6

Embodiment and conceptual structure

This chapter explores in more detail two of the central principles of cognitive semantics introduced in Chapter 5. These are: (1) the thesis that conceptual structure derives from embodiment, also known as the **embodied cognition** thesis; and (2) the thesis that semantic structure reflects **conceptual structure**. The reason for exploring these two principles together in a single chapter is because they are inextricably linked: once we have established that conceptual structure is embodied, in the sense that the nature of our embodiment determines and delimits the range and nature of concepts that can be represented, we can then examine how these concepts are encoded and externalised via language by looking at how the language system provides meaning based on concepts derived from embodiment.

We address the thesis of embodied cognition by presenting the theory of **image schemas** developed by Johnson (1987), among others. As we began to see in the previous chapter, image schemas are relatively abstract conceptual representations that arise directly from our everyday interaction with and observation of the world around us. That is, they are concepts arising from embodied experience. Once we have described the research on image schemas, and how they derive from embodiment, we then address the second principle. This is the thesis that embodiment, as the basis of conceptual organisation, should be evident in semantic structure: the meanings associated with words and other linguistic elements. In order to explore this thesis, we examine Leonard Talmy's theory of conceptual structure. In his influential work, Talmy has argued that one of the ways that language encodes conceptual representation is by providing **structural meaning**, also known as **schematic meaning**. This kind of meaning relates to structural properties of **referents** (the entities that language describes: objects, people, and so on) and **scenes**

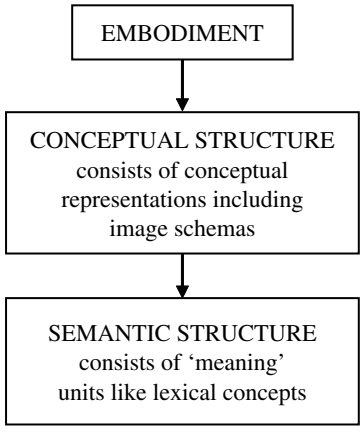

Figure 6.1 From embodiment to linguistic meaning

(the situations and events that language describes). Talmy argues that schematic meaning is directly related to fundamental aspects of embodied cognition, and can be divided into a number of distinct **schematic systems**, each of which provides a distinct type of meaning that is closely associated with a particular kind of embodied experience. Talmy's work presents compelling evidence from language that semantic structure reflects conceptual structure, and that conceptual structure arises from embodied experience.

The reader should bear in mind that Johnson's theory of image schemas and Talmy's work on the conceptual system represent two highly influential yet independent lines of research within cognitive semantics. However, we treat them together in this chapter because they relate to two of the most basic guiding principles of cognitive semantics: (1) that conceptual structure reflects embodied experience, which Johnson's theory addresses; and (2) that semantic structure reflects this conceptual structure, which Talmy's theory addresses. The relationship between these areas of investigation is represented in Figure 6.1.

6.1 Image schemas

In this section we consider the theory of image schemas, which was first developed within cognitive semantics and has come to be highly influential in neighbouring areas of study such as cognitive and developmental psychology. The notion of an image schema is closely associated with the development of the embodied cognition thesis, proposed by early researchers in cognitive semantics, notably George Lakoff and Mark Johnson. One of the central questions raised by Lakoff and Johnson in their (1980) book *Metaphors We Live By* can be stated as follows: Where does the complexity associated with our conceptual representation come from? The answer they offered was that this complexity

is, in large measure, due to a tight correlation between the kinds of concepts human beings are capable of forming and the nature of the physical bodies we have. From this perspective, our embodiment is directly responsible for structuring concepts. In this section, therefore, we address the idea central to the thesis of embodied cognition: the image schema.

6.1.1 What is an image schema?

In his (1987) book *The Body in the Mind*, Mark Johnson proposed that embodied experience gives rise to image schemas within the conceptual system. Image schemas derive from sensory and perceptual experience as we interact with and move about in the world. For example, given that humans walk upright, and because we have a head at the top of our bodies and feet at the bottom, and given the presence of gravity which attracts unsupported objects, the vertical axis of the human body is functionally asymmetrical. This means that the vertical axis is characterised by an up–down or top–bottom asymmetry: the top and bottom parts of our bodies are different.

Cognitive semanticists argue that the asymmetry of the body's vertical axis is meaningful for us because of the way we interact with our environment. For example, gravity ensures that unsupported objects fall to the ground; given the asymmetry of the human vertical axis, we have to stoop to pick up fallen objects and look in one direction (downwards) for fallen objects and in another (upwards) for rising objects. In other words, our physiology ensures that our vertical axis, which interacts with gravity, gives rise to meaning as a result of how we interact with our environment.

According to Johnson, this aspect of our experience gives rise to an image schema: the UP–DOWN schema. Moreover, as shown by the developmental psychologist Jean Mandler, image schemas are **emergent**. This means that because this experience is a function of our bodies and of our interaction in the world, this type of experience arises in conjunction with our physical and psychological development during early childhood. In other words, image schemas are not claimed to be innate knowledge structures. For example, we know from work in developmental psychology that in the early stages of development infants learn to orient themselves in the physical world: they follow the motion of moving objects with their eyes, and later reach out their hands intentionally to grasp those moving objects and so on (Mandler 2004).

The term 'image' in 'image schema' is equivalent to the use of this term in psychology, where **imagistic** experience relates to and derives from our experience of the external world. Another term for this type of experience is **sensory experience**, because it comes from sensory-perceptual mechanisms that include, but are not restricted to, the visual system. Some of these sensory-perceptual mechanisms are summarised in Table 6.1. It is therefore important

Table 6.1 Some sensory-perceptual systems

System	Sensory experience	Physical location
Visual system	Vision	Eye, optic nerve
Haptic system	Touch	Beneath the skin
Auditory system	Hearing	Ear/auditory canal
Vestibular system	Movement/balance	Ear/auditory canal

to emphasise that although the term 'image' is restricted to visual perception in everyday language, it has a broader application in psychology and in cognitive linguistics, where it encompasses all types of sensory-perceptual experience.

Imagistic experience is contrasted with what psychologists call **introspective experience**: internal subjective experience such as feelings or emotions. The term 'schema' in 'image schema' is also very important: it means that image schemas are not rich or detailed concepts, but rather abstract concepts consisting of patterns emerging from repeated instances of embodied experience. If we take a parallel example from language, words like *thing* or *container* have rather more schematic meanings than words like *pencil* or *teacup*. This use of the term 'schema' is therefore consistent with the range of ways in which the term is used elsewhere in cognitive linguistics.

By way of illustration, the image schema CONTAINER results from our recurrent and ubiquitous experiences with containers as revealed by this extract from Johnson's (1987) book, which describes the start of an ordinary day:

> You wake *out of* a deep sleep and peer *out from* beneath the covers *into* your room. You gradually emerge *out of* your stupor, pull yourself *out from* under the covers, climb *into* your robe, stretch *out* your limbs, and walk *in* a daze *out* of the bedroom and *into* the bathroom. You look *in* the mirror and see your face staring *out* at you. You reach *into* the medicine cabinet, take *out* the toothpaste, squeeze *out* some toothpaste, put the toothbrush *into* your mouth, brush your teeth *in* a hurry, and rinse *out* your mouth. (Johnson 1987: 331; our italics differ from the original)

As this example reveals by the recurrent use of the expressions *in* and *out*, a great number of everyday objects and experiences are categorised as specific instances of the schematic concept CONTAINER: not only obvious containers like bathroom cabinets and toothpaste tubes or less obvious 'containers' like bed-covers, clothing and rooms, but also states like sleep, stupor and daze.

6.1.2 Properties of image schemas

In this section, we further develop the notion of image schema by outlining a number of properties associated with this aspect of the conceptual system.

Image schemas are pre-conceptual in origin

According to Johnson, image schemas like the CONTAINER schema are directly grounded in embodied experience: they relate to and derive from sensory experience. This means that they are pre-conceptual in origin. Mandler (2004) argues that they arise from sensory experiences in the early stages of human development that precede the formation of concepts. However, once the recurrent patterns of sensory information have been extracted and stored as an image schema, sensory experience gives rise to a conceptual representation. This means that image schemas are **concepts**, but of a special kind: they are the foundations of the conceptual system, because they are the first concepts to emerge in the human mind, and precisely because they relate to sensory-perceptual experience, they are particularly schematic. Sometimes it is more difficult to grasp the idea of an image-schematic concept than it is to grasp the idea of a very specific concept like CAT or BOOK. This is because these specific concepts relate to ideas that we are aware of 'knowing about'. In contrast, image schemas are so fundamental to our way of thinking that we are not consciously aware of them: we take our awareness of what it means to be a physical being in a physical world very much for granted because we acquire this knowledge so early in life, certainly before the emergence of language.

An image schema can give rise to more specific concepts

As we have already seen, the concepts lexicalised by the prepositions *in*, *into, out, out of* and *out from* in the passage cited above are all thought to relate to the CONTAINER schema: an abstract image-schematic concept that underlies all these much more specific **lexical concepts.** As we have seen in previous chapters, a lexical concept is a concept specifically encoded and externalised by a specific lexical form.

Of course, cognitive semanticists face the same problems that semanticists of any theoretical persuasion face in attempting to describe linguistic meaning in an economical and memorable way. There are a limited number of options available to us. Most semanticists, including cognitive semanticists, use words from natural language to represent pre-linguistic elements of meaning. Our use of words in small capitals to represent concepts is an example of this strategy. As we have already mentioned, some semanticists use a formal metalanguage, usually logic, to represent the meaning of larger units like sentences or propositions. Cognitive linguists often attempt to support their formal representations of meaning elements by using diagrams. Although concepts are labelled with ordinary words, the advantage of a diagram is that it can represent a concept independently of language.

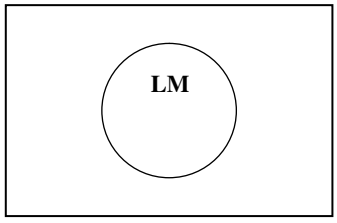

Figure 6.2 CONTAINER image schema

For example, the CONTAINER schema is diagrammed in Figure 6.2. This image schema consists of the structural elements interior, boundary and exterior: these are the minimum requirements for a CONTAINER (Lakoff 1987). The **landmark** (LM), represented by the circle, consists of two structural elements, the interior – the area within the boundary – and the boundary itself. The exterior is the area outside the landmark, contained within the square. The container is represented as the landmark because the boundary and the exterior together possess sufficient Gestalt properties (e.g. closure and continuity) to make it the figure, while the exterior is the ground (recall our discussion of Gestalt principles in Chapter 3).

Of course, the reason why this diagram does not resemble any specific type of container (like a teacup, a house or a bad mood) is precisely because of its schematic meaning. The idea behind this type of diagram is that it 'boils down' the image-schematic meaning to its bare essence, representing only those properties that are shared by all instances of the conceptual category CONTAINER.

Although Figure 6.2 represents the basic CONTAINER schema, there are a number of other image schemas that are related to this schema which give rise to distinct concepts related to containment. For instance, let's consider just two variants of the CONTAINER schema lexicalised by *out*. These image schemas are diagrammed in Figures 6.3 and 6.4, and are illustrated with linguistic examples. The diagram in Figure 6.3 corresponds to example (1). The **trajector** (TR) *John*, which is the entity that undergoes motion, moves from a position inside the LM to occupy a location outside the LM. The terms 'TR' and 'LM' are closely related to the notions of figure and reference object or ground that we discussed in Chapter 3. The terms 'TR' and 'LM' derive from the work of Langacker (e.g. 1987), and have been widely employed in cognitive semantics by scholars including Lakoff and Johnson, among others.

(1) John went out of the room. OUT1

The image schema in Figure 6.4 corresponds to example (2). In this example, the meaning of *out* is 'reflexive', which is a technical way of saying that something refers to itself: we could paraphrase example (2), albeit redundantly, as

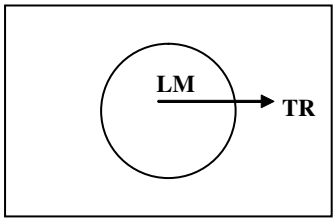

Figure 6.3 Image schema for OUT1

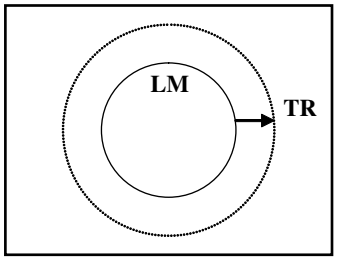

Figure 6.4 Image-schema for OUT2

The honey spread itself out. In other words, liquid substances like *honey*, because of their physical properties, can simultaneously be the LM and the TR. The LM is the original area occupied by the honey, while the honey is also the TR because it spreads beyond the boundary of its original location.

(2) The honey spread out. OUT2

The image schemas shown in Figures 6.3 and 6.4 represent two concepts that are more specific and detailed than the image schema diagrammed in Figure 6.2, because they involve motion as well as containment. This shows that image schemas can possess varying degrees of schematicity, where more specific image schemas arise from more fundamental or schematic ones.

Image schemas derive from interaction with and observation of the world

As we have seen, because image schemas derive from embodied experience, they derive from the way in which we interact with the world. To illustrate this idea, consider the image schema for FORCE. This image schema arises from our experience of acting upon other entities, or being acted upon by other entities, resulting in the transfer of motion energy. Johnson illustrates the **interactional derivation** of this image schema (in other words, how it arises from experience) as follows:

> [F]orce is always experienced through interaction. We become aware of force as it affects us or some object in our perceptual field. When

> you enter an unfamiliar dark room and bump into the edge of the table, you are experiencing the interactional character of force. When you eat too much the ingested food presses outwards on your taughtly stretched stomach. There is no schema for force that does not involve interaction or potential interaction. (Johnson 1987: 43).

The idea of FORCE is also central to Talmy's theory of conceptual structure, as we will see later in the chapter (section 6.2.2).

Image schemas are inherently meaningful

Because image schemas derive from interaction with the world, they are inherently meaningful. Embodied experience is inherently meaningful in the sense that embodied experiences have predictable consequences. Let's illustrate this point with another example. Imagine a cup of coffee in your hand. If you move the cup slowly up and down, or from side to side, you expect the coffee to move with it. This is because a consequence of containment, given that it is defined by boundaries, is that it constrains the location of any entity within these boundaries. In other words, the cup exerts force-dynamic control over the coffee. Of course, this seems rather obvious, but this kind of knowledge, which we take for granted, is acquired as a consequence of our interaction with our physical environment. For example, walking across a room holding a cup of coffee without spilling it actually involves highly sophisticated motor control that we also acquire from experience: we would be unlikely to ask a two-year-old to perform the same task. This experience gives rise to knowledge structures that enable us to make predictions: if we tip the coffee cup upside-down, the coffee will pour out.

The force-dynamic properties just described for the CONTAINER schema also show up in linguistic meaning, as illustrated by the meaning of the preposition *in*. Consider the diagram in Figure 6.5, drawn from the work of Claude Vandeloise (1994).

Vandeloise observes that the image depicted in Figure 6.5 could either represent a bottle or a lightbulb. Observe from example (3) that we can use the preposition *in* to describe the relation between *the lightbulb* (TR) and *the socket* (LM).

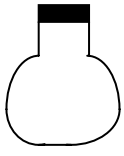

Figure 6.5 A bottle or a lightbulb? (Adapted from Vandeloise 1994)

(3) The bulb is in the socket.

In contrast, we cannot use the preposition *in* to describe the relation between a bottle and its cap, as example (4) shows. (The symbol preceding this example indicates that the sentence is semantically 'odd'.)

(4) The bottle is in the cap

Vandeloise points out that the spatial relation holding between the TR and LM in each of these sentences is identical, and yet while (3) is a perfectly acceptable sentence, (4) is semantically odd. Vandeloise suggests that it is not the spatial relation holding between the TR and LM that accounts for the acceptability or otherwise of *in*. He argues that the relevant factor is one of force-dynamics: '[W]hile the socket exerts a force on the bulb and determines its position, the opposite occurs with the cap and the bottle' (Vandeloise 1994: 173). In other words, not only is the position and the successful function of the bulb contingent on being *in* (contained by) the socket, but the socket also prevents the bulb from succumbing to the force of gravity and falling to the ground. In contrast, the position and successful function of the bottle is not contingent on being *in* the cap. This suggests that our knowledge of the functional consequences associated with the CONTAINER image schema affects the contextual acceptability of a preposition like *in*.

Image schemas are analogue representations

Image schemas are **analogue** representations deriving from experience. In this context, the term 'analogue' means image schemas take a form in the conceptual system that mirrors the sensory experience being represented. In other words, although we can try to describe image schemas using words and pictures, they are not represented in the mind in these kinds of **symbolic** forms. Instead, image-schematic concepts are represented in the mind in terms of holistic sensory experiences, rather like the memory of a physical experience. Let's illustrate this idea with an analogy: learning to drive a car properly cannot simply be achieved by reading a driving manual, or even by listening to a driving instructor explain the 'rules' of driving. At best, these provide very rough clues. Instead, we have to 'learn' how it 'feels' to drive a car by experiencing it at first hand. This learning is a complex process, during which we master an array of interrelated sensori-motor routines. Because image schemas derive from sensory experience, they are represented as summaries of **perceptual states** which are recorded in memory. However, what makes them conceptual rather than purely perceptual in nature is that they give rise to concepts that are consciously **accessible** (Mandler 2004). In other words, image schemas structure (more complex) lexical concepts.

Figure 6.6 The PATH image schema

Image schemas can be internally complex

Image schemas are often, perhaps typically, comprised of more complex aspects that can be analysed separately. For example, the CONTAINER schema is a concept that consists of interior, boundary and exterior elements. Another example of a complex image schema is the SOURCE–PATH–GOAL or simply PATH schema, represented in Figure 6.6. Because a path is a means of moving from one location to another, it consists of a starting point or SOURCE, a destination or GOAL and a series of contiguous locations in between which relate the source and goal. Like all complex image schemas, the PATH schema constitutes an **experiential Gestalt**: it has internal structure but emerges as a coherent whole.

One consequence of internal complexity is that different components of the PATH schema can be referred to. This is illustrated in example (5), where the relevant linguistic units are bracketed. In each of these examples, different components of the path are profiled by the use of different lexical items.

(5) a. SOURCE
John left [England].
b. GOAL
John travelled [to France].
c. SOURCE–GOAL
John travelled [from England] [to France].
d. PATH–GOAL
John travelled [through the Chunnel] [to France].
e. SOURCE–PATH–GOAL
John travelled [from England] [through the Chunnel] [to France].

Image schemas are not the same as mental images

Close your eyes and imagine the face of your mother or father, child or close friend. This is a mental image, relatively rich in detail. Image schemas are not the same as mental images. Mental images are detailed and result from an effortful and partly conscious cognitive process that involves recalling visual memory. Image schemas are schematic and therefore more abstract in nature, emerging from ongoing embodied experience. This means that you can't close your eyes and 'think up' an image schema in the same way that you can 'think up' the sight of someone's face or the feeling of a particular object in your hand.

Image schemas are multi-modal

One of the reasons why we are not able to close our eyes and 'think up' an image schema is because image schemas derive from experiences across different modalities (different types of sensory experience) and hence are not specific to a particular sense. In other words, image schemas are buried 'deeper' within the cognitive system, being abstract patterns arising from a vast range of perceptual experiences and as such are not available to conscious introspection. For instance, blind people have access to image schemas for CONTAINERS, PATHS and so on precisely because the kinds of experiences that give rise to these image schemas rely on a range of sensory-perceptual experiences in addition to vision, including hearing, touch and our experience of movement and balance, to name but a few.

Image schemas are subject to transformations

Because image schemas arise from embodied experience, which is ongoing, they can undergo **transformations** from one image schema into another. In order to get a sense of what this means, consider the following example from Lakoff (1987):

> Imagine a herd of cows up close – close enough to pick out the individual cows. Now imagine yourself moving back until you can no longer pick out individual cows. What you perceive is a mass. There is a point at which you cease making out individuals and start perceiving a mass. (Lakoff 1987: 428)

According to Lakoff, perceptual experiences of this kind mediate a transformation between the COUNT image schema, which relates to a grouping of individual entities that can be individuated and counted, and the MASS image schema, which relates to an entity that is perceived as internally homogenous. The COUNT and MASS schemas are reflected in the grammatical behaviour of nouns, relating to the distinction between **count** and **mass nouns**. Count but not mass nouns can be determined by the indefinite article:

(6) a. He gave me a pen/crayon/ruler/glass of water.
    b. *He gave me a sand/money/gold

However, count nouns can be transformed into mass nouns and vice versa, providing linguistic evidence for the count-mass image-schematic transformation. If a count noun, like *tomato* in example (7), is conceived as a mass, it takes on the grammatical properties of a mass noun, as shown in (8).

(7) Count noun
   a. I have a tomato.
   b. *I have tomato

(8) Mass noun
   a. After my fall there was tomato all over my face.
   b. *After my fall there was a tomato all over my face

In essence, the grammatical transformation from count to mass, which Talmy (2000) calls **debounding**, and the transformation from mass to count, which he calls **excerpting**, is held to be motivated by an image-schematic transformation that underpins our ability to grammatically encode entities in terms of count or mass. As we will see, this distinction is also important in Lakoff's theory of word meaning, which we examine in Chapter 10.

Image schemas can occur in clusters

Image schemas can occur in clusters or networks of related image schemas. To illustrate this, consider again the FORCE schema, which actually consists of a series of related schemas. Force schemas share a number of properties (proposed by Johnson 1987) which are summarised in Table 6.2.

Johnson identifies no fewer than seven force schemas that share the properties detailed in Table 6.2. These schemas are shown in Figures 6.7 to 6.13 (after Johnson 1987: 45–8). The small dark circle represents the source of the force, while the square represents an obstruction of some kind. An unbroken arrow represents the force vector (the course taken by the force), while a broken arrow represents a potential force vector.

The first FORCE schema is the COMPULSION schema (Figure 6.7). This emerges from the experience of being moved by an external force, for example being pushed along helplessly in a large dense crowd, being blown along in a very strong wind and so on.

The second force-related image schema is the BLOCKAGE schema (Figure 6.8). This image schema derives from encounters in which obstacles resist force, for example when a car crashes into an obstacle like a tree.

Table 6.2 Shared characteristics of FORCE schemas

Force schemas are always experienced through interaction
Force schemas involve a force vector, i.e. a directionality
Force schemas typically involve a single path of motion
Force schemas have sources for the force and targets that are acted upon
Forces involve degrees of intensity
Forces involve a chain of causality, a consequence of having a source, target, force vector and path of motion, e.g. a child throwing a ball at a coconut

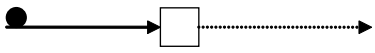

Figure 6.7 The COMPULSION image schema

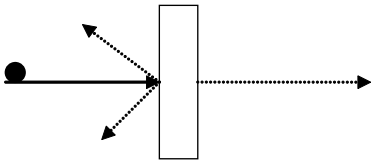

Figure 6.8 The BLOCKAGE image schema

Figure 6.9 The COUNTERFORCE image schema

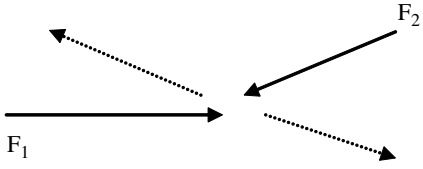

Figure 6.10 The DIVERSION image schema

The third force-related image schema is the CONTERFORCE schema (Figure 6.9). This derives from the experience of two entities meeting with equal force, like when we bump into someone in the street. F_1 and F_2 represent the two counterforces.

The fourth force-related image schema is the DIVERSION schema (Figure 6.10). This occurs when one entity in motion meets another entity and this results in diversion. Examples include a swimmer swimming against a strong current so that she is gradually pushed along the shoreline, or the ricochet of a bullet.

The fifth force-related image schema is the REMOVAL OF RESTRAINT schema (Figure 6.11). This captures a situation in which an obstruction to force is removed, allowing the energy to be released. This describes a situation like leaning on a door that suddenly opens.

The sixth force-related image schema is the ENABLEMENT schema (Figure 6.12). This image schema derives from our sense of potential energy, or lack of it, in relation to the performance of a specific task. While most people who are fit and well feel able to pick up a bag of grocery shopping, for example, few people feel able to lift up a car. It is important to observe that while this image schema does not involve an actual force vector, it does involve a poten-

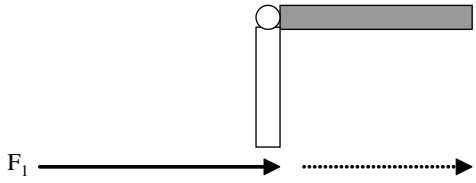

Figure 6.11 The REMOVAL OF RESTRAINT image schema

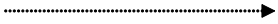

Figure 6.12 The ENABLEMENT image schema

Figure 6.13 The ATTRACTION image schema

tial force vector. According to Johnson, it is this property that marks the ENABLEMENT schema as a distinct image schema.

Finally, the ATTRACTION schema (Figure 6.13) derives from experiences in which one entity is drawn towards another entity due to the force exerted upon it. Examples include magnets, vacuum cleaners and gravity.

6.1.3 Image schemas and linguistic meaning

As we have begun to see in our discussions of the preposition *in* (recall examples (3)–(4)) and the distinction between count and mass nouns (recall examples (6)–(8)), image schemas can serve as the conceptual representation that underpins lexical items. In this section, we briefly examine the relationship between the FORCE schemas we have just considered and the English **modal auxiliary verbs** (e.g. *must*, *may*, *can*). Johnson suggests that certain FORCE schemas underlie the basic or **root** meanings of these verbs: these meanings relate to socio-physical experience, as illustrated in the following sentences:

(9) a. You **must** move your foot or the car will crush it.
[physical necessity]
b. You **may** now kiss the bride.
[no parental, social or institutional barrier now prevents the bride from being kissed by the groom]
c. John **can** throw a javelin over 20 metres.
[he is physically capable of doing this]

Johnson argues that the root meaning of *must* (physical necessity) derives from the COMPULSION schema, while the root meaning of *may* (permission) to relates

to the REMOVAL OF RESTRAINT schema and the root meaning of *can* (physical capacity) derives from the ENABLEMENT schema. Thus his claim is that the meanings associated with the modal verbs have an image-schematic basis which arises from embodied experience.

6.1.4 A provisional list of image schemas

To consolidate the discussion of image schemas presented in this section, we provide in Table 6.3 a list of image schemas compiled from Cienki (1998), Gibbs and Colston (1995), Johnson (1987), Lakoff (1987) and Lakoff and Turner (1989). While far from exhaustive, this list provides an idea of the range of image schemas that have been proposed so far in the literature. Following suggestions by Clausner and Croft (1999), we group the image schemas according to the nature of their experiential grounding, although our listing is arranged slightly differently.

6.1.5 Image schemas and abstract thought

One of the most striking claims made by cognitive semanticists is that abstract thought has a bodily basis. In their influential research on **conceptual metaphors**, George Lakoff and Mark Johnson (1980) have argued that conceptual structure is in part organised in terms of a **metaphor system**, which is characterised by related sets of conventional associations or **mappings** between concrete and abstract **domains**. A domain *in Conceptual Metaphor Theory* is a body of knowledge that organises related concepts. The importance of image schemas is that they can provide the concrete basis for these metaphoric mappings. We have seen some examples like this in earlier

Table 6.3 A partial list of image schemas

SPACE	UP–DOWN, FRONT–BACK, LEFT–RIGHT, NEAR–FAR, CENTRE–PERIPHERY, CONTACT, STRAIGHT, VERTICALITY
CONTAINMENT	CONTAINER, IN–OUT, SURFACE, FULL–EMPTY, CONTENT
LOCOMOTION	MOMENTUM, SOURCE–PATH–GOAL
BALANCE	AXIS BALANCE, TWIN–PAN BALANCE, POINT BALANCE, EQUILIBRIUM
FORCE	COMPULSION, BLOCKAGE, COUNTERFORCE, DIVERSION, REMOVAL OF RESTRAINT, ENABLEMENT, ATTRACTION, RESISTANCE
UNITY/MULTIPLICITY	MERGING, COLLECTION, SPLITTING, ITERATION, PART–WHOLE, COUNT–MASS, LINK(AGE)
IDENTITY	MATCHING, SUPERIMPOSITION
EXISTENCE	REMOVAL, BOUNDED SPACE, CYCLE, OBJECT, PROCESS

chapters: for example, recall our discussion in Chapter 5 of the conceptual metaphor STATES ARE CONTAINERS. Let's consider one more example.

Consider the image schema OBJECT. This image schema is based on our everyday interaction with concrete objects like desks, chairs, tables, cars and so on. The image schema is a schematic representation emerging from embodied experience, which generalises over what is common to objects: for example, that they have physical attributes such as colour, weight and shape, that they occupy a particular bounded region of space, and so forth. This image schema can be 'mapped onto' an abstract entity like 'inflation', which lacks these physical properties. The consequence of this metaphoric mapping is that we now understand an abstract entity like 'inflation' in terms of a physical object. This is illustrated by the examples in (10).

(10) a. If there's much more inflation we'll never survive.
b. Inflation is giving the government a headache.
c. Inflation makes me sick.
d. Lowering interest rates may help to reduce the effects of inflation.

Notice that it is only by understanding 'inflation' in terms of something with physical attributes that we can quantify it and talk about its effects. Thus image schemas which relate to and derive ultimately from pre-conceptual embodied experience can serve to structure more abstract entities such as inflation. We return to a detailed investigation of conceptual metaphor in Chapter 9.

6.2 Conceptual structure

In this section, we explore the thesis that **semantic structure** encodes and externalises conceptual structure. As we explained in the introduction to this chapter, this issue follows on from our investigation of the embodied cognition thesis: once we have uncovered evidence for the idea that embodied experience determines and delimits the range and nature of concepts that can be represented, we can then examine how these concepts are encoded and externalised in language. We do this by looking at how the language system provides meaning based on concepts derived from embodiment.

As we also mentioned in the introduction to this chapter, Talmy has argued that one of the ways that language reflects conceptual representation is by providing **structural meaning**, also known as **schematic meaning**. This kind of meaning relates to structural properties of **referents** (the entities that language describes) and **scenes** (the situations that these entities are involved in). Talmy also argues that this schematic meaning is directly related to fundamental aspects of embodiment.

6.2.1 Semantic structure

Linguistic expressions refer to entities or describe situations or scenes. Entities and scenes can be relatively concrete objects or events, or they can relate to more subjective experiences, such as feeling remorse or joy or experiencing unrequited love. According to Talmy, the way language conveys entities and scenes is by reflecting or encoding the language user's **Cognitive Representation (CR)** or conceptual system. In other words, although the conceptual system is not open to direct investigation, the properties of language allow us to reconstruct the properties of the conceptual system and to build a model of that system that, among other things, explains the observable properties of language. Talmy suggests that the CR, as manifested in language, is made up of two systems, each of which brings equally important but very different dimensions to the scene that they construct together. These systems are the **conceptual structuring system** and the **conceptual content system**. While the conceptual structuring system, as its name suggests, provides the structure, skeleton or 'scaffolding' for a given scene, the content system provides the majority of rich substantive detail. It follows from this view that the meaning associated with the conceptual structuring system is highly schematic in nature, while the meaning associated with the conceptual content system is rich and highly detailed. This distinction is captured in Figure 6.14.

It is important to emphasise that the system represented in Figure 6.14 relates to the conceptual system as it is encoded in semantic structure. In other words, semantic structure represents the conventional means of encoding conceptual structure for expression in language. The bifurcation shown in Figure 6.14 reflects the way language conventionally encodes the conceptual structure that humans externalise in language. Nevertheless, we reiterate a point here that we made in Chapter 5: while lexical concepts are conceptual in nature, in the sense

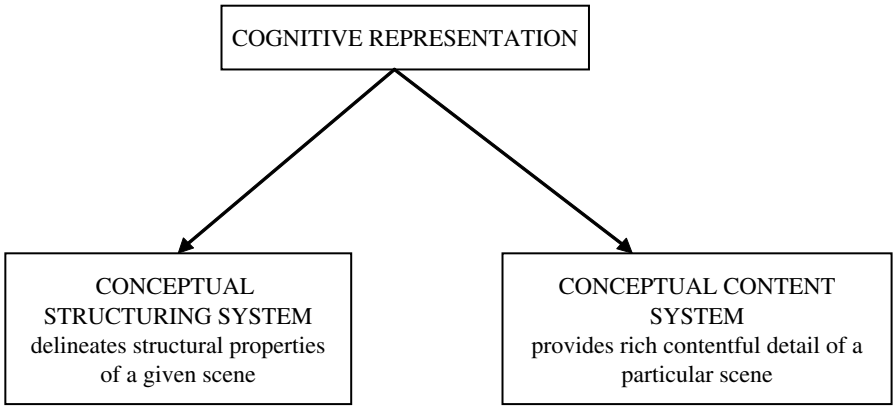

Figure 6.14 The bifurcation in the cognitive representation (CR)

that they prompt for conceptual structures of various kinds, the range of lexical concepts conventionally encoded in language must represent only a small fraction of the range and complexity of conceptual structure in the mind of any given human being. Indeed, as we will see in various chapters throughout Part II of the book, the range of concepts available in the conceptual system and the meaning potential associated with these concepts is vast. This means that while semantic structure must, to some extent at least, reflect conceptual structure, and while semantic structure can be thought of as a subset of conceptual structure – a system of lexical concepts specialised for expression in language – the relationship between conceptual structure and semantic structure is nevertheless complex and indirect. (As we will see later in this part of the book, the conceptual structure associated with linguistic units such as words are prompts for complex processes of conceptualisation, what Gilles Fauconnier refers to as **backstage cognition**.)

Given the hypothesis that semantic structure reflects conceptual structure, the system of semantic structure is also divided into two subsystems, reflecting the bifurcation in the CR. These two systems are the **open-class semantic system** and the **closed-class semantic system** that have already been introduced in previous chapters. These semantic subsystems correspond to the formal distinction between **open-class elements** (for example, nouns like *man*, *cat*, *table*, verbs like *kick*, *run*, *eat*, and adjectives like *happy*, *sad*) and **closed-class elements** (idioms like *kick the bucket*, grammatical patterns like declarative or interrogative constructions, grammatical relations like subject or object, word classes like the category verb, grammatical words like *in* or *the*, and bound morphemes like *-er* in *singer*).

As we have seen, the crucial difference between open-class and closed-class semantics is that while open-class semantics provides rich content, closed-class semantics contributes primarily to the structural content. However, a caveat is in order here. Given the view within cognitive linguistics that meaning and grammar cannot be divorced, the division of semantic structure into two subsystems sets up a somewhat artificial boundary (as we will see in Part III of the book). After all, free morphemes like prepositions (*in, on, under* and so on) which belong to the closed-class system exhibit relatively rich meaning distinctions. Therefore the distinction between the closed-class and open-class semantic subsystems might be more insightfully viewed in terms of distinct points on a continuum rather than in terms of a clear dividing line. We will elaborate this position in Part III by presenting the arguments put forward by cognitive grammarian Ronald Langacker, who suggests that while there is no principled distinction between the lexicon and the grammar, there are nevertheless qualitatively distinct kinds of phenomena that can be identified at the two ends of the continuum. The idea of a lexicon-grammar continuum is represented in Figure 6.15. We might place a lexical concept like FLUFFY at the open-class end,

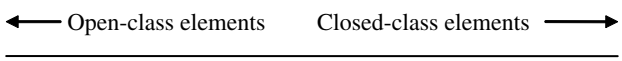

Figure 6.15 The lexicon–grammar continuum

and the concept PAST relating to a grammatical morpheme like *-ed* at the closed-class end, while the lexical concept relating to *in* might be somewhere in the middle of the continuum.

Talmy's research has examined the way in which both the open-class and closed-class semantic systems encode the CR. However, he has been primarily concerned with elaborating the semantics of the closed-class subsystem, the part of semantic structure that is at the grammar 'end' of the continuum shown in Figure 6.15. We defer a detailed presentation of this aspect of Talmy's theory until Part III of the book which explicitly focuses on grammar (Chapter 15). However, Talmy's work is important for our investigation of cognitive semantics for at least two reasons: (1) Talmy's theory illustrates that the closed-class or grammatical subsystem is meaningful (albeit schematic); (2) Talmy's findings suggest that the grammatical subsystem encodes meaning that relates to key aspects of embodied experience, such as the way SPACE and TIME are configured in language, and the way that the closed-class system encodes experiential meaning arising from phenomena such as attention, perspective and force-dynamics. For these reasons, Talmy's research both illustrates and supports the position adopted in cognitive semantics that semantic structure reflects conceptual structure which in turn reflects embodied experience. We turn next to Talmy's proposals concerning the schematic systems that comprise the CR.

6.2.2 Schematic systems

According to Talmy the conceptual structuring system is based upon a limited number of large-scale **schematic systems**. These provide the basic organisation of the CR upon which the rich content meaning encoded by open-class elements can be organised and supported. The basic architecture of these schematic systems has been described in a series of highly influential papers by Leonard Talmy, which are collected in his two-volume set *Toward a Cognitive Semantics* (2000).

Talmy proposes that various schematic systems collaborate to structure a scene that is expressed via language. Each schematic system contributes different structural aspects of the scene, resulting in the overall delineation of the scene's skeletal framework. There are four key schematic systems identified by Talmy: (1) the '**Configurational System**'; (2) the '**Perspectival System**'; (3) the '**Attentional System**'; and (d) the '**Force-Dynamics System**' (see Figure 6.16). We provide a brief overview of each of these systems in turn.

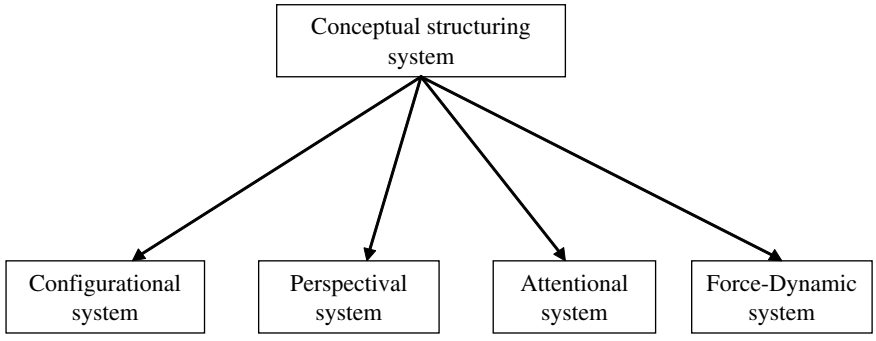

Figure 6.16 The key schematic systems within the 'Conceptual Structuring System'

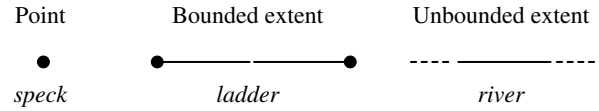

Figure 6.17 Degree of extension for matter (adapted from Talmy 2000: 61)

The 'Configurational System'

The 'Configurational System' structures the temporal and spatial properties associated with a scene, such as the division of a scene into parts and participants. Schematic systems like the 'Configurational System' can be further divided into **schematic categories**. In order to see how both the open-class and closed-class semantic systems encode configurational structure, we will consider one example of a schematic category within this system: the category **degree of extension**. Degree of extension relates to the degree to which matter (space) or action (time) are extended. Consider the open-class words *speck*, *ladder* and *river*, which exemplify this category as it relates to matter. The degree of extension of each of these is illustrated in Figure 6.17.

Lexical items like these include in their semantic specification information relating to degree of extension. For example, part of the meaning of *river* is schematic, relating to the degree of extension associated with rivers. The rich encyclopaedic meaning associated with the lexical item *river* relates to its specific properties as an entity involving water, which occupies a channel of certain dimensions, and which flows under the force of gravity from higher ground sometimes over many miles to the sea, and so on. In contrast to this rich and detailed specific meaning, its schematic meaning concerns the degree of extension associated with this entity. The schematic category 'degree of extension' has three values: a point, a bounded extent or an unbounded extent. Rivers are typically unbounded within the perceptual

field of a human experiencer. In other words, while we may know from looking at maps that rivers have beginnings and ends and are thus bounded, our 'real' experience of rivers is usually that they are unbounded because we cannot see the beginning and end.

The examples in (11)–(13) relate to action rather than matter, and employ closed-class elements in order to specify the degree of extension involved. (Note that 'NP' stands for noun phrase; the relevant NP is bracketed.)

(11) Point *at* + $NP_{point\text{-}of\text{-}time}$
The train passed through at [noon].

(12) Bounded extent *in* + $NP_{extent\text{-}of\text{-}time}$
She went through the training circuit in [five minutes flat].

(13) Unbounded extent '*keep -ing*' + '*-er and -er*'
The plane kept going higher and higher.

As these examples illustrate, some closed-class elements encode a particular degree of extension. For instance, in (11) the preposition *at* together with an NP that encodes a temporal point encodes a point-like degree of extension. The NP does not achieve this meaning by itself: if we substitute a different preposition, a construction containing the same NP *noon* can encode a bounded extent (e.g. *The train arrives between noon and 1 pm*). The punctual nature of the temporal experience in example (11) forms part of the conceptual structuring system and is conveyed in this example by the closed-class system. The nature of the punctual event, that is the passage of a train through a station rather than, say, the flight of a flock of birds overhead, relates to the conceptual content system.

In the example in (12), the preposition *in* together with an NP that encodes a bounded extent encodes a bounded degree of extension. In (13) the closed-class elements *keep -ing* + *-er and -er* encodes an unbounded degree of extension. Each of these closed-class constructions provides a grammatical 'skeleton' specialised for encoding a particular value within the schematic category 'degree of extension'. The conceptual content system can add dramatically different content meaning to this frame (e.g. *keep singing louder and louder; keep swimming faster and faster; keep getting weaker and weaker*), but the schematic meaning contributed by the structuring system remains constant (in all these examples, time has an unbounded degree of extension).

The 'Perspectival System'

In contrast to the 'Configurational System' which partitions a scene into actions and participants with certain properties, the 'Perspectival System'

specifies the perspective from which one 'views' a scene. This system includes schematic categories that relate to the spatial or temporal **perspective point** from which a scene is viewed, the distance of the perspective point from the entity viewed, the change of perspective point over time and so on. To illustrate this system, we will consider one schematic category subsumed by this system, namely **perspectival location** (traditionally called **deixis**). This relates to the position of a **perspective point** or **deictic centre** from which a scene is 'viewed'. In intuitive terms, the deictic centre corresponds to the 'narrator', from whose perspective you can imagine the scene being described. In spoken language, the 'narrator' is the speaker. In each of the following two examples, the perspective point from which the scene is described is different. In (14), the perspective point is located inside the room, while in (15) the perspective point is located outside the room.

(14) Interior perspective point
The door slowly opened and two men walked in.

(15) Exterior perspective point
Two men slowly opened the door and walked in.
(Talmy 2000: 69)

Examples like these raise the following question: how do we know where the perspective point is located? After all, there does not appear to be anything in these sentences that explicitly tells us where it is. However, it is not the case that there is no explicit encoding that conveys the perspective point. It is simply that the perspective point is encoded by the grammatical or closed-class system: here, by the grammatical construction of the sentence. In example (14), the subject of the sentence is *the door*, which is the THEME: a passive entity whose location or state is described. In this example, *open* is an intransitive verb: it requires no object. In example (15), the subject of the sentence is *two men*, which is the AGENT: the entity that intentionally performs the action of opening the door. In this example, *open* is transitive (it requires an object: *the door*).

Why does changing the grammatical structure of the sentence, and thus the subject, affect our understanding of the perspective point? The reason is that what comes first in the sentence (the subject) corresponds to what is viewed first by the speaker/narrator, and this provides us with clues for reconstructing the perspective point. In the first clause of example (14), the initiator(s) of the action are not mentioned, so we deduce that the initiators of the action are not visible. From this we conclude that the perspective point must be inside the room. In example (15) the initiators of the event are mentioned first, so we deduce that the perspective point is exterior to the room. The way in which grammatical organisation mirrors experience is called **iconicity**. This features prominently in explanations offered by functional typologists (see Croft 2002),

and has also influenced the cognitive semantics framework. These examples illustrate that the grammatical organisation of the sentence provides schematic information that enables us to determine where the perspective point is located.

The 'Attentional System'

This system specifies how the speaker intends the hearer to direct his or her attention towards the entities that participate in a particular scene. For instance, this system can direct attention to just one part of a scene. By way of illustration, consider the pattern of distributing attention that is called the **windowing of attention**:

(16) a. Initial and final windowing
The crate fell out of the plane into the ocean.
b. Initial, medial and final windowing
The crate fell out of the plane, through the air and into the sea.

The examples in (16) relate to **path windowing**. Path windowing is a way of focusing attention on a particular subpart of a path of motion. Consider the path of motion represented in Figure 6.18, where the line between point A and point B represents the path of motion followed by a crate that falls from an airborne plane travelling over water. Point A represents the initial location of the crate, the line represents the trajectory of descent and point B represents the final location of the crate once it hits the water.

Path windowing allows language users to **window** (focus attention on) subparts of the trajectory associated with the motion of an object. In principle, windowing can operate over the initial portion of the path, the medial portion or the final portion. The examples in (17) illustrate some more of the ways in which language can encode the windowing of attention. Recall from our discussion of example (5) that it is the internal complexity of the PATH image

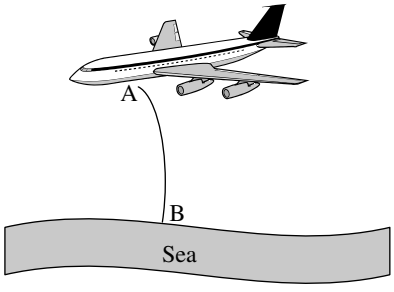

Figure 6.18 The path associated with an object falling out of a plane

schema that enables attention to be focused on distinct subparts of the path of motion. The initial, medial and final windows therefore correspond to the SOURCE, PATH and GOAL of the image schema, respectively.

(17) a. Medial and final windowing
The crate fell [through the air] and [into the ocean].
b. Initial windowing
The crate fell [out of the plane].
c. Medial windowing
The crate fell [through the air].
d. Final windowing
The crate fell [into the ocean].

The 'Force-Dynamics System'

Talmy argues that this system, as it is manifested in semantic structure, relates to the way in which objects are conceived relative to the exertion of force. It is worth pointing out that while the other schematic systems we have discussed so far relate primarily to information derived from visual perception, the 'Force-Dynamics System' derives from **kinaesthesia (**our bodily experience of muscular effort or motion) and **somesthesia** (our bodily experience of sensations such as pressure and pain). To illustrate this system and the linguistic devices that give rise to force-dynamics distinctions, consider the following examples drawn or adapted from Talmy (2000: 412).

(18) Physical force
a. The ball was rolling along the beach
b. The ball kept rolling along the beach

The examples in (18) highlight a contrast in physical force. The expression in (18a) depicts a scene that is neutral with respect to force, in the sense that, while encyclopaedic knowledge tells us that something or someone must have caused the motion of the ball, the sentence does not refer to this knowledge. In contrast, the use of the *keep* V-*ing* construction in (18b) conveys a scene in which we understand that the ball's natural tendency towards rest is overcome by some external force, perhaps the wind, which ensures that the ball remains in a state of motion. Again, the only difference between these two examples is in the grammatical constructions: specifically, the auxiliary verb *be* versus the quasi-auxiliary *keep*, together with the progressive participle V-*ing*. According to Talmy, FORCE forms part of the conceptual structure associated with our CR, the 'Force-Dynamics System', and can be encoded via closed-class elements like grammatical constructions.

The 'Force-Dynamics System' does not just relate to physical force, but can also relate to 'psychological' force. Consider example (19).

(19) Psychological force
  a. He didn't close the door.
  b. He refrained from closing the door.

In this example, the contrast is between an AGENT's non-action, as in (19a), and the AGENT's resistance of the urge to act, as in (19b). In other words, the construction *not VP* in (19a) is, like (19a), neutral with respect to force. In contrast, the construction *refrain from* VP*ing* encodes a force-dynamics conflict internal to the agent.

Finally, consider example (20), which illustrates social force.

(20) Social force
  a. She's got to go to the park.
  b. She gets to go to the park.

The *have (got) to* VP construction in (20a) encodes a scene in which the subject's desire not to act is overcome by an external force so that she is forced to act. Our encyclopaedic knowledge tells us that the force that obliges someone to go to the park is likely to be of a social rather than a physical nature: this construction therefore expresses obligation. The *get to VP* construction in (20b), on the other hand, encodes a scene in which the subject's desire to act is unimpeded by any external inhibiting force so that she is able to act. This construction therefore expresses permission. Both scenes depict the same end result, but the grammatical constructions encode different force-dynamics of a social nature that lead to this result.

The discussion in this section has provided only the briefest introduction to a number of extremely complex schematic systems proposed by Talmy, each of which consists of a number of schematic categories. It is important to point out that the systems described here do not, in all likelihood, represent an exhaustive list of the subsystems that make up the conceptual structuring system, as Talmy himself acknowledges. However, even this brief discussion reveals that systematic patterns in language, both in the open-class and the closed-class semantic systems, represent evidence for a conceptual system that structures knowledge according to embodied experience. As this discussion indicates, Talmy's theory requires a significant grammatical vocabulary in order to be fully understood. For this reason, we defer a more detailed investigation of this model until Part III of the book (Chapter 15), where our focus is on cognitive approaches to grammar.

6.3 Summary

This chapter has explored two guiding principles of cognitive semantics: (1) the thesis that conceptual structure derives from **embodied experience**; and (2) the thesis that semantic structure reflects **conceptual structure**. Conceptual structure is the cognitive system that represents and organises experience in a form that can serve as the input for processes like reasoning and expression in language. Semantic structure is the system wherein concepts are conventionally encoded in a form in which they can be externalised by language. The first part of the chapter focused on the relationship between embodied experience and conceptual structure, and introduced the theory of **image schemas**. Image schemas are relatively abstract representations that derive from our everyday interaction with and observation of the world around us. These experiences give rise to embodied representations that, in part, underpin conceptual structure. The second part of the chapter addressed the relationship between conceptual structure and semantic structure, and introduced Talmy's theory of the conceptual system. On the basis of evidence from linguistic representation, conceptual structure can be divided into two systems, the **conceptual structuring system** and the **conceptual content system**. While the conceptual structuring system provides structural or schematic information relating to a particular scene, the conceptual content system provides the rich content or detail. Talmy argues that the conceptual structuring system can be divided into a number of **schematic systems** which together serve to provide the structure or 'scaffolding' for the rich content provided by the conceptual content system. Crucially, the nature of these schematic systems relates to fundamental aspects of embodied sensory-perceptual experience, such as how referents and scenes encoded in language are structured, the perspective taken with respect to such scenes, how attention is directed within scenes and force-dynamics properties. In sum, both the open-class and closed-class semantic systems reflect and encode fundamental aspects of embodied experience, mediated by conceptual structure.

Further reading

Image schemas: theory and description

- **Cienki (1998).** An in-depth analysis of the single image schema STRAIGHT, its experiential basis and its metaphoric extensions, with data from English, Japanese and Russian.
- **Hampe (forthcoming).** This excellent collected volume constitutes an up-to-date review by leading authors of the state of the art in image schema research. Of particular importance are the papers by Grady,

Johnson and Rohrer, and Zlatev, who develops the notion of what he refers to as the 'mimetic schema'.

- **Johnson (1987).** Mark Johnson's book represents the original statement on image schemas; now a classic.
- **Lakoff (1987).** Lakoff discusses image schemas in the development of his theory of cognitive models. See in particular his influential study of *over*.
- **Lakoff (1990).** Lakoff explores the thesis that metaphoric thought is due to image schemas and their extensions to abstract domains.

Applications of image schema theory

- **Gibbs and Colston (1995).** This paper reviews findings from psycholinguistics and cognitive and developmental psychology that support the position that image schemas are psychologically real.
- **Mandler (2004).** Jean Mandler is a developmental psychologist. She argues that image schemas may form the basis of early conceptual development in infants.
- **Turner (1996).** Mark Turner, an influential figure in cognitive linguistics, applies the notion of image schemas to literary and poetic thought and language.

Schematic systems

- **Talmy (2000).** Chapter 1 of the first volume provides an influential discussion of the Cognitive Respresentation system (CR), and how it relates to the concept and content structuring systems and closed-class and open-class semantics. This volume also collects together Talmy's influential papers on the schematic systems.

Exercises

6.1 Image schemas

A number of image schemas are listed below. We have seen that image schemas derive from embodied experience. Make a list of the kinds of situations that are likely to give rise to these image schemas and the sensory-perceptual modalities to which these experiences relate (you may wish to consult Table 6.1). The first example has been done for you.

(a) COMPULSION *situations*: being moved by external forces like wind, water, physical objects and other people

sensory-perceptual modalities: haptic system (touch, pressure on skin); vestibular system (balance, orientation); kinaesthesia (awareness of motion, other-initiated motion, inability to stop oneself from moving, directionality of motion, and so on)

(b) CONTAINER
(c) MATERIAL OBJECT
(d) PROCESS
(e) CENTRE–PERIPHERY
(f) CONTACT
(g) NEAR–FAR
(h) SCALE

6.2 Image schemas and metaphor

Consider the following sentences. Identify the image schemas that serve as source domains in these sentences.

(a) We need to weigh up the arguments.
(b) They're in trouble.
(c) The logic of her argument compelled me to change my mind.
(d) Interest rates have gone up again.
(e) The current rate of borrowing on credit will prove to be a heavy burden for the nation.

6.3 Cognitive Representation

List the main differences between the conceptual structuring and conceptual content systems. How are these systems reflected in language? Can you provide some examples of your own to illustrate your answer?

6.4 Schematic category: degree of extension

In view of the discussion of the schematic category 'degree of extension', consider the following examples. Identify the sentences that relate to point, bounded extent and unbounded extent. Some of the sentences relate to matter (SPACE) and action (TIME). Identify which is which. You may wish to refer to Figure 6.17.

(a) When the sheep all died, we moved out of the farm.
(b) The house is (exactly) 10 metres away from the farm.
(c) The sheep kept dying.
(d) The house seems to go on and on.

(e) I read that book twenty years ago.
(f) The house is 10 metres wide.
(g) The sheep all died in six weeks.
(h) She read the book in two days.
(i) She kept reading the book.

6.5 The intersection of schematic categories

Consider two new schematic categories that relate to the configurational system: 'plexity' and 'state of boundedness'. The category 'plexity' relates to the division of matter or action into equal elements. In the domain of matter, plexity relates to the grammatical category 'number' with its member notions 'singular' and 'plural'. In the domain of action it relates to the traditional aspectual distinction between 'semelfactive' and 'iterative' (the distinction between one and more than one instance of a point-like event, respectively). This category and its member notions of 'uniplex' and 'multiplex' are illustrated below:

	Matter	*Action*
Uniplex	A bird flew in.	He sighed (once).
Multiplex	Birds flew in.	He kept sighing.

Now consider the schematic category 'state of boundedness'. This relates to the categories count noun and mass noun, and to the distinction between perfective and imperfective verbs (these describe events that change through time or remain constant through time, respectively). This category has two member notions, 'bounded' and 'unbounded' as illustrated below:

	Matter	*Action*
Unbounded	Water makes up three-quarters of the planet.	The Eiffel Tower stands across from the Trocadero.
Bounded	We came across a small lake.	She kicked the ball.

These schematic categories intersect. For instance, the lexical item *timber* is both unbounded (consisting of the set of all trees) and multiplex (consisting of more than one element). Place the following lexical items in the appropriate place in the table provided below:

(a) furniture
(b) (a) grove
(c) (a) cat
(d) (to) snore
(e) (to) moult, e.g. *The dog moulted*
(f) (a) tree
(g) (to) breathe
(h) (a) family

	Uniplex	*Multiplex*
Bounded		
Unbounded		

Now consider the lexical item *trees*. Where would you place this? Did you have any difficulties in deciding? What does this illustrate?

Finally, state which of the lexical items relates to matter and which to action. Is there a distinction in terms of word class ('part of speech')?