Applying Cognitive Linguistics to Pedagogical Grammar: The English Prepositions of Verticality

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In this paper, we illustrate the merit of applying insights from Cognitive Linguistics to pedagogical grammar. We do so by examining English prepositions, long assumed to be one of the most difficult areas of acquisition for second language learners. The approach to the semantics of English prepositions we present is that developed in Evans and Tyler (2004a, b, In prep.) and Tyler and Evans (2001a, 2003). This account offers the following insights: 1) the concepts encoded by prepositions are image-schematic in nature and thus have an embodied basis. In other words, prepositions are not appropriately modelled as constituting linguistic propositions or semantic feature bundles (the received view in formal linguistics); 2) an English preposition encodes an abstract mental idealization of a spatial relation, derived from more specific spatial scenes. This forms the primary meaning component of a semantic network; 3) the idealized spatial relation, also encodes a functional element, which derives from the way spatial relations are salient and relevant for human function and interaction with the physical environment and 4) the additional senses in the semantic network have been extended in systematic, constrained ways. We discuss two key principles of extension: ways of viewing a spatial scene and experiential correlation.

We demonstrate the usefulness of a Cognitive Linguistics approach by examining a few aspects of the lexicalization patterns exhibited by *in* and the four English prepositions of

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verticality, *over*, *above*, *under* and *below*. These prepositions provide good evidence that prepositional meanings are extended from the spatial to abstract domains in ways that are regular and constrained. We conclude that a Cognitive Linguistics approach to prepositions provides a more accurate, systematic account that, in turn, offers the basis for a more coherent, learnable presentation of this hitherto seemingly arbitrary aspect of English grammar.

1. Introduction.

Language teachers and researchers have long recognized that the acquisition of English prepositions poses major challenges for second language learners. Celce-Murcia and Larsen-Freeman (1998) note several reasons for this difficulty, two of which we will address in this paper. First, they observe that "in their spatial meanings, prepositions do not match up well from language to language" (ibid., 401), even in relatively closely related languages. For instance, the English sentence: *The woman walked **in** the rain*, would be "translated" in French by*: La femme marche **sous** la pluie* (The woman walks **under** the rain). Second, it is notoriously difficult to characterize the semantics of prepositions. For instance, on first inspection, the distinction between prepositions such as *over* and *above* is quite unclear. On one hand, the sentence: *The picture is over the mantle*, is a near paraphrase of: *The picture is above the mantle*. On the other hand, the sentence: *Mary crawled over the bridge* is interpreted as meaning something quite different than: *Mary crawled above the bridge.*

Traditional accounts have represented the semantics of English prepositions as largely arbitrary and difficult to characterize (Bloomfield, 1933; Frank, 1972; Chomsky, 1995). Consequently, pedagogical treatments have often suggested memorization as the best strategy.[1] Cognitive Linguistics (CL), on the other hand, offers an alternative perspective, suggesting that

the differences in expressing spatial relations found across different languages can be accounted for in non-arbitrary ways and that the distinct meanings associated with a particular preposition are related in systematic, principled ways (e.g., Brugman, 1981/1988; Brugman and Lakoff, 1988; Dewell, 1994; Dirven, 1993; Lakoff, 1987; Linder, 1982; Hawkins, 1988; Herskovits, 1986, 1988; Tyler and Evans, 2001a, 2003; Vandeloise, 1991, 1994).

An important objective of this paper is to illustrate the utility of an approach to English prepositions that takes seriously the perspective and methodology of CL (Evans and Tyler 2004a, 2004b, In prep.; Tyler and Evans 2001a, 2003). Our analysis reveals the following: 1) Concepts deriving from human interaction with the physical-spatial world, such as the spatial relations coded by prepositions, are better represented as being more gestalt-like and image-schematic in nature rather than as linguistic propositions or semantic feature bundles (Langacker, 1987). This requires assuming that, through a process of reanalysis of perceptual information (Mandler, 1992, 2004), humans create mental representations of their recurring experiences with the spatio-physical world which involve *spatial scenes.* While spatial scenes are relatively rich in content, generalizations across spatial scenes give rise to highly abstract, schematic generalizations established in memory in response to observing or experiencing physical entities in a number of similar spatial relationships. These abstractions we will term *proto-scenes* (to be explicated in detail). As such, a preposition codes an abstract mental idealization of the spatial relation between two entities (proto-scenes); 2) Particular spatial relations between entities in the world have meaningful consequences for us as human beings and those consequences are part of the interpretation of each preposition, what we refer to as a *functional element*. For instance, the spatial configuration described by the English preposition *in* involves one entity being surrounded by another entity, as in the sentence: *The weed poison is in the sealed container*

where the *poison* is understood to be surrounded by *the container.* One of the meaningful consequences of this spatial configuration is that the activity of the surrounded entity, in this case the *weed poison*, is constrained by the boundaries of the surrounding entity, in this case the *sealed container*. As a result, if the poison is in the sealed container, it is not free to flow out into the environment; and 3) The range of (often non-spatial) meanings associated with a particular preposition can be accounted for on the basis of the primary spatial meaning, the proto-scene, in conjunction with a constrained set of cognitive principles. That is, the many meanings associated with a particular spatial particle are motivated by the primary spatial meaning in systematic, principled ways.

In previous work (Tyler and Evans 2001b, 2004) we argued that CL offers a number of important benefits for pedagogical grammars over more traditional approaches. For instance, in Tyler and Evans (2004), we noted a number of advantages our model of English prepositions holds for language teachers and learners. First, a systematic, motivated account of the range of conventional meanings associated with a single preposition, a *semantic network*, cuts down considerably on the amount of arbitrariness and hence reduces the need for rote learning on the part of the second language learner. Second, because the model draws heavily on the notion of the experiential basis of meaning and represents the extended senses as arising from observations of the external, spatio-physical world, it reflects the learners' own experiences with the world. Understanding the motivation behind the extended senses as being experientially motivated and coherent with the learners' own observations of the world would seem to make these senses easier to acquire. Third, the various senses are represented as gestalt like conceptualizations of situations or scenes which are systematically connected, rather than a series of discrete dictionary-type definitions strung together in a list. Such graphic representations provide visual

rubrics that may be useful presentational tools for the language teacher and useful aids for the second language learner. Finally, the constrained, principled nature of the model--we refer to our model as the *Principled Polysemy model* of English Prepositions (see also Evans 2004, 2005 for a 'principled polysemy' treatment of the abstract noun *time*)--would seem to provide a solid foundation for the learners from which to infer the meanings of unfamiliar uses of prepositions when they are encountered in context.

Our purpose in this paper is not to provide specific suggestions for the nature and make-up of a pedagogical grammar based on our presentation of CL, or the specific model of English prepositions we present. Such an ambitious project is beyond the scope of the present paper, although this project is underway (Tyler and Evans In prep.). Rather, our purpose here is more limited. Our aim is to demonstrate the usefulness of a CL approach by examining a few aspects of the lexicalization patterns exhibited by *in* and the four English prepositions of verticality, *over*, *above*, *under* and *below*. These prepositions provide good evidence that prepositional meanings are extended from the spatial to abstract domains in ways that are regular and constrained. We conclude that a CL approach to prepositions provides a more accurate, systematic account than the more traditional accounts which currently underpin the majority of pedagogical grammars, and upon which the majority of contemporary EFL and ESL textbooks and materials are based. Our general point is that the sort of approach to prepositions we sketch here offers the basis for a more coherent, learnable presentation of this hitherto seemingly arbitrary aspect of English grammar.

2. Previous Accounts

Beginning in the early 1980's, a number of groundbreaking accounts of the semantics of English prepositions were put forward by cognitive linguists (e.g., Brugman, 1981; Brugman and Lakoff, 1988; Hawkins, 1988; Herskovits 1986, 1988; Lakoff, 1987; Linder, 1982). These analyses convincingly argued that a preposition encodes a spatial relation between two entities—a located element in focus, termed the Trajector (TR), and a locating element in background, termed the Landmark (LM)[2], and that these spatial relations were best represented as idealized, abstract representations, termed *image-schemas* (Lakoff, 1987; Johnson, 1987). These researchers further argued that the various, multiple meanings associated with a preposition could be accounted for as deriving from the primary image-schema through a set of image-schematic transformations, metaphors and similarity links (e.g., Lakoff 1987). Thus, the multiple meanings associated with each preposition were conceived as forming a polysemy network[3] in which more peripheral meanings are organized around a central image-schema. Building on the premise that each preposition represents a highly polysemous, organized network of meanings, Dirven (1993) attempted to characterize the central meaning of 12 English prepositions and categorize their additional meanings as extensions into various domains such as temporal, degree, and manner.

Despite the important insights of such accounts, a number of problems remain. The primary difficulties are as follows. In such accounts: 1) The most detailed analyses tend to focus on only one or two prepositions (e.g. Brugman, 1981; Brugman and Lakoff 1988; Lakoff, 1987; Linder, 1982, who examined two prepositions). This has led to a failure to consider how a set of prepositions might contrast with each other which, and in turn, has resulted in overlooking information key to accurately characterizing each preposition; 2) The problems associated with the focus on only one or two prepositions are exacerbated by the fact that the transformations and similarity links (i.e., the "rules") licensing meaning extensions from the primary image-schema

are methodologically unconstrained and lack clear criteria without which relatively straightforward extensions to other prepositions is impossible. (e.g., Kreitzer, 1997; Sandra and Rice, 1995; Tyler and Evans, 2001a, 2003b; Vandeloise, 1990); and, 3) Dirven's (1993) analysis, while important in attempting to account for a broader range of prepositions, remained too vague and abstract (e.g. the characterization of the domains of extension and the mechanisms for extension were problematic) to provide a clear explanation for the patterns of use.

Despite these problems, many interested in pedagogical grammar have remained convinced that English prepositions are more systematic than traditional accounts assume. Celce-Murcia and Larson-Freeman (1998) and Lindstromberg (1997) represent valiant attempts to apply the insights of these early cognitive analyses to pedagogical grammar. However, these attempts at application inherit the weaknesses of the early analyses.

In the remainder of this paper, we will outline three basic insights that have emerged more recently from CL and demonstrate their usefulness in explaining the two problematic aspects of prepositions identified by Celce-Murcia and Larson-Freeman mentioned above. Recall that these related to the "mismatch" problem, in which prepositions from related languages often fail to match up in translation, and the problem of accurately characterizing the semantics of a particular preposition.

To address the "mismatch" problem, we present a brief comparison between *in* and the French prepositions *dans, sur,* and *sous*. This adopts the insight from CL that meaning is grounded in experience. Once seen in this way, much of the arbitrariness of the "mismatch" problem disappears , as we will illustrate. To address the semantic characterization problem, we sketch an analysis of the English prepositions of verticality (*over, above, under and below*), which posits idealized representations based on highly schematic spatial scenes (what we will

term *proto-scenes*) of the four prepositions. Before proceeding however, we will first sketch in more detail some core insights which underpin CL, as we see them (see also Evans and Green In press).

3. Core Insights

3.1. Embodied Experience and Non-propositional Representations of Concepts.

CL argues that 1) conceptual structure is crucially shaped by our human perceptions of and interactions with the real word, and 2) language is a reflection of human cognitive structure. Accordingly, given the premise that experience and human neuro-anatomical architecture[4] (i.e., the world we inhabit and the nature of our bodies) give rise to meaning, it seems highly unlikely that conceptual representations will be structured in terms of semantic features or any other kind of propositional representation (Cienki, 1998; Johnson, 1987; Johnson-Laird and Byrne, 1991; Langacker, 1987). Rather, concepts, derived from sensorimotor interaction with the world may be more appropriately modelled in imagistic terms.[5]

Johnson (1987) defines such representations as image-schematic structures which are "constantly operating in our perception, bodily movement through space, and physical manipulation of objects" (ibid.: 23). On this view, image-schemas are abstract structures, which organize recurrent patterns of sensorimotor experience. Accordingly, they are not rich concrete images, but rather, are "structures that emerge as part of our meaningful interaction with things "outside us" (ibid.: 205). Important empirical support for this position comes from researchers in psychology such as Gibbs and Colston (1995), Mandler (e.g., 1988; 1992, 1996, 2004), and Rosch (1976).

3.1.1. Prepositions as spatial scenes.

We assume that a preposition designates a conceptual *spatial relation* between a TR (trajector) and a LM (landmark), which is conceived as constituting an abstract *spatial scene*. Conceptual content can be abstracted away from specific spatial scenes, giving rise to a highly abstract and schematized representation, which we term a *proto-scene*. A proto-scene can be equated with the primary meaning associated with a particular preposition, and thus includes information relating to the TR and LM, as well as the spatial relation mediating the two. As proto-scenes are idealized, they do not contain detailed information about the nature of either the TR or the LM, nor detailed metric information concerning notions such as the exact shape of the LM or the degree of contact between the TR and LM.

In addition to the spatial configuration between a TR and a LM, the concept prompted for by a preposition also involves a functional element, which arises as a consequence of the particular spatial configuration between the TR and LM (Evans and Tyler 2004b; Tyler and Evans, 2001a, 2003; Vandeloise, 1991, 1994). In the case of *in*, for example, the spatial configuration involves a LM in a surround configuration vis-à-vis the TR (Talmy, 2000); the functional element involves the notion of containment. Johnson (1987), for instance, has argued that the functional element of containment includes location, confinement, protection, and potential obscuring of the element(s) being contained. For instance, if a young child is **in** a playroom, the caretaker knows where the child is located, the actions of the child are limited to those which can take place within the space of the playroom, the child is protected from certain outside threats (e.g. the hot stove in the kitchen), and, for the most part, the child is physically obscured from entities outside the playroom.[6] The container and its interior region also form the physical environment, which surrounds the TR. In the case of the child in the playroom, the

interior region of the room largely determines the temperature, lighting, ambient sounds, etc, in other words, the general physical environment, which surrounds the child[7]. Figure 1 presents the proto-scene designated by the English preposition *in.* In figure 1 the dark sphere represents the Trajector (TR); the Landmark (LM) is drawn with bold lines.

[Figure 1 about here]

3.2. Polysemy networks

An indisputable fact about each English preposition is that it is associated with a complex set of uses. Studies in CL (e.g. Brugman, 1981; Dewell, 1999; Kreitzer, 1997; Lakoff, 1987; Tyler and Evans, 2001a, 2003, 2004) have convincingly argued that the multiple uses associated with a preposition such as *over* are related in systematic ways. Work in psycholinguistics (e.g., Sandra and Rice, 1995; Rice, Sandra and Vanrespaille, 1999) offers empirical support for this position. For instance, it is not an arbitrary fact—and thus one which must be memorized, as we will argue—that English has the compounds *overseer*, but not **aboveseer,* and *underdog* but not **belowdog*. We will suggest that this distribution of compounds involving prepositions follows from a constrained set of principles. Each proto-scene is understood to constitute the primary meaning representation associated with a particular preposition, from which additional meanings have been systematically derived. Thus, each preposition and the multiple uses associated with it are represented as an organized, connected network of related meanings, rather than arbitrary lists of distinct meanings that happen to share the same phonological form.

3.3 Two cognitive principles

We posit two principles[8], which act in conjunction with the proto-scene, to account for the uses of individual prepositions.

i) Spatial scenes can be construed in a number of ways

Any spatial scene can be viewed or conceptualized from a number of vantage points. Each shift in vantage point coincides with a shift in interpretation of the scene (Langacker, 1987). A particular view/interpretation of a spatial scene can be conventionalized by a particular language. We note that this principle is crucial in explaining the cross-linguistic "mismatch" problem.

ii) The basic meaning element associated with the proto-scene can be extended through reoccurring patterns in human experience with the spatio-physical world[9].

Humans regularly observe distinct events co-occurring in the world. After repeated observations of co-occurrence, the distinct events can become associated at the conceptual level. Due to these co-occurrences, or correlations, in experience, speakers come to conceive one event in terms of another. This phenomenon has been termed *experiential correlation* (Grady, 1997).

Such experiential correlations are commonly reflected in language. For instance, we often observe an increase in amount co-occurring with an increase in elevation, as in when more of a liquid (an increased amount) is added to a container, the level of the liquid rises (increased elevation). The close conceptual association between increased amount and vertical elevation is reflected in utterances such as: *The customer tally is really up today*. Conventional interpretation of this utterance is not that the mechanism for counting customers is physically elevated or that the customers are physically stacked one on top of the other. Rather, such a sentence provides the reading that an increased elevation (up) is interpreted as an increase in amount (more customers).

The co-occurrence of two distinct experiences, such as increased elevation and increased amount, which are grounded in the nature of recurrent, everyday observations of the world, give rise to systematic meaning extensions from the proto-scene that are associated with a particular preposition. Once an extended meaning becomes established in the language, it has the status of a distinct meaning within the semantic network associated with the preposition. In turn, once a distinct meaning, for instance 'more', has become part of the semantic network for a preposition, for instance *up*, the preposition can be used to code for the extended, non-spatial meaning, as in the sentences: *The customer tally is up* or *Frank's bowling average is up*. Thus a preposition, which originally coded for a spatial-functional relation between physical entities, can come to have non-spatial meanings, such as 'more', and describe non-physical entities such as *customer tallies* and *bowling averages*.

4. Application of the core insights.

We turn now to a consideration of how these core insights can clarify our understanding of prepositions.

4.1. Ways of viewing the scene.

As noted above, an important insight offered by CL is that spatial scenes can be construed (i.e., viewed) in a number of ways (see Langacker, 1987, 1991a, 1991b). The physical vantage point on a spatial scene will determine how we conceptualize that scene, and no two vantage points offer the same view. For instance, in a scene in which a large cloth is positioned in relation to a table so that the cloth covers the top of the table, the scene can be construed by focusing on contact between the cloth and the table. In this case, the scene is likely to be coded in English by

the sentence: *The tablecloth is on the table*. Alternatively, the relationship between the cloth and the table can be viewed as the cloth hiding or obscuring the table from the observer's view. In this case, the scene might be coded as: *The cloth is over the table*. A less typical, but perfectly acceptable view would be to place the table in focus, in which case the coding would be something like: *The table is under the tablecloth*. Hence, the same basic scene affords several distinct ways of being viewed and interpreted.

Research by the developmental psychologist Jean Mandler (e.g., 2004) provides powerful evidence that the semantic superstructure for spatial categorization may be laid down before language is acquired. Mandler's research suggests that humans, like other primates, have a highly developed anatomy and thus share certain common perceptual patterns. One fundamental aspect of human perception is that it is highly selective. In other words, we do not simultaneously give equal attention to all perceptual stimuli in the environment; humans regularly focus attention on certain entities or actions they deem salient at any particular moment, thereby giving less attention to other aspects of the scene. In part this is due to the fact that any particular real-world scenario contains too many elements to attend to equally at one time.

Moreover, while humans may perceive a real-world scenario as a complex gestalt, within which certain elements are in focus while others are in background, the nature of our bodies and spoken language result in the sequential structuring of information when communication takes place through language. The result is that language is compelled to both divide up and conflate various pieces of information presented in spatial scenes. Cross-linguistic investigations have established that languages regularly divide and conflate aspects of a scene in various ways. For instance, Slobin (1996) has shown that languages such as Spanish and Greek tend to conflate

motion and path into one lexical form (e.g., in a verb such as *alio* 'came out') while articulating manner separately (e.g., in a separate clause such as *corriendo* 'running')[10]. In contrast, languages such as English regularly conflate motion and manner (e.g., in a verb such as *slithered)* while expressing path separately (e.g. in prepositional phrases such as *toward the door*; see also Talmy 2000).

Analogously, because any spatial scene can be construed in a wide range of ways, languages as conventionalized systems of knowledge have encoded choices as to which aspects of the scene to privilege (i.e., which aspects of the scene to pick out for attention; see Croft 2000). Consequently, the exact ways various languages encode spatial scenes are different, as noted by researchers such as Pederson and his colleagues (e.g., Pederson et al., 1998), and Bowerman (e.g., 1996). We submit that rather than viewing prepositions (and other spatial-relational particles) from different languages as presenting different *meanings*, it is more insightful to take the view that different languages emphasize different aspects of the same (or similar) scene.

In order to clarify this point, consider the problem raised by Celce-Murcia and Larson-Freeman (1998). They argue that one of the aspects which makes learning English prepositions so difficult is that prepositions do not "translate or match up well" even between related languages (ibid.: 401). For instance, English prepositions do not seem to pick out the same spatial relations as similar particles in other languages; they note that language learners have to "cope with anomalies" (ibid.: 401). By way of illustration, they provide the following (1):

(1) English *to* = German *zu* English *at* = German *an*

(But) John is at home = Johann ist zu Hause (1998: 401)

A parallel "mismatch" is found between English and French. The spatial relation described by the English preposition *in*, corresponds to at least three distinct prepositions in French, namely *dans*, *sous* and *sur*, as evidenced by the following examples:

(2) La femme est dans la pièce
The woman is in the room
'The woman is in the room'
(3) La femme marche sous la pluie
The woman walks under the rain
'The woman walks in the rain'
(4) La femme est sur la place
The woman is on the square
'The woman is in the square'

Traditionally, grammarians have represented *in* as being, most typically, the equivalent of *dans*. Sometimes, however, *in* can be the equivalent of the French *sur* (i.e., *on*), and sometimes, it can be equivalent to *sous* (i.e., *under*). Treating language specific spatial particles in terms of verbal equivalences gives the impression that the fundamental spatial relation represented by each preposition is somehow changeable. That is, in some situations the word, say *dans*, means one thing, say *in,* while in other situations it means something quite different, say *under*. In this approach, the emphasis is on how the meaning of the preposition changes with each context.

Furthermore, these equivalences are represented as unpredictable and arbitrary. Hence, language learners simply have to memorize them.

We offer an alternative view that, in contrast, represents each preposition or spatial particle as having a primary representation, a proto-scene.[11] Differences in usage are, we suggest, far less arbitrary than previously thought. Following the core concepts outlined in section 2, we believe that rather than understanding a preposition to *mean* something in terms of a propositional definition and a long list of example usages, it is more useful to understand each preposition as encoding a particular abstract proto-scene.

Following this assumption, we will examine the French data, given above in examples (2) through (4). The English equivalent of the sentence in (2), is diagrammed in figure 2 while *la femme est dans la pièce*, is diagrammed as figure 3. The TR—the element in focus— is described by *la femme*, while the LM—the backgrounded, immovable element—is *la pièce*. In this scene, the LM, *la piece*, is construed as a container with six solid sides. The preposition *dans* mediates a relation in which the TR is construed as being contained by the LM. This corresponds with the proto-scene for the English preposition *in*, and with the English version of the same sentence, in figure 2.

[Figure 2 about here]

[Figure 3 about here]

In sentence (3), the spatial scene involving rain comprises a number of aspects. Although there are no clearly defined boundaries, as we would expect to find in a prototypical case of containment, the functional element of containment involves determination of the environment

that surrounds and hence constrains and influences the TR. In sentence (3), the rainy weather is conceptualized as a container that envelops the walker. This is illustrated by figure 4. In contrast, when speakers of French perceive the same spatial scene, the emphasis is on a different aspect of the scene, i.e., viewing the TR as being under the rain. This is a perfectly reasonable interpretation as the rain originates from a location that is physically higher than the TR. This interpretation is illustrated in figure 5.

[Figure 4 about here]

[Figure 5 about here]

This interpretation/view licenses the use of *sous*, 'under', rather than *dans*, 'in'. Note that our explanation emphasizes that the spatial relations coded by *in, dans, sur,* and *sous* are all relatively stable, due to their being grounded in recurring patterns of physical experience. What varies is the language specific vantage on and privileging of elements of the scene. In each language, the particular view/interpretation of the scene is conventionalized in the linguistic system.

A similar phenomenon occurs in the sentence in (4). One way of construing a spatial scene involving a public *square* would be to construe this large space as a container. Again, this understanding of the scene differs from a canonical container because the sides or boundaries of the container are not solid. However, the functional aspect of providing the environs in which the TR operates hold, thus the TR, *the woman*, can be conceptualized as being contained by the LM, *the square*. This is the interpretation privileged in English, which codes the spatial relation with the preposition *in*, as diagrammed in figure 6. However, this is not the only possible

interpretation of the spatial scene. In French, the physical contact between the TR, *la femme* and the surface of the LM, *la place*, is emphasized. This is coded by the French preposition *sur*, 'on', as shown in figure 7.

[Figure 6 about here]

[Figure 7 about here]

This brief examination of the contrast between English and French prepositions reveals that the way prepositions apply is 1) closely tied to the manner in which we experience spatial scenes, and that 2) cross-linguistic "mismatches" result from taking different vantages on the scene, resulting in different aspects of a particular spatial scene being privileged, and 3) that the ways of viewing a spatial scene which are privileged become conventionalized in each linguistic system. We further argue that the spatial relation encoded by any spatial particle is relatively stable.

In our attempt to develop a comprehensive and accurate model of prepositions, this analysis has several important consequences. First, it suggests that it is insufficient simply to provide a propositional characterization of a particular preposition. Rather, we need to provide accurate spatio-functional depictions, along the lines of the proto-scene described for *in*. In addition, we must provide the principles which allow the meaning of the preposition to be extended to non-spatial meanings.

4.2 Propositional definitions versus spatio-functional proto-scenes

Before considering how the two principles discussed earlier give rise to systematic extensions of the proto-scene associated with a particular preposition, it is important to develop a more precise understanding of the difficulties associated with propositional definitions of prepositions. Consider Celce-Murcia and Larson-Freeman's (1998) attempt to extend Dirven's (1993) analysis to a pedagogical approach to English prepositions. Accepting Dirven's characterization of the semantics of prepositions, these researchers provide propositional definitions of the spatial relations coded by 20 prepositions. (Notice that these definitions do not take account of the functional attributes associated with proto-scenes described above.) We focus on the subset *above, over, below* and *under.* Consider table 1.

[INSERT TABLE 1 ABOUT HERE]

On the basis of the propositional definitions in table 1, one would expect *above* and *over,* on the one hand, and *below* and *under,* on the other, to form two pairs of synonyms since *over* is defined in terms of *above* and *under* in terms of *below*. Considering the use of the prepositions in the spatial domain, we find that the propositional descriptions of the semantics of these prepositions fail to account for the differences in interpretation regularly assigned by native speakers of English to the following :

(5) She walked over the bridge

(6) She walked above the bridge

In (5) the TR, *she*, uses the LM, *the bridge*, as a means for walking across whatever it is that the bridge is spanning. Our understanding of the event is based on our human experience of walking which requires physical contact between the walker and the surface being traversed. In (6), we cannot interpret the bridge as the surface which is walked upon. One possible interpretation of (6) is that the pronoun *she* refers to a ghostly being who is walking through the air, without actually touching the bridge. A second interpretation of (6) is that the TR, *she*, is using a second bridge in a deep valley, in which case the bridge that the TR, *she,* is located on is physically higher than the bridge referred to in (6). A third interpretation of (6) is that *above* refers to north of the LM, *the bridge*. Key to each of these interpretations is the notion that *above* depicts a relationship between the TR and the LM which does not allow contact. This is in contrast to the preposition *over* which does allow for the possibility of contact, as illustrated in (5). The point is that speakers of English interpret (5) and (6) differently, and that these meaning distinctions result from the particular preposition selected and the distinct spatial relations coded by each proto-scene. Our semantic analysis of *over* and *above* must be able to account for these distinct interpretations. Additional examples illustrating this semantic distinction are provided below:

(7) a. John placed the bandage over Jane's left temple

b. John placed the bandage above Jane's left temple

(8) a. Sallie climbed over the wall

b. Sallie climbed above the wall

In these examples, *over* is mediating a spatial-functional relationship in which there is contact between the TR and the LM, while *above* is mediating a relationship in which there is no

possible contact. However, it is also undeniable that [+contact] cannot be an intrinsic, defining feature associated with *over*, because speakers of English regularly create sentences such as (9) and (10) in which no contact between the TR and LM is involved :

(9) The ball whizzed over the wall

(10) The arrow flew over the top of the target

We suggest that these interpretations reflect basic distinctions in the semantics of the proto-scenes associated with *over* and *above*. Our proto-scenes for *over* and *above* are diagrammed in figures 8 and 9. Each diagram represents a highly schematic generalization over a number of similar spatial scenes. That is, each diagram represents what we term a proto-scene. The shaded sphere represents the TR, the thick line represents the LM. The dashed line represents a division in the spatial scene between the area which is construed as being physically proximal to the LM and the area which is construed as being physically distal relative to the LM. Hence, we can characterize *over* as mediating a relation in which the TR is physically higher

[Figures 8 and 9 about here]

than but within *potential reach* of the LM. This element of potential reach represents the functional element associated with the preposition and allows for the interpretation of contact between the TR and the LM. Dewell (1994) notes that some scholars have referred to the functional element associated with *over* as relating to the TR and LM being within each other's sphere of influence. In contrast, the proto-scene for *above* mediates a spatial relation in which

the TR is physically higher than but **not** within reach of the LM. We suggest that the functional element associated with *above* is that of an unbridgeable distance between the TR and LM. Extending Dewell's insight concerning *over*, we hypothesize that in the case of *above* the TR and LM are construed as **not** being within each other's sphere of influence. One important consequence of this semantic distinction is that *over* allows (but crucially does not require) contact between the TR and the LM, whereas *above* precludes contact. These proto-scenes neatly account for the distinct interpretations of the sentences in (5) and (6), while accommodating the sentences in (9) and (10).

Having argued that *over* and *above* are not synonyms and thus code for different conceptualizations, we must explain why they can be used interchangeably in certain contexts. We hypothesize that two prepositions are interchangeable in select contexts because they encode very similar spatial configurations between the TR and LM. In this case, *over* and *above* both code for a TR being located higher than a LM. In many instances, the speaker's communicative intentions can be met by either preposition. Consider the following dialogue:

(11) A: Which picture are you planning on selling?

B: The one hanging above/over the mantle

In this situation, the relevant information for locating the picture in question is that it is the one located higher than the mantle, rather than, say, to the right of the mantle or in the hallway. Either preposition provides the relevant information (Grice, 1975; Sperber & Wilson, 1986).

To summarize, we believe that previous propositional characterizations of prepositions have not accurately characterized their meanings within the spatio-physical domain. We have

argued that the basic meanings of prepositions, what Celce-Murcia and Freeman-Larson (1998) refer to as their proto-typical meanings, are better modeled as idealized, schematic representations of spatial configurations between a TR and a LM. Furthermore, a functional element, which reflects the meaningful consequences of the particular spatial configuration between the TR and the LM, is an essential part of a preposition's full and accurate characterization.

4.2.2. Non-spatial meaning extensions from the proto-scene

Celce-Murcia and Freeman-Larson (1998), following Dirven (1993), argue that prepositions exhibit extensions of meaning from the spatio-physical domain to non-spatial domains and, furthermore, that such extensions do not occur in a haphazard way. We are in full agreement with this position. However, as their accounts do not provide sufficiently accurate characterizations of the prepositions in the spatio-physical domain, their attempts to characterize the patterns of non-spatial usage are also flawed. In this section, we will demonstrate how the appropriate characterization of the proto-scene, in conjunction with the principle of experiential correlation, accounts for the patterns of non-spatial uses of *over, above, under,* and *below* illustrated in table 1.

Recall that the principle of experiential correlation posits that two distinct events which frequently co-occur can become associated at the conceptual level. In our earlier discussion, we noted that one of the most ubiquitous experiential correlations is that between a change in vertical elevation and a change in amount. As in the case of *up*, in their spatial uses, both *over* and *above* code for a TR which is located higher than the LM; in other words, their proto-scenes involve vertical elevation of the TR in relation to the LM. Thus, they are likely candidates for

developing non-spatial meanings involving increased amount or 'more'. For instance, in the particular case of *above/over £3* as the phrase occurs in the utterance: *The price of a share of Manchester United is above/over £3*, the relationship between the TR (*the price of a share of Manchester United)* and the LM (*£3*) is interpreted as involving an increase in amount of money.

Turning to table 1 and the non-spatial domain of degree, contra the predictions made by the propositional characterizations of the prototypes, there is a clear distinction between *over* and *above* in relation to their possible occurrence with the adjective *average.* We believe the proto-scenes we posit explain this distribution. When parents or teachers talk about a student being above average, they are generally emphasizing the fact that the student is out of the range of being considered average. If the student is perceived as potentially within reach of being average, then she is not likely to be described as above average. The emphasis is on the unbridgeable distance between the standard of 'average' and the abilities the individual possesses, just as our proto-scene and the position that non-spatial meanings reflect systematic extensions from the spatio-physical domain would predict.

Parallel argumentation holds for the extensions represented in the final column. Again, the propositional definition would lead us to expect that *above/over* should be able to occur with the same nouns from the domain of condition, such as *suspicion* and *reproach*; in fact, these extensions are unacceptable for *over.* Celce-Murcia and Larson-Freeman (and Dirven) are forced to simply label this distribution of extended uses as arbitrary.

In contrast, we argue that these extensions are non-arbitrary and explainable in a relatively straightforward way based on the proto-scenes we have posited and the principle of extension discussed in section 2. We suggest that the following utterances are representative of how the phrases *above suspicion* and *above reproach* are typically used:

(12) Unlike many presidents, Lincoln's personal relations have always been considered above reproach

(13) Ghandi's simple lifestyle placed him above suspicion in terms of acting out of greed or desire to accumulate wealth

In these sentences, the focus is on the unbridgeable difference in Lincoln's or Ghandi's character/actions and the character/actions which would be considered within the realm of *suspicion* or *reproach.* If someone's character or actions put them within potential reach of *suspicion* or *reproach*, then their character or actions are within the scope of *suspicion* or *reproach*. Thus, saying someone is *over suspicion* or *over reproach* would seem to be akin to damning them with slight praise.

As further illustration of semantic extensions and their systematic limits, consider the examples in (14) and (15)

(14) Mary has a strange power over John ["Control/dominance" reading]

(15) ?Mary has a strange power above John ["Control/dominance" reading]

In (14) and (15), the use of *over* is not denoting a spatial relation per se, *Mary* is not physically located higher than *John*. Rather, the interpretation in (14) involves some kind of control. The TR, *Mary*, has control over the LM, *John*. In (15), *above* cannot be extended in the same way, as the control reading is not accessible.

The distinction between *over* and *above* represented in our proto-scenes allows us to understand why *over* can have the extended usage in (14) but *above* cannot in (15). In terms of socio-physical experience, we understand control in terms of physical proximity or sphere of influence and one entity being physically higher than the other entity. In the most simple terms, someone who has physical control over us is often physically proximal, and can thus physically affect our actions, i.e., guarantee our compliance. Further, physically bigger, up, controls physically smaller, down. Thus, there is a long established experiential correlation between the controlling entity being higher than but in physical proximity to the element being controlled. The preposition *above* cannot designate control, as it precludes physical proximity or sphere of influence. *Over,* on the other hand codes both proximity and the spatial relation of the TR being physically higher relative to the LM. [12]

As with certain examples in which the prepositions are mediating spatial relations between two physical entities, we note that, in many of the extended examples of 'degree', the prepositions *above* and *over* are interchangeable. We suggest there are two possible reasons for this. Parallel with the argument made previously, there are contexts in which simply conveying the notion of the TR being understood as being vertically elevated in relation to the LM is sufficient for the speaker's communicative purposes. Second, prepositions do not encode precise metric relationships (Talmy, 1988, 2000); the notions such as proximal and distal which they encode are relativistic and rather subjective. In the case of prices and temperature, what might seem large differences to one speaker, might seem relatively small to others. For instance, consider the sentence *Today under pressure from the Glazer take-over, Manchester United ended above/over £3 a share*. If the speaker owns several thousand shares of Manchester

United's stock and bought them at £2.99 a share, but saw them become more than £3 a share, s/he might see even a fraction of a point higher than the $2.99 mark as representing a sizeable increase in wealth. In this case, the speaker might choose to use *above*. In contrast, to a neutral observer who holds no stocks at all, a fraction of a point might seem very minor. In this case, the speaker might choose to use *over.* Taken out of context, it is not clear if the interchangeability is the result of 1) either preposition providing sufficient relevant information, i.e. the price of a share is higher than £3, or 2) the speaker deliberately choosing *over* or *above* with the intension of indicating that the price is being conceived as only slightly higher than £3 (as coded by *over)* or much higher than £3 (as coded by *above*).

5. Under and Below

Now let us briefly consider how this pattern is repeated with *under* and *below*. While both *under* and *below* relate a TR which is located physically lower than the LM, *under* specifies that the TR must be within reach of the LM, whereas, *below* specifies that the TR is not within reach of the LM. This is represented in figures 10 and 11.

[Figures 10 and 11 about here]

To illustrate this distinction consider discussion of the examples which follow. Turning to the non-spatial examples in table 1, we find *under duress* and *under stress* but **below duress* and **below stress.* Again, we argue that this distribution is predictable from our proto-scenes. The person who is *under stress* or *under duress* is affected by stress or duress. That person is within the sphere of influence of the source of the stress or duress. To say a person is *below stress* or

below duress would indicate that they could not be affected by the stress or the source of stress. Although it sounds contrived, a possible scenario would be a person who is so irresponsible or so impervious (perhaps because lack of contact with reality) that they are incapable of feeling stress.

Consider two final examples :

(16) Don't worry about Jack, he's under my control

(17) ??Don't worry about Jack, he's below control

In (16) *under* specifies that the TR, *Jack*, is controlled by the LM, the speaker. For this to be so, the TR must be within the sphere of influence of the LM. In (17) the TR is distant from or not within the sphere of influence of the LM, and therefore cannot be controlled by the LM, hence the questionable quality of the sentence. Interestingly, the implication which arises from (17) is that the TR is beyond the LM's control. This clearly demonstrates that *below* (like *above*) describes a scene in which the TR is not within reach of the LM. Figure 12 presents a summary of the way in which the English conceptual system divides the spatial axis of verticality.

Now if we return to the compounds we mentioned earlier in the paper in section 1, *underdog* versus *belowdog*, we can see how these items are systematically accounted for by our analysis. We can explain the use of *under* in the compound *underdog* to the physical, experiential world of dogs fighting. At any point in the fight, the dog which appears to be losing is physically positioned under the dog which appears to be winning or in control. This scene includes not only relative vertical position but also contact. This experiential relationship is extended through the principle of experiential correlation to any situation which can be construed

as a combat or exercise of control and to the participant who appears to be weaker. *Belowdog* cannot have a similar interpretation because *below* does not encode contact. We can find many examples of this systematic limitation on extension: *overlord* vs. **abovelord*; *overseer* vs. **aboveseer*; *underling* vs. **belowling; underclass* vs. **belowclass*.

6. Conclusion

In conclusion, we have argued that key insights from Cognitive Linguistics provides an account of English prepositions that is substantially more accurate and systematic than traditional accounts. We have focused on the notion that the traditional ways of representing the meanings of prepositions in terms of linguistic propositions has resulted in a number of inaccurate characterizations of the prepositions. These mischaracterizations have, in turn, led to assertions that much about the meanings of English prepositions is idiosyncratic. In contrast to traditional representations, we have argued that the meaning of a preposition is best modelled as encoding for a relatively abstract, schematized representation of a particular spatial configuration between two entities, the TR and LM, as well as a functional element. We call this representation the proto-scene. The proto-scene emerges from recurring human experiences with and interpretations of the spatial configurations between entities in the world and the particular meaningful consequences of these configurations for us as human beings. In addition, we have argued that assuming a limited set of cognitive principles (scenes can be viewed from multiple perspectives and experiential correlation), in conjunction with the proto-scene, addresses what Celce-Murcia and Larson-Freeman (1998) call the cross-linguistic "mismatch" problem, as well as accounting for the extended, non-spatial uses regularly exhibited by English prepositions. Under this account, much of the arbitrariness and irregularity traditionally ascribed to English

prepositions falls away. This analysis promises great utility in the creation of new materials and methods of presenting the semantics of prepositions in the second language classroom.

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Figure 1: Proto-scene for English preposition *in*

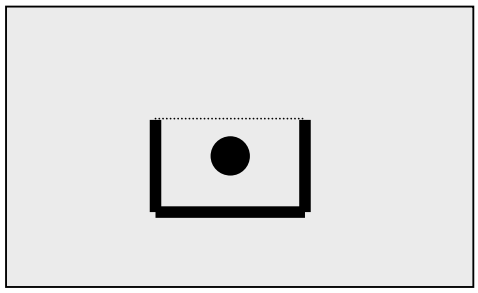


Figure 2: The woman is in the room

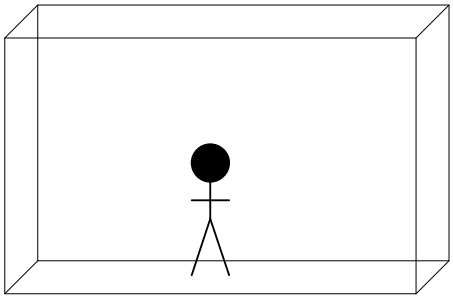


Figure 3: La femme est dans la pièce

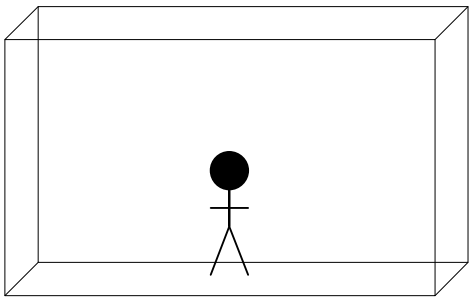


Figure 4: The woman walks in the rain

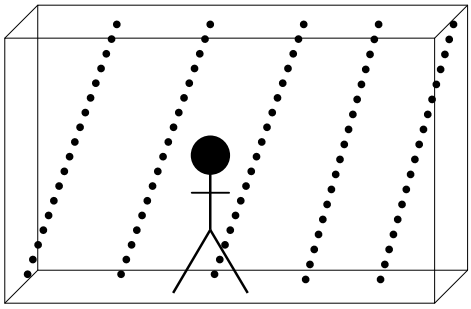


Figure 5: La femme marche sous la pluie

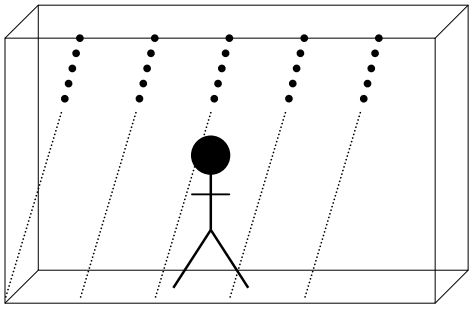


Figure 6: The woman is in the square

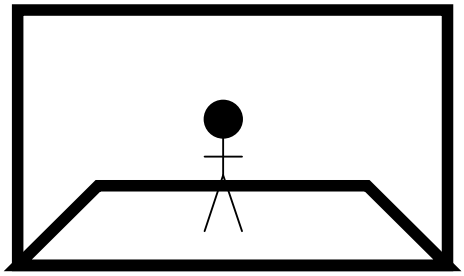
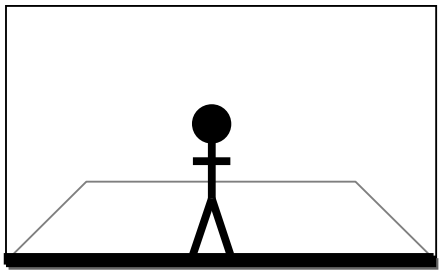


Figure 7: La femme est sur la place



Prep	Space	Degree	Other Including Idiomatic usages
Above	*higher than* : above the picture	above £3 above freezing above average	above suspicion above reproach
Over	*state of being above* (with or without contact) : carry a sweater over his shoulder; the roof over our heads; action : jump over the fence	over £2 over zero degrees [*over average]	*communications* : over the radio [*over suspicion][13] [*over reproach]
Below	*lower than :* below the surface	below zero below average	[*below duress] [*below stress]
Under	*below (state) :* be under the house; crawl under the house	under £1 under 70 degrees under 10 men [*under average]	*condition* : under duress, stress

Table 1 Adapated from Celce-Murcia and Larsen-Freeman, 1998: Ibid : 409-411.

Figure 8: Proto-scene for *Over*

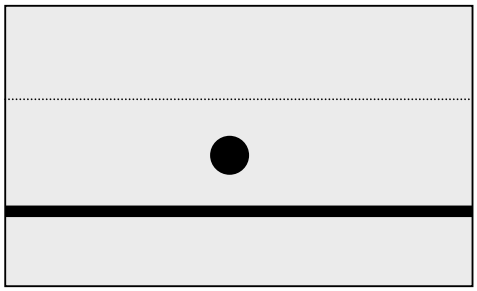


Figure 9: Proto-scene for *Above*

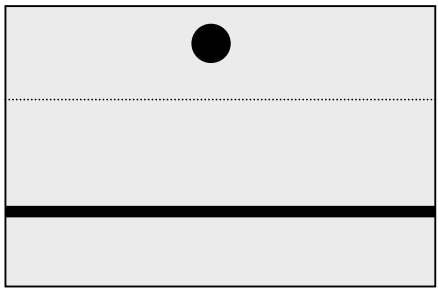


Figure 10: Proto-scene for *Under*

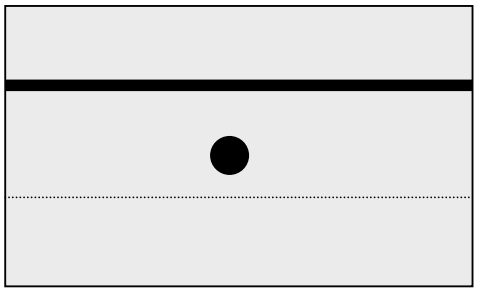


Figure 11: Proto-scene for *Below*

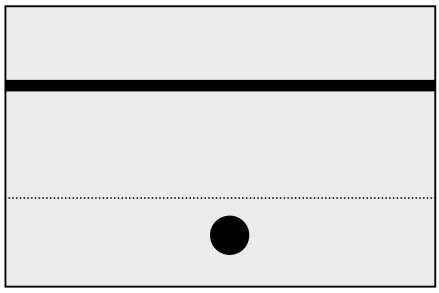
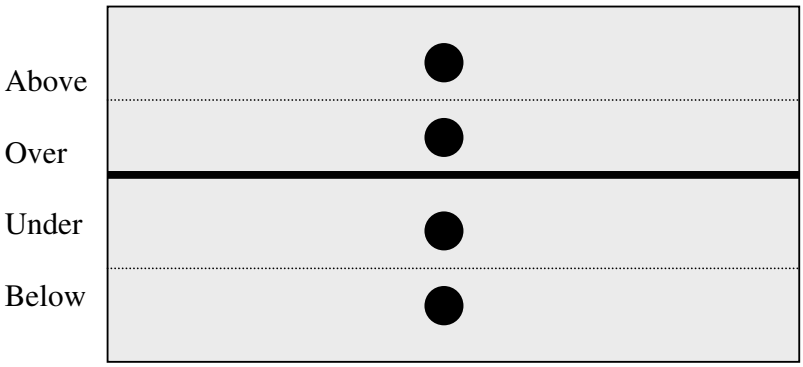


Figure 12: The Verticality Axis in English



[1] Lindstomrberg (1997) and Celce-Murcia & Larson-Freeman (1998) represent exceptions to this trend.

[2] In this terminology, they are following Langacker (1987). The Trajector and the Landmark are generalized from the Gestalt psychology notions of *figure* and *ground*.

[3] Polysemy networks have been argued to constitute radial categories.

[4] A good deal of evidence points to the conclusion that human cognitive structure is ultimately is a reflection of the nature of experience, see Evans 2004: chapter 4; Evans and Green In press).

[5] The notion of imagery is explored extensively by Johnson (1987), Langacker (1987) and Dirven and Verspoor (1998). Image-schemas have been studied by Johnson (1987). Also see Cienki (1998), for a detailed analysis of a single image schema.

[6] Of course, the child's view of the world outside the room would also be obscured.

[7] How the nature of the container is crucial in creating the environment is vividly exemplified in the Cuban film *When Night Falls*, in which, as an infant, the protagonist is left in a small, open pit dug into the yard while the other members of the family work in the fields and about the house. The pit is deep enough that the walls are well above the infant's head. The infant's environment is defined by the open pit --its earthern floor, walls, the sky, and the weather conditions.

[8] In our full account of the semantics of English prepositions (Tyler & Evans, 2001a, 2003), there are several additional principles.

[9] Grady's (1997) work provides important refinements on the the earlier work on conceptual metaphor. He posits at least two separate mechanisms which result in semantic ' metaphorical' extensions--experiential correlation and perceptual resemblance. Previous accounts of conceptual metaphor failed to distinguish between these two separate mechanisms, thus offering a far less explanatory or constrained account than that offered by Grady. For the purposes of this paper, we will only discuss experiential correlation. See also usage-based approaches to semantic change such as the importnant study presented in Traugott and Dasher (2002).

[10] The entire sentence is *Se cayo y el perro salio corriendo*

he fell and the dog came-out running

[11] As we argued above, this is so by virtue of being grounded in bodily experience of a recurring kind.

[12] Previous scholars, e.g. Lakoff and Johnson (1980) have talked about this relation between increased amount and vertical elevation in terms of conceptual metaphor. They have identified two conceptual metaphors in English for understanding control, these are: CONTROL IS UP, and CONTROL IS PHYSICAL PROXIMITY. Grady (1997) convincingly argued that these metaphors are motivated by experiential correlation.

[13] Elements which appear in brackets are not present in Celce-Murcia and Larson-Freeman's account and were added for the purpose of the present analysis.