

# Section I

## **Overview**

# 1 The cognitive linguistics enterprise: an overview<sup>1</sup>

*Vyvyan Evans, Benjamin K. Bergen and Jörg Zinken*

## 1 Introduction

Cognitive linguistics is a modern school of linguistic thought and practice. It is concerned with investigating the relationship between human language, the mind and socio-physical experience. It originally emerged in the 1970s (Fillmore, 1975; Lakoff & Thompson, 1975; Rosch, 1975) and arose out of dissatisfaction with formal approaches to language which were dominant, at that time, in the disciplines of linguistics and philosophy. While its origins were, in part, philosophical in nature, cognitive linguistics has always been strongly influenced by theories and findings from the other cognitive sciences as they emerged during the 1960s and 1970s, particularly cognitive psychology.<sup>2</sup> Nowhere is this clearer than in work relating to human categorization, particularly as adopted by Charles Fillmore in the 1970s (e.g., Fillmore, 1975) and George Lakoff in the 1980s (e.g., Lakoff, 1987). Also of importance have been earlier traditions such as Gestalt psychology, as applied notably by Leonard Talmy (e.g., 2000) and Ronald Langacker (e.g., 1987). Finally, the neural underpinnings of language and cognition have had longstanding influence on the character and content of cognitive linguistic theories, from early work on how visual biology constrains colour term systems (Kay & McDaniel, 1978) to more recent work under the rubric of the Neural Theory of Language (Gallese & Lakoff, 2005). In recent years, cognitive linguistic theories have become sufficiently sophisticated and detailed to begin making predictions that are testable using the broad range of converging methods from the cognitive sciences.

Early research was dominated in the 1970s and early 1980s by a relatively small number of scholars, primarily (although not exclusively) situated on the western seaboard of the United States.<sup>3</sup> During the 1980s, cognitive linguistic research began to take root in northern continental Europe, particularly in Belgium, Holland and Germany. By the early 1990s, there was a growing proliferation of research in cognitive linguistics throughout Europe and North America, and a relatively large internationally-distributed group of researchers who identified themselves as ‘cognitive linguists’. This led, in 1989, with a major conference held at Duisburg, Germany, to the formation of the International Cognitive Linguistics Association, together with, a year later, the foundation of the journal *Cognitive Linguistics*. In the words of one of the earliest pioneers in cognitive linguistics, Ronald Langacker (1991b, p. xv), this event ‘marked the birth of cognitive linguistics as a broadly grounded, self conscious intellectual movement.’

Cognitive linguistics is best described as a ‘movement’ or an ‘enterprise’, precisely because it does not constitute a single closely-articulated theory. Instead, it is an approach that has adopted a common set of core commitments and guiding principles, which have led to a diverse range of complementary, overlapping (and sometimes competing) theories. The purpose of this article is to trace some of the major assumptions and commitments that make cognitive linguistics a distinct and worthwhile enterprise. We also attempt to briefly survey the major areas of research and theory construction which characterize cognitive linguistics, areas which make it one of the most lively, exciting and promising schools of thought and practice in modern cognitive science.<sup>4</sup>

## 2 Two key commitments of cognitive linguistics

The cognitive linguistics enterprise is characterized by two fundamental commitments (Lakoff, 1990). These underlie both the orientation and approach adopted by practising cognitive linguists, and the assumptions and methodologies employed in the two main branches of the cognitive linguistics enterprise: *cognitive semantics*, and *cognitive approaches to grammar*, discussed in further detail in later sections.

### 2.1 The Generalization Commitment

The first key commitment is the *Generalization Commitment* (Lakoff, 1990). It represents a dedication to characterizing general principles that apply to all aspects of human language. This goal is just a special subcase of the standard commitment in science to seek the broadest generalizations possible. In contrast to the cognitive linguistics approach, other approaches to the study of language often separate the language faculty into distinct areas such as phonology (sound), semantics (word and sentence meaning), pragmatics (meaning in discourse context), morphology (word structure), syntax (sentence structure), and so on. As a consequence, there is often little basis for generalization across these aspects of language, or for study of their interrelations. This is particularly true of *formal linguistics*.

Formal linguistics attempts to model language by positing explicit mechanical devices or procedures operating on theoretical primitives in order to produce all the possible grammatical sentences of a given language. Such approaches typically attempt precise formulations by adopting formalisms inspired by computer science, mathematics and logic. Formal linguistics is embodied most notably by the work of Noam Chomsky (e.g., 1965, 1981, 1995) and the paradigm of Generative Grammar, as well as the tradition known as Formal Semantics, inspired by philosopher of language Richard Montague (1970, 1973; see Cann, 1993, for a review).

Within formal linguistics it is usually argued that areas such as phonology, semantics and syntax concern significantly different kinds of structuring principles operating over different kinds of primitives. For instance, a syntax ‘module’ is an area in the mind concerned with structuring words into sentences, whereas a phonology ‘module’ is

concerned with structuring sounds into patterns permitted by the rules of any given language, and by human language in general. This modular view of mind reinforces the idea that modern linguistics is justified in separating the study of language into distinct sub-disciplines, not only on grounds of practicality, but because the components of language are wholly distinct, and, in terms of organization, incommensurable.

Cognitive linguists acknowledge that it may often be useful to treat areas such as syntax, semantics and phonology as being notionally distinct. However, given the Generalization Commitment, cognitive linguists do not start with the assumption that the ‘modules’ or ‘subsystems’ of language are organized in significantly divergent ways, or indeed that wholly distinct modules even exist. Thus, the Generalization Commitment represents a commitment to openly investigating how the various aspects of linguistic knowledge emerge from a common set of human cognitive abilities upon which they draw, rather than assuming that they are produced in encapsulated modules of the mind.

The Generalization Commitment has concrete consequences for studies of language. First, cognitive linguistic studies focus on what is common among aspects of language, seeking to re-use successful methods and explanations across these aspects. For instance, just as word meaning displays prototype effects – there are better and worse examples of referents of given words, related in particular ways – so various studies have applied the same principles to the organization of morphology (e.g., Taylor, 2003), syntax (e.g., Goldberg, 1995), and phonology (e.g., Jaeger & Ohala, 1984). Generalizing successful explanations across domains of language isn’t just a good scientific practice – it is also the way biology works; reusing existing structures for new purposes, both on evolutionary and developmental timescales. Second, cognitive linguistic approaches often take a ‘vertical’, rather than a ‘horizontal’ approach to the study of language. Language can be seen as composed of a set of distinct layers of organization – the sound structure, the set of words composed by these sounds, the syntactic structures these words are constitutive of, and so on. If we array these layers one on top of the next as they unroll over time (like layers of a cake), then modular approaches are horizontal, in the sense that they take one layer and study it internally – just as a horizontal slice of cake. Vertical approaches get a richer view of language by taking a vertical slice of language, which includes phonology, morphology, syntax, and of course a healthy dollop of semantics on top. A vertical slice of language is necessarily more complex in some ways than a horizontal one – it is more varied and textured – but at the same time it affords possible explanations that are simply unavailable from a horizontal, modular perspective.

## 2.2 The Cognitive Commitment

The second commitment is termed the Cognitive Commitment (Lakoff, 1990). It represents a commitment to providing a characterization of the general principles for language that accord with what is known about the mind and brain from other disciplines. It is this commitment that makes cognitive linguistics cognitive, and thus an approach which is fundamentally interdisciplinary in nature.

Just as the Generalization Commitment leads to the search for principles of language structure that hold across all aspects of language, in a related manner, the Cognitive Commitment represents the view that principles of linguistic structure should reflect what is known about human cognition from the other cognitive and brain sciences, particularly psychology, artificial intelligence, cognitive neuroscience, and philosophy. In other words, the Cognitive Commitment asserts that models of language and linguistic organization proposed should reflect what is known about the human mind, rather than purely aesthetic dictates such as the use of particular kinds of formalisms or economy of representation (see Croft, 1998, for discussion of this last point).

The Cognitive Commitment has a number of concrete ramifications. First, linguistic theories cannot include structures or processes that violate known properties of the human cognitive system. For instance, if sequential derivation of syntactic structures violates time constraints provided by actual human language processing, then it must be jettisoned. Second, models that use known, existing properties of human cognition to explain language phenomena are more parsimonious than those that are built from a priori simplicity metrics. For example, quite a lot is known about human categorization, and a theory that reduces word meaning to the same mechanisms responsible for categorization in other cognitive domains is simpler than one that hypothesizes a separate system for capturing lexical semantics. Finally, it is incumbent upon the cognitive linguistic researcher to find convergent evidence for the cognitive reality of components of any proffered model or explanation – whether or not this research is conducted by the cognitive linguist (Gibbs, to appear/*this volume*).

### 3 Cognitive semantics and cognitive approaches to grammar

Having briefly set out the two key commitments of the cognitive linguistics enterprise, we now briefly map out the two, hitherto, best developed areas of the field.

Cognitive linguistics practice can be roughly divided into two main areas of research: cognitive semantics and cognitive (approaches to) grammar. The area of study known as cognitive semantics is concerned with investigating the relationship between experience, the conceptual system, and the semantic structure encoded by language. In specific terms, scholars working in cognitive semantics investigate knowledge representation (*conceptual structure*), and meaning construction (*conceptualization*). Cognitive semanticists have employed language as the lens through which these cognitive phenomena can be investigated. Consequently, research in cognitive semantics tends to be interested in modelling the human mind as much as it is concerned with investigating linguistic semantics. A cognitive approach to grammar is concerned with modelling the language system (the mental ‘grammar’), rather than the nature of mind per se. However, it does so by taking as its starting point the conclusions of work in cognitive semantics. This follows as meaning is central to cognitive approaches to grammar.<sup>5</sup> It is critical to note that although the study of cognitive semantics and cognitive approaches to grammar are occasionally separate in practice, this by no

means implies that their domains of enquiry are anything but tightly linked –most work in cognitive linguistics finds it necessary to investigate both lexical semantics and grammatical organization jointly.

As with research in cognitive semantics, cognitive approaches to grammar have also typically adopted one of two foci. Scholars such as Ronald Langacker (e.g., 1987, 1991a, 1991b, 1999) have emphasized the study of the cognitive principles that give rise to linguistic organization. In his theory of *Cognitive Grammar*, Langacker has attempted to delineate the principles that structure a grammar, and to relate these to aspects of general cognition.

The second avenue of investigation, pursued by researchers including Fillmore and Kay (Fillmore et al., 1988; Kay & Fillmore, 1998), Lakoff (Lakoff & Thompson, 1975; Lakoff, 1987) Goldberg (1995, 2003/this volume) and more recently Bergen and Chang (2005/this volume) and Croft (2002), aims to provide a more descriptively and formally detailed account of the linguistic units that comprise a particular language. These researchers attempt to provide a broad-ranging inventory of the units of language, from morphemes to words, idioms, and phrasal patterns, and seek accounts of their structure, compositional possibilities, and relations. Researchers who have pursued this line of investigation are developing a set of theories that are collectively known as *construction grammars*. This general approach takes its name from the view in cognitive linguistics that the basic unit of language is a form-meaning pairing known as a *symbolic assembly*, or a *construction* (particularly in construction grammar accounts, see, e.g., Goldberg, 1995, for discussion).

## 4 Cognitive semantics: guiding principles

In this section we consider in a little more detail the first of these two best-developed areas of cognitive linguistics. Cognitive semantics, like the larger enterprise of which it is a part, is not a single unified framework. Those researchers who identify themselves as cognitive semanticists typically have a diverse set of foci and interests. However, there are a number of guiding principles that collectively characterize a cognitive approach to semantics. In this section we identify these guiding principles (as we see them). In Section 5 we explore some of the major theories and research areas which have emerged under the ‘banner’ of cognitive semantics.

The four guiding principles of cognitive semantics are as follows:

- i) Conceptual structure is embodied (the ‘embodied cognition thesis’).
- ii) Semantic structure is conceptual structure.
- iii) Meaning representation is encyclopaedic.
- iv) Meaning construction is conceptualization.

#### 4.1 Conceptual structure is embodied

Due to the nature of our bodies, including our neuro-anatomical architecture, we have a species-specific view of the world. In other words, our construal of 'reality' is mediated, in large measure, by the nature of our embodiment. One example of the way in which embodiment affects the nature of experience is in the realm of colour. While the human visual system has three kinds of photoreceptors (i.e., colour channels), other organisms often have a different number (Varela et al., 1991). For instance, the visual system of squirrels, rabbits and possibly cats, makes use of two colour channels, while other organisms, including goldfish and pigeons, have four colour channels. Having a different range of colour channels affects our experience of colour in terms of the range of colours accessible to us along the colour spectrum. Some organisms can see in the infrared range, such as rattlesnakes, which hunt prey at night and can visually detect the heat given off by other organisms. Humans are unable to see in this range. The nature of our visual apparatus – one aspect of our embodiment – determines the nature and range of our visual experience.

The nature of the relation between embodied cognition and linguistic meaning is contentious. It is evident that embodiment underspecifies which colour terms a particular language will have, and whether the speakers of a given language will be interested in 'colour' in the first place (Saunders, 1995; Wierzbicka, 1996). However, the interest in understanding this relation is an important aspect of the view in cognitive linguistics that the study of linguistic meaning construction needs to be reintegrated with the contemporary study of human nature (e.g., Núñez & Freeman, 1999).

The fact that our experience is embodied – that is, structured in part by the nature of the bodies we have and by our neurological organization – has consequences for cognition. In other words, the concepts we have access to and the nature of the 'reality' we think and talk about are a function of our embodiment. We can only talk about what we can perceive and conceive, and the things that we can perceive and conceive derive from embodied experience. From this point of view, the human mind must bear the imprint of embodied experience. This thesis, central to cognitive semantics, is known as the thesis of embodied cognition. This position holds that conceptual structure (the nature of human concepts) is a consequence of the nature of our embodiment and thus is embodied.

#### 4.2 Semantic structure is conceptual structure

The second guiding principle asserts that language refers to concepts in the mind of the speaker rather than, directly, to entities which inhere in an objectively real external world. In other words, *semantic structure* (the meanings conventionally associated with words and other linguistic units) can be equated with *conceptual structure* (i.e., concepts). This 'representational' view is directly at odds with the 'denotational' perspective of what cognitive semanticists sometimes refer to as *objectivist semantics*, as exemplified by some formal approaches to semantics.

However, the claim that semantic structure can be equated with conceptual structure does not mean that the two are identical. Instead, cognitive semanticists claim that the meanings associated with linguistic units such as words, for example, form only a subset of possible concepts. After all, we have many more thoughts, ideas and feelings than we can conventionally encode in language. For example, as Langacker (1987) observes, we have a concept for the place on our faces below our nose and above our mouth where moustaches go. We must have a concept for this part of the face in order to understand that the hair that grows there is called a *moustache*. However, there is no English word that conventionally encodes this concept (at least not in the non-specialist vocabulary of everyday language). It follows that the set of *lexical concepts*, the semantic units conventionally associated with linguistic units such as words (see Evans, 2004, 2006; Evans & Green, 2006) is only a subset of the full set of concepts in the minds of speaker-hearers.<sup>6</sup>

### 4.3 Meaning representation is encyclopaedic

The third guiding principle holds that semantic structure is *encyclopaedic* in nature. This means that lexical concepts do not represent neatly packaged bundles of meaning (the so-called *dictionary view*, see Haiman, 1980, for a critique). Rather, they serve as ‘points of access’ to vast repositories of knowledge relating to a particular concept or conceptual domain (e.g., Langacker, 1987).

Of course, to claim that lexical concepts are ‘points of access’ to encyclopaedic meaning is not to deny that words have conventional meanings associated with them. The fact that example (1) means something different from example (2) is a consequence of the conventional range of meanings associated with *sad* and *happy*.

(1) James is sad.

(2) James is happy.

Nevertheless, cognitive semanticists argue that the conventional meaning associated with a particular linguistic unit is simply a ‘prompt’ for the process of *meaning construction*: the ‘selection’ of an appropriate interpretation against the context of the utterance.

By way of example take the word *safe*. This has a range of meanings, and the meaning that we select emerges as a consequence of the context in which the word occurs. To illustrate this point, consider the examples in (3), discussed by Fauconnier and Turner (2002), against the context of a child playing on the beach.

- (3) a. The child is safe.  
 b. The beach is safe.  
 c. The shovel is safe.

In this context, the interpretation of (3a) is that the child will not come to any harm. However, (3b) does not mean that the beach will not come to harm. Instead, it means that

the beach is an environment in which the risk of the child coming to harm is minimized. Similarly, (3c) does not mean that the shovel will not come to harm, but that it will not cause harm to the child. These examples illustrate that there is no single fixed property that *safe* assigns to the words *child*, *beach* and *shovel*. In order to understand what the speaker means, we draw upon our encyclopaedic knowledge relating to children, beaches and shovels, and our knowledge relating to what it means to be safe. We then ‘construct’ a meaning by ‘selecting’ a meaning that is appropriate in the context of the utterance.

#### 4.4 Meaning construction is conceptualization

The fourth guiding principle is that language itself does not encode meaning. Instead, as we have seen, words (and other linguistic units) are only ‘prompts’ for the construction of meaning. Accordingly, meaning is constructed at the conceptual level. Meaning construction is equated with conceptualization, a process whereby linguistic units serve as prompts for an array of conceptual operations and the recruitment of background knowledge. Meaning is a process rather than a discrete ‘thing’ that can be ‘packaged’ by language.

## 5 Cognitive semantics: major theories and approaches

In this section we briefly introduce some of the most significant theories in cognitive semantics, and consider how they best exemplify the guiding assumptions discussed above.

### 5.1 Image schema theory

The theoretical construct of the *image schema* was developed in particular by Mark Johnson. In his now classic 1987 book, *The Body in the Mind*, Johnson proposed that one way in which embodied experience manifests itself at the cognitive level is in terms of image schemas. These are rudimentary concepts like CONTACT, CONTAINER and BALANCE, which are meaningful because they derive from and are linked to human *pre-conceptual experience*. This is experience of the world directly mediated and structured by the human body. These image-schematic concepts are not disembodied abstractions, but derive their substance, in large measure, from the sensory-perceptual experiences that give rise to them in the first place.

The developmental psychologist Jean Mandler (e.g. 1992, 1996, 2004) has made a number of proposals concerning how image schemas might arise from embodied experience. Starting at an early age infants attend to objects and spatial displays in their environment. Mandler suggests that by attending closely to such spatial experiences, children are able to abstract across similar kinds of experiences, finding meaningful patterns in the process. For instance, the CONTAINER image schema is more than simply a spatio-geometric representation. It is a ‘theory’ about a particular kind of configuration

in which one entity is supported by another entity that contains it. In other words, the CONTAINER schema is meaningful because containers are meaningful in our everyday experience.

Lakoff (1987, 1990, 1993/this volume) and Johnson (1987) have argued that rudimentary embodied concepts of this kind provide the conceptual building blocks for more complex concepts, and can be systematically extended to provide structure to more abstract concepts and conceptual domains. According to this view, the reason we can talk about being *in* states like love or trouble (4) is because abstract concepts like LOVE are structured and therefore understood by virtue of the fundamental concept CONTAINER. In this way, image-schematic concepts serve to structure more complex concepts and ideas.

- (4) a. James is in love.  
 b. Susan is in trouble.  
 c. The government is in a deep crisis.

According to Johnson, it is precisely because containers constrain activity that it makes sense to conceptualize POWER and all-encompassing states like LOVE or CRISIS in terms of the CONTAINER schema.

Mandler (2004) describes the process of forming image schemas in terms of a redescription of spatial experience via a process she labels *perceptual meaning analysis*. As she notes, '[O]ne of the foundations of the conceptualizing capacity is the image schema, in which spatial structure is mapped into conceptual structure' (Mandler, 1992, p. 591). She further suggests that 'Basic, recurrent experiences with the world form the bedrock of the child's semantic architecture, which is already established well before the child begins producing language' (Mandler, 1992, p. 597). In other words, it is experience, meaningful to us by virtue of our embodiment, that forms the basis of many of our most fundamental concepts. Again, this basis must be very broad, and it underspecifies the semantic spatial categories that children acquire (see Bowerman & Choi, 2003/this volume). Nevertheless, image schema theory represents an important attempt to relate conceptual structure to the nature of embodiment. Thus, it most transparently reflects the thesis of embodied cognition, and the first guiding principle of cognitive semantics which holds that conceptual structure is embodied.

## 5.2 Encyclopaedic semantics

The traditional view in formal linguistics holds that meaning can be divided into a dictionary component and an encyclopaedic component. According to this view, it is only the dictionary component that properly constitutes the study of *lexical semantics*: the branch of semantics concerned with the study of word meaning. In contrast, encyclopaedic knowledge is external to linguistic knowledge, falling within the domain of 'world knowledge'. Of course, this view is consistent with the modularity hypothesis adopted within formal linguistics, briefly mentioned earlier.

In contrast, cognitive semanticists typically adopt an encyclopaedic approach to meaning. There are a number of assumptions which constitute this approach to semantics, which we briefly outline here.

- i) There is no principled distinction between semantics and pragmatics.
- ii) Encyclopaedic knowledge is structured.
- iii) Encyclopaedic meaning emerges in context.
- iv) Lexical items are points of access to encyclopaedic knowledge.
- v) Encyclopaedic knowledge is dynamic.

*i) There is no principled distinction between semantics and pragmatics*

First, cognitive semanticists reject the idea that there is a principled distinction between ‘core’ meaning on the one hand, and pragmatic, social or cultural meaning on the other. This means that cognitive semanticists do not make a sharp distinction between semantic and pragmatic knowledge. Knowledge of what words mean and knowledge about how words are used are both types of ‘semantic’ knowledge.

Cognitive semanticists do not posit an autonomous mental lexicon which contains semantic knowledge separately from other kinds of (linguistic or non-linguistic) knowledge. It follows that there is no distinction between dictionary knowledge and encyclopaedic knowledge: there is only encyclopaedic knowledge, which subsumes what we might think of as dictionary knowledge.

*ii) Encyclopaedic knowledge is structured*

The view that there is only encyclopaedic knowledge does not entail that the knowledge we have connected to any given word is a disorganized mess. Cognitive semanticists view encyclopaedic knowledge as a structured system of knowledge, organized as a network. Moreover, not all aspects of the knowledge that is, in principle, accessible by a single word has equal standing. For example, what we know about the word *mango* includes information concerning its shape, colour, smell, texture and taste. This holds whether we like or hate mangos, and so on.

*iii) Encyclopaedic meaning emerges in context*

Encyclopaedic meaning arises in context(s) of use, so that the ‘selection’ of encyclopaedic meaning is informed by contextual factors. For example, recall our discussion of *safe* earlier. We saw that this word can have different meanings depending on the particular context of use. *Safe* can mean ‘unlikely to cause harm’ when used in the context of a child playing with a spade. Alternatively *safe* can mean ‘unlikely to come to harm’, when used in the context of a beach that has been saved from development as a tourist resort.

Compared with the dictionary view of meaning, which separates core meaning (semantics) from non-core meaning (pragmatics), the encyclopaedic view makes very different claims. Not only does semantics include encyclopaedic knowledge, but meaning is fundamentally ‘guided’ by context. Furthermore, the meaning of a word is ‘constructed’ on line as a result of contextual information. From this perspective, fully-specified pre-assembled word meanings do not exist, but are selected and formed from encyclopaedic

knowledge, which is called the *semantic potential* (Evans, 2006) or *purport* (Croft & Cruse, 2004; Cruse, 2000) of a lexical item.

iv) *Lexical items are points of access to encyclopaedic knowledge*

The encyclopaedic approach views lexical items as *points of access* to encyclopaedic knowledge (Langacker, 1987). Accordingly, words are not containers that present neat pre-packaged bundles of information. Instead, they selectively provide access to particular parts of the vast network of encyclopaedic knowledge.

v) *Encyclopaedic knowledge is dynamic*

Finally, while the central meaning associated with a word is relatively stable, the encyclopaedic knowledge that each word provides access to is dynamic. Consider the lexical concept CAR. Our knowledge of cars continues to be modified as a result of our ongoing interaction with cars, our acquisition of knowledge regarding cars, and so on (see Barsalou, e.g., 1999).

There are two relatively well developed theories of encyclopaedic semantics. The first is the theory of frame semantics, developed in a series of publications by Charles Fillmore (e.g., 1975, 1977, 1982, 1985; Fillmore & Atkins, 1992). A second theory is the theory of domains developed by Ronald Langacker (e.g., 1987).

Fillmore proposes that a *semantic frame* is a schematization of experience (a knowledge structure), which is represented at the conceptual level, and held in long-term memory. The frame relates the elements and entities associated with a particular culturally embedded scene from human experience. Thus, a word cannot be understood independently of the frame with which it is associated.

Langacker's (e.g., 1987) theory of domains (like Fillmore's theory of Frame Semantics), is based on the assumption that meaning is encyclopaedic, and that lexical concepts cannot be understood independently of larger knowledge structures. Langacker calls these knowledge structures *domains*.

### 5.3 Categorization and Idealized Cognitive Models (ICMs)

A third important theoretical development in cognitive semantics relates to George Lakoff's theory of Idealized Cognitive Models (ICMs), developed in his now classic 1987 book *Women, Fire and Dangerous Things*. Like Fillmore's notion of a semantic frame, and Langacker's domains, ICMs are relatively stable background knowledge structures with respect to which lexical concepts are relativized. However, Lakoff's account was less concerned with developing an approach to encyclopaedic semantics than with addressing issues in categorization which emerged from developments in cognitive psychology.

In the 1970s the *classical theory* of human categorization – so called because it had endured since the time of the ancient Greek philosophers – was called into question. The new ideas that contributed to this development emerged from the research of Eleanor Rosch and her colleagues on prototypes and basic level category research (e.g.,

Rosch, 1975, 1977, 1978; Rosch & Mervis, 1975; Rosch et al., 1976). Rosch's work on categorization, known as prototype theory, was, in fact, less a theory of knowledge representation than a series of findings which provided new insights into human categorization. In so far as the findings led to a theory, Rosch proposed that humans categorize not by means of the *necessary and sufficient conditions* of the classical theory but with reference to a prototype, a relatively abstract mental representation that assembles the key attributes or features that best represent instances of a given category.

The claim that categories are structured with respect to prototypes, or cognitive reference points, was based on a number of experimental findings. Two of the most striking relate to the notion that many categories appear to have fuzzy boundaries, and the related notion of typicality effects. In terms of fuzziness, consider the category FURNITURE. While TABLE and CHAIR are clearly instances of this category, it is less clear whether CARPET should be considered a member. Rather than having sharply delineated boundaries as predicted by the classical view, human subjects often appear to have difficulty judging in which categories various physical artefacts belong. Moreover, this difficulty is influenced by context, such as the physical situation or how the object in question is being used at a given time.

A related issue concerns the notion of prototype or *typicality effects*. For example, while people judge TABLE or CHAIR as 'good examples' of the category FURNITURE, CARPET is judged as a less good example. These asymmetries between category members are called typicality effects.

Despite Rosch's early claim that conceptual fuzziness and typicality effects are the result of conceptual prototypes, in later work she retreated from this position.

'The fact that prototypicality is reliably rated and is correlated with category structure does not have clear implications for particular processing models nor for a theory of cognitive representations of categories.' (Rosch, 1978: 261).

In other words, while typicality effects are 'real' in the sense that they are empirical findings, it does not follow that these findings can be directly 'translated' into a theory of how categories are represented in the human mind. Lakoff (1987) represents an important attempt to develop a theory of cognitive models that might plausibly explain the typicality effects uncovered by Rosch and her colleagues.

Lakoff argued that categorization relates to *idealized cognitive models (ICMs)*. These are relatively stable mental representations that represent 'theories' about the world. Moreover, ICMs guide cognitive processes like categorization and reasoning. Lakoff argues that typicality effects can arise in a range of ways from a number of different sources. One way in which typicality effects can arise is due to mismatches between ICMs against which particular concepts are understood.

Consider the ICM to which the concept BACHELOR relates. This ICM is likely to include information relating to the institution of marriage, and a standard marriageable age. It is with respect to this ICM, Lakoff argues, that the notion of BACHELOR is understood. Furthermore, because the background frame defined by an ICM is idealized, it may only partially match up with other cognitive models. This can therefore give rise to typicality effects.

Consider the Pope with respect to the category *BACHELOR*. While an individual's status as a bachelor is an 'all or nothing' affair, because this notion is understood with respect to the legal institution of *MARRIAGE*, the Pope, while strictly speaking a bachelor, is judged to be a poor example of this particular category. Lakoff's theory accounts for this sort of typicality effect as follows. The concept *POPE* is primarily understood with respect to the ICM of the *CATHOLIC CHURCH*, whose clergy are unable to marry. Clearly, there is a mismatch between these two cognitive models. In the ICM against which *BACHELOR* is understood, the Pope is 'strictly speaking' a bachelor, because he is unmarried. However, the Pope is not a prototypical bachelor because the Pope is more frequently understood with respect to a *CATHOLIC CHURCH* ICM in which marriage of Catholic clergy is prohibited.

There are a number of other ways in which, according to Lakoff, typicality effects arise, by virtue of the sorts of ICMs people have access to. For instance, a typicality effect arises when an *exemplar* (an individual instance) stands for an entire category. The phenomenon whereby one conceptual entity stands for another is called *metonymy*, discussed later. Thus, typicality effects that arise in this way relate to what Lakoff refers to as *metonymic ICMs*.

An example of a metonymic ICM is the cultural stereotype *HOUSEWIFE-MOTHER*, in which a married woman does not have paid work, but stays at home and looks after the house and family. The *HOUSEWIFE-MOTHER* stereotype can give rise to typicality effects when it stands for, or represents, the category *MOTHER* as a whole. Typicality effects arise from resulting expectations associated with members of the category *MOTHER*. According to the *HOUSEWIFE-MOTHER* stereotype, mothers nurture their children, and in order to do this they stay at home and take care of them. A *WORKING MOTHER*, by contrast, is not simply a mother who has a job, but also one who does not stay at home to look after her children. Hence, the *HOUSEWIFE-MOTHER* model, by metonymically representing the category *MOTHER* as a whole, serves in part to define other instances of the category such as *WORKING MOTHER*, which thus emerges as a non-prototypical member of the category.

Lakoff's work on ICMs is important in a number of respects. For instance, it embodies the two key commitments of cognitive linguistics: the Generalization Commitment and the Cognitive Commitment. Lakoff took what was then a relatively new set of findings from cognitive psychology and sought to develop a model of language that was compatible with these findings. In attempting to model principles of language in terms of findings from cognitive psychology, Lakoff found himself devising and applying principles that were common both to linguistic and conceptual phenomena, which thus laid important foundations for the cognitive approach to language.

#### 5.4 Cognitive lexical semantics

One important consequence of Lakoff's theory of ICMs was the impetus it provided to the cognitive semantic treatment of word-meaning, an area known as *cognitive lexical semantics*. Cognitive lexical semantics takes the position that

*lexical items* (words) are *conceptual categories*; a word represents a category of distinct yet related meanings that exhibit typicality effects. Thus, Lakoff argued, words are categories that can be modelled and investigated using the theory of ICMs. In particular, Lakoff argued that lexical items represent the type of complex categories he calls *radial categories*. A radial category is structured with respect to a prototype, and the various category members are related to the prototype by convention, rather than being ‘generated’ by predictable rules. As such, word meanings are stored in the mental lexicon as highly complex structured categories of meanings or *senses*.

In this section, we briefly present Lakoff’s account of the semantics of *over*, which has been highly influential in the development of cognitive lexical semantics. Lakoff’s account was based on ideas proposed in a master’s thesis by Claudia Brugman, his former student. The idea underpinning Lakoff’s approach was that a lexical item like *over* constitutes a conceptual category of distinct but related (polysemous) senses. Furthermore, these senses, as part of a single category, can be judged as more prototypical (central) or less prototypical (peripheral). This means that word senses exhibit typicality effects. For instance the ABOVE sense of *over* in example (5a) would be judged by most native speakers of English as a ‘better’ example of *over* than the CONTROL sense in example (5b). While the prototypical ABOVE sense of *over* relates to a spatial configuration, the CONTROL sense does not.

- (5) a. The picture is over the mantelpiece.  
 b. Jane has a strange power over him.

The intuition that the spatial meanings are somehow prototypical led Brugman and Lakoff (1988), and Lakoff (1987) to argue that the CONTROL sense of *over* is derived metaphorically from the more prototypical spatial meaning of *over*.

While Lakoff’s theory of lexical semantics has been hugely influential, there nevertheless remain a number of outstanding problems that have attracted significant discussion. For instance, Lakoff’s so-called ‘full-specification’ view has been criticized as it entails a potentially vast proliferation of distinct senses for each lexical item (e.g., Sandra, 1998). For example, Lakoff’s approach entails that *over* has, at the very least, several dozen distinct senses. A proliferation of senses is not problematic *per se*, because cognitive linguists are not concerned with the issue of economy of representation. However, the absence of clear methodological principles for establishing the distinct senses is problematic. More recent work (e.g., Tyler & Evans, 2001/this volume, 2003) has sought to address some of the difficulties inherent in Lakoff’s approach by providing a methodology for examining senses associated with lexical categories. With the also quite recent use of empirical methods in cognitive linguistics (see Cuyckens et al., 1997/this volume), and particularly the use of corpora and statistical analysis (e.g., Gries, 2005), cognitive lexical semantics has now begun to make serious progress in providing cognitively realistic analyses of lexical categories.

## 5.5 Conceptual metaphor theory

Conceptual metaphor theory was one of the earliest and most important theories to take a cognitive semantic approach. For a long time in the development of the larger cognitive linguistics enterprise it was one of the dominant theories and despite its limitations (see Evans, 2004; Evans & Zinken, To appear; Haser, 2005; Leezenberg, 2001; Murphy, 1996; Stern, 2000; Zinken, Hellsten, & Nerlich, in press), it still remains an important perspective.

The seminal publication is Lakoff and Johnson's 1980 volume *Metaphors we live by*, the basic premise of which is that metaphor is not simply a stylistic feature of language, but that thought itself is fundamentally metaphorical. According to this view, conceptual structure is organized by *cross domain mappings* or correspondences which inhere in long term memory. Some of these mappings are due to pre-conceptual embodied experiences while others build on these experiences in order to form more complex conceptual structures. For instance, we can think and talk about QUALITY in terms of VERTICAL ELEVATION, as in (6):

- (6) She got a really high mark in the test.

where *high* relates not literally to physical height but to a good mark.

According to Conceptual Metaphor Theory, this is because the conceptual domain QUALITY is conventionally structured and therefore understood in terms of the conceptual domain VERTICAL ELEVATION. The claims made by conceptual metaphor theorists like Lakoff and Johnson directly relate to two of the central assumptions associated with cognitive semantics. The first is the embodied cognition thesis, and the second is the thesis that semantic structure reflects conceptual structure.

In a more recent development, conceptual metaphors are held to be derived from more basic 'super-schematic' aspects of conceptual structure known as *primary metaphors* (Grady, 1997; Lakoff & Johnson, 1999). On this view, more culture-specific metaphors such as THEORIES ARE BUILDINGS as exemplified by (7):

- (7) a. Is that the *foundation* for your theory?  
 b. The theory needs more *support*.  
 c. The argument is *shaky*.

are derived from more fundamental, and arguably universal conceptual mappings which persist in long-term memory. The process whereby more foundational primary metaphors give rise to more complex or *compound metaphors* takes place by virtue of an integration process known as *conceptual blending* (Grady et al., 1999/this volume), which is discussed further below. The account of conceptual metaphor as deriving from primary metaphors has been further fleshed out in terms of the neural operations that could give rise to such cross-domain mappings, as elucidated in great detail by Lakoff and Johnson (1999).

## 5.6 Conceptual metonymy

In *Metaphors We Live By*, Lakoff and Johnson pointed out that, in addition to metaphor, there is a related conceptual mechanism that is also central to human thought and language: *conceptual metonymy*. Like metaphor, metonymy has traditionally been analysed as a trope: a purely linguistic device. However, Lakoff and Johnson argued that metonymy, like metaphor, was conceptual in nature. In recent years, a considerable amount of research has been devoted to metonymy. Indeed, some scholars have begun to suggest that metonymy may be more fundamental to conceptual organization than metaphor (e.g., Taylor, 2003; Radden, 2001), and some have gone so far as to claim that metaphor itself has a metonymic basis (Barcelona, 2001).

To illustrate the phenomenon of metonymy consider the following example drawn from Evans and Green (2006):

(8) The ham sandwich has wandering hands.

Imagine that the sentence in (8) is uttered by one waitress to another in a restaurant. This use of the expression *ham sandwich* represents an instance of metonymy: two entities are associated so that one entity (the item the customer ordered) stands for the other (the customer). As this example demonstrates, metonymy is *referential* in nature. It relates to the use of expressions to ‘pinpoint’ entities in order to talk about them. This shows that metonymy functions differently from metaphor. For (8) to be metaphorical we would need to understand *ham sandwich* not as an expression referring to the customer who ordered it, but in terms of a food item with human qualities. As these two quite distinct interpretations show, while metonymy is the conceptual relation ‘X stands for Y’, metaphor is the conceptual relation ‘X understood in terms of Y’.

A further defining feature of metonymy pointed out by Lakoff and Johnson is that it is motivated by physical or causal associations. Traditionally, this was expressed in terms of contiguity. This concerns a close or direct relationship between two entities. This explains why the waitress can use the expression *the ham sandwich* to refer to the customer; there is a direct experiential relationship between the ham sandwich and the customer who ordered it.

A related way of viewing metonymy is that metonymy is often *contingent* on a specific context. Within a specific discourse context, a salient *vehicle* activates and thus *highlights* a particular *target* (Croft, 1993).

Finally, Lakoff and Turner (1989) added a further component to the cognitive semantic view of metonymy. They pointed out that metonymy, unlike metaphor, is not a cross-domain mapping, but instead allows one entity to stand for another because both concepts co-exist within the same domain. This explains why a metonymic relationship is based on contiguity or conceptual ‘proximity’. The reason *ham sandwich* in (8) represents an instance of metonymy is because both the target (the customer) and the vehicle (the ham sandwich) belong to the same RESTAURANT domain.

## 5.7 Mental spaces theory

Mental Spaces Theory is a cognitive theory of meaning construction. Gilles Fauconnier developed this approach in his two landmark books *Mental Spaces* ([1985] 1994), and *Mappings in Thought and Language* (1997). More recently, Fauconnier, in collaboration with Mark Turner in a series of papers and a 2002 book, *The way we think*, has extended this theory, which has given rise to a new framework called *Conceptual Blending Theory*. Together these two theories attempt to provide an account of the often hidden conceptual aspects of meaning construction. From the perspective of Mental Spaces and Blending theory, language provides underspecified prompts for the construction of meaning, which takes place at the conceptual level. Accordingly, these two theories exemplify the fourth of the guiding principles of the cognitive semantics approach. We briefly introduce some key notions from Mental Spaces Theory and then in the next section briefly survey the more recent Conceptual Blending Theory.

According to Fauconnier, meaning construction involves two processes: (1) the building of *mental spaces*; and (2) the establishment of *mappings* between those mental spaces. Moreover, the mapping relations are guided by the local discourse context, which means that meaning construction is always context-bound. Fauconnier defines mental spaces as ‘partial structures that proliferate when we think and talk, allowing a fine-grained partitioning of our discourse and knowledge structures.’ (Fauconnier, 1997, p. 11). The fundamental insight this theory provides is that mental spaces partition meaning into distinct conceptual regions or ‘packets’, when we think and talk.

Mental spaces are regions of conceptual space that contain specific kinds of information. They are constructed on the basis of generalized linguistic, pragmatic and cultural strategies for recruiting information. However, because mental spaces are constructed ‘on line’, they result in unique and temporary ‘packets’ of conceptual structure, constructed for purposes specific to the ongoing discourse. The principles of mental space formation and the relations or mappings established between mental spaces have the potential to yield unlimited meanings.

As linguistic expressions are seen as underdetermined prompts for processes of rich meaning construction, linguistic expressions have *meaning potential*. Rather than ‘encoding’ meaning, linguistic expressions represent partial *building instructions*, according to which mental spaces are constructed. Of course, the actual meaning prompted for by a given utterance will always be a function of the discourse context in which it occurs, which entails that the meaning potential of any given utterance will always be exploited in different ways dependent upon the discourse context.

Mental spaces are set up by *space builders*, which are linguistic units that either prompt for the construction of a new mental space, or shift attention back and forth between previously constructed mental spaces. Space builders can be expressions like prepositional phrases (*in 1966, at the shop, in Fred’s mind’s eye*), adverbs (*really, probably, possibly*), and subject-verb combinations that are followed by an embedded sentence (*Fred believes [Mary likes sausages], Mary hopes..., Susan states...*), to name but a few. Space builders require the hearer to ‘set up’ a scenario beyond the ‘here and now’, whether

this scenario reflects past or future reality, reality in some other location, a hypothetical situation, a situation that reflects ideas and beliefs, and so on.

Mental spaces contain *elements*, which are either entities constructed on line, or pre-existing entities in the conceptual system. Mental spaces are also *internally structured* by existing knowledge structures, including frames and ICMs. The space builders, the elements introduced into a mental space, and the properties and relations prompted for, *recruit* this pre-existing knowledge structure. Once a mental space has been constructed, it is linked to the other mental spaces established during discourse. As discourse proceeds, mental spaces proliferate within a network or lattice, as more background knowledge is recruited and links between the resulting spaces are created. One of the advantages of Mental Spaces theory is that it provides an elegant account of how viewpoint shifts during discourse, which in turn facilitates an intuitive solution to some of the referential problems formal accounts of semantics have wrestled with.

### 5.8 Conceptual blending theory

In terms of its architecture and in terms of its central concerns, Blending Theory is closely related to Mental Spaces Theory. This is due to its central concern with *dynamic* aspects of meaning construction, and its dependence upon mental spaces and mental space construction as part of its architecture. However, Blending Theory is a distinct theory that has been developed to account for phenomena that Mental Spaces Theory (and Conceptual Metaphor Theory) cannot adequately account for. Moreover, Blending Theory adds theoretical sophistication of its own.

The crucial insight of Blending Theory is that meaning construction typically involves integration of structure from across mental spaces, that gives rise to *emergent structure*: structure which is more than the sum of its parts. Blending theorists argue that this process of *conceptual integration* or *blending* is a general and basic cognitive operation, which is central to the way we think.

One of the key claims of cognitive semantics, particularly as developed by conceptual metaphor theorists, is that human imagination plays a crucial role in cognitive processes, and in what it is to be human. This theme is further developed by Gilles Fauconnier and Mark Turner, the pioneers of Blending Theory. Blending Theory was originally developed in order to account for linguistic structure and for the role of language in meaning construction, particularly 'creative' aspects of meaning construction like novel metaphors, counterfactuals, and so on. However, recent research in Blending Theory has given rise to the view that conceptual blending is central to human thought and imagination, and that evidence for this can be found not only in human language, but also in a wide range of other areas of human activity, such as art, literature, religious thought and practice, and scientific endeavour. Fauconnier and Turner also argue that our ability to perform conceptual integration or blending may have been the key mechanism in facilitating the development of advanced human behaviours that rely on complex symbolic abilities. These behaviours include rituals, art, tool manufacture and use, and language.

The mechanism by which dynamic meaning-construction occurs involves, according to Fauconnier and Turner, the establishment of an integration network, resulting in a blend. Integration networks consist of (at least) two *input mental spaces*, a *generic space* which serves to identify counterparts in the inputs, and a fourth *blended space*, which provides the novel emergent structure not contained in either of the inputs. The process of blending or integration resulting in the emergent structure contained in the blended space involves a process termed *compression* which reduces the conceptual 'distance' between counterpart elements in the input spaces.

For instance, consider the following example adapted from John Taylor (2002):

(9) In France, Bill Clinton wouldn't have been harmed by his affair with Monica Lewinsky.

This is a complex counterfactual which is achieved by virtue of conceptual blending. The point of the utterance is to set up a disanalogy between what we know about the US and the behaviours expected by American voters of their political leaders especially with respect to marital fidelity, and the behaviours expected by French voters of their political leaders. Yet, this disanalogy is achieved by establishing a counterfactual scenario, a complex imaginative feat, in order to facilitate inferential work in reality, with respect to American and French attitudes to extramarital affairs. Conceptual blending theory, thus, represents an ambitious attempt to model the dynamic qualities of meaning-construction, by extending the theoretical architecture of Mental Spaces theory. Its applications are wide-ranging, including, for example, the study of the development and cognitive structure of mathematical systems (Lakoff & Núñez, 2000).

## 6 Cognitive approaches to grammar: guiding principles

Just as we have seen for cognitive semantics, cognitive linguists who study grammar typically have a diverse set of foci and interests. Some cognitive linguists are primarily concerned with elucidating the cognitive mechanisms and principles that might account for the properties of grammar, as Ronald Langacker does in his highly detailed theory *Cognitive Grammar*, and as Leonard Talmy does in developing his model. Others are primarily concerned with characterizing and delineating the linguistic units or constructions that populate a grammar; theories of this kind are called *construction grammars*. Finally, cognitive linguists who focus on grammatical change set out to explain the process of *grammaticalization*, whereby open-class elements gradually transform into closed-class elements. These different paths of investigation are united by certain shared assumptions, which we very briefly set out in this section. We thus identify the two guiding principles that underpin a cognitive approach to grammar (as we see them).

Cognitive approaches to grammar assume a cognitive semantics, and build a model of linguistic knowledge ('grammar') which is consistent with the assumptions and findings of work in cognitive semantics. In addition to this, the two guiding principles of cognitive approaches to grammar are:

- i) The symbolic thesis.
- ii) The usage-based thesis.

## 6.1 The symbolic thesis

The symbolic thesis holds that the fundamental unit of grammar is a form-meaning pairing, or *linguistic unit* (called a ‘symbolic assembly’ in Langacker’s Cognitive Grammar, or a ‘construction’ in construction grammar approaches). In Langacker’s terms, the symbolic unit has two poles: a semantic pole (its meaning) and a phonological pole (its sound). The idea that language has an essentially symbolic function, and that the fundamental unit of grammar is the symbolic unit, has its roots in Ferdinand de Saussure’s (1857–1913) theory of language. Central to Saussure’s theory was the view that language is a symbolic system in which the linguistic expression (*sign*) consists of a mapping between a concept (*signified*) and an acoustic signal (*signifier*), where both signified and signifier are psychological entities. While there are important differences between Saussure’s work and the approach taken in cognitive linguistics, the cognitive approach adopts the idea of the Saussurean symbol. In cognitive approaches the semantic pole corresponds to the ‘signified’, and the phonological pole to the ‘signifier’. These are both ‘psychological entities’ in the sense that they belong within the mental system of linguistic knowledge (the ‘grammar’) in the mind of the speaker.<sup>7</sup>

It follows that cognitive approaches to grammar are not restricted to investigating aspects of grammatical structure, largely independently of meaning, as is often the case in formal traditions. Instead, cognitive approaches to grammar encompass the entire inventory of linguistic units defined as form-meaning pairings. These run the gamut from skeletal syntactic configurations such as the ditransitive construction (expressed in *John baked Mary a cake*) to idioms (like *kick the bucket*), to bound morphemes like the *-er* suffix, to words. This entails that the received view of clearly distinct ‘sub-modules’ of language cannot be meaningfully upheld within cognitive linguistics, where the boundary between cognitive semantics and cognitive approaches to grammar is less clearly defined. Instead, meaning and grammar are seen as mutually interdependent and complementary. To take a cognitive approach to grammar is to study the units of language, and hence the language system itself. To take a cognitive approach to semantics is to attempt to understand how this linguistic system relates to the conceptual system, which in turn relates to embodied experience.

The adoption of the symbolic thesis has an important consequence for cognitive approaches to grammar. Because the basic unit is the linguistic or symbolic unit, meaning achieves central status. That is, as the basic grammatical unit is a symbolic unit, then form cannot be studied independently of meaning. This entails that the study of grammar, from a cognitive perspective, is the study of the full range of units that make up a language, from the lexical to the grammatical. For example, cognitive linguists argue that the grammatical form of a sentence is paired with its own (*schematic*) meaning in the same way that words like *cat* represent pairings of form and (*content*) meaning.

The idea that grammatical units are inherently meaningful is an important theme in cognitive approaches to grammar, and gives rise to the idea of a *lexicon-grammar continuum*, in which content words like *cat* and grammatical constructions like the passive or the ditransitive both count as symbolic units, but differ in terms of the quality of the meaning potential associated with them.

## 6.2 The usage-based thesis

The usage-based thesis holds that the mental grammar of the speaker (his or her knowledge of language) is formed by the abstraction of symbolic units from situated instances of language use. An important consequence of adopting the usage-based thesis is that there is no principled distinction between knowledge of language and use of language (competence and performance, in generative terms), since knowledge of language *is* knowledge of how language is used. The usage-based thesis is central not just to cognitive approaches to grammar but approaches to both language change and language acquisition which take a cognitive linguistic perspective, as represented by articles by Tomasello (2000/this volume) and by Croft (1996/this volume).

## 7 Major theories and approaches

In this section we consider some of the major theoretical approaches in cognitive linguistics which focus on language as a system of knowledge ('grammar'). The ultimate objective of a cognitive theory of grammar is to model speaker-hearer knowledge of language in ways that are consistent with the two key commitments underlying the cognitive linguistics enterprise, the Generalization and Cognitive commitments discussed earlier. From this perspective, language emerges from general cognitive mechanisms and processes.

### 7.1 Talmy's grammatical vs. lexical sub-systems approach

The model of grammar developed by Leonard Talmy (e.g., Talmy, 2000, Chapter 1/this volume), assumes the symbolic thesis and, like other cognitive approaches to grammar, views grammatical units as inherently meaningful. However, Talmy's model is distinguished by its emphasis on the qualitative distinction between grammatical (closed-class) and lexical (open-class) elements. Indeed, Talmy argues that these two forms of linguistic expression represent two distinct conceptual subsystems, which encode qualitatively distinct aspects of the human conceptual system. These are the *grammatical subsystem* and the *lexical subsystem*. For Talmy, while closed-class elements encode schematic or structural meaning, open-class elements encode meanings that are far richer in terms of content. In his research output Talmy is primarily interested

in delineating the nature and organization of the grammatical subsystem. In particular, Talmy is concerned with establishing the nature and function of the conceptual structure subsystem, which is to say the conceptual structure encoded by closed class elements. For Talmy this issue is a particularly fascinating one as in principle, language could function with a lexical or conceptual content system alone. The fact that languages do not makes establishing the distinction in terms of the respective contributions of the two subsystems in encoding and externalizing our cognitive representation(s) a particularly fascinating one. Because Talmy assumes the bifurcation of the conceptual system into two distinct subsystems, his cognitive model of grammar focuses more on the closed-class system than it does on the open-class system.

According to Talmy, the closed-class subsystem is semantically restricted and has a *structuring function*, while the open-class system is semantically unrestricted and has the function of providing conceptual content. To illustrate the restricted nature of the closed-class system, Talmy observes that while many languages have nominal inflections that indicate NUMBER, no language has nominal inflections that indicate COLOUR. For example, many languages have a grammatical affix like plural *-s* in English, but no language has a grammatical affix designating, say, REDNESS. Furthermore, the grammatical system reflects a restricted range of concepts within the relevant domain. For example, the grammatical NUMBER system can reflect concepts like SINGULAR, PLURAL or PAUCAL (meaning 'a few') but not concepts like MILLIONS or TWENTY-SEVEN. Talmy accounts for such restrictions by means of the observation that grammatical categories display *topological* rather than *Euclidean* properties. In other words, the meaning encoded by closed-class elements remains constant despite contextual differences relating to size, shape and so on. For example, the demonstrative determiner *that* in the expressions *that book in your hand* and *that city* encodes DISTANCE FROM THE SPEAKER regardless of the expanse of that distance. As these examples illustrate, the function of the grammatical/closed-class system is to provide a 'pared-down' or highly abstract conceptual structure. This structure provides a 'scaffold' or a 'skeleton' over which elements from the lexical/open-class system are laid in order to provide rich and specific conceptual content.

Talmy argues that while no inventory of concepts expressible by open-class forms can ever be specified (because there is no limit to human experience, knowledge and understanding), there is a restricted inventory of concepts expressible by closed-class forms. Each individual language has access to this inventory, but it does not follow that any given language will exploit all the available possibilities. Thus, one of the major impulses behind Talmy's work is to provide a descriptively adequate account of the major semantic content associated with the grammatical subsystem. He does this by identifying what he refers to as schematic systems within which closed-class elements appear to cluster. These systems include (at least) a configurational system, an attentional system, a perspectival system and a force-dynamics system. Thus, Talmy's approach represents an attempt to characterize that aspect of our cognitive representation that is encoded by the closed-class subsystem, and to describe how that system is organized.

## 7.2 Cognitive Grammar

Cognitive Grammar is the theoretical framework that has been under development by Ronald Langacker since the mid 1970s, and is best represented in his two *Foundations of Cognitive Grammar* volumes published in 1987 and 1991. This is also arguably the most detailed and comprehensive theory of grammar to have been developed within cognitive linguistics, and to date has been the most influential.

Langacker's approach attempts to model the cognitive mechanisms and principles that motivate and license the formation and use of symbolic units of varying degrees of complexity. Like Talmy, Langacker argues that grammatical or closed-class units are inherently meaningful. Unlike Talmy, he does not assume that open-class and closed-class units represent distinct conceptual subsystems.

Instead, Langacker argues that both types of unit belong within a single structured inventory of conventionalized linguistic units which represents knowledge of language in the mind of the speaker. Accordingly, Langacker's model of grammar has a rather broader focus than Talmy's.

For Langacker, knowledge of language (the mental grammar) is represented in the mind of the speaker as an inventory of symbolic units (Langacker, 1987, p. 73). It is only once an expression has been used sufficiently frequently and has become *entrenched* (acquiring the status of a habit or a *cognitive routine*) that it becomes a *unit*. From this perspective, a unit is a symbolic entity that is not built compositionally by the language system but is stored and accessed as a whole. Furthermore, the symbolic units represented in the speaker's grammar are *conventional*. The *conventionality* of a linguistic unit relates to the idea that linguistic expressions become part of the grammar of a language by virtue of being shared among members of a speech community. Thus conventionality is a matter of degree. For instance, an expression like *dog* is more conventional (shared by more members of the English-speaking community) than an expression like *allophone*, which is shared only by a subset of English speakers with specialist knowledge relating to the study of linguistics. The role of entrenchment and conventionality in this model of grammar emerge from the usage-based thesis (see Langacker, 2000, for detailed discussion; see also Evans & Green, 2006, Chapter 4, for a review).

Symbolic units can be *simplex* or *complex* in terms of their symbolic structure. For example, a simplex symbolic unit like a morpheme may have a complex semantic or phonological structure, but is simplex in terms of symbolic structure if it does not contain smaller symbolic units as subparts. The word *dog* and the plural marker *-s* are examples of simplex symbolic units. Complex units vary according to the level of complexity, from words (for example, *dogs*) and phrases (for example, *John's brown dog*) to whole sentences (for example, *Geoff kicked the dog*). Langacker refers to complex symbolic units as *constructions*.

The repository of entrenched symbolic units is conceived by Langacker as a mental inventory. Yet, the contents of this inventory are not stored in a random way. The inventory is structured, and this structure lies in the relationships that hold between the units. For example, some units form subparts of other units which in turn form subparts of other units (for example, morphemes make up words and words make up

phrases which in turn make up sentences). This set of interlinking and overlapping relationships is conceived as a *network*.

There are three kinds of relation that hold between members of the network: (i) *symbolization*—the symbolic links between semantic pole and phonological pole; (ii) *categorization*—for example, the link between the expressions *rose* and *flower*, given that ROSE is a member of the category FLOWER; and (3) *integration* (the relation between parts of a complex symbolic structure like *flower-s*).

As a constraint on the model, Langacker (1987, pp. 53–54) proposes the *content requirement*. This requirement holds that the only structures permissible within the grammar of a language are (i) phonological, semantic and symbolic units; (ii) the relations that hold between them (described above); and (iii) *schemas* that represent these units. This requirement excludes abstract rules from the model. Instead, knowledge of linguistic patterns is conceived in terms of schemas.

### 7.3 Constructional approaches to grammar

Constructional approaches to grammar are based on the observation that the meaning of a whole utterance is more than a combination of the words it contains – the meaning of the whole is more than the meaning of the parts (Lakoff, 1977). There are (at least) four main varieties of constructional approach to grammar. The first is the theory called *Construction Grammar* that was developed by Charles Fillmore, Paul Kay and their colleagues (e.g., Fillmore et al., 1988/this volume). While this theory is broadly generative in orientation, it set the scene for the development of cognitively realistic theories of construction grammar which adopted the central thesis of Fillmore and Kay's approach. This thesis is the position that grammar can be modelled in terms of constructions rather than 'words and rules'. In part, Construction Grammar is motivated by the fact that certain complex grammatical constructions (e.g. idioms like *kick the bucket* or *throw in the towel*) have meaning that cannot be predicted on the basis of their sub-parts and might therefore be 'stored whole' rather than 'built from scratch'.

We also briefly introduce three other constructional approaches that are set firmly within the cognitive linguistics framework: (1) a model that we call *Goldberg's Construction Grammar*, developed by Adele Goldberg (e.g., 1995, 2003/this volume); (2) *Radical Construction Grammar*, developed by William Croft (e.g., 1996/this volume, 2001); and (3) *Embodied Construction Grammar*, a recent approach developed by Benjamin Bergen and Nancy Chang (2005/this volume). It is worth pointing out that Cognitive Grammar could also be classified as a constructional approach to grammar because Langacker also adopts a constructional view of certain types of grammatical unit. However, Langacker defines the notion of a construction in a different way from these models.

Cognitive Grammar and constructional approaches to grammar share another feature in common. Both are *inventory-based* approaches to the study of grammar (Evans & Green, 2006). In other words, both types of approach view the grammar as an inventory of symbolic units rather than a system of rules or principles. This amounts to

the claim that the language system does not work predominantly by 'building' structure (as in generative models of grammar) but by 'storing' it.

#### *Fillmore et al.'s Construction Grammar*

In their 1988 paper (this volume), Fillmore, Kay and O'Connor argue in favour of a model in which, like the lexical item, the complex grammatical construction (the phrase or the clause), has semantic and pragmatic properties directly associated with it. To illustrate they examine formal idioms, complex expressions which have syntax that is unique to the complex construction of which it is part. In principle, the number of instances of a formal idiom constructions is infinitely large. Despite this, such constructions often have a clearly identifiable semantic value and pragmatic force. For this reason, formal idioms pose a particularly interesting challenge to the 'words and rules' model of grammar. They are productive and therefore rule-based, yet often defy the 'usual' rules of grammar. Fillmore et al. therefore took as their case study the idiomatic *let alone* construction.

In light of their findings concerning the *let alone* construction, Fillmore et al. argue against the 'words and rules' view (which they call the 'atomistic' view) of grammatical operations, where lexical items are assembled by phrase structure rules into complex units that are then assigned compositional meaning and only subsequently subjected to pragmatic processing. In other words, they argue against a modular view of the language system. Instead of a model in which syntactic, semantic, phonological and pragmatic knowledge is represented in encapsulated subsystems, the constructional model proposes that all this information is represented in a single unified representation, which is the construction.

In later work, for example Kay and Fillmore (1999), Fillmore, Kay and their collaborators develop their theory of Construction Grammar further. This model is *monostratal*: containing only one level of syntactic representation rather than a sequence of structures linked by transformations, a feature that characterizes transformational generative models like Principles and Parameters Theory. Furthermore, the representations in Construction Grammar contain not only syntactic information but also semantic information relating to argument structure as well as pragmatic information.

#### *Goldberg's Construction Grammar*

The contribution of Fillmore et al. (1988) and Kay and Fillmore (1999) in developing Construction Grammar was to establish the symbolic thesis from first principles. These researchers observed that the 'words and rules' approach to grammar, while accounting for much that is regular in language, had failed to account for the irregular, which represents a significant subset of language. They then set out to explain the irregular first, on the assumption that once principles have been developed that account for the irregular, then the same principles should be able to explain the regular as trivial cases.

The next stage in developing the constructional perspective was to apply this approach to what is regular in the grammar. Perhaps the most important development in this area has been Adele Goldberg's work, most notably her landmark 1995 book, *Constructions* (see also Goldberg, 2003/this volume). In this work Goldberg

developed a theory of construction grammar that sought to extend the constructional approach from ‘irregular’ idiomatic constructions to ‘regular’ constructions. In order to do this, she focused on *verb argument constructions*. In other words, she examined ‘ordinary’ sentences, like ones with transitive or ditransitive structure, and built a theory of construction grammar for the argument structure patterns she found there. One of Goldberg’s notable achievements, in addition to making a compelling case for the constructional approach to verbal argument structure, was in showing that ‘sentence-level’ constructions exhibit the same sorts of phenomena as other linguistic units including polysemy and metaphor relations and extensions.

### *Radical Construction Grammar*

The Radical Construction Grammar model was developed by Croft (1996/this volume, 2001), and sets out to explore the implications of linguistic typology for syntactic theory. Linguistic typology is the subdiscipline of linguistics that examines the structural properties of language from a crosslinguistic perspective and describes patterns of similarity as well as observing points of diversity. Although typological studies can in principle be theory neutral, relying on large-scale comparisons and statistical findings, explanations for the patterns observed are usually couched in *functional* terms. *Functional typology* is in a number of ways compatible with the approach adopted by cognitive linguists, and it is this link that Croft seeks to exploit in developing a model of language that marries typological insights with a meaning-based model of language structure.

Croft argues that instead of taking grammatical *universals* across the world’s languages as a starting point and building a model of language that assumes a universal grammar (the formal approach), we should instead take grammatical *diversity* as a starting point and build a model that accounts adequately for patterns of typological variation. Croft argues that a constructional approach is best placed to provide this type of model, since a constructional approach enables the articulation of the *arbitrary* and the *unique*, in contrast to most formal approaches which place the emphasis on *generalization*.

What makes Croft’s constructional approach ‘radical’ emerges as a consequence of the typological stance he adopts. In Croft’s theory, the existence of constructions is the only primitive theoretical construct. All other linguistic elements, including word classes, such as nouns and verbs, word order patterns, and grammatical relations such as subject and object are epiphenomenal. In this way, the notion of syntax, as usually understood, is eradicated from the picture altogether.

### *Embodied Construction Grammar*

Embodied Construction Grammar (ECG) is a recent theory of construction grammar developed by Benjamin Bergen and Nancy Chang, together with various collaborators. In this model, the emphasis is on language processing, particularly language comprehension or understanding. In other words, while the approaches we have discussed thus far place the emphasis on modelling linguistic knowledge rather than on on-line processing, the ECG model takes it for granted that constructions form the basis of linguistic knowledge, and focuses on exploring how constructions are

processed in on-line or *dynamic* language comprehension. Moreover, ECG is centrally concerned with describing how the constructions of a given language relate to embodied knowledge in the process of language understanding. Therefore much of the research to date in ECG has been focused on developing a formal 'language' to describe the constructions of a language like English; this formal language also needs to be able to describe the embodied concepts that these constructions give rise to in dynamic language comprehension. For further details see Bergen and Chang (2005/this volume).

#### 7.4 Cognitive approaches to grammaticalization

The final group of theories that we mention, albeit briefly, are cognitive approaches to *grammaticalization*: the process of language change whereby grammatical or closed-class elements evolve gradually from the open-class system. Because it relates to language change, the process of grammaticalization falls within the domain of historical linguistics. Grammaticalization is also of interest to typologists (see Croft, 1996/this volume), because patterns of language change can inform their explanations of current patterns in language. A subset of these historical linguists and typologists have developed models that are informed by cognitive linguistics, which attempt to explain the grammaticalization process. See in particular Heine et al. (1991), Sweetser (1990) and Traugott and Dasher (2002).

### 8 Empirical approaches in cognitive linguistics

A criticism that has been levelled against cognitive linguistics, particularly early on in the development of the enterprise, related to a perceived lack of empirical rigour. This criticism arose in response to some of the early foundational studies conducted under the banner of cognitive semantics. For example, while intuitively appealing, early research on lexical polysemy networks (see Brugman & Lakoff, 1988) and early research on conceptual metaphors (Lakoff & Johnson, 1980) was largely based on speaker intuition and interpretation. The studies on *over* by Brugman ([1981] 1988; Brugman & Lakoff, 1988) and Lakoff (1987), for instance, were criticized for lacking a clear set of methodological decision principles (see Sandra, 1998), particularly given semantic network analyses of the same lexical item often differed quite radically from one theorist to another (see Sandra & Rice, 1995, for a review). In recent years, the empirical foundations of cognitive linguistics have become stronger. For example, experimental research (e.g., Gibbs, 1994; Boroditsky, 2000) and discourse analytic research (e.g., Musolff, 2004; Zinken et al., in press) have begun to provide an empirical basis for drawing conclusions about conceptual metaphor. Research by Seana Coulson (e.g. Coulson & Van Petten, 2002/this volume) has begun to provide an empirical basis

for assessing conceptual integration networks. Research by psycholinguists Sandra and Rice (1995) and Cuyckens et al. (1997/*this volume*), together with cognitively oriented corpus studies as illustrated by Gries (2005) have begun to strengthen the empirical basis of cognitive approaches to lexical semantics, and research by Tyler and Evans (e.g. 2001/*this volume*), among others, has begun to provide a sound theoretical and methodological basis for investigating lexical polysemy. Finally, experimental work in the area of mental simulation (Zwaan et al., 2002; Glenberg & Kaschak, 2002; Bergen, *to appear*) offers experimental confirmation of the role of mental imagery in the construction of sentential meaning. With respect to cognitive approaches to grammar, William Croft's (e.g. 1996/*this volume*, 2001) proposals concerning the integration of typological methods with cognitive linguistic theory has strengthened the empirical basis of constructional accounts of grammar.

Indeed, the last few years have witnessed an increase in the influence of empirical methods from neighbouring disciplines upon cognitive linguistics, including brain-scanning techniques from experimental psychology. The increased concern with empirical methods is attested by Gonzales-Marquez et al. (*to appear*), a collection of papers emerging from a recent workshop entitled 'Empirical Methods in Cognitive Linguistics'.

Despite these advances, outstanding challenges remain. For example, Gibbs (2000, p. 349) observes that many psychologists complain that work in cognitive linguistics that attempts to infer 'aspects of conceptual knowledge from an analysis of systematic patterns of linguistic structure leads to theories that appear to have a post hoc quality'. In other words, psychologists have argued that cognitive linguistic theories are not predictive but assume without adequate evidence that the conceptual system has certain properties in order to account for the properties of language.

For example, Blending Theory purports to be a theory about conceptual processes but is forced to posit underlying mental spaces and integration networks in order to account for linguistic expressions. In other words, it infers the conceptual structures that it attempts to demonstrate evidence for rather than seeking independent evidence for these conceptual structures (from psychology or psycholinguistics, for example). This means that the theory cannot be empirically falsified, since it does not make predictions about the properties of conceptual structure that can be empirically tested. Falsifiability is a necessary property of any theory that seeks to achieve scientific rather than purely ideological status. Accordingly, if cognitive linguistic accounts of conceptual structure are to achieve a theoretical status beyond ideology, it will be necessary for them to continue to develop the means by which they can be empirically tested.

## 9 Achievements of the cognitive linguistics enterprise

In this final section we briefly review some of the most significant achievements of the cognitive linguistics enterprise, as we see them.

### **9.1 An integrated view of language and thought**

The Generalization Commitment and the Cognitive Commitment, the two key commitments which underpin a cognitive linguistics approach, have given rise to an integrated approach to linguistic and conceptual organization. This has been particularly evident in cognitive semantics and cognitive approaches to grammar, the two areas we have focused upon in this review article. Other areas, such as cognitive approaches to phonology, cognitive approaches to pragmatics and applications of cognitive linguistics to areas such as psycholinguistics and language teaching, while increasingly the focus of research in cognitive linguistics, remain at this point less well developed.

### **9.2 Re-examination of the empiricist thesis**

The rationalist view that underpins generative approaches to language has dominated the field of linguistics for over half a century. A notable achievement of the cognitive linguistics enterprise has been to refocus interest on the empiricist perspective, and thus to reopen channels of investigation into language and mind that take into account embodiment, experience and usage while remaining firmly committed to the study of cognitive structures and processes.

### **9.3 Focus on conceptual phenomena**

Cognitive linguistics has also contributed to extending the range of conceptual phenomena studied by cognitive scientists. For example, the idea of conceptual projection or ‘mappings’, which is addressed by the frameworks of Conceptual Metaphor Theory, Mental Spaces Theory and Conceptual Blending Theory, attempts to model the richness and complexity of the human imagination. Until relatively recently, it was assumed either that the human imagination was peripheral to cognition or that it could not be systematically studied. The cognitive linguistics enterprise has provided an approach for studying the imagination, and has shown that language reveals systematic processes at work in human imagination which cognitive linguists have argued are central to the way we think.

### **9.4 Integration of formalist and functionalist concerns**

A further achievement of the cognitive linguistics enterprise has been to integrate formalist and functionalist concerns. While formalists are particularly concerned with developing descriptively adequate accounts of linguistic phenomena and with modelling the representation of knowledge of language in the mind, functionalists have been primarily concerned with exploring the social and communicative functions of situated language use. Cognitive linguistics, while functionalist in spirit, is concerned both with achieving descriptive adequacy and with modelling language as a cognitive phenomenon.

## 9.5 A final caveat

Despite these achievements, there remain, of course, other kinds of challenges for the cognitive linguistics enterprise. Indeed, it is worth pointing out that the detailed and precise claims made by cognitive linguists about conceptual organization, e.g., conceptual metaphors, are largely based on the properties of language and are therefore, for the most part, inferential. Until we learn a good deal more about the human mind and brain, this remains a sobering caveat for any theory that attempts to model the cognitive representation of language.

### Notes

- 1 We are grateful to Michael Israel, George Lakoff and Chris Sinha for helpful comments on an earlier draft of this paper.
- 2 For a review of historical antecedents of cognitive linguistics see Nerlich and Clarke (in press).
- 3 This applies to the history of cognitive linguistics in the English-speaking academic world. It adds to the importance of cognitive linguistics as a new 'paradigm' to note that cognitive linguistic theories with very similar commitments were independently being developed around the same time in other academic discourses, e.g., in countries where the language of international scientific discourse is Russian (see, for example, Bartmiński, 1993).
- 4 Cognitive linguistics has by now been applied to a wide range of areas, including non-verbal communication (e.g., gesture, sign language(s)), and applied linguistics (including literature, and language teaching/pedagogy), as well as a by now bewildering array of disciplines in the social and cognitive sciences, and humanities. Consideration of such applications and areas is clearly beyond the scope of this review article, which is primarily concerned with the theoretical and ideological underpinnings of the enterprise and a review of some of the notable theoretical approaches. For a fuller review, and copious references to some of the applications to which cognitive linguistic theories have been put, see Evans and Green (2006).
- 5 This centrality of meaning for cognitive linguistics is another way in which this enterprise is necessarily 'cognitive', as pointed out by Talmy (2000).
- 6 One objection that has been levelled at cognitive semantics is that some proponents appear to straightforwardly equate semantic structure with conceptual structure (see Levinson, 1997, for a critical appraisal of such a view). As Sinha (1999) observes, such a position, if accepted, would be deeply problematic. Recent work, such as the theory of Lexical Concepts and Cognitive Models, developed by Evans (e.g., 2006) argues for a level of semantic structure, 'lexical concepts', which are distinct from conceptual structure.
- 7 Note that the adoption of such a bi-polar semiotic model is not an intrinsic, but a historical aspect of cognitive linguistic research. In fact, many cognitive linguists argue for a 'triangular' semiotics that can model the grounding of linguistic meaning construction in the intersubjectively shared world (e.g., Sinha, in press).

## References

- Allwood, J. (2003). Meaning potentials and context: Some consequences for the analysis of variation in meaning. In H. Cuyckens, R. Dirven & J. Taylor (eds), *Cognitive Approaches to Lexical Semantics* (pp. 29–66). Berlin: Mouton de Gruyter.
- Barcelona, A. (2001). On the plausibility of claiming a metonymic motivation for conceptual metaphor. In A. Barcelona (ed.), *Metaphor and Metonymy at the Crossroads: A Cognitive Perspective* (pp. 31–58). Berlin: Mouton de Gruyter.
- Barsalou, L. (1999). Perceptual symbol systems. *Behavioral and Brain Sciences*, 22, 577–609.
- Bartmiński, J. (ed.) (1993). *Profilowanie pojęć* [Conceptual profiles]. Lublin: Wydawnictwo UMCS.
- Bergen, B. (To appear). Experimental methods for simulation semantics. In M. Gonzalez-Marquez, I. Mittelberg, S. Coulson & M. J. Spivey (eds), *Empirical Methods in Cognitive Linguistics*. Amsterdam: John Benjamins.
- Bergen, B. & Chang, N. (2005). Embodied construction Grammar in simulation-based language understanding. In J.-O. Östman & M. Fried (eds), *Construction Grammars: Cognitive Grounding and Theoretical Extensions* (pp. 147–190). Amsterdam: John Benjamins.
- Boroditsky, L. (2000). Metaphoric structuring: Understanding time through spatial metaphors. *Cognition*, 75(1), 1–28.
- Bowerman, M. & Choi, S. (2003). Space under construction: Language-specific spatial categorization in first language acquisition. In D. Gentner & S. Goldin-Meadow (eds), *Language in Mind: Advances in the Study of Language and Thought* (pp. 387–428). Cambridge, MA: MIT Press.
- Brugman, C. (1981) *The Story of 'over'; Polysemy, Semantics and the Structure of the Lexicon*. MA thesis, University of California, Berkeley. Published New York: Garland, 1988.
- Brugman, C. & Lakoff, G. (1988). Cognitive topology and lexical networks. In S. Small, G. Cottrell & M. Tannenhaus (eds), *Lexical Ambiguity Resolution* (pp. 477–507). San Mateo, CA: Morgan Kaufman.
- Cann, R. (1993). *Formal Semantics*. Cambridge: Cambridge University Press.
- Chomsky, N. (1965). *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.
- Chomsky, N. (1981). *Lectures on Government and Binding*. Dordrecht: Foris.
- Chomsky, N. (1995). *The Minimalist Program*. Cambridge, MA: MIT Press.
- Coulson, S. & Van Petten, C. (2002). Conceptual integration and metaphor: An event-related potential study. *Memory and Cognition*, 30(6), 958–968.
- Croft, W. (1993). The role of domains in the interpretation of metaphors and metonymies. *Cognitive Linguistics*, 4, 335–370.
- Croft, W. (1996). Linguistic selection: An utterance-based evolutionary theory of language. *Nordic Journal of Linguistics*, 19, 99–139.
- Croft, W. (1998). Mental representations. *Cognitive Linguistics*, 9(2), 151–174.
- Croft, W. (2002). *Radical Construction Grammar: Syntactic Theory in Typological Perspective*. Oxford: Oxford University Press.

- Croft, W. & Cruse, D. A. (2004). *Cognitive Linguistics*. Cambridge: Cambridge University Press.
- Cruse, D. A. (2000). *Meaning in Language*. Oxford: Oxford University Press.
- Cuyckens, H., Sandra, D., & Rice, S. (1997). Towards an empirical lexical semantics. In B. Smieja & M. Tasch (eds), *Human Contact Through Language and Linguistics* (pp. 35–54). Frankfurt: Peter Lang.
- Evans, V. (2004). *The Structure of Time. Language, Meaning and Temporal Cognition*. Amsterdam: John Benjamins.
- Evans, V. (2006). Lexical concepts, cognitive models and meaning-construction. *Cognitive Linguistics*, 17(4), 491–534.
- Evans, V. & Green, M. (2006). *Cognitive Linguistics: An Introduction*. Hillsdale, NJ: LEA and Edinburgh: Edinburgh University Press.
- Evans, V. & Zinken, J. (To appear). Figurative language in a modern theory of meaning construction: a lexical concepts and cognitive models approach. In C. Makris and R. Chrisley (eds). *Art, Body and Embodiment*. Cambridge: Cambridge Scholars Press.
- Fauconnier, G. ([1985] 1994). *Mental Spaces*. Cambridge: Cambridge University Press.
- Fauconnier, G. (1997). *Mappings in Thought and Language*. Cambridge: Cambridge University Press.
- Fauconnier, G. & Turner, M. (2002). *The Way We Think: Conceptual Blending and the Mind's Hidden Complexities*. New York, NY: Basic Books.
- Fillmore, C. (1975). An alternative to checklist theories of meaning. *Proceedings of the First Annual Meeting of the Berkeley Linguistics Society*, pp. 123–131.
- Fillmore, C. (1977). Scenes-and-frames semantics. In A. Zampolli (ed.), *Linguistic Structures Processing* (pp. 55–82). Amsterdam: North Holland.
- Fillmore, C. (1982). Frame semantics. The Linguistic Society of Korea (ed.), *Linguistics in the Morning Calm* (pp. 111–137). Seoul: Hanshin Publishing Company.
- Fillmore, C. (1985). Frames and the semantics of understanding. *Quaderni di Semantica*, 6, 222–254.
- Fillmore, C. & Atkins, B. T. (1992). Toward a frame-based lexicon: The semantics of RISK and its neighbors. In A. Lehrer & E. F. Kittay (eds), *Frames, Fields and Contrasts* (pp. 75–102). Hillsdale, NJ: Lawrence Erlbaum.
- Fillmore, C., Kay, P., & O'Connor, M. K. (1988). Regularity and idiomaticity: The case of let alone. *Language*, 64(3), 501–538.
- Gallese V. & Lakoff, L. (2005). The brain's concepts: The role of the sensory-motor system in reason and language. *Cognitive Neuropsychology*, 22, 455–479.
- Gibbs, R. W. (1994). *The Poetics of Mind: Figurative Thought, Language, and Understanding*. New York: Cambridge University Press.
- Gibbs, R. W. (2000). Making good psychology out of blending theory. *Cognitive Linguistics*, 11(3–4), 347–358.
- Gibbs, R. W. (To appear). Just why should cognitive linguists care about empirical evidence, much less want to go to the trouble of gathering it? In M. Gonzalez-

- Marquez, I. Mittelberg, S. Coulson & M. J. Spivey (eds), *Empirical Methods in Cognitive Linguistics*. Amsterdam: John Benjamins.
- Glenberg, A. & Kaschak, M. (2002). Grounding language in action. *Psychonomic Bulletin & Review*, 9, 558–565
- Goldberg, A. (1995). *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago: Chicago University Press.
- Goldberg, A. (2003). Constructions: A new theoretical approach to language. *Trends in Cognitive Science*, 7(5), 219–224.
- Gonzalez-Marquez, M., Mittelberg, I., Coulson, S., & Spivey, M. J. (eds) (To appear). *Empirical Methods in Cognitive Linguistics: Ithaca*. Amsterdam: John Benjamins.
- Grady, J. (1997). THEORIES ARE BUILDINGS revisited. *Cognitive Linguistics*, 8(4), 267–290.
- Grady, J., Oakley, T., & Coulson, S. (1999). Blending and metaphor. In R. W. Gibbs & G. Steen (eds), *Metaphor in Cognitive Linguistics* (pp. 101–124). Amsterdam: John Benjamins.
- Gries, S. Th. (2005). The many senses of *run*. In S. Th. Gries & A. Stefanowitsch (eds), *Corpora in Cognitive Linguistics*. Berlin: Mouton de Gruyter.
- Haiman, J. (1980). Dictionaries and encyclopedias. *Lingua*, 50, 329–357.
- Haser, V. (2005). *Metaphor, Metonymy, and Experientialist Philosophy: Challenging Cognitive Semantics*. Berlin: Mouton de Gruyter.
- Heine, B., Claudi, U., & Hünnemeyer, F. (1991). *Grammaticalization: A Conceptual Framework*. Chicago: Chicago University Press.
- Jaeger, J. & Ohala, J. (1984). On the structure of phonetic categories. *Proceedings of the 10th Annual Meeting of the Berkeley Linguistics Society* (pp. 15–26). Berkeley, CA.: Berkeley Linguistics Society.
- Johnson, M. (1987). *The Body in the Mind. The Bodily Basis of Meaning, Imagination, and Reason*. Chicago: University of Chicago Press.
- Kay, P. & Fillmore, C. (1999). Grammatical constructions and linguistic generalizations: The *What's X doing Y* construction. *Language*, 75, 1–34.
- Kay, P. & McDaniel, C. (1978). The linguistic significance of the meanings of basic color terms. *Language*, 54(3), 610–646.
- Lakoff, G. (1977). Linguistic gestalts. *Chicago Linguistics Society*, 13, 236–87
- Lakoff, G. (1987). *Women, Fire and Dangerous Things: What Categories Reveal About the Mind*. Chicago: University of Chicago Press.
- Lakoff, G. (1990). The invariance hypothesis: Is abstract reason based on image-schemas? *Cognitive Linguistics*, 1(1), 39–74.
- Lakoff, G. (1993). The contemporary theory of metaphor. In A. Ortony (ed.), *Metaphor and Thought. Second edition* (pp. 202–251). Cambridge: Cambridge University Press.
- Lakoff, G. & Johnson, M. (1980). *Metaphors We Live By*. Chicago: University of Chicago Press.
- Lakoff, G. & Johnson, M. (1999). *Philosophy in the Flesh: The Embodied Mind and its Challenge for Western Thought*. New York: Basic Books.
- Lakoff, G. & Núñez, R. (2000). *Where Mathematics Comes From*. New York: Basic Books.

- Lakoff, G. & Thompson, H. (1975). Introduction to cognitive grammar. *Proceedings of the 1st Annual Meeting of the Berkeley Linguistics Society* (pp. 295–313). Berkeley, CA.: Berkeley Linguistics Society.
- Lakoff, G. & Turner, M. (1989). *More than Cool Reason: A Field Guide to Poetic Metaphor*. Chicago: University of Chicago Press.
- Langacker, R. (1987). *Foundations of Cognitive Grammar, Volume I*. Stanford: Stanford University Press.
- Langacker, R. (1991a). *Foundations of Cognitive Grammar, Volume II*. Stanford: Stanford University Press.
- Langacker, R. (1991b). *Concept, Image, Symbol: The Cognitive Basis of Grammar. Second edition*. Berlin: Mouton de Gruyter.
- Langacker, R. (1999). *Grammar and Conceptualization*. Berlin: Mouton de Gruyter.
- Langacker, R. (2000). A dynamic usage-based model. In M. Barlow & S. Kemmer (eds), *Usage-based Models of Language* (pp. 1–64). Stanford, CA.: CSLI Publications.
- Leezenberg, M. (2001). *Contexts of Metaphor*. Oxford: Elsevier.
- Mandler, J. (1992). How to build a baby II. Conceptual primitives. *Psychological Review*, 99, 567–604.
- Mandler, J. (1996). Preverbal representation and language. In P. Bloom, M. A. Peterson, L. Nadel, & M. F. Garrett (eds), *Language and Space* (pp. 365–384). Cambridge, MA: MIT Press.
- Mandler, J. (2004). *The Foundations of Mind: Origins of Conceptual Thought*. Oxford: Oxford University Press.
- Montague, R. (1970). Universal grammar. *Theoria*, 36, 373–398.
- Montague, R. (1973). The proper treatment of quantification in ordinary English. In K. Hintikka, E. Moravcsik, & P. Suppes (eds), *Approaches to Natural Language* (pp. 221–242). Dordrecht: Reidel.
- Murphy, G. (1996). On metaphoric representation. *Cognition*, 60, 173–204.
- Musolff, A. (2004). *Metaphor and Political Discourse. Analogical Reasoning in Debates about Europe*. Basingstoke: Palgrave Macmillan.
- Nerlich, B. & Clarke, D. D. (In press). Cognitive linguistics and the history of linguistics. In D. Geeraerts & H. Cuyckens (eds), *Handbook of Cognitive Linguistics*. Oxford: Oxford University Press.
- Núñez, R. & Freeman, W. J. (eds) (1999). *Reclaiming Cognition: The Primacy of Action, Intention and Emotion*. Thorverton: Imprint Academic.
- Radden, G. (2001). How metonymic are metaphors? In A. Barcelona (ed.), *Metaphor and Metonymy at the Crossroads* (pp. 93–108). Berlin: Mouton de Gruyter.
- Rosch, E. (1975). Cognitive representations of semantic categories. *Journal of Experimental Psychology: General*, 104, 192–233.
- Rosch, E. (1977). Human categorization. In N. Warren (ed.), *Studies in Cross-linguistic Psychology* (pp. 1–49). London: Academic Press.
- Rosch, E. ([1978] 1999). Principles of categorization. In B. Lloyd & E. Rosch (eds), *Cognition and Categorization* (pp. 27–48). Hillsdale, NJ: Erlbaum. Reprinted in E. Margolis & S. Laurence (eds), (1999), *Concepts: Core Readings* (pp. 189–206). Cambridge, MA: MIT Press.

- Rosch, E. & Mervis, C. (1975). Family resemblances: Studies in the internal structure of categories. *Cognitive Psychology*, 7, 573–605.
- Rosch, E., Mervis, C., Gray, W., Johnson, D., & Boyes-Braem, P. (1976). Basic objects in natural categories. *Cognitive Psychology*, 8, 382–439.
- Sandra, D. (1998). What linguists can and can't tell you about the human mind: A reply to Croft. *Cognitive Linguistics*, 9(4), 361–478.
- Sandra, D. & Rice, S. (1995). Network analyses of prepositional meaning: Mirroring whose mind—the linguist's or the language user's? *Cognitive Linguistics*, 6(1), 89–130.
- Saunders, B. (1995). Disinterring *Basic Color Terms*. A study in the mystique of cognitivism. *History of the Human Sciences*, 8 (4), 19–38.
- Sinha, C. (In press). Cognitive linguistics, psychology and cognitive science. In D. Geeraerts & H. Cuyckens (eds), *Handbook of Cognitive Linguistics*. Oxford, Oxford University Press.
- Sinha, C. (1999). Grounding, mapping and acts of meaning. In T. Janssen & G. Redeker (eds), *Cognitive Linguistics, Foundations, Scope and Methodology* (pp. 223–256), Berlin: Mouton de Gruyter.
- Stern, J. (2000). *Metaphor in Context*. Cambridge, MA: MIT Press.
- Sweetser, E. (1990). *From Etymology to Pragmatics: Metaphorical and Cultural Aspects of Semantic Structure*. Cambridge: Cambridge University Press.
- Talmy, L. (2000). *Toward a Cognitive Semantics (2 volumes)*. Cambridge, MA: MIT Press.
- Taylor, J. (2002). *Cognitive Grammar*. Oxford: Oxford University Press.
- Taylor, J. (2003). *Linguistic Categorization. Third edition*. Oxford: Oxford University Press.
- Tomasello, M. (2000). A usage-based approach to child language acquisition. *Proceedings of the Berkeley Linguistics Society* (pp. 305–319). Berkeley: Berkeley Linguistic Society.
- Traugott, E. C. & Dasher, R. (2002), *Regularity in Semantic Change*. Cambridge: Cambridge University Press.
- Tyler, A. & Evans, V. (2001). Reconsidering prepositional polysemy networks: The case of *over*. *Language*, 77(4), 724–65.
- Tyler, A. & Evans, V. (2003). *The Semantics of English Prepositions: Spatial Scenes, Embodied Meaning and Cognition*. Cambridge: Cambridge University Press.
- Varela, F., Thompson, E., & Rosch, E. (1991). *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge, MA: MIT Press.
- Wierzbicka, A. (1996). The meaning of color terms and the universals of seeing. In *Semantics. Primes and Universals, Chapter 10* (pp. 287–334). Oxford. Oxford University Press.
- Zinken, J., Hellsten, I., & Nerlich, B. (In press). Discourse metaphors. In E. Bernardez, R. Dirven, R. Frank, & T. Ziemke (eds), *Body, Language, and Mind. Vol. 2: Sociocultural Situatedness*. Berlin: Mouton.
- Zwaan, R., Stanfield, R., & Yaxley, R. (2002). Language comprehenders mentally represent the shapes of objects. *Psychological Science*, 13, 168–171.