

# RECONSIDERING PREPOSITIONAL POLYSEMY NETWORKS: THE CASE OF *over*

ANDREA TYLER

*Georgetown University*

VYVYAN EVANS

*University of Sussex, UK*

This article explores lexical polysemy through an in-depth examination of the English preposition *over*. Working within a cognitive linguistic framework, the present study illustrates the nonarbitrary quality of the mental lexicon and the highly creative nature of the human conceptual system. The analysis takes the following as basic: (1) human conceptualization is the product of embodied experience, that is, the kinds of bodies and neural architecture humans have, in conjunction with the nature of the spatio-physical world humans inhabit, determine human conceptual structure, and (2) semantic structure derives from and reflects conceptual structure. As humans interact with the world, they perceive recurring spatial configurations that become represented in memory as abstract, imagistic conceptualizations. We posit that each preposition is represented by a primary meaning, which we term a *PROTOSCENE*. The *protoscene*, in turn, interacts with a highly constrained set of cognitive principles to derive a set of additional distinct senses, forming a motivated semantic network. Previous accounts have failed to develop adequate criteria to distinguish between coding in formal linguistic expression and the nature of conceptualization, which integrates linguistic prompts in a way that is maximally coherent with and contingent upon sentential context and real-world knowledge. To this end, we put forward a methodology for identifying the *protoscene* and for distinguishing among distinct senses.\*

**1. PRINCIPLED POLYSEMY.** We focus here on the issue of semantic polysemy, the phenomenon whereby a single linguistic form is associated with a number of related but distinct meanings or *SENSES*. In particular, we consider how the notorious polysemy of the English preposition *over* might be accounted for in a principled, systematic manner within a cognitive linguistic framework. At base, we argue that the many senses of *over* constitute a motivated semantic network organized around an abstract, primary meaning component, termed a *PROTOSCENE*. The many distinct senses associated with *over* are accounted for by interaction of the *protoscene* with a constrained set of cognitive principles. Accordingly, our more general claim is that the lexicon is not an arbitrary repository of unrelated lexemes. Rather, the lexicon constitutes an elaborate network of form-meaning associations (Langacker 1987, 1991a, 1991b), in which each form is paired with a semantic network or continuum (Brisard 1997). This follows from two basic assumptions, widely demonstrated within the framework of cognitive linguistics. First, semantic structure derives from and mirrors conceptual structure (see, for example, Fauconnier 1994, 1997, Heine 1997, Jackendoff 1983, Lakoff 1987). Second, the kinds of bodies and neural architecture human beings have—HOW we experience—and the nature of the spatio-physical world we happen to live in—WHAT we experience—determine the conceptual structure we have (Clark 1973, Evans 2000, Grady 1997, Heine 1993, 1997, Johnson 1987, Lakoff & Johnson 1980, 1999, Svorou 1993, Sweetser 1990, Talmy 1983, 1988, 1996, 2000, Turner 1991, Varela et al. 1991).

This model of the lexicon generally, and the model of polysemy proposed here in

\* Our thinking has benefited greatly from conversations with a number of colleagues. We would particularly like to thank Joseph Grady, Elizabeth Lemon and the members of the Georgetown Metaphor Group. We also thank Mark Aronoff, Steven Cushing, and two anonymous *Language* referees for their detailed comments and suggestions. We are grateful to Angela Evans for her assistance with the diagrams throughout, and for supplying us with many of our linguistic examples. Andrea Tyler would like to acknowledge the many insights and persistent questions raised by the students in her classes on pedagogical grammar and applying cognitive linguistics. Vyvyan Evans has benefited from detailed discussions with Craig Hamilton, and owes especial thanks to Mark Turner for his insight and encouragement.

particular, contrasts with traditional models in a number of ways. The traditional view holds that all regularity and productivity are in the syntax, with the lexicon serving as a repository of the arbitrary. Aronoff (1994) points out that Bloomfield articulated this perspective as early as 1933. More recently, Chomsky has reasserted this stance: 'I understand the lexicon in a rather traditional sense: as a list of "exceptions", whatever does not follow from general principles' (1995:235). Models within this framework have tended to represent different word senses as distinct lexical items (Croft 1998). Polysemous forms are simply represented as an arbitrary list of discrete words that happen to share the same phonological form.

Over the years, this stand has been criticized for failing to account for systematic ways in which numerous forms are clearly related (Jackendoff 1997, Langacker 1991a, Levin 1993, Pustejovsky 1998). Croft (1998) notes that a number of linguists have argued for some type of derivation within the lexicon that would represent distinct senses as arising from a primary sense via a set of lexical operations. By and large, these analyses have focused on polysemy involving changes in the argument structure of verbs or alternatively in category changes, and have had little to say about the type of polysemy demonstrated by English prepositions in which syntactic category changes are often not involved.

In fact, most linguists (cognitive linguists excepted) have not paid much attention to the phenomena of polysemy. Pustejovsky notes that 'The major part of semantic research . . . has been on logical form and the mapping from a sentence-level syntactic representation to a logical representation' (1998:33). The lexicon has been represented as a static set of word senses, tagged with features for syntactic, morphological and semantic information, ready to be inserted into syntactic frames with appropriately matching features. Within this tradition the lexicon has been viewed as 'a finite set of [discrete] memorized units of meaning' (Jackendoff 1997:4).

Cognitive linguistics takes a significantly different perspective on the nature of the mental lexicon. Of primary importance is the notion of EMBODIED MEANING: the meanings associated with many individual lexemes are instantiated in memory not in terms of features, nor as abstract propositions, but rather as imagistic, schematic representations. Such IMAGISTIC SCHEMAS are held to be embodied, in the sense that they arise from PERCEPTUAL REANALYSIS of recurring patterns in everyday physical experience (see Johnson 1987, Mandler 1992, 1996 for a developmental perspective).<sup>1</sup> Perceptual reanalysis creates a new, abstract level of information—information tied to the spatio-physical world we inhabit but mediated by human perception and conceptualization. The central assumption of embodied meaning stands in stark contrast to approaches to the mental lexicon that represent lexical items as bundles of semantic, syntactic and morphological features.

A second distinguishing tenet of cognitive linguistics involves the representation of lexical items as natural categories involved in networks or continuums of meaning. Research into human categorization (Rosch 1975) strongly suggests that speakers distinguish between prototypical and peripheral members of a set, based not on criterial properties or features, but rather on how predictable a member is, based on a prototype (Lakoff 1987). Consequently, cognitive semantic accounts of polysemy (Brugman

<sup>1</sup> Johnson's (1987) pioneering work argues that image-schemas are representations of recurring aspects of bodily sensory-motor experience, such as verticality, containment, and so on, which are stored in long-term memory. Hence, they are not 'mental pictures', but rather abstractions from rich experience. See also Cienki 1998 for an analysis of a single image schema: STRAIGHT.

1988, Brugman & Lakoff 1988, Lakoff 1987) have argued that lexical items constitute natural categories of related senses organized with respect to a primary sense and thus form semantic or polysemy networks. Hence, such accounts are strongly suggestive that the lexicon is much more motivated and organized than has traditionally been assumed (Dirven 1993, Lakoff 1987, see also Langacker 1991a; the work in CONSTRUCTION GRAMMAR argues in a related vein, e.g. Fillmore et al. 1988, Kay & Fillmore 1999, Goldberg 1995).

In the 1980s, Brugman conducted pioneering work in the polysemy of the English preposition *over* (1981/1988). This research was followed by Lakoff 1987, Brugman & Lakoff 1988, Dewell 1994 and Kreitzer 1997. Brugman and Lakoff treated prepositions as denoting a spatial relation between an element in focus (the figure), and an element not in focus (the ground).<sup>2</sup> The Brugman/Lakoff framework took a highly fine-grained approach to the semantics of prepositions. Accordingly, Lakoff 1987 provides a network that contains at least twenty-four distinct senses. More recently, work such as Evans 2000, Kreitzer 1997, Ruhl 1989,<sup>3</sup> Rice 1993, Sandra & Rice 1995, Sandra 1998, Tyler & Evans 2002, and Vandeloise 1990, has questioned whether such a fine-grained analysis is warranted, arguing that the Brugman/Lakoff analysis is methodologically unconstrained.

We will argue that a significant problem with previous approaches is that they fail to distinguish between what is coded by a lexical expression and the information that must be derived from context, background knowledge of the world, and spatial relations in general. That is, previous analyses fail to take account of meaning construction as a process which relies upon conceptual integration of linguistic and nonlinguistic prompts, guided by various global cognitive principles. Hence, we follow recent work in cognitive linguistics (Fauconnier 1994, 1997, Fauconnier & Turner 1998, Turner 1991, 1996), which posits that formal linguistic expression underspecifies for meaning. We will further argue that this failure stems in large part from the fact that previous approaches have not developed well-motivated criteria for (1) distinguishing between distinct senses within a network versus interpretations produced on-line and (2) determining the primary sense associated with a preposition.

Our first objective in the present article is to outline what we term a PRINCIPLED POLYSEMY framework. This will anchor the semantic network of *over* to a foundational conceptual representation (our protoscene), deriving directly from uniquely human perceptions of and experience with the spatio-physical world. The protoscene we posit is a highly abstract representation of a recurring spatial configuration between two (or more) objects. Hence, details of the physical attributes of the objects involved in a particular spatial scene will be shown not to involve distinct senses (contra Brugman/Lakoff). We will argue that many of the distinct senses posited in previous approaches are produced on-line, as a result of a highly constrained process of integrating linguistic prompts at the conceptual level. Key to distinguishing our framework from previous ones will be outlining clear, motivated methodology for determining the protoscene

<sup>2</sup> The figure/ground notions were developed by the cognitive linguist Leonard Talmy (e.g. 1978), and are derived from gestalt psychology.

<sup>3</sup> Ruhl (1989) has elegantly argued against a polysemy position, championing instead a monosemy framework. Monosemy holds that each lexical item is associated with a single highly abstract sense. On this view, the sense is so abstract that its precise meaning is filled in by context in conjunction with pragmatic knowledge. We will demonstrate (§4) that some senses cannot be predicted by context alone, a strong argument against a monosemy position.

associated with a preposition and distinguishing between senses that are instantiated in memory versus interpretations produced on-line. Our second objective is to demonstrate the usefulness of the framework by providing a complete account of the polysemy exhibited by *over*.

## 2. PREVIOUS APPROACHES

**2.1. THE FULL-SPECIFICATION APPROACH.** The full-specification approach (e.g. Lakoff 1987) characterizes the polysemy network for *over* as subsuming distinct but related topographical structures at a fine-grained level. Each sense is represented by a distinct image-schema; each image-schema is related through various formal links and transformations. To see the level of granularity in this model, consider 1 and 2.

- (1) The helicopter hovered over the ocean.
- (2) The hummingbird hovered over the flower.

Following Langacker's COGNITIVE GRAMMAR (Langacker 1987, 1991a, 1991b), figure-ground relations denoted by prepositions were described in terms of a TRAJECTOR (TR) and a LANDMARK (LM). Lakoff observed that in a sentence such as 1 *over* describes a relation between a TR, *the helicopter*, and an LM that is extended, *the ocean*, while in 2 the relationship is between a TR, *the hummingbird*, and an LM that is not extended, *the flower*. Lakoff argued that such differences in dimensionality of the LM should be represented as distinct senses in the semantic network associated with *over*. He termed this approach FULL SPECIFICATION (see Lakoff 1987 for full details and copious examples). From this view it follows that for a word such as *over*, there would be a vast number of distinct senses explicitly specified in the semantic network, including many of the metric characteristics of the variety of TRs and LMs, that can be mediated by the spatial relation designated by *over*.

While not in principle inconceivable,<sup>4</sup> in practice, as Kreitzer observed, the fine-grained distinctions between instances of *over* as in 1 and 2, along with the proposed links and transformations, provide a semantic network so unconstrained that 'the model . . . [allows] . . . *across*, *through* and *above* all to be related to the polysemy network of *over*' (1997:292). Sandra and Rice (1995), based on their experimental findings, question whether the actual polysemy networks of language users are as fine-grained as suggested by models of the sort proposed by Lakoff. This view is echoed forthrightly in Vandeloise 1990.

Moreover, a Lakoff-type analysis fails to consider that detailed metric properties of LMs and TRs are often not specified by the lexical forms used by speakers in their utterances. For instance, the lexical form *flower* does not specify whether the entity should be construed as [+vertical], as a tulip or calla lily might be, or [-vertical], as a lobelia or a water lily might be. Thus, in a sentence such as 2, *The hummingbird hovered over the flower*, it appears that verticality is not explicitly specified by the semantics of the LM. This indicates that there must be a sense of *over* in which the TR is higher than the nonextended LM and the verticality of the LM is not specified. Thus, Lakoff's account results in the highly questionable consequence of positing three senses of *over* in which the TR is located higher than a nonextended LM—one which specifies for a vertical LM, one which specifies for a nonvertical LM, and one which

<sup>4</sup> Future empirical analysis might find that speakers make such fine-grained distinctions but the evidence to date does not bear this out. Although we cannot definitively prove Lakoff's full-specification model is wrong, it does result in questionable consequences, both in terms of its linguistic representations and in terms of the little experimental evidence that is available.

does not specify for verticality and hence subsumes the first two senses. Similarly, Lakoff's model would posit three additional senses involving an LM which is extended, one which specifies for verticality (e.g. *a mountain range*), one which specifies for nonverticality (e.g. *an ocean*), and one which does not specify for verticality (e.g. *the area*) and hence subsumes the first two.<sup>5</sup>

In essence, by building too much redundancy into the lexical representation, Lakoff's model vastly inflates the number of proposed distinct meanings associated with a preposition such as *over*. An implicit consequence of this representation is that real-world knowledge as well as discourse and sentential context, which are used in the conceptual processes of inferencing and meaning construction, are reduced in importance, as much of the information arising from inferencing and meaning construction is actually built into the lexical representation.

**2.2. THE PARTIAL-SPECIFICATION APPROACH.** Kreitzer's approach (1997), which we term PARTIAL SPECIFICATION, offers a notable refinement of the Brugman/Lakoff approach because Kreitzer is able to constrain the number of senses within a polysemy network, in a consistent, motivated way. Building on work by Talmy (1983), Kreitzer posits that there are three distinct levels of schematization inherent in the conceptualization of a spatial scene: the component level, the relational level, and the integrative level. The component level constitutes conceptual primitives, notions such as LM, TR, PATH, contact between TR and LM, lack of contact, whether the LM is extended, vertical, and so on. These combine giving the relational level. Crucially, for Kreitzer 'the relational level schema is taken as the basic level of "granularity" representing a "sense" of a preposition' (1997:295). Whereas for Lakoff, each additional topographical component constituted a distinct sense, Kreitzer claims that these individual components apply compositionally at the relational level. As such, image-schema transformations (which allow new components to be added to the image-schemas) are no longer taken as providing a new sense. Rather, image-schema transformations simply serve to widen the applicability of a particular sense. Exx. 3 and 4 illustrate this point.

(3) The boy climbed over the wall.

(4) The tennis ball flew over the wall.

In 3 there is contact between the TR, *the boy*, and the LM, *the wall*, whereas in 4 there is not. For Lakoff, this distinction warranted two distinct senses. Kreitzer, by claiming that the sense provided by an image-schema is defined at the relational level (rather than at the component level), is able to argue that both usages represent only one sense

<sup>5</sup> The variations among just the two attributes of +/– or unspecified extended and +/– or unspecified vertical result in nine distinct senses. Each time another attribute is added to the model, the list of distinct senses multiplies accordingly. Consider Table 1.

	+ VERTICAL	– VERTICAL	UNSPECIFIED
+ EXTENDED	N	N	x
– EXTENDED	N	N	x
UNSPECIFIED	x	x	x

TABLE 1. Topographical features (after Lakoff 1987).

The predictions become even more questionable when one considers that five of the nine senses involve attributes being unspecified.

Analogous arguments can be made for specification of the exact, metric relationship between the TR and LM in terms of the presence or absence of contact, as Kreitzer (1997) underscores with the example *Sam went over the wall*, in which the precise manner of passing over the wall, either jumping or crawling, is unspecified, therefore the presence or absence of contact is unspecified.

of *over*. His insight is that the basic spatial relation between the TR and LM remains unchanged in 3 and 4, even though the components of the spatial scene may vary contextually. For Kreitzer, topographical features such as contact and extendedness of the LM, are situated at the component level, and consequently do not delineate distinct senses or image-schemas.

Consequently, Kreitzer argues that the plethora of separate image-schemas posited by Lakoff can be represented by three image-schemas at the relational level. The primary sense, which he terms *over1* is static, *over2* is dynamic, and *over3* is what Kreitzer terms the occluding sense. Examples of these are:

- (5) The picture is over the sofa. (*over1*, static sense)
- (6) Sam walked over the hill. (*over2*, dynamic sense)<sup>6</sup>
- (7) The clouds are over the sun. (*over3*, occluding sense)

Although Kreitzer is successful in constraining Lakoff's analysis, his account faces a significant problem because his three basic senses of *over* are arbitrarily connected; they do not share a common TR-LM configuration. As Lakoff's model with a system of links and transformations has been abandoned, *over* now denotes three distinct relations, it is difficult to see how Kreitzer's occluding sense of *over3* could be related to *over1* or *over2*. In order to appreciate the difficulty, consider 7 in relation to 5 and 6. In 7, *over* denotes a relationship in which the TR, *the clouds*, is beneath the LM, *the sun*. In 6, *over* denotes a dynamic relationship in which the TR is above the LM only at the midpoint of the TR, but in 5 the TR is stationed above the LM. It would seem that his claim to polysemy is undermined by three schemas so distinct as to have little in common. Moreover, he makes no attempt to account for how *over1* could give rise to *over2* and *over3* respectively.

Second, as with Lakoff's full-specification approach, Kreitzer's model fails to fully address the issue of the contributions of sentential context and background knowledge. Consider 8 for instance.

- (8) The clouds moved over the city.

Kreitzer posits that 8 has two construals as a result of his assumption that *over* has both a static and a dynamic relational schema. Construal 1 stipulates that the clouds moved above and across the city, such that they originated in a position not above the city, moved over the city, and came to be in a position beyond the city. Construal 2 stipulates that the clouds moved from a position in which they were not over the city, to a position such that they came to be directly over the city. These construals are diagrammed in Figures 1 and 2.

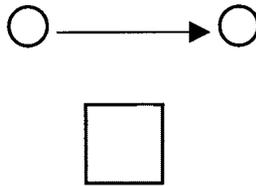


FIGURE 1. *The clouds moved over the city* (construal 1, after Kreitzer 1997:305).

<sup>6</sup> In order to motivate the distinction between *over1* and *over2*, Kreitzer appeals to Langacker's notion of SUMMARY SCANNING (Langacker 1987, 1991a). Langacker posits that summary scanning provides a means of integrating points occupied by a TR along a path into a construal of motion along a path. The path is reified at the conceptual level, even though it never actually exists in the world. Kreitzer argues that the dynamic *over2* describes a relation between a TR and an LM in which it is the path that is the TR.

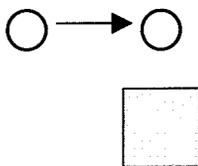


FIGURE 2. *The clouds moved over the city* (construal 2, after Kreitzer 1997:305).

Kreitzer argues that construal 1 is the result of *over*<sub>2</sub>, while construal 2 represents an integration of *move*, which contains a path schema as one of its components, and *over*<sub>1</sub>. On this view, the whole meaning of the sentence depends on which image-schema for *over* is taken.

In addition to these two construals posited by Kreitzer, however, there is a third construal in which the clouds move around but remain above the city. This is represented in Figure 3.

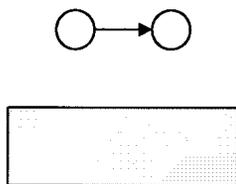


FIGURE 3. *The clouds moved over the city* (construal 3).

Based on Kreitzer's account, we would expect construal 3 to result from integration of *move* with *over*<sub>1</sub>, as the TR is always 'above' the city. However, the problem for Kreitzer's account is that we have two construals, 2 and 3, which would thus not be distinguished image schematically. How do we obtain distinct construals without such being coded?

Kreitzer's account is problematic because he is assuming that distinct construals either result from such being coded by a preposition at the relational level or arise at the integrative level. But the integrative level simply 'conflates' the two linguistic codes. That is, the path schema of *move* is added to the static schema of *over*<sub>1</sub>, resulting in a dynamic construal. Since we are able to distinguish construal 3 from construal 2, there must be a further level of integration at which linguistic codes are elaborated, such that linguistic underspecification is filled in, providing a variety of construals, limited only by our perceptual abilities and what is possible in the world. This is the level of integration we refer to as the conceptual level. Hence, a fundamental problem with Kreitzer's account (as well as with Lakoff's), is that it assumes that the rich understanding we obtain about spatial scenes is derived entirely from what is coded by formal linguistic expression. This represents a commitment to the view that conceptualization must always derive from linguistic antecedents. We argue that the ambiguity (given that there are three construals) arises precisely because *move* codes a path schema whereas *over* does not, and because of what we know about cities and clouds (cities, unlike walls, for instance, occupy an extended area). Accordingly, the elements can be integrated in at least three different ways, as indicated by the three construals. This is testimony to the highly elaborate and rich processes of conceptual integration. The linguistic prompts themselves do not provide distinct interpretations; these come from our knowledge of what is possible in the world and our ability to integrate minimal

cues to construct a complex and dynamic conceptualization of a spatial scene. Sentence 9 illustrates this point.

(9) The clouds moved over the wall.

In 9 construals 1 (Fig. 1) and 3 (Fig. 3) are ruled out, not because *over* has both a dynamic and a static sense, but because walls are not extended landmarks (as noted in Lakoff's analysis), whereas cities are, and *moved* codes a path schema. Thus, when the sentential elements are integrated, the TR follows a path, as designated by *moved*, such that the TR occupies a position relative to the LM, as specified by the mental representation for *over*. The clouds move, not away from the wall, nor in a vertical manner without crossing the wall, but from a position prior to the wall to a position beyond the wall. That this should be so follows from conceptual integration of the cues prompted by the linguistic elements in the sentence. Accordingly, we argue that a polysemy network needs to allow for the distributed contribution of meaning played by all sentential elements, as well as the constraints imposed by our experience of the world and our ability to construct a rich and highly dynamic conceptualization based on minimal linguistic cues.

Another problem with Kreitzer's account is that in attempting to constrain Lakoff's analysis he has significantly understated the amount of polysemy appropriately associated with *over*. For instance, many senses touched on by Lakoff are simply ignored by Kreitzer. We will provide a detailed examination of the semantic network for *over* in §4. Finally, neither Kreitzer nor Lakoff attempts a serious account of how he determined which sense of *over* should be considered the primary sense. We address this issue in detail in §3.2.

The spirit of our model is coherent with a number of previous analyses that have addressed the multiple meanings associated both with prepositions (Herskovits 1986, Vandeloise 1991, 1994) and with other linguistic forms (Cushing 1990, 1991). While these scholars differ from each other and from us in several key assumptions (e.g. the nature of lexical representation), they do entertain the possibility that the polysemy exhibited might be best modeled in terms of a central (or ideal) sense.<sup>7</sup>

### 3. PRINCIPLED POLYSEMY: THE BASIC FRAMEWORK

**3.1. METHODOLOGY FOR DETERMINING DISTINCT SENSES.** One of the problems with previous polysemy networks, as noted by Sandra and Rice (1995), is that there appear to be as many different approaches to how best to model a semantic network as there are semantic network theorists. While we accept that all linguistic analysis is to some extent subjective, we propose here to introduce methodology to minimize the subjective nature of our analysis. We do so in the hope that other scholars can employ our methodology and test the predictions made by our model. We aim to provide the basis for replicability of findings, a prerequisite for any theoretically rigorous study.

We suggest two criteria for determining whether a particular instance of a preposition counts as a distinct sense. First, accepting the standard assumption that the primary sense coded for by prepositions is a particular spatial relation between a TR and an LM (although we will nuance what 'spatial' means), for a sense to count as distinct, it must involve a meaning that is not purely spatial in nature and/or in which the spatial configuration between the TR and LM is changed vis-à-vis the other senses associated

<sup>7</sup> The term IDEAL MEANING is from Herskovits 1986: ch. 4.

with a particular preposition.<sup>8</sup> Second, there must be instances of the sense that are context-independent, instances in which the distinct sense could not be inferred from another sense and the context in which it occurs. To see how this would work let's reconsider the sentences in 1 and 2. In 1, *over* designates a spatial relation in which the TR, coded by *the helicopter*, is located higher than the LM. In 2, *over* also designates a spatial relationship in which the TR, *the hummingbird*, is located higher than the LM, coded by *the flower*. Neither instance of *over* constitutes a nonspatial interpretation, hence, neither use adds additional meaning with respect to the other. By virtue of our proposed methodology, these instances of *over* cannot be treated as two distinct senses.

In contrast, examples 10 and 11 do appear to constitute a distinct sense.

(10) Joan nailed a board over the hole in the ceiling.

(11) Joan nailed a board over the hole in the wall.

In these sentences the spatial configuration between the TR and LM designated by *over* is not consistent with the 'above' meaning designated in ex. 1 and 2. In addition, a nonspatial meaning appears to be part of the interpretation. That is, meaning associated with *over* appears to be that of covering, such that *the hole*, the LM, is obscured from view by the TR. Clearly, this notion of covering and obscuring represents an additional meaning not apparent in examples such as 1 and 2. The fact that the usage in 10 and 11 brings additional meaning meets the first assessment criterion for whether this instance counts as a distinct sense.

In terms of the second criterion, we must establish whether the covering or obscuring meaning can be derived from context. If it can be, then this instance would fail the second assessment criterion and so could not, on the basis of the present methodology, be deemed a distinct sense. Assuming that the primary sense of *over* involves a spatial configuration between a TR and LM and that this configuration involves some sense of the TR being higher than the LM,<sup>9</sup> we see no way in which the covering meaning component associated with *over* in 10 and 11 can be derived from context. To see why this is so, contrast this instance with 12, in which the covering meaning is derivable from context.

(12) The tablecloth is over the table.

The TR, the *tablecloth*, is higher than (and in contact with) the LM, *the table*. As tablecloths are typically larger than tables, and the usual vantage point from which

<sup>8</sup> It is important to note that some central (= most basic, to be explicated) senses associated with prepositions will crucially involve a coordinate system along the vertical or horizontal axes, while others will not. We will argue that the primary sense associated with *over* does involve such a system in which the spatial relation of the TR being located higher than the LM is essential. But this should not be interpreted as a claim that ALL prepositions prompt for such a system. While the English prepositions *over* and *under* regularly code respectively for the TR being in a higher-than or lower-than position relative to the LM, the preposition *out* appears to be insensitive to this dimension. Thus, we find sentences like *The rain poured out of the sky* (in which the TR is lower than the LM) and *The water bubbled out of the hot springs* (in which the TR is higher than the LM) which do not affect the basic interpretation associated with *out*. Whether a particular preposition is sensitive to the horizontal or vertical dimensions is part of its basic lexical entry.

<sup>9</sup> Although there has been disagreement about the appropriate representation of the primary sense associated with *over*, all published analyses accept these two basic assumptions. Synchronically, evidence that the basic spatial configuration prompted for by *over* is something like a TR in a higher-than position relative to the LM comes from sentences with clearly contrasting interpretations: *Nicole decided to walk over the bridge* versus *Nicole decided to walk under the bridge*. Having argued that the primary sense for *over* involves a spatial configuration in which the TR is higher than the LM, we readily acknowledge that in many instances this spatial configuration is NOT prompted for by *over*. Our analysis attempts to model how these noncanonical spatial configurations have come to be associated with the form *over*.

such a spatial scene would be viewed is a point higher than the table, the result would be that a substantial part of the table would be covered and so obscured from view. The interpretation that the table is covered/obscured could be inferred from the fact that the tablecloth is *over* and hence higher than the table, in conjunction with our knowledge that tablecloths are larger than tables and that we typically view tables from above the top of the table. Such an inference is not possible in 10 as the spatial relation holding between the TR and the LM is one that would normally be coded by *below* (i.e. *the board is below the hole in the ceiling*), rather than by *over* given the typical vantage point. Similarly, in 11 the spatial configuration between the TR and LM would normally be coded by something like *next to*. In short, unless we already know that *over* has a covering/obscuring meaning associated with it, there is no ready contextual means of deriving this meaning in sentences such as 10 and 11. From this, we conclude that the covering/obscuring meaning associated with *over* in 10 and 11 constitutes a distinct sense.

The two assessment criteria being proposed are rigorous and, in the light of future empirical research, may be shown to exclude senses that are legitimately instantiated in the language user's mental lexicon and hence would have to be adjusted. Nonetheless, without prejudging future findings, we suggest that this methodology predicts many findings that have already come to light, and so represents a reasonable approximation for assessing where we should draw the line between what counts as a distinct sense conventionalized in semantic memory and a contextual inference, produced on-line for the purpose of local understanding. The appeal of such methodology is that it provides a rigorous and relatively consistent way of making judgments about whether a sense is distinct, and provides methodology that can be used in an intersubjective way.

**3.2. METHODOLOGY FOR DETERMINING THE PRIMARY SENSE.** An equally thorny problem is the question of what counts as the primary sense associated with a polysemy network. In previous studies of semantic networks researchers have assumed that there is a single primary sense associated with a preposition and that the other senses are derived from this primary sense in a principled way. We share this assumption. Scholars, however, have often disagreed about which sense should be taken as primary (or central). Lakoff (1987) following Brugman (1988), argued that the primary sense for *over* is 'above and across', and included a path along which the TR moves, as represented by sentences such as *The plane flew over the city*. Kreitzer (1997) disagreed, suggesting that the primary sense (*over1*) is something akin to an 'above' sense, as in *The hummingbird hovered over the flower*. These decisions were primarily asserted rather than being argued for. Because linguists have simply asserted what constitutes the primary sense for a particular lexical category, appealing to intuitions and assumptions they often fail to explicitly articulate, we are in the unfortunate position that Lakoff (1987) and Kreitzer (1997) can offer equally plausible yet conflicting views of what the primary sense of *over* should be.

Sandra and Rice (1995) observed that given the current state of theoretical development, any analysis of a polysemy network, including what constitutes its primary sense, is relatively arbitrary, reflecting each analyst's own preferences (or indeed imagination). Langacker, however, has argued persuasively that there are various kinds of evidence to help us discover and verify the structure of a complex category (1987:376). Building on his suggestions we advance a set of criteria that we believe provides a more principled, intersubjective method of determining the appropriate primary sense for individual prepositions. As with our criteria for determining distinct senses, we see these criteria

as the beginning of a plausible methodology leading to replicability of findings. We hypothesize that some of these criteria may also be useful for other classes of words. But because of the particular nature of prepositions—that they code for spatial relations that may not have changed over many thousand years (that is, the way humans perceive space seems not to have changed) and that they are a closed class—the nature of the primary senses associated with lexical forms are likely to be at least somewhat distinct from the primary senses associated with word classes such as nouns, adjectives, and verbs.

We suggest that there are at least four types of linguistic evidence that can be used to narrow the arbitrariness of the selection of a primary sense. We posit that no one piece of evidence is criterial but, taken together, they form a substantial body of evidence pointing to one sense among the many distinct senses being what Langacker (1987: 157) terms the SANCTIONING sense, from which other senses may have been extended. The evidence includes (1) earliest attested meaning, (2) predominance in the semantic network, (3) relations to other prepositions, and (4) grammatical predictions (Langacker 1987).

Given the very stable nature of the conceptualization of spatial relations within a language, one likely candidate for the primary sense is the historically earliest sense. Having examined more than twenty English prepositions (see Tyler & Evans 2002), we found that the historical evidence indicates the earliest attested uses coded a spatial configuration holding between the TR and the LM (as opposed to a nonspatial configuration as in *The movie is over* [= complete]). Since English has historically drawn from several languages, not all prepositions entered the language at the same time and there are instances of competing, near synonyms, for instance, *beneath*, *below*, and *under*. In such cases, over a period of time the semantic territory has been divided among such competing prepositions, but even so, they retain a core meaning that directly involves the original TR-LM configuration. Unlike words from many other word classes, the earliest attested sense for many prepositions is still a major, active component of the synchronic semantic network of each particle. *Over* is related to the Sanskrit *upari* ‘higher’ as well as the Old Teutonic comparative form *ufa* ‘above’, that is, a spatial configuration in which the TR is higher than the LM (OED).

Turning to the notion of predominance within a semantic network, by this we mean that the sense most likely to be primary will be the one whose meaning components are most frequent in other distinct senses. We have identified fourteen distinct senses associated with *over*. Of these, eight directly involve the TR being located higher than the LM; four involve a TR located on the other side of the LM vis-à-vis the vantage point; and three—covering, reflexive, and repetition—involve multiple TR-LM configurations. Thus, the criterion of predominance suggests that the primary sense for *over* involves a TR being located higher than the LM.

Within the entire group of English prepositions, certain clusters of prepositions appear to form compositional sets that divide up various spatial dimensions. *Above*, *over*, *under*, and *below* appear to form a compositional set that divides the vertical dimension into four related subspaces (see Tyler & Evans 2002). Other compositional sets include *in* and *out*, *on* and *off*, *up* and *down*. The linguistically coded division of space and spatial relations is relativistic in nature, depending largely on construal of the particular scene being prompted for (Talmy 1988, 2000, Langacker 1987). To a large extent, the label assigned to denote a particular TR-LM configuration is determined in relation to other labels in the composite set. So, for instance, what we label as *up* is partially determined by what we label as *down*. In this sense, the meaning of a preposition that

participates in a compositional set is partially determined by how it contrasts with other members of the set. The particular sense used in the formation of such a compositional set would thus seem to be a likely candidate as a primary sense. For *over*, the sense that distinguishes this preposition from *above*, *under*, and *below* involves the notion of a TR being located higher than but potentially within reach of the LM.<sup>10</sup>

The choice of a primary sense gives rise to testable grammatical predictions. So, for instance, if we recognize that what are now distinct senses were at one time derived from and related to a preexisting sense and became part of the semantic network through routinization and entrenchment of meaning, we would predict that a number of the senses should be directly derivable from the primary sense. This is consistent with Langacker's (1987) discussion of a 'sanctioning' sense giving rise to additional senses through extension. Any senses not directly derivable from the primary sense itself should be traceable to a sense that was derived from the primary sense. This view of polysemy explicitly acknowledges that language is an evolving, usage-based system. Grammatically, for any distinct sense that is represented as directly related to the primary sense, we should be able to find sentences whose context provides the implicature that gives rise to the additional meaning associated with the distinct sense. We have already discussed this notion briefly (§3.1) when we considered the additional meaning of covering/obscuring associated with *over* in 10–12. We argued that the use of *over* in 10 and 11 revealed additional meaning that could not be derived from sentential context, while the additional meaning of covering/obscuring could be derived from context in 12. By the criterion of grammatical prediction, 12 constitutes evidence that a likely candidate for the primary sense associated with *over* involves the TR being located higher than the LM as the distinct, covering/obscuring sense can be derived from this primary sense and certain sentential contexts. Of course, the covering/obscuring sense is only one of fourteen; all other senses would have to be tested against this same criterion.

**3.3. THE PROTO SCENE.** As we said earlier, we assume that English prepositions form polysemy networks organized around a primary sense. At the conceptual level, the primary sense is represented in terms of abstracting away from specific spatial scenes, that is, real-world scenarios such as described by 13a and b, resulting in an idealized spatio-functional configuration.

- (13) a. The picture is over the mantel.  
b. The bee is hovering over the flower.

We call this abstracted mental representation of the primary sense the **PROTO SCENE**. It consists of a schematic trajector (TR), which is the locand (the element located and in focus), and is typically smaller and moveable; a schematic landmark (LM), which is the locator (the element with respect to which the TR is located and in background), and is typically larger and immovable, and a conceptual configurational-functional relation which mediates the TR and the LM. In the case of *over*, the TR is conceptualized as being proximate to the LM, so that under certain circumstances, the TR could come into contact with the LM. The functional aspect resulting from this particular spatial configuration is that the LM (or the TR) is conceptualized as being within the sphere of influence of the TR (or the LM) (see Dewell 1994, and Vandeloise 1991, 1994 for a discussion of other prepositions).

In our label **protoscene**, the term **PROTO** captures the idealized aspect of the conceptual

<sup>10</sup> We expand on this argument in the next section.

relation, which lacks the rich detail apparent in individual spatial scenes, while the use of SCENE emphasizes visual awareness of a spatial scene, although the information included in the image can contain information from other sense-perceptions. Because protoscenes are abstractions ultimately arising from recurring real-world spatial scenarios, we will diagram them.<sup>11</sup> In our diagrammatic representation of the protoscene posited for *over* (Fig. 4), the TR is portrayed as a dark sphere, the LM, as a bold line.

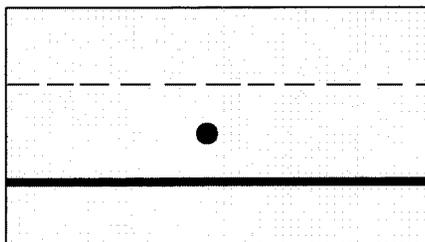


FIGURE 4. Protoscene for *over*.

The dashed line signals a distinction between the part of the spatial scene conceptualized as being proximal to the LM (i.e. within potential contact with the LM) and that which is conceptualized as being distal. The vantage point for construing the spatial scene is offstage. The vantage point is external to the spatial scene. Crucially, the linguistic form *over* prompts for the conceptual spatial relation captured by the protoscene.

Two claims warrant more thorough investigation: First, that the spatial configuration holding between the TR-LM is correctly expressed by the description that *over* lexicalizes the protoscene depicted in Fig. 4, namely that the TR is above but within a region of potential contact with the LM. This contrasts with the English preposition *above*, which we argue prompts for a conceptual spatial relation in which the TR is higher than but not within reach of the LM. The second claim warranting further scrutiny is that the TR and LM are within each other's sphere of influence.

Dealing with the first claim, using the criterion of relationship to other prepositions which form a compositional set, consider the instances of *over* and *above* in sentences such as 14.

- (14) a. She walked over the bridge.  
 b. She walked above the bridge.

The sentences in 14 are characteristic of the distinction in English between *over* and *above*. While in 14a the conventional reading is one in which the TR, *she*, is above but within reach (in this particular case, the TR is in contact with the bridge), most native speakers of English would exclude possible contact from their reading of 14b. The TR, *she*, might constitute a ghostly presence capable of levitation, or the TR might be on a second bridge higher than the first, but generally English speakers would not interpret the bridge as the surface being walked upon. These examples strongly suggest that we are right in positing that *over* does designate a spatial configuration in which the TR is in potential contact with the LM.

We turn now to the functional aspect of the protoscene in Fig. 4, namely the claim that the TR and LM are within each other's sphere of influence. A consequence of

<sup>11</sup> It should be noted that our diagrammatic representations of protoscenes are made for ease of explication. They should not be interpreted as making any serious claim about the neurological nature of imagistic representation.

being within potential reach of the LM, is that the TR can affect the LM in some way and vice versa. For instance, because of an independently motivated experiential correlation (Grady 1997), we conventionally understand power and control being associated with an entity who is higher than the entity being controlled (we will discuss this in more detail when we deal with the control sense for *over*). In physical terms we can only control someone or something, and hence ensure compliance, if we are physically proximal to the entity we seek to control. If, then, in recurring human experience, control, and hence, the ability to physically influence someone or something, is dependent upon being higher than and physically close to the entity we seek to control, we would expect that these notions can be designated by *over* but not *above*. While both *over* and *above* designate spatial relations which are higher than, only *over* also designates the functional relation of influence, precisely because part of its spatial configuration involves the notion of potential contact between the TR and LM. Consider 15.

- (15) a. She has a strange power over me. (Lakoff 1987)  
 b. ?She has a strange power above me.

In terms of a control reading, while *over* in 15a is perfectly acceptable, *above* in 15b is decidedly odd. This suggests that the protoscene for *over* does indeed have a functional element of influence between the TR and LM, as a consequence of its spatial configuration designating potential contact between the TR and LM (see Vandeloise 1994 for a discussion of the functional nature of prepositions).

This relation places certain maximal constraints on what can count as *over*: a spatial relation should be prompted for using the preposition *over* only if the spatial relation ranges from a configuration in which there is TR-LM contact to one in which there is no contact but the TR can be construed as within potential reach of the LM. While there is strong evidence for defining *over* in this way, a review of the many interpretations regularly assigned to *over* by speakers of English shows that this representation alone is inadequate. Hence, there is need to posit a set of cognitive principles of meaning construction and meaning extension that will account for the many additional senses associated with *over*.

### 3.4. COGNITIVE PRINCIPLES

#### PERCEPTUAL ANALYSIS AND RECONCEPTUALIZATION

Mandler (1988, 1992, 1996) argues that a basic aspect of human cognition is the ability to submit salient (i.e. recurring) real-world scenarios and spatial scenes to perceptual analysis that gives rise to a new level of conceptualized information which is stored imagistically in the form of an abstract schematization, termed an IMAGE-SCHEMA.<sup>12</sup> Once stored, the image-schema is available for integration with other conceptualizations, further analysis, and reconceptualization.

Earlier, we used the term CONCEPTUALIZATION in a nontechnical way. In order to distinguish our nontechnical usage from a more sharpened operationalization, we here introduce the term COMPLEX CONCEPTUALIZATION. A complex conceptualization is a constructed representation,<sup>13</sup> typically (but not inevitably) produced on-line. A complex

<sup>12</sup> An image-schema, as Mandler uses the term, constitutes a representation distinct from purely perceptual information. As such, it constitutes a rudimentary 'theory' as to the nature of a particular object or relation between objects. The image-schema relating to containment, for instance, is a concept as opposed to a perceived entity, insofar as it constitutes a means of understanding the functional aspects of a particular spatial configuration.

<sup>13</sup> This is akin to what Jackendoff (1983:29) refers to as the PROJECTED WORLD, and is constructed at what Fauconnier (1997:36) terms the COGNITIVE LEVEL OF LEVEL C.

conceptualization represents our projection of reality (in the sense of Jackendoff 1983), and can represent static and relatively simple phenomena, e.g. *The cloud is over the sun*, or dynamic and relatively complex phenomena, e.g. *The cat ran over the hill and ended up several miles away*. Our claim is that the integration of linguistic forms with other cognitive knowledge prompts for the construction of a complex conceptualization.

In our model, the image-schemas representing the spatial configurations associated with prepositions are termed protoscenes.<sup>14</sup> The primary scene (i.e. the protoscene) associated with a preposition can be used, in conjunction with other linguistic prompts (i.e. within an utterance), to prompt for recurring spatial scenes and real-world scenarios.

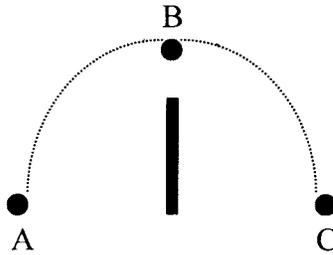


FIGURE 5. *The cat jumped over the wall.*

Figure 5 represents the complex conceptualization which would be constructed in the interpretation of the recurring scenario prompted by sentences such as 16 and 17.

(16) The rabbit hopped over the fence.

(17) The boy stepped over the pile of leaves.

At some point, such recurring complex conceptualizations become subject to reanalysis and hence reconceptualization.<sup>15</sup> We posit that distinct senses arise as a result of the reanalysis of a particular aspect of such a recurring complex conceptualization. In other words, the recurring complex conceptualization from which a distinct sense originally arises is derivable from the protoscene and thus the distinct sense is related to the protoscene in a principled manner.

On our analysis, while prepositions themselves do not prompt for dynamism, prepositions do participate in prompting for complex conceptualizations, which often are dynamic (in the sense that they include motion phenomena). Minimally varying static spatial scenes can be integrated at the conceptual level to provide a dynamic sequence. This is analogous to the way in which movie stills (static images) are flashed onto a screen in sequence to create the illusion of a moving image, a movie. Hence, we are arguing that prepositions prompt for nondynamic conceptual spatial relations, while maintaining that such relations can be integrated with other prompts, to create (dynamic)

<sup>14</sup> In terms of specifics our claim is as follows: a particular spatial scene is a rich real-world scenario, mediating two objects (TR and LM) via a conceptual spatial relation. Recurring spatial scenes perceived as resembling each other are stored as an abstract protoimage. The aspect of the protoimage coded by a preposition is the spatial-relation mediating the TR and LM, and not the whole protoimage. From this, it follows that a preposition presupposes a TR and an LM (as the conceptual spatial relation holds by virtue of mediating a relation between a TR and an LM). In minimal terms, a preposition prompts for a TR and LM, which are typically supplied linguistically, e.g. *The picture [TR] is over the mantel [LM]*.

<sup>15</sup> The reanalysis of an aspect of a particular complex conceptualization results in privileging a different aspect or perspective on the complex conceptualization. Yet, because the pertinent complex conceptualization is first prompted for by the use of *over*, as in Fig. 5, the derived sense is coded by the same linguistic form, namely *over*.

complex conceptualizations. In sum, we hold that while human conceptualization of spatial scenes is rich and dynamic, the available linguistic prompts underspecify such richness. Meaning is the result of integration of linguistic prompts at the conceptual level. Thus, the protoscene for *over* is integrated in the most felicitous way, given the sentential context, and given what we know about what is possible in the world.

#### WAYS OF VIEWING SPATIAL SCENES

The notion of a vantage point mentioned in the discussion of the protoscene suggests that how a particular spatial scene is viewed will in large part determine the functional nature of a particular spatial scene, and thus in what way it is meaningful. Four distinct issues affect the functional nature of a particular spatial scene, based on the different ways in which such scenes can be construed (i.e. 'viewed').

1. Every spatial scene is conceptualized from a particular vantage point. The conceptualizer represents the default vantage point. Accordingly, the same scene can be construed from many different vantage points (Langacker 1987, divides this phenomenon into two aspects, PERSPECTIVE and VANTAGE POINT).

2. Certain parts of the spatial scene can be profiled (Langacker 1987, 1992). Thus, in the sentence *The cat is sitting in the middle of the circle*, the TR, *the cat*, is conceptualized as being surrounded by the LM, described by the circle; here the LM is being conceptualized as a container, and the space encompassed by the LM is being profiled. In contrast, in the sentence *Okay everybody, get in a circle*, the outer edge, or shape of the LM is being profiled.<sup>16</sup>

3. Related to 2 above is the fact that the same scene can be construed in a different way. For instance, in a spatial scene in which a large cloth is positioned in relation to a table such 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 occluding 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 construal would be to place the table in focus, in which case the coding would be something like *The table is under the tablecloth*.

4. The exact properties of the entities which are conceptualized as TR and LM can vary. In the sentence *The hot air balloon floated over New York City*, the LM is conceptualized as vertical and extended; whereas in the sentence *The plane flew over the ocean*, the LM is nonvertical and extended.

#### ATEMPORALITY

In advancing the model of word-meaning on which we will base our analysis of *over* in §4, we note, following Langacker (1987, 1991a, 1991b, 1992; see also Talmy 1988, 2000) that prepositions profile (i.e. designate) a spatio-functional relation that is scanned (i.e. apprehended) in summary fashion.<sup>17</sup> That is, they do not profile a relation that

<sup>16</sup> Cruse (1986) discusses this in terms of modulation of a lexical item. For instance, various parts of *the car* are highlighted in the following sentences: *The car needs to be washed* (where *car* is interpreted as the exterior body of the car) versus *The car needs to be serviced* (where *car* is interpreted as the engine) versus *The car need vacuuming* (where the *car* is interpreted as the interior). This constitutes modulation or highlighting different parts and backgrounding others.

<sup>17</sup> Langacker (1992) discusses the atemporal nature of prepositions in terms of the relationships they profile. 'With *before* and *after*, time functions as the domain in which the profiled relationship is manifested. Its role is consequently analogous to that of space in the basic sense of *in*, *on* or *near*. A verb, on the other hand, is said to be temporal in a very different way . . . the profiled relationship is conceived as evolving through time and is scanned sequentially along this temporal axis. It is by incorporating this further level

evolves through time, as is the case for example with nonstative verbs. Nonstative verbs profile processes that are scanned in serial fashion. For instance, in the sentence *The boy runs home from school*, the process profiled by *run* constitutes a process that integrates all the points occupied by the TR, the boy, which intervene between school and home, hence the process evolves through time by integrating these sequential components. The result is a sequential process. This contrasts with the relation described by a preposition, which does not evolve through time. Prepositions represent a conceptualized relation holding between two entities (a TR and an LM), independent of sequentially evolving interdependencies. In this sense, prepositions can be considered to profile atemporal relations.

#### INFERENCE STRATEGIES

We have argued that not all meanings assigned to a preposition, which arise from interpreting the particle within an utterance, are stored as distinct senses and that previous models have often failed to recognize the contribution of encyclopedic knowledge and inferencing involved in natural language processing. In deriving on-line interpretations we employ a number of inferencing strategies. Because of space constraints we will mention just three of the most important. In §4 we provide a detailed illustration of how these strategies enable us to produce meaning on-line.

1. Best fit. Only a tiny fraction of all possible spatial relations are coded by discrete lexical items. In linguistic terms, prepositions represent a closed class, that is, English speakers have a limited set of linguistic choices to represent a virtually unlimited set of conceptual spatial relations. Speakers choose the preposition that offers the best fit between the conceptual spatial relation and the speaker's communicative needs. The notion of best fit represents a crucial means for allowing us to fill in information about a particular spatial scene. To our knowledge, no other linguist has specifically discussed this notion, but it seems to be a logical extension of the notion of relevance (Grice 1975, Sperber & Wilson 1986).

2. Knowledge of real-world force dynamics. Although a spatial scene is conceptual in nature, in the creation and interpretation of an utterance the speaker and hearer will assume that all elements in a spatial scene are subject to real-world force dynamics.<sup>18</sup> For instance, in the interpretation of a sentence such as *The cat jumped over the wall*, it is assumed the interlocutors will apply their knowledge of the world, which includes the information that entities cannot float in midair unless they possess the means or ability to do so. General knowledge of cats includes the information that they cannot hover above walls and that they are subject to gravity. Hence, any responsible account of the conceptual system and meaning extension must recognize the large body of real-world knowledge we bring to bear (often unconsciously) when constructing meaning. Vandeloise (1991) discusses this in terms of a naive theory of physics that applies to how humans conceptualize spatial relations and use language to express those conceptualizations.

3. Topological extension. This strategy involves the notion that the principles of Euclidean geometry do not hold at the level of conceptual structure (Talmy 1988, 2000). Conceptualized space and spatial relations are not held to be metric notions of fixed distance, amount, size, contour, angle, and so on. Rather, conceptualized space and

of conceptual organization that *precede* and *follow* differ from the prepositions *before* and *after* . . . [Verbs] specifically track [a process] through time . . . A preposition can thus be characterized as profiling an atemporal relation that incorporates a salient landmark (1992:292).

<sup>18</sup> Unless the world being discussed is explicitly designated as science fiction.

spatial relations are topological in nature, that is they 'involve relativistic relationships rather than absolutely fixed quantities' (2000:170). Thus, a TR-LM configuration can be distorted conceptually, as long as the relation denoted by the protoscene remains constant. In applying this principle to prepositions, we argue that *over* denotes a relation in which the TR is above but within reach of the LM. This functional relationship has sometimes been referred to as the TR/LM being conceptualized as in each other's SPHERE OF INFLUENCE (Dewell 1994). The principle of topological extension allows us to account for examples in which, on first analysis at least, this relation does not appear to hold, e.g. *The plane flew over the city* (the plane is a considerable distance above the city, yet is being conceptualized as within potential reach).

**3.5. ON-LINE MEANING CONSTRUCTION.** How might on-line meaning construction apply to the protoscene (or indeed any distinct sense) to produce a contextualized interpretation of a preposition? To illustrate this process, we will consider the path sense posited by Lakoff (1987) and Kreitzer (1997). Lakoff termed this the above-across sense, while Kreitzer called it *over*<sub>2</sub>. Both Lakoff and Kreitzer sought to capture the intuition that *over* could be employed to designate a trajectory followed by a TR in which it moves from a position on one side of a LM so that it comes to be on the other side, as in 18.

(18) The cat jumped over the wall.

Crucially, they suggested that *over* codes the trajectory or path as a distinct sense instantiated in semantic memory. Following the methodology previously suggested for determining whether a sense is distinct or not, we posit that in sentences such as 18 the interpretation that the TR follows a particular trajectory described by 'above and across' can be inferred from context. Based on this methodology, *over* does not have a distinct above-across path sense associated with it.

The case for attributing an above-across sense to *over* in examples such as 18 relies on implied reasoning which runs as follows: (1) a spatial scene is conceptualized in which a cat starts from a position on one side of the wall and comes to be in a position on the other side; (2) there is nothing in the sentence, other than *over*, which indicates the trajectory followed by the cat; (3) therefore, *over* must prompt for an above-and-across trajectory. But this conclusion is a non sequitur. Simply because a trajectory is not prompted for by specific linguistic forms (formal expression) does not entail that such information is absent. To reach this conclusion is to assume that the lack of formal expression coding trajectory information implicates a lack of trajectory information per se. On this view, all elements that are salient in the interpretation of a scene must be coded linguistically.

We offer an alternative account that argues that the meaning assigned to any utterance is radically underdetermined by the lexical items and the grammatical structures in which they occur. That is, sentential interpretation is largely the result of various cognitive/inferential processes and accessing appropriate world knowledge. Consider the conceptualizations prompted for by the sentence in 18 and contrast this with 19.

(19) The tree branch extended over the wall.

Lakoff's full-specification account for *over* would argue that 18 and 19 represent two different senses of *over*. For 19 he assumes that *over* has a meaning that can be paraphrased as 'above' while in 18 *over* has a meaning, as already intimated, of 'above and across'. The implied reasoning for adducing that *over* in 19 is associated with a static 'higher than' sense runs as follows: in the interpretation prompted for by 19, (1) no motion is involved hence there is no trajectory; (2) the branch is located above the

wall; and (3) the only element that indicates the location of the branch in relation to the wall is the word *over*; hence, (4) *over* must have an above sense.

We suggest that it's wrong to conclude that exx. 18 and 19 represent two distinct senses. Rather than representing prepositions as carrying detailed information about each scene being described, we argue that they prompt for schematic conceptualizations (a protoscene and other distinct senses instantiated in semantic memory) that are interpreted within the particular contexts in which they occur. Under our analysis, a path (or its absence) is typically prompted for by the verb as it relates to other words in the sentence.<sup>19</sup>

In 18, the verb *jumped* does prompt for a conceptualization involving motion, which entails a trajectory. Hence, the interpretation of the above-across trajectory of the movement in 18 is not prompted for by *over* (i.e. the concept of the TR in motion is not a semantic attribute of the protoscene, nor for any of the other distinct senses associated with *over*), but rather arises from the integration of linguistic prompts at the conceptual level. Most of the information required to integrate the linguistic prompts and construct a mental conceptualization of the spatial scene is filled in by inferencing and real-world or encyclopedic knowledge. In turn, this knowledge constrains the possible interpretations that *over* can have in this particular sentence. In the interpretation of 18, encyclopedic knowledge (as adduced in part by the inferencing strategy pertaining to real-world force dynamics) includes (at the very least): (1) our understanding of the action of jumping, and in particular our knowledge of the kind of jumping cats are likely to engage in (that is, not straight up in the air as on a trampoline and not from a bungee cord suspended from a tree branch extending above the wall); (2) our knowledge of cats (for instance, that they cannot physically hover in the air the way a hummingbird can); (3) our knowledge of the nature of walls (that they provide vertical, impenetrable obstacles to forward motion along a path); and (4) our knowledge of force dynamics such as gravity (which tells us that a cat cannot remain in midair indefinitely and that if the cat jumped from the ground such that the trajectory of its path at the point matches the relation described by *over the wall*, then it would have to come to rest beyond the wall, providing an arc trajectory). Thus, we argue that the interpretation regarding the above-across interpretation of the trajectory in sentence 18 is not prompted for by *over*, but rather arises from the integration of linguistic prompts at the conceptual level, in a way that is maximally coherent with and contingent on our real-world interactions.

We further suggest that part of the general understanding of this particular sentence involves the interpretation of *the wall* as an obstacle which *the cat* is attempting to overcome. There is an important conceptual connection between the TR, *the cat*, and the LM, *the wall*, that is, *the cat* and *the wall* are within each other's sphere of influence. Given this particular context and the functional element we have assigned the protoscene, the salient point is that the cat jumped high enough to overcome the obstacle. The exact metric details of a spatial relation in a specific spatial scene are filled in by application of inferencing strategies. These allow us to construct a likely interpretation,

<sup>19</sup> In sentence 19 the lack of motion is the result of integrating what is coded by the verb *extended* with our knowledge of trees. In particular, the interpretation of lack of motion depicted by 19 is the result of the interpretation of *extended* as it relates to a tree branch. We understand trees to be slow-growing plants such that humans do not perceive the growth of a branch as involving motion. Thus, we interpret *extended* to depict a state. Notice that the stative interpretation of *extended* is contingent upon the precise sentential context in which it occurs. *Extended* can also be interpreted to convey motion as in *He extended his arm towards the door*. Since there is no sense of motion prompted for by the verb in the sentential context provided in 19, no path or trajectory is projected for the TR.

based largely on knowledge gained from recurring daily interactions with our environment. To make this point more concrete, reconsider Fig. 5, which offers an approximate depiction of the complex conceptualization constructed in the interpretation of 18.

In Fig. 5, the various positions occupied by the TR, *the cat*, along its trajectory are represented by the three spheres labeled A, B, and C. Notice that only point B—the point at which the cat is higher than but in potential reach of the wall—is explicitly mentioned in the sentence (i.e. this point in the trajectory is explicitly prompted for by the occurrence of *over*). Points A and C are inferred from what we know about jumping, cats, and walls. The verb *jumped* codes self-propelled motion using a solid surface to push off from, thus, point A is implied as the initial point of the trajectory. The prompts are integrated in such a way that the trajectory initiated by the verb *jump* intersects with point B. Our knowledge of real-world force dynamics fills in position C. Put another way, if a cat begins at point A and passes through point B, then given our knowledge of gravity and the kind of jumping cats are able to do, point C is entailed.

Many spatial relationships exist between the TR and the LM in the complex conceptualization represented diagrammatically in Fig. 5; thus, the speaker has many choices of which relationship between the TR and LM to mention. For instance, at both points A and C, the cat is beside the wall. The cat could also be described as jumping near the wall. But, none of these choices provides a sufficient cue for the construction of the relevant conceptualization that the cat jumped such that at one point in its trajectory it was higher than, but crucially within the sphere of influence of the wall. Alternative prepositions fail to prompt for the key spatial configuration that prompts the listener to construct the complex conceptualization represented in Fig. 5. Given the conceptualization the speaker wishes to convey, the speaker chooses from the closed class of English prepositions the one that best fits the relevant conceptual spatial relation between the TR and LM at one point in the cat's trajectory, which will, in turn, prompt the appropriate entailments or inferences. This inferencing strategy is the notion of best fit. Accordingly, we reiterate that a serious flaw in both the full- and partial-specification approaches is that neither fully distinguishes between formal expression in language, which represents certain information, and patterns of conceptualization, which integrate information prompted for by other linguistic elements of the sentence. *Over* does not itself prompt for an above-across sense, that is, for a path. We hypothesize that all path or trajectory information in the examples discussed results from conceptual integration of linguistic and other prompts, following the notion of best fit, which determines that the relation designated by the protoscene (and indeed other distinct senses), will not precisely capture a dynamic real-world spatial relation, which is constantly changing, but will provide a sufficient cue for conceptualization.

In order to illustrate the strategy of topological extension, we offer ex. 20.

(20) There are a few stray marks just above the line.

Ex. 20 provides, on first inspection at least, a counterexample to the spatial configuration we proposed for the protoscene associated with *over* when it designates a spatial relation in which the TR is above but crucially within potential contact with the LM. On this view then, we would expect *over*, and not *above* to be employed in sentences such as 20, as this example is describing a spatial scene in which the TR, *a few stray marks*, is physically proximal to the LM, *the line*.

However, the inferencing strategy of topological extension places less significance on the absolute metric distance between the TR and LM than on the functional element associated with a particular sense. That is, the metric distance between the TR-LM can

be extended or contracted if the functional element holds; in the case of *over* the TR and LM are understood as being within each other's sphere of influence. Although *the few stray marks*, the TR, are metrically proximal to *the line*, the LM, there is no contact and no potential for contact between them. The stray marks are distinct from the line and the LM is not within the sphere of influence of the TR. On the basis of sentences such as *She walked above the bridge*, in which no contact between the TR and LM is possible, we hypothesize that the functional element of the protoscene for *above* places the focus on the notion of nonbridgeable distance between the LM and TR. Thus, the relation in 14b is best designated by *above*. This analysis is supported if we attempt to use *over* in place of *above*, as in *There are a few stray marks over the line*, which presents the ambiguous interpretation that the marks are in contact with the line and potentially obscuring parts of it. This interpretation arises from the covering sense, which we will address later.

Grice (1975) noted with his MAXIM OF MANNER that in everyday conversation speakers generally try to avoid ambiguity, unless there is a purpose for the ambiguity. To avoid possible ambiguity, the inferencing strategy of attempting best fit in the choice of lexical item suggests that the speaker will choose the protoscene (or particular sense) that best facilitates conceptualization of the scene he or she intends the listener to construct. In light of the strategies of topological extension and best fit, we argue that *above* is the most felicitous choice to prompt for the complex conceptualization that involves an LM (*a line*) and TR (*stray marks*) that is higher than and not in contact with the LM, as attested by 20.<sup>20</sup>

**3.6. PRAGMATIC STRENGTHENING.** Earlier we presented a method for establishing when a sense is distinct and hence putatively instantiated in semantic memory. Given our assumption that the distinct senses associated with a particular preposition are related to one another in a principled way, one of our purposes is to understand both how and why new senses associated with a particular preposition came to be derived. Since what are now conventionalized senses at one time did not exist, we seek to explain how they are related to the protoscene. Our hypothesis is that all the senses associated with the preposition *over* were at one time derived from the protoscene or from a sense that can be traced back to the protoscene for each individual preposition.<sup>21</sup>

Grady (1997) has shown in detail that tight correlations in experience can lead to

<sup>20</sup> We hasten to acknowledge that there are contexts in which two prepositions appear to be interchangeable and virtually synonymous: *Susan hung the picture over the mantel* versus *Susan hung the picture above the mantel*. We hypothesize that such substitutability arises because the semantic networks associated with each preposition represent continuums and at certain points the interpretations of two continuums can overlap. In addition, for *over* and *above* we find a close diachronic relationship, with *over* initially being used as the comparative form of *above*. The diachronic link may surface in these overlapping uses.

<sup>21</sup> In terms of synchronic polysemy networks, the empirical work by Sandra, Rice, and their colleagues, suggests that it may not be the case that a particular lexical form has a single primary sense from which language users perceive all other senses being derived. Their empirical work raises questions about the view that we can define polysemy as a strictly synchronic phenomenon in which speakers are consciously aware of a relationship holding between distinct senses of a particular lexical form. This is an empirical question for which we do not yet have sufficient evidence to determine the answer. If extensive experimental evidence shows that language users systematically and consistently fail to perceive some senses as being related, then we must question whether what we term polysemy constitutes a phenomenon that is wholly synchronic in nature. While we believe all the senses in a particular semantic network are diachronically (and perhaps developmentally) related, in terms of the adult lexicon, there may be differences in the perceived relatedness between distinct sets of senses, due to routinization and entrenchment, obscuring the original motivation for the derivation of senses from preexisting senses such as the protosense for language users (see Rice et al. 1999, in particular).

conceptual associations between two quite distinct and otherwise unrelated concepts. For instance, on a daily basis we experience recurring correlations between quantity and vertical elevation. When a liquid is added to a container or when more objects are added to a pile, an increase in quantity correlates with an increase in height. Grady has suggested that correlations of this kind result in lexical items relating to vertical elevation developing a conventional reading in which they denote quantity, as in sentences such as *The prices have gone up*, where *gone up* refers not literally to an increase in vertical elevation, but rather to a quantificational increase.

A number of scholars who have investigated the meaning extension of lexical items have observed that inferences deriving from experience (analogous to the situation just discussed) can, through continued usage, come to be conventionally associated with the lexical form identified with the implicature (see e.g. Bybee et al. 1994, Evans 2000, Hopper & Traugott 1993, Fleischman 1999, Svorou 1993, Traugott 1989). Following Traugott, we term this process PRAGMATIC STRENGTHENING, and it results in the association of a new meaning component with a particular lexical form through the continued use of the form in particular contexts in which the implicature results. New senses derive from the conventionalization of implicatures through routinization and the entrenchment of usage patterns.

Recurring implicatures that come to be conventionalized can result either from independently motivated experiential correlations (as with quantity and vertical elevation) or from construing a spatial scene in a certain way, that is, from a new vantage point (Examples of each of these will be presented in §4.)

Prepositions can also be employed to express figure-ground relations between non-physical elements. In a sentence such as *A feeling of dread hung over the crowd*, the TR, *dread*, is an emotion rather than a physical entity. We argue that this use is possible because *over* conveys a specific relationship between an emotion, the TR, and the crowd, the LM; one in which the crowd is being affected by, or within the sphere of influence of, the feeling of dread. Being within the sphere of influence of a physical TR means the LM can potentially be affected by the TR as in *Rain clouds hung over the city all week*. In *A feeling of dread hung over the crowd*, the TR is not physically located higher than the LM, but because *over* has the functional notion of a sphere of influence associated with it, *over* can be employed to designate relations between nonphysical entities.

**3.7. THE CONCEPTUAL SIGNIFICANCE OF SYNTAX.** Our model takes the view that formal aspects of language, such as syntactic configurations have conceptual significance. As syntax is meaningful, in principle in the same way as lexical items, it follows that differences in syntactic form reflect a distinction in meaning (Lakoff 1987, Langacker 1987, 1991a, 1991b, Sweetser 1990, Talmy 1988, 2000). We are using the generic term preposition to describe the linguistic forms we are studying. But this term subsumes a number of formal distinctions characterized by prepositions, verb-particle constructions (or phrasal verbs), adpreps—which are adverbial in nature, and do not overtly code an LM, e.g. *the race is over* (discussed in §4), and particle prefixes (bound spatial particles as in *overflow*, *overhead*, and so on).<sup>22</sup>

<sup>22</sup> In formal terms, the particle in a VPC is a more grammaticized preposition in that the LM is linguistically covert, that is, it is contextually understood without being linguistically coded (Lindner 1981, O'Dowd 1998). Such particles form part of a verb-particle construction with a verbal element, and each unit (the particle and the verb) contributes to the meaning of the whole unit (see Goldberg 1995 for a construction grammar approach, Morgan 1997 for a study of verb-particle constructions). We introduce the term adprep to describe a spatial particle which has adverbial meaning, that is, certain usages of the form *over* are adverbial in nature, describing an aspect of a conceptual process, *the movie is over* (= finished). Each formal component: preposition, particle (in a VPC), particle prefix, or adprep, contributes different kinds of meaning.

#### 4. BEYOND THE PROTO SCENE: ADDITIONAL SENSES IN THE SEMANTIC NETWORK.

Our methodology for determining distinct senses points to the conclusion that in addition to the protoscene a number of senses must be instantiated in semantic memory (contra Ruhl's monosemy framework (1989)).<sup>23</sup> For instance, we see no direct way of deriving the interpretation of completion normally assigned to *over* in the sentence *The movie is over* (= finished), suggesting that such an interpretation is due to a distinct completion sense associated with *over* being stored in long-term memory. We now turn to a consideration of the distinct senses, other than the protoscene conventionally associated with the preposition *over*.

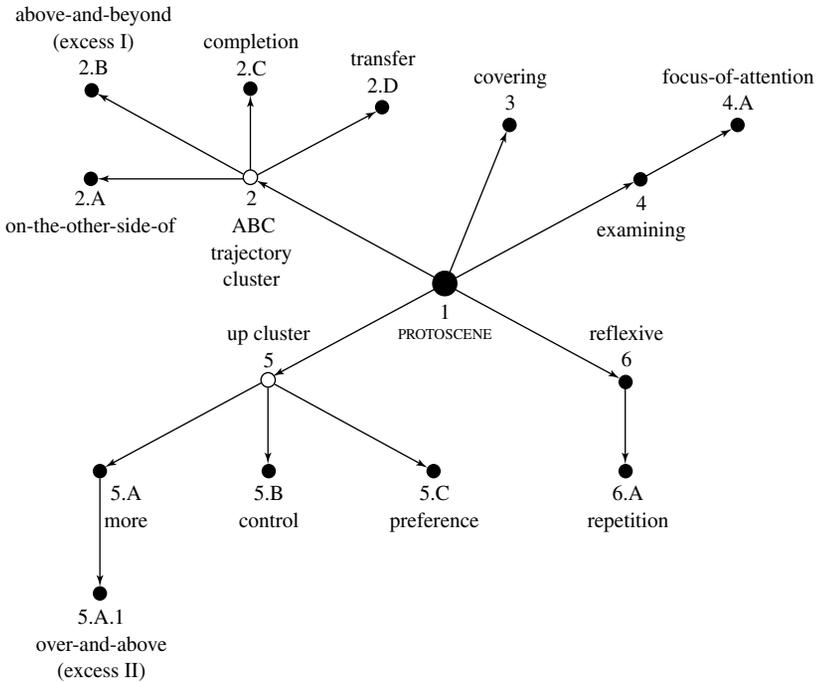


FIGURE 6. Semantic network for *over*.

Figure 6 is a preview of the remainder of this paper; it represents our proposed semantic network for *over*, subsuming a total of fourteen distinct senses, including the protoscene. Each distinct sense is shown as a dark sphere, which represents a node in the network; the protoscene occupies a central position indicating its status as the primary sense. In some instances our representation of the semantic network depicts a distinct, conventionalized sense arising from the conceptualization prompted for by another conventionalized sense, rather than directly from the protoscene. For instance, in the network represented in Fig. 6, the 'excess' sense is represented as arising from the conceptualization associated with the 'more' sense rather than directly from a conceptualization in which the protoscene of *over* occurs. Fig. 6 represents the claim that reanalysis of conceptualizations is potentially recursive and that a distinct sense can be the result of multiple instances of reanalysis. Moreover, we believe that a complex

<sup>23</sup> Recall that we are using the term SENSE for distinct meanings instantiated in memory (i.e. in the semantic network associated with each preposition).

conceptualization, such as the one represented in Fig. 5, can be submitted to multiple reanalyses and thus give rise to several distinct senses. When a complex conceptualization gives rise to multiple senses, we term the set of senses a **CLUSTER OF SENSES**. A cluster of senses is denoted in our representation of a semantic network by an open circle. A single distinct sense is represented by a shaded sphere.

**4.1. THE A-B-C TRAJECTORY CLUSTER.** The four distinct senses in the A-B-C trajectory cluster (on-the-other-side-of, above-and-beyond (excess I), completion, and transfer) all derive from reanalyses of the complex conceptualization depicted in Fig. 5, in which the verb designates point A as a starting/push-off point. All involve TRs that cannot hover and must return to ground; involve LMs construed as impediments to forward motion; and use *over* to designate the key spatial/functional configuration (i.e. the TR being higher than the LM and both being within each other's spheres of influence). This complex conceptualization, although profiling a sequentially evolving process, is subject during reanalysis to conceptualization in summary format. That is, although points B and C never exist simultaneously in the world (because a TR such as a cat could not occupy two such positions simultaneously), when such a spatial scene is conceptualized in summary format, point C can be related to point B, and hence the lexical form that prompts for point B can come, through entrenchment, to be employed to reference senses related to point C.

#### THE ON-THE-OTHER-SIDE-OF SENSE (2A)

An unavoidable consequence of the unique trajectory prompted by sentences analogous to 18 is that when the motion is complete the TR is located on the other side of the LM relative to the starting point of the trajectory. Although point C in Fig. 5 and its relation to point A are not part of the protoscene for *over* (and cannot be derived from the protoscene absent the particular properties of the verb and TR discussed above), the on-the-other-side-of sense has come to be associated with certain uses of *over* that are not derivable from context. Consider 21.

(21) Arlington is over the Potomac River from Georgetown.

Notice in this sentence that the verb, *is*, fails to indicate any sense of motion. In our model, the verb typically codes for motion and hence prompts for a trajectory. Thus, the lack of motion coded by *is*, in turn, results in failure to prompt for a trajectory. If there is no trajectory, there is no beginning or endpoint, hence, no principled way of deriving an on-the-other-side-of sense from this sentential context. Native speakers nevertheless will normally interpret this utterance such that Arlington is understood to be located on the other side of the Potomac River from Georgetown. Consequently, *over* must have a context-independent on-the-other-side-of sense associated with it. Accordingly, the two criteria for establishing that a sense is distinct have been met. The on-the-other-side-of sense adds meaning not apparent in the protoscene and the use in 21 is context-independent.

We hypothesize that this distinct sense came to be instantiated in memory as a result of reanalysis of the complex conceptualization represented in Fig. 5, specifically, the privileging of the consequence of the jump—that the TR ends up on the other side of the LM. In addition, this conceptualization involves a shift in vantage point from being offstage (Langacker 1992) to being in the vicinity of point A. The default vantage point specified in the protoscene for *over*, Fig. 4, is offstage. Previously, we noted that spatial scenes could be viewed from a number of possible vantage points, and these different vantage points could give rise to different construals of the same scene.



FIGURE 7. On-the-other-side-of sense.

The on-the-other-side-of sense is illustrated in Figure 7. The eye icon on the left represents the vantage point, the vertical line the impediment and the dark sphere the TR.

Further evidence for this sense comes from examples like 22.

(22) Arlington is just over the river.

The sentence in 22 is felicitous only if the construer (the vantage point) is located in vicinity of point A (in Fig. 5) and Arlington is construed as point C. Thus, the reanalysis of *over* which results in the on-the-other-side-of sense involves two changes vis-à-vis the protoscene—the privileging of point C and interpreting it as the point at which the TR is located, and a shift in vantage point such that the construer is located in the vicinity of point A. While the on-the-other-side-of component (point C in Fig. 5) is correlated in experiential terms with arc-shaped trajectories and jumping *over* (i.e. higher than) obstacles by TRs such as cats, without the shift in vantage point this experiential correlation cannot be construed. We hypothesize that through the use of *over* in contexts where on-the-other-side-of is implicated, this meaning has come to be conventionally associated with *over* as a distinct sense, a process we term pragmatic strengthening.

The on-the-other-side-of sense is highly productive in English, as attested by the examples below. Notice that in neither of the following do we conventionally obtain the reading in which the TR is physically higher than the LM or that jumping or moving is involved.<sup>24</sup>

(23) The old town lies over the bridge.

(24) John lives over the hill.

Moreover, examples such as 24, which have been described as having ENDPOINT FOCUS, are reminiscent of the examples offered in Lakoff's (1987:423) analysis for *over*, as evidence for an above-across sense.<sup>25</sup> We suggest that misanalysis of the on-the-other-side-of sense contributed to a path above-across sense being posited by earlier analyses.<sup>26</sup>

<sup>24</sup> It is worth pointing out that sentences such as 21–25 offer strong evidence against a monosemy theory of word meaning. Monosemy (see Ruhl 1989), as noted previously, posits that all interpretations of a linguistic form, such as a preposition, are contextually derivable from a highly abstract primary sense. However, as can be seen from the on-the-other-side-of sense, neither of the original aspects of the spatial configuration hold—the TR is not above the LM and the TR is not proximal to the LM. The nature of a primary sense that would derive both these senses simply from contextual cues would need to be extremely abstract. We cannot see how a representation so abstract would also be constrained enough to distinguish among many other English prepositions.

<sup>25</sup> Lakoff (1987:422–23) represents sentences such as *Sam lives over the hill* as an example of schema 1.VX.C.E. (above-across, with a vertical, extended LM, contact between the TR and LM, and end point focus).

<sup>26</sup> There is arguably a distinct sense which is derived from the on-the-other-side of sense. In examples such as

- (i) The festival will take place over the weekend.
- (ii) The friendship remained strong over the years.
- (iii) Let's take a look at changes over time.

*over* mediates a temporal relation of concurrence between a process or activity and the times during which

## THE ABOVE-AND-BEYOND (EXCESS I) SENSE (2B)

In 25 and 26 *over* is used as predicted by the protoscene but with the additional implicatures that the LM represents an intended goal or target and that the TR moved beyond the intended or desired point.

(25) The arrow flew over the target and landed in the woods.

(26) Lissa just tapped the golf ball, but, it still rolled over the cup.

Given general knowledge of shooting arrows and targets, most speakers would assume that whoever shot the arrow intended to hit the target but aimed too high. The movement of the arrow, the TR, was above and beyond the LM, or in excess of what the agent intended. Similarly, given general knowledge of the game of golf and the goals of people who engage in the game, most speakers would assume that the agent (*Lissa*) intended that the movement of the ball (the TR), which she initiated with a tap, would result in the ball going into the cup, the LM. Thus the movement of the ball was above and beyond, or in excess of, what the agent intended.

The basic spatial configuration and trajectory followed by the TR is identical to that associated with the protoscene in the context of a verb depicting forward motion. But in sentences such as *The cat jumped over the wall*, the TR's movement beyond the LM is presumed to be intentional, while in sentences such as 25 and 26 the LM is construed as the target or goal and the presumed intention is to have the TR come into contact with the target. When the TR misses the target, it goes above and beyond the LM. Going above and beyond the target is conceptualized as going too far or involving too much. The implicatures of (1) the LM being construed as the target/goal and (2) the TR passing *over* the LM as going beyond the target/goal have been reanalyzed, resulting in a distinct sense being added to the semantic network. Evidence for this sense being distinct comes from sentences such as 27, in which the sense cannot be derived from context.

(27) Your article is over the page limit.

In this sentence, *over* cannot felicitously be interpreted as physically higher than, or even on-the-other-side-of. Rather, the interpretation seems to be that there is an established or 'targeted' number of pages for the article and that the actual number of pages 'went beyond' that target.



FIGURE 8. Above-and-beyond (excess I) sense.

Figure 8 diagrams the above-and-beyond (excess I) sense, representing the LM as a bull's-eye target and highlighting the salient 'beyond' portion of the trajectory.<sup>27</sup>

the process or activity elapses. This sense is likely to have developed from the on-the-other-side-of sense, when the physical LM is extended, as, for example, in *The boy walked over the hill*, *The cable runs over the yard*, *The bridge stretches over the river*. In such situations the activity is concurrent with the duration required for the activity. Because of pragmatic strengthening a duration sense may have become associated with *over*.

<sup>27</sup> Our analysis provides for a second source of an excess sense associated with *over*. This sense and its implication for the model are discussed later.

We emphasize that we are not claiming that the semantic network contains criterial senses: that is, we are not suggesting that all uses of *over* will absolutely reflect one sense or another. Often, specific uses of a preposition will contain flavors of more than one sense, imbuing a particular reading with complex nuances of meaning and providing both intra- and inter-hearer differences in interpretation. Equally, we are not suggesting that application of the model outlined in §3 will mechanistically provide a single, unique derivation for each distinct sense, based ultimately on the protoscene. We do not want to posit a simplicity rubric which claims that there is one correct analysis and deny that there may be many means of instantiating a distinct sense in memory. We find no strong evidence that human conceptualization and cognition is constrained by such a dictum (contra the widespread view adopted in formalist approaches to meaning in the generative tradition; for a critique of such views see Langacker 1991a: ch. 10 and the discussion of the generality fallacy in Croft 1998).

At this point we see no principled reason to rule out the possibility that an excess interpretation might arise through an alternative route, as represented in the network by the *over-and-above* (excess II) sense (5A.1). We in fact hypothesize that some speakers might derive an excess interpretation through one route while others arrive at it through the other. Still others may use both routes; the two resultant senses would then serve to inform each other in various ways. We further argue that it is inappropriate to treat this flexibility (or redundancy) as evidence that our model is flawed. Nor should an alternative analysis of the derivation of a particular sense be taken to constitute a counterexample to the overall model being posited. We see this flexibility (and redundancy) as an appropriate reflection of the richness of human cognition and the way in which experience is meaningful to us as human beings.

#### COMPLETION SENSE (2C)

When *over* is integrated into a complex conceptualization, such as described by Fig. 5, the inferred shape of the trajectory has an end point C. The end point of any trajectory (which represents the process of moving) is commonly understood as representing the completion of the process.

We suggest that the completion sense associated with *over* has arisen as a result of the implicature of completion being reanalyzed as distinct from the complex conceptualization represented in Fig. 5. Once reanalysis has taken place, the final location resulting from motion correlates with the completion of motion, the distinct sense comes to be associated with the form *over* in the semantic network via pragmatic strengthening.

(28) The cat's jump is over. [= finished/complete]

We suggest that the meaning component of completion results from reanalysis of the spatial location of the TR as standing for an aspect of a process. In 28, for example, the end point of the motion through space over an impediment (i.e. the location at which the TR comes to rest) is interpreted as the completion of the movement. In this instance the completion sense is not describing a spatial relation but rather an aspect of a process. This is reflected syntactically by the fact that the completion sense does not mediate a TR-LM configuration in which the preposition is sequenced between the TR and the LM, as illustrated by example 28. The completion sense, in formal terms, is represented not by a preposition but rather by what we are terming an ADPREP (Bolinger 1971, O'Dowd 1998).<sup>28</sup>

<sup>28</sup> This is consistent with Langacker (1992) who argues that '[a]n expression's grammatical class is determined by the nature of its profile' (1992:279). The relationship profiled by adverbs crucially differs from the relationship profiled by prepositions in that an adverb takes a relationship as its TR and does not have a salient LM. In contrast, a preposition takes an entity as its TR and elaborates a relational LM.

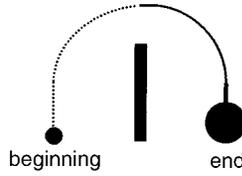


FIGURE 9. Completion sense.

The completion sense differs crucially from the on-the-other-side-of sense in that the latter focuses on the spatial location of the TR when the process is completed (see Fig. 9) while the former focuses on interpreting point C as the end of the motion or process. We tentatively hypothesize that an adprep will always arise when the reanalysis involves interpreting the location of the TR as an aspect of a process.

Figure 9 diagrams the completion sense. The dark sphere on the left represents the location of the TR at the beginning of the process. The large sphere on the right, which is in focus, represents the endpoint or completion.

THE TRANSFER SENSE (2D)

A consequence of the conceptualization represented in Fig. 5 gives rise to the transfer sense. Consider the following examples.

- (29) Sally turned the keys to the office over to the janitor.
- (30) The teller handed the money over to the investigating officer.

In these sentences, the conceptualization constructed is of a TR moving from one point to another. This follows from the conceptualization schematized in Fig. 5, in which an implicature of transfer arises, a consequence of understanding the scene as one involving the transfer of a TR from one location, point A, to a new location, point C (see Fig. 10). We suggest that change in location of an entity is experientially correlated with

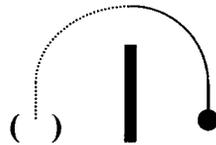


FIGURE 10. Transfer sense.

transfer of the entity; change in position often gives rise to the implicature that transfer has taken place. Via pragmatic strengthening, this implicature is conventionalized as a distinct meaning component and instantiated in the semantic network associated with *over* as a distinct sense. As with the completion sense, the transfer sense involves the reanalysis of the trajectory or process. Again, in formal terms, *over* is represented not by a preposition but by an adprep. In Fig. 10, the TR has been transferred from the left side of the impediment to the right side, as represented by the dark sphere, which is in focus.<sup>29</sup>

<sup>29</sup> Nonphysical entities can be identified as TRs or LMs, if they are construed as focal and backgrounded respectively, and if a relation holds between them. As *over* has a conventionalized transfer sense associated with it, the relation between nonphysical TRs and LMs cannot be spatio-configurational, but as in *The government handed its power over to the newly elected officials*, it can involve the notion of transfer. This further illustrates that transfer must be a distinct sense; it could not be derived from context in such sentences. There is a conventional reading in which the members of the government transfer their authority, i.e. their

**4.2. THE COVERING SENSE (3).** In our basic definition of TR and LM we noted that the typical situation is for the TR to be smaller than the LM, when the TR and LM are physical entities (although as we have seen, it is not inevitable that such is the case). All the senses and interpretations examined thus far have assumed that the TR is smaller than the LM. This default ascription is also represented in the protoscene we posited for *over*. However, there are instances in the real world in which the object that is in focus (the TR) is larger or perceived to be larger than the locating object (the LM). Such a situation is described by the sentence in 31.

(31) Frank quickly put the tablecloth over the table.

Given our normal interactions with tables and tablecloths—we sit at tables or walk past them such that both the table and the tablecloth are lower than our line of vision—it follows that our typical vantage point is such that when a tablecloth is over the table we perceive it as covering the table. This being so, the vantage point is not that depicted in the default representation of the protoscene, in which the viewer/construer is offstage. Rather the vantage point has shifted so that the TR is between the LM and the construer or viewer. The perceptual effect of having the TR physically intervene between the viewer and the LM is that the TR will often appear to cover the LM or some significant portion of it.<sup>30</sup>

In accordance with the position outlined previously—that spatial scenes can be viewed from different vantage points—the covering interpretation results from having a particular vantage point from which the situation is construed. When a shift in vantage point occurs, the conceptualization constructed is likely to involve an additional implicature not part of the interpretation when the default vantage of the protoscene is assumed. In sum, we are arguing that the conceptualization constructed in the normal interpretation of 31 involves two changes from the default representation of the protoscene: first, the TR is perceived as being larger than the LM and second, the vantage point has shifted from offstage to higher than the TR.<sup>31</sup>

mandate to govern, to a new set of officials. In literal terms, nothing is physically transferred, as the TR, *power*, is a nonphysical entity. Nonetheless, to say that power is a nonphysical entity is not to say that the concept power is without foundation in real-world experiences. In fact, the concept of power derives from a variety of very real experiences; physical forces, socially constructed relationships and hierarchies, and social interactions such as taking, issuing and following orders, commands, edicts, and so on. In this sense, we each experience power in a real way, although the variety of experiences subsumed by the concept of power does not have physical substance or spatial dimensionality in the same way that a chair or a table has. Accordingly, it makes sense that power can be transferred, thus licensing the use of the transfer sense.

<sup>30</sup> Again, following our argument that metric properties concerning the relationship between the TR and LM are filled in on-line, *over* can be used to prompt for this covering interpretation when there is contact between the LM and TR, as in 31, or when there is no contact between the TR and the LM as in *The fiberglass protector was put over the drained swimming pool for the winter*.

<sup>31</sup> These two changes are closely intertwined in everyday experience. We are often involved in real-world scenarios where the TR is physically larger than the LM and we normally view the TR-LM from above, as in *The cloth is over the table*. In this real-world scene, if the TR were smaller than the LM, the preposition of choice (best fit) would be likely to change:

- (i) ?The small handkerchief was spread out over the table.
- (ii) The small handkerchief was spread out on the table.

However, there are also many real-world scenarios in which the TR is actually smaller than the LM but because of the construer's vantage point (the TR intervenes between the viewer and the LM), the TR appears larger than the LM. For instance, in *The thick, dark clouds moved over the sun*, the clouds are not physically larger than the sun, but they appear larger to the earth-bound viewer.



FIGURE 11. Covering sense.

(Eye icon = vantage point; elongated sphere = TR; horizontal bar = LM)

The covering implicature has been reanalyzed as distinct from the spatial configuration designated by the protoscene (see Fig. 11). As noted with examples 10 and 11, when *over* prompts for a covering sense, the TR need not be construed as being located higher than the LM; hence, the covering sense must exist independently in semantic memory.<sup>32</sup>

**4.3. ABOVE AND PROXIMAL THE EXAMINING SENSE (4).** As noted earlier, any spatial scene can be viewed from a variety of vantage points. The construal that gives rise to the examining sense is the result of a shift from the default (i.e. offstage) vantage point. In particular, we argue that in the scene associated with the examining sense, the vantage point is that of the TR, and further that the TR's line of vision is directed at the LM.

How might this construal arise? Consider the following sentence:

(32) Phyllis is standing over the entrance to the underground chamber.

Here *over* is being used as designated in the protoscene and is mediating a spatial

<sup>32</sup> Lakoff (1987:429) accounted for cases of the covering reading in which the TR is not higher than the LM by positing a ROTATION TRANSFORMATION. 'The covering schemas all have variants in which the TR need not be above (that is, higher than) the LM. In all cases, however, there must be an understood viewpoint from which the TR is blocking accessibility of vision to at least some part of the LM . . . We will refer to these as *rotated* (RO) schemas, though with no suggestion that there is actual mental rotation degree-by-degree involved'. This is an extremely powerful transformation, potentially affecting all prepositions whose primary sense involves either a vertical or horizontal orientation. In a number of instances, the protoscenes for *over*, *under*, *before*, and *after* would be essentially indistinguishable. And this analysis offers no explanation for why TR-LM configurations that do not match the protoscene would develop this reading.

A common consequence of the LM being covered by the TR is that the LM is occluded from the construer's view. Typically the scene described in 31 is that the tablecloth occludes the tabletop from the observer. As we see in examples such as the following, occlusion is not an inevitable consequence of covering.

- (i) The mask is over her face.
- (ii) She wore a transparent veil over her face.
- (iii) The dark, heavy clouds are over the sun.
- (iv) There are a few wispy clouds over the sun.

In sentences (i) and (iii) a consequence of the LM being covered by the TR is that the LM is no longer visible. In (ii) and (iv), however, covering does not obscure the object. We have not been able to find any instances of occluding (which involve the use of *over*) that do not include a covering sense. Further, in the examples in which we can tease apart covering from occluding, the physical attribute of transparency/opacity of the TR must be specified. If the TR is not specified as transparent, the normal reading is that covering entails occlusion. Thus, we have concluded that the occlusion interpretation is a contextual implicature of the covering sense and real-world knowledge of the properties of objects such as tablecloths and blankets. Given the absence of contextually independent examples of occlusion—linguistic examples of *over* in which occlusion is not an implicature deriving from covering—our methodological procedure suggests that an occluding reading is an on-line interpretation.

relation between the TR, *Phyllis*, and the LM, *the entrance to the underground chamber*, in which the TR is higher than but proximal to the LM. A consequence of Phyllis's being in this physical relation to the entrance is that she is in a position to carefully observe the entrance. An important way of experiencing and therefore understanding the act of examining is in terms of the examiner being physically higher than but proximal to the object being examined. Many recurring everyday examples of looking carefully at objects involve the human eyes being higher than the object being scrutinized, for example, examining tools, jewelry, a written text, or wounds on the body. Further, if an object is not proximal to the viewer, it is generally not possible to see the object clearly and therefore not possible to examine the object thoroughly. The experiential correlation between proximity and potential thoroughness is reflected in sentences such as 33 and 34.

(33) I'll give the document a close examination.

(34) I'll give the manuscript a close read.

Two experiential correlates of examining are the viewer being located above the LM and in proximity to the LM. Further, the functional aspect associated with the protoscene is that there is a conceptual connectedness between the TR and LM, i.e. the notion of sphere of influence. In this case, the connection is construed as that between the examiner and the examined. Because the protoscene for *over* contains these elements—a TR higher than an LM, proximity between the TR and LM, and a conceptual connectedness between the TR and LM—which match the physical correlates necessary for examination, *over* is a likely candidate for developing an examining sense.

But this is not the entire story. Notice that the use of *over* in 32 does not prompt for the interpretation that Phyllis is examining the entrance, only that she is located such that she could examine it. For the examining sense to arise, the scene must contextually imply examination. Put another way, examination must be an implicature deriving from the particular linguistic prompts in a given sentence. Consider 35:

(35) Mary looked over the manuscript quite carefully.

The normal interpretation of this sentence is something like 'Mary examined the manuscript'. In this sentence, the TR, *Mary*, is physically higher than and in proximity to the LM, *the manuscript*. Thus, the TR and the LM are in the spatial configuration associated with the protoscene for *over*. In addition, the TR is construed as directing attention toward the manuscript. (This construal arises from our knowledge of the act of looking (it involves looking at something) and our knowledge of humans (often when they are looking, it is for some purpose).)

This additional meaning element of directing attention towards the LM is essential to the examining sense (see Fig. 12). Now consider sentence 36.



FIGURE 12. Examining sense.

(36) The mechanic looked over the train's undercarriage.

The normal reading is that the mechanic examined the train's undercarriage, but for

such examination to occur, *the mechanic*, the TR, must be physically underneath the train. In other words, in this conceptualization, the TR is UNDER the LM. Clearly, in this situation, there is no way of predicting that *over* has associated with it an examination reading, given that the TR-LM spatial configuration does not correspond with that normally associated with *over*, the very configuration that motivated the implicature of examination in the first place. This is good evidence, therefore, that the contextual implicature of examination has been instantiated as a distinct sense in the network via pragmatic strengthening. Hence, examination results from construing a scene in a particular way. This being so, speakers are free to use this examination meaning component in the absence of the TR-LM configuration which gave rise to the implicature of examination initially.

THE FOCUS-OF-ATTENTION SENSE (4A)

Sentences 37 and 38 illustrate what we call the focus-of-attention sense. Notice that in 37 *over* can be paraphrased by *about*.

- (37) The little boy cried over his broken toy.  
 (cf. The little boy cried about his broken toy.)  
 (38) The senator presided over the opening ceremonies.

In 37 and 38 the LM is the focus of attention. This sense is closely related to the examining sense from which it derives. In the examining sense, the vantage point is that of the TR, while the LM is physically below and proximal to the TR. We further posited that the TR must be construed as directing attention toward the LM. A natural consequence of the examining sense is that the object being examined, the LM, is the focus of the TR's attention. This natural consequence of examining has been privileged and reanalyzed as distinct from the spatial scene in which it originally occurred (see



FIGURE 13. Focus-of-attention sense.

Fig. 13), and via pragmatic strengthening, conventionalized as a distinct sense. (Fig. 13 differs minimally from Fig. 12; here the LM is in focus.)

Once this sense has been instantiated in memory, nonphysical TRs and LMs can be mediated by this sense.

- (39) The committee agonized over the decision.  
 (40) The committee chair watched over the decision-making process.

**4.4. THE VERTICAL ELEVATION OR UP CLUSTER (5).** Four distinct senses fall under this cluster, as can be seen from Fig. 6 (above). Each arises from construing a TR located physically higher than the LM as being vertically elevated or up relative to the LM. Being up entails a particular construal of the scene in which upward orientation is assigned to the TR (see Fig. 14).

This construal arises frequently in real-world experiences associated with the conceptual spatial relation *over*. For instance, in order to move over and beyond many LMs, movement from a physically lower location to a physically higher location is often



FIGURE 14. Up cluster.

necessary, i.e. vertical elevation of the TR occurs. Furthermore, an upward orientation is not typically construed in a neutral way. As Clark (1973) and Lakoff and Johnson (1980) have observed, an upward orientation is meaningful in human experience. An element in a vertically elevated position is often experienced as being positive or superior to an element in a physically lower position. Notice that there is nothing in the protoscene of *over*, i.e. of a TR being higher than the LM, that entails this construal: in the scene described by *The picture is over the mantel*, the picture is not construed as being in a better or superior position vis-à-vis the mantel.

#### THE MORE SENSE (5A)

As noted in the discussion of experiential correlation, vertical elevation and quantity are correlated in our experience. When there is an addition to the original amount of a physical entity, the height or level of that entity often rises. Because *over* can be construed as relating a TR which is physically up with respect to an LM and vertical elevation correlates in experiential terms with greater quantity, an implicature associated with having more of some entity is associated with being *over*. This implicature is conventionalized (via pragmatic strengthening), as attested by ex. 41.

(41) Jerome found over forty kinds of shells on the beach.

The normal interpretation of *over* in this context is 'more than'. The LM, *forty kinds of shells*, is interpreted as a kind of standard or measurement. The TR is not actually mentioned; in interpreting the sentence, we infer that the TR is shell types forty-one and greater. If *over* were interpreted in terms of the protoscene in this sentence, we would obtain a semantically anomalous reading in which the additional shells would be understood as somehow being physically higher than the forty kinds actually mentioned in the sentence. Again, we see no direct way in which this interpretation can be constructed from the protoscene and the sentential context alone. Moreover, there is no direct correlation between the concept of more types and vertical elevation. The concept here is more variety not greater quantity of shells. We argue that the 'more' sense associated with *over* has arisen because of the independently motivated experiential correlation between greater quantity and greater elevation. Because of this experiential correlation, the implicature of greater quantity comes to be conventionally associated with *over*, (which in terms of the designation prompted by the protoscene, has a greater height meaning, and hence also implicates greater quantity).

The implicature of greater quantity or more comes to be reanalyzed as distinct from the conceptualization of the physical configuration that originally gave rise to it (see Fig. 15). Once reanalysis has taken place, the distinct sense comes to be associated with the form *over*, in the semantic network.

#### OVER-AND-ABOVE (EXCESS II) SENSE (5A.1)

The over-and-above (excess II) sense is closely related to the more sense. It adds an interpretation of 'too much' to the more construal. We believe that a likely origin for this sense is the reanalysis of scenes involving containment, such as those described in 42 and 43.



FIGURE 15. 'More' sense.

- (42) The heavy rains caused the river to flow over its banks.  
 (43) Lou kept pouring the cereal into the bowl until it spilled over and onto the counter.

In these scenarios the LMs are containers and the TRs are understood as entities held by the container. When the level of liquid or cereal (or whatever) has been placed in the container is higher than but within reach of the top of the LM, then the amount constitutes more than the container can hold. A consequence of the capacity of a container being exceeded is that more of the TR becomes an excess of the TR, which results in spillage. In sum, more of the TR, *the water*, equals a higher level of water. Too much more of the TR results in a mess (see Fig. 16).

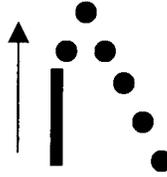


FIGURE 16. Excess sense.

This node in the semantic network represents a second potential source for the general notion of excess associated with certain uses of *over*. We see subtle but distinguishable differences between the excess I sense, which seems to us to be more closely tied to motion along a path and the interpretation of going beyond a designated point, and the excess II sense, which seems to be more closely related to exceeding the capacity of containers and exceeding what is normal. For instance, in a compound such as *overtired*, it may be that the conceptualization involved is not that an expected level of tiredness is a goal that is missed, but rather, an expected or normal capacity for tiredness has been exceeded. Consider 44.

- (44) The child was overtired and thus had difficulty falling asleep.

In our interpretation of this sentence the child is conceptualized as having a certain capacity for activity; the child is conceptualized as a container and her or his activities are conceptualized as filling the container. When the activity level reaches that capacity, the child is tired and the normal response to that tiredness is to fall asleep. If the activity level exceeds the normal capacity, the child becomes too tired, which results in irritability and difficulty going to sleep.<sup>33</sup>

<sup>33</sup> In some cases, we see no clear way to determine which source is most appropriate. As we noted in our discussion of the excess I sense, specific uses of *over* (or any preposition), seem to contain 'flavors' of more than one sense, which imbues a reading with complex nuances of meaning. For instance, consider the following:

- (i) Hey! Why are you bringing in so many cases of motor oil? There must be a dozen cases here. That's well over the two cases I ordered.

In this example we might construct a 'more' conceptualization for *over*, or we might construct an 'excess' interpretation (which provides not just a more meaning, but the additional too-much-more meaning) for *over*.

## CONTROL SENSE (5B)

A third experiential correlate associated with vertical elevation is the phenomenon of control or power. This meaning component associated with *over* is illustrated by 45 (from Lakoff 1987).

(45) She has a strange power over me.

Clearly, this sentence does not mean that the TR, *she*, is higher than but within reach of *me*, the LM. Rather, the conventional interpretation derived from such an example is that the TR exerts influence, or control over the LM (as observed earlier). This meaning could not be derived from context, and is therefore suggestive, given our methodology, that this constitutes a distinct control sense instantiated in semantic memory. How then did the control sense derive from the semantic network associated with *over*? We suggest that this sense is due to an implicature becoming conventionally associated with *over*, from an independently motivated experiential correlation between control and vertical elevation.

For most of human history, when one person has been in physical control of another person, control has been experienced as the controller being physically higher. In physical combat, the victor, or controller, is often the one who finishes standing, in the up position, the loser finishes on the ground, physically lower than the controller. Hence an important element of how we actually experience control (and presumably from where the concept itself is derived) is that of being physically higher than that which is controlled.

(46) The fight ended with John standing over Mac, his fist raised.

Further, within the physical domain, the physically bigger, up, often controls the physically smaller, down. Within the animal kingdom, a widespread signal of the acknowl-

In this latter case, the example could be derived from either the above-and-beyond (excess I) sense or the over-and-above (excess II) sense. On the one hand, *two cases* could be conceptualized as the target the customer was aiming for, and bringing in ten additional cases could be construed as going beyond the designated target. On the other hand, *two cases* could be conceptualized as the expected amount or level of goods, and the additional ten cases could be construed as going above the expected amount or level.

Alternatively, the hearer may construct a complex conceptualization in which all three senses are influencing the interpretation. This reflects our claim that there is a semantic network linking distinct senses, and that conceptualizations may be due to a semantic network constituting a meaning continuum, as discussed earlier. Accordingly, our network should be thought of as a semantic continuum, in which complex conceptualizations can draw on meanings from distinct nodes as well as the range of points between nodes, which provide nuanced semantic values. In addition, an important consequence of our claims

(1) that the principles of meaning construction in conjunction with a distinct sense such as the protoscene (or any other distinct mental representation or sense), can be used to construct a wide range of conceptualizations;

(2) that any one conceptualization is subject to multiple construals (through, for instance, privileging a particular aspect of the scene or shifting the vantage point from which the scene is viewed);

(3) that distinct senses can be extended to include nonphysical entities when such are perceived as focal (TRs) and backgrounded reference points (LMs);

(4) that semantic networks form an interrelated continuum of interpretations (rather than just a series of absolutely discrete points of meaning)

is that the model predicts that a particular sense may arise from more than one source.

In forms such as *overachieve*, *overkill*, *overdo*, and *overdress* we do not see a clear basis for arguing for the superiority of the above-and-beyond interpretation versus the over-and-above interpretation. As noted earlier, we do not consider this a flaw in our model; rather we see it as testimony to the richness and complexity of conceptualization. We also hypothesize that native speakers are likely to vary in their intuitions about these cases.

edgment of power or status is for the submissive animal to adopt a position in which its head is physically lower than the head of the dominant animal. In experiential terms then, control and vertical elevation are correlated. We suggest that because of an independently motivated experiential association between control and being vertically elevated, there is an implicature of control associated with *over*.

Nonetheless, if control were understood only in terms of vertical elevation, we would expect that the English preposition *above* should also implicate control. But as 47 demonstrates, this is not the case.

(47) #She has a strange power above me (control reading)

To exert control in order to affect the subject's actions and thus guarantee compliance, one must be physically proximal to the subject. In experiential terms, there are two elements associated with the concept control; the first is up, and the second is physical proximity. As we have argued throughout this article, while the protoscene for *over* designates a TR being physically higher and proximal to the LM there is good evidence for supposing that *above* designates that the TR will be physically higher but precludes physical proximity. In linguistic terms, we would expect *over* to develop a control reading. The linguistic usage, then, accords with how we actually experience control

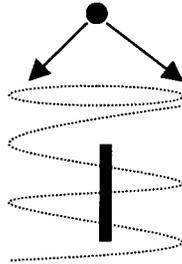


FIGURE 17. Control sense.

(see Fig. 17; in Fig. 17 the spiral shape denotes that the TR (sphere) controls the LM (vertical line)).

As we have been arguing, distinct senses, once instantiated in semantic memory, can be employed in situations that did not originally motivate them, as a consequence of being instantiated as distinct within the semantic network. Accordingly, the control sense can be employed to mediate relations between nonphysical TRs and LMs. In examples 48 and 49, either or both the TR/LM are nonphysical entities.

(48) Camilia has authority over purchasing. (= the act of deciding what will be purchased)

(49) Personality has more influence over who we marry than physical appearance.

#### THE PREFERENCE SENSE (5C)

In the preference sense, that which is higher is conventionally understood as being preferred to that which is lower.

(50) I would prefer tea over coffee.

(51) I like Beethoven over Mozart.

We suggest that the preference sense derives in the following way: being physically up in experiential terms can implicate greater quantity, which generally is preferred to a lesser quantity. In another experiential pattern being physically up is associated with

positive states such as happiness (*He's feeling up today*), while being physically down is associated with being unhappy (*I'm feeling down today*) (see Lakoff & Johnson 1980). Given that happiness is normally preferred to unhappiness, this experiential correlation results in states associated with positions of vertical elevation being preferred to those associated with a lower position. Hence, being *over* implicates a preferred state (see Fig. 18; the TR, which is higher, is to be preferred to the LM, which is hence



FIGURE 18. Preference sense.

not in focus). This implicature of preference is conventionalized, allowing a preference interpretation (rather than a higher-than reading) in examples 50 and 51.

#### 4.5. REFLEXIVITY

##### THE REFLEXIVE SENSE (6)

Spatial reflexivity (first noted by Lindner 1981) is the phenomenon whereby a single entity which occupies multiple positions is conceptualized such that two salient positions occupied by the entity are integrated into a TR-LM spatial configuration. A preposition such as *over* is then used to mediate a spatial relation between the two positions, even though the same entity cannot simultaneously occupy two distinct spatial positions in the world. The dynamic character of experience is reanalyzed as a STATIC spatial configuration. Langacker (1987) discusses this gestalt-like static conceptualization of a dynamic process as summary scanning. Consider 52.

(52) The fence fell over.

In 52, the TR—the initial (upright) position of the fence—is distinguished from the final position, in which the fence is lying horizontally on the ground. We see the fence fall through a ninety-degree arc and from this experience a conceptual spatial relation is abstracted (via summary scanning), mediating the two temporally situated locations into a single spatial configuration. In the world, no such spatial configuration exists; after all, the same fence cannot be in two locations at the same time, but by conceptualizing the fence reflexively, the same entity can be both the TR and the LM (see Fig. 19).

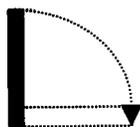


FIGURE 19. Reflexive sense.

Additional examples of the reflexive sense are given in 53 and 54.

(53) He turned the page over.

(54) The log rolled over.

This sense arises from reanalysis of a process. As noted previously, when *over* is used to profile a process, it is coded as an adprep.

## THE REPETITION SENSE (6A)

The repetition sense adds an iterative meaning component to the use of *over*, a meaning component that could not be predicted from the protoscene alone (or from any other sense considered so far). In examples 55 and 56, *over* can be paraphrased by *again* or *anew*.

- (55) After the false start, they started the race over.  
 (cf. After the false start, they started the race again/anew.)  
 (56) This keeps happening over and over.

Many native speakers have informed us that sentences such as 56 prompt for a conceptualization of a wheel or cycle, which seems to be evoked by the notion of repetition. We hypothesize that the repetition meaning component associated with *over*, may be the result of iterative application of the reflexive sense (i.e. the ninety-degree arc is repeated such that the TR passes through 360 degrees returning to its original starting point).

Such an analysis is consistent with the intuition that repetition is conceptualized as cyclical in nature (Fig. 20). An alternative derivation may be due to an iterative applica-

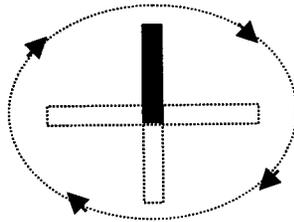


FIGURE 20. Repetition sense.

tion of the A-B-C trajectory, such that when the end point or completion of the trajectory is reached the process begins again.<sup>34</sup> A third possibility may be that the notions of completion and reflexivity are conceptually integrated forming a conceptual blend (in the sense of Fauconnier & Turner 1994, 1998). We remain agnostic about which of these routes led to the instantiation of the repetition sense in the semantic network for *over*.

**5. CONCLUSION.** Previous polysemy accounts of *over* offer analyses that are too fine-grained. These accounts fail to distinguish between coding in formal expression and a level of conceptualization that integrates linguistic prompts in a way maximally coherent with sentential context and real-world knowledge. The selection of a linguistic prompt is, we argued, motivated by a principle of best fit. That is, given that prepositions represent a closed class they cannot possibly code the infinite array of all conceptual spatial relations. The speaker selects the preposition which, given the scene being described, is closest to accurately describing the key spatial relation. Conceptual integration results from such underspecified cues being used to construct a complex conceptualization, which elaborates the relatively impoverished linguistic input. A sentence such as *The cat jumped over the wall* results in a dynamic complex conceptualization in which the cat moves above and across the wall, not because this trajectory is coded for linguistically but because this is the most coherent and reasonable conceptualization, given the particular prompts, and given what we know about cats and walls.

<sup>34</sup> Lindstromberg (1997) offers a very similar explanation.

In addition, we distinguish between constructed meanings and senses. The former are constructed on-line in the course of constructing a conceptualization of a specific scene prompted by a particular utterance, whereas senses are instantiated in memory, and can be recruited for the process of conceptual integration. While complex conceptualizations result from the process of conceptual integration taking account of motion and hence temporal frames, it does not follow that prepositions themselves code dynamism. Accordingly, we maintain the general assumption that prepositions code atemporal relations.

Within the polysemy network for *over* set forth here, the primary sense is termed the protoscene, and represents a highly idealized abstraction from our rich recurring experience of spatial scenes. We set forth a set of explicit criteria for determining the primary sense. Other distinct senses instantiated in the polysemy network for *over* result from pragmatic strengthening, i.e. reanalysis and encoding. We recognize a use as distinct only if its interpretation involves a change in the spatial configuration between the TR and LM and/or additional nonspatial information is involved. The polysemy network for *over* contains fourteen distinct senses. Other interpretations derive from conceptual integration constrained by the cognitive principles discussed in §3.

The results of our study provide a means for distinguishing between distinct senses and the process of on-line meaning construction, which is primarily conceptual in nature. Clearly, a recognition of this distinction is imperative for future research into the nature of semantic networks, and provides additional insight into (1) the fundamentally nonarbitrary quality of the mental lexicon, (2) the highly creative nature of the human conceptual system, and (3) the fact that the way we experience renders spatio-physical interactions meaningful, which in turn gives rise to emergent conceptual structure.

#### REFERENCES

- ARONOFF, MARK. 1994. Morphology by itself: Stems and inflectional classes. Cambridge, MA: MIT Press.
- BLOOM, PAUL; MARY A. PETERSON; LYNN NADEL; and MERRILL F. GARRETT (eds.) 1996. Language and space. Cambridge, MA: MIT Press.
- BLOOMFIELD, LEONARD. 1933. Language. New York: Holt, Rinehart and Winston.
- BOLINGER, DWIGHT. 1971. The phrasal verb in English. Cambridge, MA: Harvard University Press.
- BRISARD, FRANK. 1997. The English tense-system as an epistemic category: The case of futurity. *Lexical and syntactical constructions and the construction of meaning*, ed. by Marjolijn Verspoor, K. D. Lee, and Eve Sweetser, 271–86. Amsterdam: John Benjamins.
- BRUGMAN, CLAUDIA. 1988. The story of *over*: Polysemy, semantics and the structure of the lexicon. New York: Garland Press. [1981. The story of *over*. Berkeley, CA: UC-Berkeley master's thesis.]
- BRUGMAN, CLAUDIA, and GEORGE LAKOFF. 1988. Cognitive topology and lexical networks. *Lexical ambiguity resolution*, ed. by S. Small, G. Cottrell, and M. Tanenhaus, 477–507. Palo Alto, CA: Morgan Kaufman.
- BYBEE, JOAN; REVERE PERKINS; and WILLIAM PAGLIUCA. 1994. The evolution of grammar: Tense, aspect, and modality in the languages of the world. Chicago: University of Chicago Press.
- CHOMSKY, NOAM. 1995. Categories and transformations. *The minimalist program*, by Noam Chomsky, 219–394. Cambridge, MA: MIT Press.
- CIENKI, ALAN. 1998. STRAIGHT: An image schema and its metaphorical extensions. *Cognitive Linguistics* 9.107–150.
- CLARK, HERBERT H. 1973. Space, time, semantics, and the child. *Cognitive development and the acquisition of language*, ed. by T. Moore, 27–64. New York: Academic Press.
- CROFT, WILLIAM. 1998. Linguistic evidence and mental representations. *Cognitive Linguistics* 9.151–74.

- CRUSE, D. A. 1986. *Lexical semantics*. Cambridge: Cambridge University Press.
- CUSHING, STEVEN. 1990. Prototypical considerations on modal meanings. In Tsohatzidis, 74–90.
- CUSHING, STEVEN. 1991. Explaining a missing modal meaning: Ideology and paradigm as pragmatic parameter. *Levels of linguistic adaptation*, ed. by J. Verschueren, 19–32. Amsterdam: John Benjamins.
- DEWELL, ROBERT. 1994. *Over* again: Image-schema transformations in semantic analysis. *Cognitive Linguistics* 5.351–80.
- DIRVEN, RENÉ. 1993. Dividing up physical and mental space into conceptual categories by means of English prepositions. *The semantics of prepositions: From mental processing to natural language processing*, ed. by C. Zelinsky-Wibbelt, 73–97. Berlin: Mouton de Gruyter.
- EVANS, VYVYAN. 2000. *The structure of time: Language, meaning and temporal cognition*. Washington, DC: Georgetown University dissertation.
- FAUCONNIER, GILLES. 1994. *Mental spaces*. Cambridge: Cambridge University Press.
- FAUCONNIER, GILLES. 1997. *Mappings in thought and language*. Cambridge: Cambridge University Press.
- FAUCONNIER, GILLES, and MARK TURNER. 1994. *Conceptual projection and Middle Spaces*. Cognitive Science Technical Report, no. 9401, UC-San Diego.
- FAUCONNIER, GILLES, and MARK TURNER. 1998. Conceptual integration networks. *Cognitive Science* 22.133–187.
- FILLMORE, CHARLES; PAUL KAY; and MARY CATHERINE O'CONNOR. 1988. Regularity and idiomaticity in grammatical constructions: The case of *let alone*. *Language* 64.501–538.
- FLEISCHMAN, SUZANNE. 1999. *Discourse markers across languages: Implications of a case study for historico-comparative and sociolinguistics*. Paper presented at Georgetown University, November 1999.
- GOLDBERG, ADELE. 1995. *Constructions: A construction grammar approach to argument structure*. Chicago: University of Chicago Press.
- GRADY, JOSEPH. 1997. *Foundations of meaning: Primary metaphors and primary scenes*. Berkeley, CA: UC-Berkeley dissertation.
- GRICE, PAUL. 1975. Logic and conversation. *Syntax and semantics*, vol. 3: *Speech acts*, ed. by P. Cole and J. Morgan, 41–58. New York: Academic Press.
- HEINE, BERND. 1993. *Auxiliaries: Cognitive forces and grammaticalization*. New York: Oxford University Press.
- HEINE, BERND. 1997. *Cognitive foundations of grammar*. New York: Oxford University Press.
- HERSKOVITS, ANNETTE. 1986. *Language and spatial cognition: An interdisciplinary study of the prepositions in English*. Cambridge: Cambridge University Press.
- HOPPER, PAUL, and ELIZABETH CLOSS TRAUOGOTT. 1993. *Grammaticalization*. Cambridge: Cambridge University Press.
- JACKENDOFF, RAY. 1983. *Semantics and cognition*. Cambridge, MA: MIT Press.
- JACKENDOFF, RAY. 1997. *The architecture of the language faculty*. Cambridge, MA: MIT Press.
- JOHNSON, MARK. 1987. *The body in the mind*. Chicago: University of Chicago Press.
- KAY, PAUL, and CHARLES FILLMORE. 1999. Grammatical constructions and linguistic generalizations: The *What's X doing Y?* construction. *Language* 75.1–34.
- KREITZER, ANATOL. 1997. Multiple levels of schematization: A study in the conceptualization of space. *Cognitive Linguistics* 8.291–325.
- LAKOFF, GEORGE. 1987. *Women, fire and dangerous things: What categories reveal about the mind*. Chicago: University of Chicago Press.
- LAKOFF, GEORGE, and MARK JOHNSON. 1980. *Metaphors we live by*. Chicago: University of Chicago Press.
- LAKOFF, GEORGE, and MARK JOHNSON. 1999. *Philosophy in the flesh: The embodied mind and its challenge to western thought*. New York: Basic Books.
- LANGACKER, RONALD. 1987. *Foundations of cognitive grammar*, vol. 1. Stanford, CA: Stanford University Press.
- LANGACKER, RONALD. 1991a. *Concept, image and symbol*. Berlin: Mouton de Gruyter.
- LANGACKER, RONALD. 1991b. *Foundations of cognitive grammar*, vol. 2. Stanford, CA: Stanford University Press.

- LANGACKER, RONALD. 1992. Prepositions as grammatical(izing) elements. *Leuvenese Bijdragen* 81.287–309.
- LEVIN, BETH. 1993. *Towards a lexical organization of English verbs*. Chicago: University of Chicago Press.
- LINDNER, SUSAN. 1981. *A lexico-semantic analysis of English verb particle constructions with out and up*. UC-San Diego dissertation. Distributed by the Indiana University Linguistics Club.
- LINDSTROMBERG, SETH. 1997. *English prepositions explained*. Amsterdam: John Benjamins.
- MANDLER, JEAN. 1988. How to build a baby: On the development of an accessible representational system. *Cognitive Development* 3.113–36.
- MANDLER, JEAN. 1992. How to build a baby: II Conceptual primitives. *Psychological Review* 99.587–604.
- MANDLER, JEAN. 1996. Preverbal representation. In Bloom et al., 365–84.
- MORGAN, PAMELA. 1997. Figuring out figure out: Metaphor and the semantics of the English verb-particle construction. *Cognitive Linguistics* 8.327–57.
- O'DOWD, ELIZABETH. 1998. *Prepositions and particles in English: A discourse-functional account*. New York: Oxford University Press.
- PUSTEJOVSKY, JAMES. 1998. *The generative lexicon*. Cambridge, MA: MIT Press.
- RICE, SALLY. 1993. Far afield in lexical fields. *Eastern States Conference on Linguistics* 92.206–17.
- RICE, SALLY; DOMINIEK SANDRA; and MIA VANRESPAILLE. 1999. Prepositional semantics and the fragile link between space and time. Cultural, psychological and typological issues in cognitive linguistics, ed. by Masako Hiraga, Chris Sinha, and Sherman Wilcox, 107–27. Amsterdam: John Benjamins.
- ROSCH, ELEANOR. 1975. Cognitive representations of semantic categories. *Journal of Experimental Psychology: General* 104.192–233.
- RUHL, CHARLES. 1989. *On monosemy: A study in linguistic semantics*. Albany: State University of New York Press.
- SANDRA, DOMINIEK. 1998. What linguists can and can't tell you about the human mind: A reply to Croft. *Cognitive Linguistics* 9.361–378.
- SANDRA, DOMINIEK, and SALLY RICE. 1995. Network analyses of prepositional meaning: Mirroring whose mind—The linguist's or the language user's? *Cognitive Linguistics* 6.89–130.
- SPERBER, DANIEL, and DEIRDRE WILSON. 1986. *Relevance: Communication and cognition*. Cambridge, MA: Harvard University Press.
- SVOROU, SOTERIA. 1993. *The grammar of space*. Amsterdam: John Benjamins.
- SWEETSER, EVE. 1990. *From etymology to pragmatics: Metaphorical and cultural aspects of semantic structure*. Cambridge: Cambridge University Press.
- TALMY, LEONARD. 1978. Figure and ground in complex sentences. *Universals in human language*, vol. 4, ed. by Joseph Greenberg, 625–49. Stanford, CA: Stanford University Press.
- TALMY, LEONARD. 1983. How language structures space. *Spatial orientation: Theory, research and application*, ed. by H. Pick and L. Acredelo, 225–320. New York: Plenum.
- TALMY, LEONARD. 1988. Force dynamics in language and cognition. *Cognitive Science* 12.49–100.
- TALMY, LEONARD. 1996. Fictive motion in language and 'ception'. In Bloom et al., 211–76.
- TALMY, LEONARD. 2000. *Toward a cognitive semantics*. Cambridge, MA: MIT Press.
- TRAUGOTT, ELIZABETH CLOSS. 1989. On the rise of epistemic meanings in English: An example of subjectification in semantic change. *Language* 65.31–55.
- TSOHATZIDIS, SAVAS L. (ed.) 1990. *Meanings and prototypes: Studies in linguistic categorization*. London: Routledge.
- TURNER, MARK. 1991. *Reading minds*. Princeton: Princeton University Press.
- TURNER, MARK. 1996. *The literary mind*. New York: Oxford University Press.
- TYLER, ANDREA, and VYVYAN EVANS. 2002. *Spatial scenes: A cognitive approach to prepositions and the experiential basis of meaning*. Cambridge: Cambridge University Press, to appear.
- VANDELOISE, CLAUDE. 1990. Representation, prototypes and centrality. In Tsohatzidis, 403–437.

- VANDELOISE, CLAUDE. 1991. Spatial prepositions: A case study in French. Chicago: University of Chicago Press.
- VANDELOISE, CLAUDE. 1994. Methodology and analyses of the preposition *in*. *Cognitive Linguistics* 5.157–184.
- VARELA, FRANCISCO; EVAN THOMPSON; and ELEANOR ROSCH. 1991. *The embodied mind*. Cambridge, MA: MIT Press.

Tyler  
Linguistics Dept.  
Georgetown University  
Washington DC 20057  
[tyleran@georgetown.edu]

[Received 13 April 1999;  
revision received 4 October 1999;  
accepted 18 May 2000]

Evans  
School of Cognitive and  
Computing Sciences  
University of Sussex  
Falmer, Brighton BN1 9QH  
UK  
[vyv@cogs.susx.ac.uk]