*. Remember that the relational schema $over_{dynamic}$ consists of two component-level schemata: a path schema and an object schema. The trajector's path is constrained in that it must traverse the boundaries of the landmark and cannot be at or below ground level. In English, if the path does come into contact with the ground, then it becomes ungrammatical to use *over*, and *across* is used instead. The path schema of $over_{dynamic}$ is located in CS and the schematized landmark and trajector are located in SR. The learned mapping for English *over* (in this case, $over_{dynamic}$), then, matches the path schema from CS and the landmark and trajector from SR to look something like Figures 3 and 4 (It is important to remember that the learned mapping for $over_{dynamic}$ is highly constrained in that the trajector cannot come into contact with the construed ground level).

Chinese does not distinguish between $over_{dynamic}$ and *across*. Chinese *guo* is the closest approximation of English's $over_{dynamic}$, yet from Figure 7 it is clear that there are no constraints on the trajector's path – except that it must be in a dynamic relation to the landmark. Chinese learners of L2 English, then, are faced with acquiring at least two distinct relational schemata: $over_{dynamic}$ and *across*. Again, Chinese learners of L2 English do not learn a new concept for *over* ($over_{dynamic}$); rather, grammatical use of *over* and *across* requires Chinese learners of L2 English to learn new relational schemata, which are different from that of *guo* only in that the trajectory is constrained in ways that do not exist in Chinese.

With regards to English $over_{deictic}$, Chinese does not have a preposition with a relational schema that expresses landmark occlusion equivalent to that of English's *over*. Chinese learners of L2 English, then, must acquire this relational schema in whole. Here, some may argue that learners must acquire a new concept before *over* can be used/understood correctly in this context. It seems somewhat preposterous, though, to argue that mature Chinese learners of L2 English do not already have a concept of landmark occlusion. A more likely explanation proposes that learners must acquire a new configuration (mapping) of already-available component-level schemata for this usage of *over*. This mapping consists of a trajector that is large enough to occlude a landmark from an observer; i.e., deictic center. This relational schema relies on the construal of a deictic center and a 'path' of vision, which are located in CS. The schematized trajector and landmark are located in SR. The learned mapping for this sense of over ($over_{deictic}$) matches the necessary CS with the necessary SR in such a way that the trajector is able to obstruct the view of the construed deictic center from the landmark (see Figure 8). It is important to remember that the

grammaticality of over for this relational schema is not dependent upon whether there is contact between trajector and landmark.

Summary

In this section we have seen that Jackendoff's model of Representational Modularity (1996, 1997) provides a means by which we can investigate exactly what L2 learners acquire when learning new L2 spatial prepositions. Ample evidence has been provided to show that learners of an L2 are not just learning new words for old concepts. For example, Chinese separates $over_{static}$ into $over_{static1}$ and $over_{static2}$, depending upon the dimensions of the trajector. This distinction does not exist in English. An English learner of Chinese, then, could choose to map one of the distinctions (say *shang kong*; i.e., $over_{static1}$) onto the preexisting concept of $over_{static}$, but would then be left with nothing to map *shang* ($over_{static2}$) onto. At this point, it may seem reasonable to say that the learner must acquire a new concept in order to understand/use *shang*. But when we look at what distinguishes $over_{static1}$ from $over_{static2}$, (see Figures 1&2) we see that, conceptually speaking, they are very similar (i.e., there are two object schemata in vertical alignment with one another). What seems more reasonable, then, is to say that the concept OVER, whether it is $over_{static}$, $over_{static1}$, or $over_{static2}$, exists in both English and Chinese, but that they make distinctions depending on a variety of different factors: e.g., the dimensions of the component-level schemata; the contact between trajector or landmark; or the position of the trajector in relation to the landmark, etc. And so what is learned is not a new concept of OVER, necessarily, but new relational schemata of *over*, which are nothing more than mappings of component-level schemata from CS and SR.

CONCLUSION

The approach here has been broad in its scope. The issues that have been dealt with range from (1) the cross-linguistic differences of how OVER is construed between English and Chinese, to (2) a revitalized notion of linguistic relativity, to (3) a hypothesis of what the acquisition of L2 spatial prepositions entails. This broad of a scope is justified, it is felt, in that, by adopting the model of Representational Modularity, all of these issues can be adequately addressed. Taking (1) and (2) into account first, it was shown that there are clear differences in how English and Chinese choose to refer to the same spatial relation. These types of observations bring to mind the Whorfian hypothesis again. Bowerman (1996) acknowledges that the Whorfian hypothesis has seemed implausible to many; but, she says, "...in the widespread rejection of the Whorfian hypothesis, the baby has been thrown out with the bathwater. Regardless of whether the semantic categories of our language play a role in fundamental cognitive activities...we must still *learn* them in order to speak our native language fluently" (p. 404).

The question of what it means to learn a semantic category was addressed, focusing especially on what it means to learn an L2 spatial semantic category. The question posed by Peterson, et al. (1996), of whether or not the conceptual representations at the interface between language and thought were different between languages was addressed. Using Jackendoff's model of Representational Modularity (1996, 1997), it was argued that what we learn when we learn new spatial prepositions are not new concepts per se, but new mappings between CS and SR. After all, OVER in English is not all that different from OVER in Chinese.

What is different, though, is the difference in how the new mappings, or relational schemata, are constrained. The answer to the question posed by Peterson, et al. (1996), then, is no. There is no evidence that basic conceptual representations (in this case, CS and SR) are different between languages. The apparent differences lie in how individual languages choose to combine CSs and SRs.

Extending the above argument permits a hypothesis of what learners acquire when learning L2 spatial prepositions. If, as this paper argues, the concept of OVER in its most basic form exists in both English and Chinese (and presumably all languages), then, for example, Chinese learners of L2 English are not acquiring new concepts when learning English. Instead, what is learned is the nature of CS-SR mappings that make English *over* distinct from its Chinese counterpart.

NOTES

1. Small caps are used to indicate the 'concept' of a word. This is why it is possible to say 'Chinese and English OVER' because OVER is referring to the concept, which exists in both languages. The small caps notation is used throughout the paper and is very different in meaning than an italicized lower-case *over*, which refers to the English word.

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