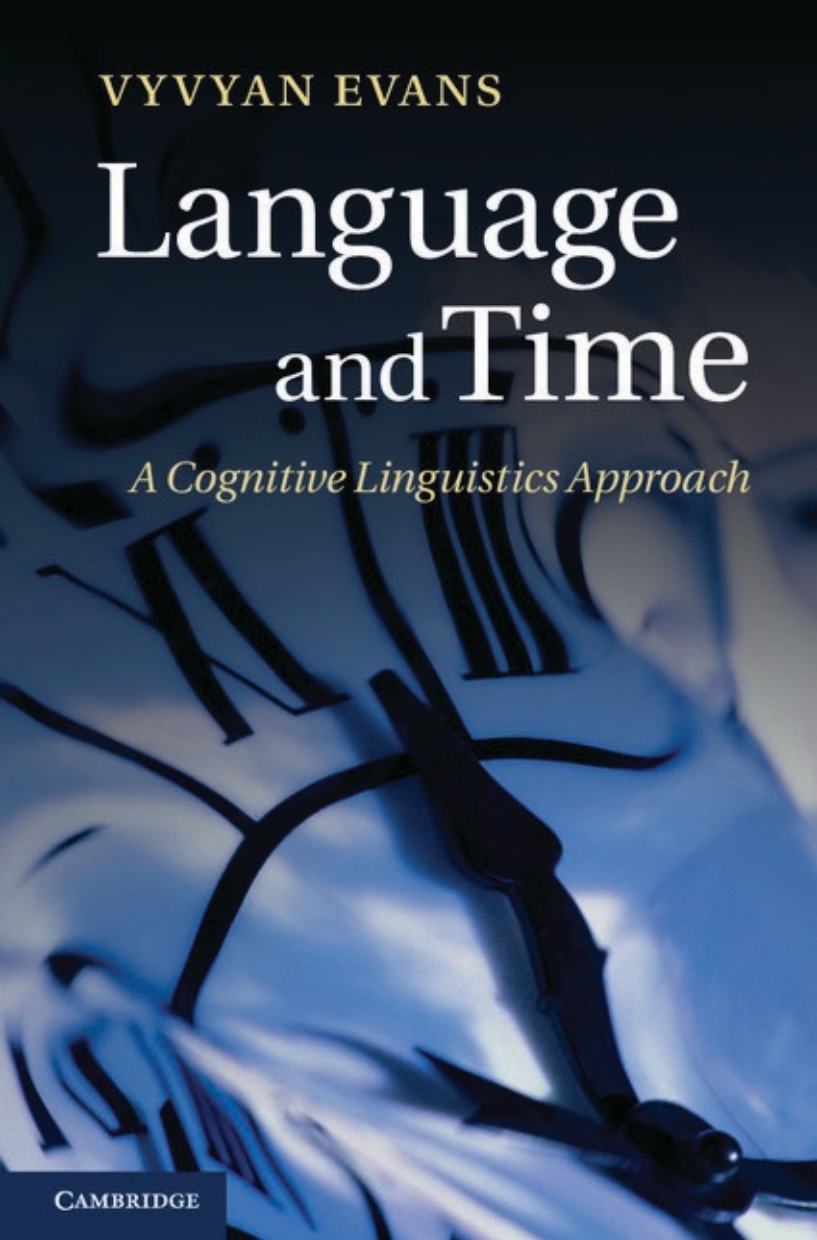
VYVYAN EVANS

Language and Time

A Cognitive Linguistics Approach



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Language and Time

Using language and thought to fix events in time is one of the most complex computational feats that humans perform. In the first book-length taxonomy of temporal frames of reference, Vyvyan Evans provides an overview of the role of space in structuring human representations of time. Challenging the assumption that time is straightforwardly structured in terms of space, he shows that while space is important for temporal representation, time is nevertheless separate and distinguishable from it. Evans argues for three distinct temporal frames of reference in language and cognition and evaluates the nature of temporal reference from a cross-linguistic perspective. His central thesis is that the hallmark of temporal reference is transience, a property unique to the domain of time. This important study has implications not only for the relationship between space and time, but also for that between language and figurative thought, and the nature of linguistically mediated meaning construction.

VYVYAN EVANS is Professor of Linguistics at Bangor University.

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For Georgina, Myles, Lila, Isabella and Max

Time present and time past
Are both perhaps present in time future,
And time future contained in time past.
If all time is eternally present
All time is unredeemable.

T.S. Eliot – Burnt Norton, *Four Quartets*

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Preface

This book provides a study in the domain of time: an arena of inquiry I first addressed in an earlier book-length treatment, unassumingly entitled *The Structure of Time*, published in 2004. In that book I was primarily concerned with detailing a level of language-specific concepts for time. These I referred to as *lexical concepts*. The present book is concerned with somewhat different issues, although the study developed here can be seen as complementing the previous one. It is also probably fair to say that this study is broader and in key respects more ambitious in scope, in terms of both its descriptive focus and its theoretical aspirations.

In this book I focus on the linguistic and conceptual resources we make use of when we fix events in time. This is the phenomenon of temporal reference. In particular, this book is concerned with the nature of temporal frames of reference. While there has been an increasing body of research investigating the nature of reference strategies in the domain of space, deriving from, in particular, the pioneering work of Leonard Talmy (e.g., 2000) and Stephen Levinson (e.g., 2003), there has been relatively little research conducted on temporal frames of reference, although there are now some notable and important exceptions (Bender *et al.* 2010, 2012; Tenbrink 2011; Zinken 2010). Hence, a book-length study of temporal frames of reference is both timely and overdue.

This book is concerned with two intertwined issues in the study of temporal reference. My first concern is to explore the nature of temporal frames of reference. Specifically, I examine their conceptual and representational content, and look at evidence from across a number of modalities, especially language. My aim here is to provide a taxonomy of temporal frames of reference. And in particular, I seek to compare and contrast temporal frames of reference with what is known regarding strategies for reference in the domain of space.

My second concern relates to the way in which linguistically mediated meaning construction proceeds, such that expressions encoding temporal frames of reference are correctly understood. This involves providing an account of the respective roles of linguistic and non-linguistic – which is to say, conceptual – knowledge. As temporal frames of reference appear to borrow structure and content from the domain of space, one of the issues I consider in detail is the

nature of figurative language and thought. I provide an account of the nature and role of different types of figurative phenomena, including conceptual metaphors, in order to get to grips with the way different types of knowledge contribute to the way expressions encoding temporal frames of reference are understood.

A further motivation for conducting this study is a theoretical one. In my previous book, *How Words Mean*, published in 2009, I developed a theoretical model of lexical representation and linguistically mediated meaning construction. This is the Theory of Lexical Concepts and Cognitive Models, or LCCM Theory for short. A major concern of that book was theory construction. This necessarily reduced the scope for detailed application to linguistic and conceptual phenomena. The study presented here is intended, in part, as a means of making good on what that earlier book promised. This book represents, in effect, a detailed case study in how to deploy the toolkit and perspective provided by LCCM Theory. As such, it can be viewed as a companion to *How Words Mean*. Nevertheless, for purposes of accessibility, the present book is free standing. While some prior knowledge of LCCM Theory may be an advantage, this book assumes (almost) no knowledge of the earlier work, and introduces key ideas as they are required. Moreover, the present work takes the opportunity to further develop and refine certain aspects of LCCM Theory.

The study in this book applies the two theoretical dimensions modelled in LCCM Theory. These provide an account of lexical representation and the linguistic and non-linguistic processes necessary to account for linguistically mediated meaning construction. The two central parts of the present book, Parts II and III, address these respectively. In Part II, I present a detailed linguistic taxonomy of temporal frames of reference. I use the methodology provided by LCCM Theory to identify linguistic units and lexical concepts for temporal reference. In Part III, I address the issue of figurative language and thought in order to establish the way in which meaning construction applies in expressions that encode temporal frames of reference. I examine the nature of figurative language in order to work out the relative contribution of different types of knowledge to understanding how interpretations of temporal reference arise. I do so by making use of the way meaning construction is modelled in LCCM Theory.

The central claim I make in this book is this: time is a phenomenologically real experience that we perceive via interoceptively real, subjective experience. Moreover, the hallmark of temporal reference – that aspect of temporal experience under the microscope here – is *transience* (cf. Galton 2011). I argue that our temporal frames of reference, which are cognitive entities, are anchored to transience – I spell out its nature in Chapter 3. Previous research has often, perhaps blithely, assumed that time in many respects patterns after space. But it is now beginning to be acknowledged that a straightforward application of

frames of reference from the domain of space can only get us so far in understanding temporal reference (Bender *et al.* 2012). A theme of my 2004 book was that time is distinct and distinguishable from space, and this is a theme I pick up and develop further in this book. I hope to convince the reader that the underpinnings of our ability to compute temporal reference are fundamentally temporal in nature. This doesn't mean, of course, that space is not important for representations of time. It is. But the onus on the analyst is to figure out what space brings to the table, so to speak, and what is inalienable to time. This is a recurring issue that I grapple with here.

Since the advent of experimental psychology over a century ago, the scientific investigation of time has been a recurring topic of study. And there is an impressively large literature in various branches of psychology stretching back well over a century. Moreover, over the last four decades, large literatures relating to time have developed in linguistics, in (cognitive) anthropological traditions, and in neuroscience. Yet despite the large amount of data and the range of theories across a number of disciplines, it is striking how much remains to be understood about time in language and thought. While this book is doubtless not for the faint-hearted, the study presented here will contribute, I hope, to our ongoing discovery of time's essence, and its mystery.

Acknowledgements

I have been fascinated by the study of time since I was a graduate student. A good number of fellow-travellers, who at different points have held the dubious honour of being described as my colleague(s), mentor(s) and/or friend(s), have variously agreed and disagreed with me in terms of how to approach time, temporal reference, figurative language, and a good many other things. I am especially indebted to the following researchers for their input into my understanding of time, for their own excellent research in this area, and for their forbearance when I have (in some cases too often) chosen to ignore their sound advice: Daniel Casasanto, Gilles Fauconnier, Sarah Duffy, George Lakoff, Kevin Moore, Günter Radden, Chris Sinha, Kazuko Shinohara, and Mark Turner. I owe a particular and profound debt to my colleagues Thora Tenbrink and Alan Wallington, not only for their own important contributions to the study of time, but also for their generosity in thinking through and engaging with me in detail on many of the ideas presented in this book. Thora and Alan read and commented on various draft chapters, going way beyond the call of duty in doing so. I will always be grateful for the time they have given me. I will also always be indebted to Andrea Tyler, my former PhD supervisor, and an enduring colleague and friend. It was Ande who supported my initial forays into the domain of time when I was a PhD student at Georgetown University. In addition to her own exemplary scholarship, I remain indebted to her for her example of what it means to be an outstanding researcher, educator and colleague. I am also grateful to two anonymous readers for Cambridge University Press who provided such excellent feedback.

I first began developing the ideas that are apparent here in the summer of 2010. Since then, I have had outstanding opportunities to present some of the ideas described in these pages at numerous venues around the world. I remain grateful to the organisers of these events for the opportunities I have been afforded. But I would like, in particular, to acknowledge the work of Barbara Lewandowska-Tomaszczyk in organising the very important TimeLing conference that took place in 2012 at the University of Łódź in Poland. I remain especially grateful to the audience and participants at that event for their extremely

insightful feedback. Finally, I gratefully acknowledge the work of my editor at Cambridge University Press, Andrew Winnard. Andrew is an exemplary model of efficiency, organisation and sound judgement. I remain extremely grateful for his belief and support.

Abbreviations

ADJ	Adjective
ATOM	A Theory of Magnitude
ERP	Event-related potential
F	Figure
FoR	Frame of reference
LCCM Theory	The Theory of Lexical Concepts and Cognitive Models
LM	Landmark
ME	Moving Ego construal
MT	Moving Time construal
MTL	The Mental Time Line hypothesis
NP	Noun phrase
O	Origo
OBL	Oblique
Part	Particle
PP	Perspective point
Prep	Preposition
PrepP	Prep-phrase
PRP	Primary reference point
RO	Reference object
RP	Reference point
s-FoR	Spatial frame of reference
SRP	Secondary reference point
Subj	Subject
TAM	Tense, aspect and modality
TE	Target event
t-FoR	Temporal frame of reference
TNS	Tense
TR	Trajector
VP	Verb phrase
VPC	Verb particle construction

Part I

Orientation

This part of the book provides an orientation to the research questions, perspective and theoretical approach undertaken. It consists of two chapters. The first of these provides an introduction to the nature of temporal reference and considers, in broad terms, the research foci of the book. In so doing it sets the scene for the study of temporal reference and meaning construction in the remainder of the book. The second chapter is concerned with introducing the theoretical and methodological perspective that guides the study of time presented here.

1 Introduction

> Transience is the force of time that makes a ghost of every experience.
> John O'Donohue, *Anam Cara: A Book of Celtic Wisdom*

This book is concerned with *temporal frames of reference*: the means that humans have available to them in order to fix events in time. In broad terms I am concerned with two aspects of temporal reference. First, I seek to uncover the cognitive representations for temporal frames of reference (hereafter t-FoRs). Linguistic evidence provides the primary tool I deploy for delving into the nature of temporal representation. And second, I am concerned with meaning construction. I examine the way in which situated interpretations arise in linguistic expressions relating to temporal reference. To achieve this, we must of necessity grapple with two intertwined issues. First off, time often appears to be supported by spatial knowledge. Does this then mean that time is somehow not real, but a mental construct, parasitic on, in some sense, space as a more 'basic' type of experience? I argue that the neurological and behavioural evidence does not support such a view. That said, space does appear to be necessary for the representation of time in both language and thought. I explore the reasons for this. The second issue concerns the precise nature of the role of *conceptual metaphor* in meaning construction (in the domain of time). The consequence of these two broad concerns is the following: in this book I address the nature of the linguistic resources humans deploy in order to signal temporal reference. This in turn sheds light, I will argue, on the non-linguistic resources – both conceptual and neurological – that language relies upon in establishing temporal reference and in constructing meaning in the domain of time.

The book has three distinct aims. First, it represents a detailed application of the *Theory of Lexical Concepts and Cognitive Models*, or LCCM Theory for short. This I developed in an earlier book (Evans 2009b). LCCM Theory provides an account of two fundamental aspects of language and its relation to the conceptual system: lexical representation and meaning construction. In an important sense, this book provides a detailed application of LCCM Theory, taking temporal reference as its object of enquiry. Accordingly, it presents a case study in the nature of the lexical representation of temporal

reference and the way in which linguistically mediated meaning is achieved in this domain.

Second, the book focuses on the domain of time. I have chosen time for this study as it is one of the most, if not the most, challenging domain of enquiry in terms of understanding the relation between language, perceptual experience, conceptual representation and meaning. Part of the complexity comes from the fact that time appears, in some ways, to be structured in terms of aspects of spatial experience. And yet time is quite unlike space. Time exhibits the phenomenon of *transience*, as intimated by the quotation above, and as discussed in more detail in Chapter 3. And in contrast to time, space doesn't. Indeed, in the chapters that follow I argue that temporal and spatial reference are distinct and distinguishable for precisely this reason. Important questions that need to be resolved relate to the nature and status of space in temporal representation, language and thought. These are questions that I also address.

Third, in this book, I am concerned with the role of metaphor in temporal language and in meaning construction more generally. I argue that it is overly simplistic to assume that conceptual metaphor is the driving force for much of meaning construction, as has sometimes been proposed by some prominent cognitive linguists. Conceptual metaphor has a role in structuring the conceptual system. But language provides a semiotic system in its own right, and temporal reference is a system that, in terms of its provenance, does not derive from space, as I shall argue in detail. Time as a domain of experience is, in principle, distinct from spatial experience; it can, for instance, be traced to independent neurological structures, as I make clear later in the book.

1 Previous approaches to temporal reference

Research on temporal reference has traditionally focused on the ascription of motion to time, thereby facilitating different perspective points. Since Clark (1973), the phenomenon of *deictic reference* has been recognised with the so-called Moving Time (MT) and Moving Ego (ME) perspective points. In the examples in (1), temporal reference arises from the ascription of motion to temporal events with respect to a stationary ego – as in (1a) – or from the ascription of motion to the ego which moves towards a temporal event, conceived as a static location – as in (1b).

(1) a. Christmas is approaching (us) [Moving Time]
b. We are approaching Christmas [Moving Ego]

Since Moore (2000, 2006; see also Núñez and Sweetser 2006), a further distinction has been recognised, that of *sequential reference* in the domain of time. Building on insights by Traugott (1978), Moore argued that the ascription of motion to events conceived as a sequence provides an alternative, and

a complementary, means of facilitating temporal reference. Importantly, while deictic reference encodes a future/past relationship, sequential reference facilitates an earlier/later relationship (see also Evans 2004a):

(2) Christmas comes before New Year's Eve

In the example in (2), Christmas is fixed in time with respect, not to an ego, but to a later event, namely New Year's Eve.

In addition to deictic and sequential reference, Kranjec (2006) has suggested that a third type of temporal reference may also exist. He dubs this *extrinsic reference*, and it also makes use of the ascription of motion to time. In this reference strategy, motion provides an extrinsic field which serves to fix an event, or events, in time. In this type of reference strategy, time is conceived as a matrix, or manifold (Evans 2004a), which constitutes *the* event within which all other events occur. This way of conceiving of time allows the human experiencer to fix events by virtue of 'where' in time they occur, and is evidenced by motion ascriptions such as the following:

(3) Time flows on (forever)

In addition to the linguistic evidence, there is compelling behavioural evidence which supports the view that the three temporal reference strategies have psychological reality. In a classic experiment, McGlone and Harding (1998) developed a paradigm involving an ambiguous temporal task. In so doing, they established the psychological reality of the deictic temporal perspective. This finding has since been substantiated in related experimental work using spatial cues by Boroditsky (2000) and Gentner *et al.* (2002), amongst others. Adapting the McGlone and Harding paradigm, Núñez and colleagues (2006) provided behavioural evidence for the psychological reality of sequential reference. And Kranjec (2006) has provided behavioural evidence to suggest the psychological reality of extrinsic temporal reference.

Given the putative existence of three types of temporal reference strategy, the question that arises is how best to account for these. More specifically, what exactly is the nature of each type of reference strategy? How do they differ? What are their neurological and experiential antecedents, if any? And do they have linguistic reflexes? These are questions I address in detail in Part II of the book.

An important research tradition in cognitive science is Conceptual Metaphor Theory (Lakoff and Johnson 1980, 1999). This approach has demonstrated that time is supported, in part, in terms of our experience of and representations for (motion through) space. Lakoff (1993), for instance, argues that the different perspective points associated with deictic reference in the domain of time are due to a general conceptual metaphor: TIME PASSING IS MOTION THROUGH SPACE. In other words, time is structured, at least in part, in terms of spatial

representations grounded ultimately by sensory-motor experience (Lakoff and Johnson 1999).

The findings from Conceptual Metaphor Theory have contributed, in part, to an approach to temporal reference which seeks to apply *frames of reference* (FoRs) from the domain of space to observable temporal reference strategies. The hypothesis is that if time is partly structured in terms of space, then temporal reference should make use of and hence pattern after spatial reference (Bender *et al.* 2005, 2010; Kranjec 2006). In particular, two recent treatments have developed detailed taxonomies of temporal reference that, in slightly different ways, apply the framework of spatial reference to understand temporal reference. These accounts (Bender *et al.* 2010 and Tenbrink 2011), which I review in Chapter 3, provide extremely insightful applications of the spatial reference to the domain of time, and in so doing build on and extend Levinson's (2003) seminal treatment of FoRs in the domain of space.

That said, in addition, temporal reference invokes the notion of transience: a phenomenologically real experience type that has not hitherto been fully recognised (although see Galton 2011). While not denying that space often does support temporal reasoning, my central thesis is that time is not quite like space. While time shares some – although only some – abstract parameters with space, especially that of quantifiability, for which I will use the term *magnitude*, the two domains are different in large measure. While an application of *spatial frames of reference* (hereafter s-FoRs) to time is doubtless insightful, I argue that such an application does not fully resolve the inalienable nature of temporal reference. In Chapter 3 I make the case for the often divergent nature of spatial and temporal reference. Once this has been done, I develop a taxonomy of deictic, sequential and extrinsic t-FoRs. Temporal reference, I claim, is grounded in the phenomenon of transience, the hallmark of temporal reference (Galton 2011). Moreover, transience manifests itself in three distinct ways, giving rise to distinct *temporal relations*. I argue that the function of a t-FoR is to give rise to a temporal relation, and hence it may not be best studied by focusing exclusively on the way temporal reference patterns after *spatial relations*. This follows, I will argue, as transience is precisely that facet of temporal experience which is absent from spatial experience.

2 Temporal frames of reference

A t-FoR, I shall argue, can be encoded by a conventional argument-structure construction – which is to say a sentence-level construction. Such argument-structure constructions can be lexically filled in a delimited range of ways. To illustrate, consider the following examples from English:

(4) We are getting close to Christmas
(5) The microchip came after the transistor

In the example in (4), the event of Christmas is being fixed with respect to the egocentric experience of now. In contrast, in (5) the advent of the microchip is being fixed relative to the appearance of the transistor (Evans 2009b; Moore 2006, 2011; see also Núñez and Sweetser 2006). In his work, Kevin Moore has insightfully argued that the temporal reference point (RP) in examples such as these is distinct. The example in (4) locates Christmas with respect to an Ego-RP, encoded by the expression *we*. This ego-based RP encodes a future/past relation: in (4) Christmas is located in the future with respect to the egocentric perspective encoded by *we*. In (5) the advent of the microchip is located with respect to another event, and hence an Event-RP. The example in (5) thereby encodes an earlier/later – rather than future/past – relation. That is, two events are being sequenced with respect to one another: the emergence of the microchip came later than the invention of the transistor.

My theoretical starting point for the linguistic analysis presented in Part II of this book is the following claim: language is made up of learned associations between form and meaning (Croft 2001; Goldberg 1995, 2006; Langacker 1987, 2008; see also Evans and Green 2006). These form–meaning pairings are often referred to as *constructions*.[1] In other words, the sentences in (4) and (5) are licensed by underlying t-FoR constructions – conventional units of linguistic knowledge that allow us to formulate temporal expressions with respect to different RPs and hence provide different temporal perspectives and even different types of temporal relations.

Argument-structure constructions, the type of construction I shall be analysing in this book, provide a given language with structure at the level of clauses and sentences. As argument-structure constructions possess meaning independent of the individual words that are integrated within the construction, any given sentence, in any given language, arises on the basis of these constructional templates. Put slightly differently, constructions provide the sentence with schematic meaning independently of the words that fill it.

In classic work, Goldberg (1995) has shown that, for instance, the ditransitive construction carries a distinct semantic representation – one that is independent of the individual words that serve to substantiate it. By way of example, consider the sentence in (6). This, she argues, is motivated by the ditransitive construction in (7), consisting of a form, which I refer to as the *vehicle* (7a), and a meaning, which I refer to as a *lexical concept* (7b):

[1] See, in particular, Goldberg's Cognitive Construction Grammar (1995, 2006), and Croft's Radical Construction Grammar (2001). Langacker (1987, 2008) deploys the term *symbolic unit* to refer to the same phenomenon.

(6) John baked Mary the cake

(7) a. Vehicle: NP1 VP NP2 NP3
b. Lexical concept: [ENTITY X CAUSES ENTITY Y TO RECEIVE ENTITY Z]

A lexical concept constitutes the semantic and pragmatic knowledge bundle conventionally associated with the sentence-level vehicle (to be explicated in more detail in Chapter 3). In (7b) I provide a gloss, which serves as mnemonic to identify this bundle of semantic structure – discussed in more detail in the next chapter. In order to indicate that the gloss refers to a lexical concept, I place the gloss in square brackets.

My main analytic concern in Part II of the book is to identify the range of t-FoR constructions that are evident in English – constructions that encode deictic, sequential, and extrinsic reference. T-FoR constructions are, I claim, a subset of argument-structure constructions. Moreover, my primary focus is not on the vehicles – the formal component of these constructions – but rather on their semantic structure – lexical concepts – which I elaborate on in the next chapter.

The nature of the argument I present proceeds in the following way. English has a series of conventional argument-structure constructions encoding motion of various types. An example is the intransitive motion construction (Goldberg 1995). The intransitive motion construction consists of the vehicle and lexical concept given in (8), and is exemplified by the examples in (9).

(8) a. Vehicle: NP1 VP OBL
b. Lexical concept: [ENTITY X MOVES WITH RESPECT TO LOCATION Y]

(9) a. The boat is approaching (us)
b. The boat floats into the cave
c. The cork is drifting on the water

Just as English exhibits motion argument-structure constructions, so too it exhibits a series of t-FoR constructions. Constructions of this kind provide a means of encoding *temporal scenes*. In so doing, they are analogous to motion argument-structure constructions which provide a means of encoding *spatial scenes*. Indeed, the t-FoR construction that motivates (10) is, I suggest, an extension of the intransitive motion construction in (8).

(10) Christmas is approaching

As the notion of a t-FoR construction is a novel one, I provide a characterisation of what I mean by this. A t-FoR construction is a sentence-level symbolic assembly that provides a conventional, language-specific means of encoding a particular type of temporal scene. The hallmark of a t-FoR construction (in English) is that it appears to derive from argument-structure constructions that encode veridical motion and/or spatial relations. Hence, the specific lexical items involved derive from, although they do not specifically refer to, veridical

aspects of motion and space. Like s-FoR expressions, t-FoR constructions provide reference (cf. Levinson 2003). That is, they fix an event with respect to a temporal RP given by a coordinate system, as I shall describe in Chapter 3. The nature of the coordinate system derives from distinct types of transience and concerns distinct temporal relations. A t-FoR, as we shall see, does not, however, involve purely spatial coordinates, axial relations or vectors. Hence, a t-FoR, as understood in this book, is quite distinct as a theoretical construct from an s-FoR. It involves temporal, rather than spatial, relations, although these can be computed in part (but only in part), from spatial information encoded as part of the t-FoR. Moreover, quite distinct and detailed temporal information derives from t-FoRs. This includes degree of temporal remove from the RP, relative sequence, and, in some cases, the quality of temporal elapse holding between a *target event* (TE) – only somewhat analogous to the *Figure* (F) in spatial scenes – and the RP. Finally, the individual verbs integrated with a t-FoR construction, verbs that in, for instance, the intransitive motion construction refer to veridical motion, provide what I refer to as *semantic affordances* (Evans 2010b), and thereby different types of temporal relations. This is achieved as a semantic affordance is a conventional inference associated with a specific lexical form.[2] Consider the sentences in (11) by way of example:

(11) a. Christmas is approaching
b. Christmas is whizzing towards us

A semantic affordance conventionally associated with *approaching* (but not *whizzing*) has to do with imminence of occurrence, while a semantic affordance associated with *whizzing* (but not *approaching*) has to do with rapid motion. I will have more to say about semantic affordances in Part III of the book, in Chapter 10 in particular.

A potential objection to the use of the term 'frame of reference' in this context is the following. If a t-FoR does not involve vectors, axiality, and so on, notions apparent in the domain of space, in what sense is it legitimate to invoke the notion of FoR to describe the types of temporal relations I will be discussing in this book? In broad terms, I argue that it is legitimate for the following reason. A t-FoR involves reference points in order to establish a relationship between events in service of identifying a specific temporal point. That is, we are dealing with systems involving temporal points – or 'coordinates' – in order to establish a temporal relation. We would, presumably, not wish to deny that a calendar or a clock provides a (temporal) frame of reference. Indeed, and as we shall see, t-FoRs are at least as complex as s-FoRs – they deploy at least

[2] More precisely, a semantic affordance derives from the semantic potential to which an (open-class) lexical concept facilitates access. This is a notion I begin to develop in the next chapter and in Part III of the book.

the same number of coordinates, in part because both spatial and temporal reference points are deployed in order to fix events in time and establish temporal relations holding between events. And hence, I refer to the phenomena that I discuss as t-FoRs, while recognising that these are not homologues of, nor strictly speaking analogous to, s-FoRs.

While in the past few years there has been a burgeoning interest in temporal reference (see in particular Bender *et al.* 2005, 2010, 2012; Kranjec 2006; Tenbrink 2011; Zinken 2010), nevertheless, relatively little is known about t-FoRs. In particular, much still needs to be discovered in terms of what a full taxonomy of t-FoRs might look like; much remains to be learned as to how they are encoded in language; it is still not fully clear how language interfaces with conceptual knowledge in providing temporal reference; and we do not fully know which components of conceptual knowledge are important for facilitating linguistically mediated temporal reference.

In contrast, the study of the related notion of s-FoRs[3] is well established, both theoretically and in terms of extensive cross-linguistic descriptive analysis (e.g., Fortescue 2011; Levinson 2003; Talmy 2000; see also Brown 2012). There are detailed and persuasive theoretical frameworks for s-FoRs which chart the nature and level of cross-linguistic variation in spatial reference. These frameworks are based on extensive cross-linguistic studies which have investigated a large number of languages from different areal and genetic groupings (e.g., Levinson and Wilkins 2006). Moreover, research on s-FoRs has revealed the extent to which spatial language draws upon innate spatio-geometric mechanisms and abilities as well as learned spatial knowledge allowing us to locate objects, people and places in space (Evans and Chilton 2010; O'Keefe and Nadel 1978).[4]

Given that both space and time are fundamental domains of human experience, it is perhaps surprising that the domain of time, and t-FoRs in particular, have received relatively scant attention. One reason for this, presumably, results from the sometimes mooted view that time is an intellectual achievement, an abstract realm that doesn't exist as a thing in itself, but one that is grounded in and even parasitic on spatial abilities and knowledge. And indeed, research on time perception in psychology, for instance, has failed to find any evidence for an internal centralised biological clock. That said, a large body of research on time perception going back, in some cases, well over a century, has shown that time is a complex, phenomenologically real phenomenon, and is perceived in an inter-subjectively reliable way (see Evans 2004a for a review).

[3] The more usual term for an s-FoR in the literature is a frame of reference (FoR).

[4] That all said, I hasten to add that accounts of s-FoRs are not necessarily complete. For instance, with the notable exception of Tenbrink (2011), accounts of s-FoRs have not generally included motion in accounting for spatial relationships.

Moreover, the advent of cognitive neuroscience has shown that a range of brain mechanisms are implicated in temporal processing. Together, these lines of evidence, reviewed in Chapter 3, reveal that temporal awareness and perception are grounded in bodily and brain mechanisms which support and, in (perhaps large) part, contribute to our ability to perceive events and our spatial world around us. A study of linguistically mediated t-FoRs provides a means of providing further insight into the way in which we conceptualise time, given that language reflects and provides (albeit indirect) access to human cognitive function.

3 A framework for studying t-FoRs

While t-FoRs have received relatively scant attention,[5] this does not mean that language science has neglected the study of the linguistics of time. One important line of research has studied the semantics of grammatical systems including tense, aspect and modality (TAM). The study of markers of TAM systems has led to a voluminous literature from a surfeit of different theoretical perspectives. This ranges from classic work on tense (Reichenbach 1947) and aspect (Vendler 1957) to more recent treatments (e.g., Binnick 1991; Bybee *et al.* 1994; Comrie 1976, 1985; Cutrer 1991; Hopper 1982; Jaszczolt 2009; Palmer 1990, 1994; Portner 2009; Smith 1997; Tedeschi and Zaenen 1981).

The grammatical systems of TAM do, in different ways, encode temporal information. Nevertheless, grammatical systems such as these provide relatively schematic content. This is not to say that the information is not important to linguistic understanding. Rather, it is impoverished; it doesn't afford a richly detailed representation of temporal reference. For instance, English has just two morphologically encoded tenses. These encode now and not now (or past). In contrast, the language with the most tenses thus far discovered is the African language Bamileke-Dschang, with eleven tenses. While eleven distinct morphological tenses is a relatively high number, it still allows only a relatively limited range of ways of encoding temporal reference. While grammatical systems for encoding temporal reference are an important arena of investigation, I suggest that these in fact provide only a relatively small subset of the linguistic (and non-linguistic) means for encoding temporal reference. For instance, some languages don't even encode such systems; Mandarin lacks grammatical tense, for instance. This doesn't mean, of course, that Mandarin speakers are unable to signal temporal reference. This fact demonstrates, rather, that the way in which temporal reference is studied needs to be enlarged in order to

[5] There are only a few researchers who have attempted to study temporal frames of reference in a thoroughgoing way. See, in particular, Bender *et al.* (2010); Moore (2011); Tenbrink (2011); and Zinken (2010).

obtain a better and more detailed understanding of the full range of linguistic and, indeed, non-linguistic strategies for fixing events in time.

In particular, I will show in Part II of this book that there exists a rich and detailed linguistic repertoire for encoding t-FoRs, and hence for fixing events in time. This provides the language user with a means of signalling the relative temporal proximity of events, encoding an earlier/later versus past/future relation, the relative imminence and/or occurrence of temporal events, as well as the granularity of the durational experience associated with events. Hence, I suggest, the study of t-FoRs provides fuller insight into the nature of temporal awareness and experience as mediated, in particular, by language.

Recognising the existence of linguistically encoded t-FoRs also provides a means of studying cross-linguistic variation in temporal reference. As time is presumably a universal feature of human cognition, providing a putative taxonomy of t-FoRs provides a falsifiable theoretical basis for investigating the linguistics of temporal reference in the languages of the world. Given the variation that exists in the domain of spatial reference, variation is to be expected in the arena of temporal reference. And cross-linguistic divergence is likely to provide insight into non-linguistic matters, including the cultural and cognitive bases of time.

In addition to research on grammatical systems such as TAM, there is a second tradition that has investigated some aspects of temporal reference. This tradition is that of Conceptual Metaphor Theory. This perspective, developed in the seminal research of Lakoff and Johnson (1980, 1999), has yielded a by now voluminous literature on time, drawing on an impressive number of languages, ranging from English to Japanese, from Mandarin to Greek, and from Aymara to Wolof. Nevertheless, the main focus of that particular research effort has not been primarily concerned with detailed linguistic analyses per se. This follows as Conceptual Metaphor Theory holds that language is, in (large) part, subserved by underlying systems of conceptual mappings – conceptual metaphors – which provide long-term knowledge structures inhering in the human conceptual system rather than in the linguistic system. These structures are held to underpin a broad range of types of linguistic usage, in a universal way. Hence, much of the focus in the Conceptual Metaphor tradition has been concerned with identifying fairly abstract patterns in usage that are indicative of putatively underlying conceptual metaphors. This has led, in the most recent version of this theory (Lakoff and Johnson 1999), to the claim that the human conceptual system is made up, in part, of what are referred to as *primary metaphors*, a level of highly abstract and foundational cognitive associations which are assumed to be universal. One such example is the putative primary metaphor TIME IS (MOTION ALONG) A PATH (Grady 1997b). But by virtue of being theoretical constructs that relate to conceptual structure rather than to the level of semantic structure encoded in language, conceptual metaphors

are not well suited to revealing the nature and complexity of t-FoRs in a single language, let alone revealing variation cross-linguistically (see Evans 2004a: Ch. 4; and Sinha *et al.* 2011 for discussion of this point). While primary conceptual metaphors may well constrain what is possible within and across language(s), and represent an important arena of investigation, they do not directly determine, I shall argue in Part III, the way in which language(s) represent temporal concepts in order to facilitate temporal reference. Yet this is precisely the assumption that has sometimes been made. And that being the case, some researchers have thus blithely deployed putative conceptual metaphors to guide cross-linguistic research in the domain of time (see Alverson 1994, for instance) drawing erroneous conclusions in the process (see Yu 2001 for a critique). The assumption that conceptual metaphors directly determine linguistic representations has led to a presumption that primary metaphors are (nearly) universal even in the face of compelling counter-evidence (see Núñez and Sweetser 2006 for a case in point). While Conceptual Metaphor Theory represents an important and insightful perspective that the researcher investigating temporal reference can and should take account of, this approach does not, on its own, adequately account for the semantic complexity of temporal reference as manifested in language use.[6]

Perhaps of more concern, the development and success of Conceptual Metaphor Theory has led some researchers to neglect other ways in which time is represented in our mental life. Indeed, and as I shall argue here, the representation of time in language is impressively complex and multifaceted. Its level of sophistication cannot be appreciated without assuming a more inclusive theoretical stance. As I shall argue in Part III, significant aspects of temporal representation in language, and our conceptions of time as they arise in linguistically mediated communication, must of necessity be independent of conceptual metaphors for time. Such a thesis requires the development of a reliable methodology for uncovering (i) the linguistic representation of time, and (ii) the way in which linguistic knowledge is integrated with non-linguistic knowledge in the conceptions of time and temporal reference when we talk and think. In short, a linguistic framework that complements work by conceptual metaphor theorists is urgently required in order to successfully study how t-FoRs are realised.

In the present study, the focus is primarily on the linguistic level of representation. Indeed, my concern in this book is with identifying the way in which t-FoRs are encoded in language – Part II – and the way in which these units of

[6] That said, one recent and extremely welcome development relates to the seminal work of Kevin Moore. Moore (2000, 2006, 2011) has developed a conceptual metaphor account of temporal reference. This complements some aspects of the findings reported on in the present study. I will have more to say about Moore's work in Chapter 3, as well as at various later points in the book.

linguistic representation contribute to meaning construction, in the domain of time – Part III – when we use language in the act of communication.

Let's begin, then, by getting a sense of some of the complexity associated with linguistic expressions relating to temporal reference. To do this, consider a subset of the distinctions that a single language such as English allows the language user to make:

(12) a. Christmas is near
b. Christmas is some way off

(13) a. Christmas is approaching
b. Christmas has passed

(14) a. Christmas is rapidly approaching
b. Christmas is taking an age to arrive

(15) a. Christmas sped by this year
b. Christmas dragged by this year[7]

In (12) the expressions relate to the relative imminence of the temporal event: Christmas. In (13) the expressions relate to whether Christmas is located in the past or future with respect to a reference point of now. In (14) the expressions relate to an assessment of temporal magnitude – namely duration – engendered by the relative imminence of the temporal event, while in (15), the expressions relate to our perception of temporal magnitude – that is, our subjective assessment of felt duration – associated with the event itself. While Conceptual Metaphor Theory is most exercised by studying the ascription of the spatial to the non-spatial, these expressions don't actually concern space per se – in the sense of giving rise to spatial readings.[8] Rather, they each encode quite different types of time-reference relationships, having to do with relative location, imminence and the quality of the durational experience associated either with the relative imminence of the event or the event itself. That is, these expressions provide evidence for an impressive level of complexity available to the language user in expressing temporal relations of quite sophisticated kinds.

[7] One reviewer asked me why I chose to introduce the notion of temporal reference by deploying examples such as these. The objection is that these examples are 'metaphors' taken from the spatial domain, which is to say, the venue where real motion takes place. My response is this: while these examples do appear to be motivated, at least in part, by conceptual metaphor, drawing from the domain of motion in space, language users automatically process examples such as these as relating to time. While metaphor theorists and other experts are used to analysing such examples in terms of their metaphoric structuring, the purpose of these expressions is to convey temporal, rather than spatial, ideas, irrespective of the underlying structure for the ideas.

[8] This does not mean, of course, that we should not consider why temporal expressions appear to relate to spatial terms in some way, and what this might reveal about relationships between time and space. Indeed, this is an issue that I take up later in the book.

In this book I will be introducing and deploying a recent approach to lexical representation and semantic compositionality. This approach provides an analytic framework that is, I argue, ideally suited to both studying the complexity of expressions such as t-FoRs within a single language and identifying variation in semantic structure across languages. This, of course, is LCCM Theory, as mentioned above. LCCM Theory assumes a principled separation between conceptual structure and semantic structure. Conceptual structure is a level of non-linguistic representation that derives from sensory-motor, proprioceptive and subjective experience. Semantic structure is a language-specific level of representation encoded at the semantic pole associated with words and other multiword constructions. These two levels are modelled by the theoretical constructs that give the theory its name: the lexical concept and the *cognitive model*. Crucially, in LCCM Theory, lexical concepts – units of language-specific semantic structure – facilitate access to units of conceptual structure – cognitive models. In language use, lexical concepts activate the cognitive models to which they provide access, thereby *simulating* – in the sense of, for instance, Barsalou (1999) – the content encoded by the cognitive models. Language, from this perspective, provides a means of harnessing knowledge contained in the conceptual system in service of linguistically mediated communication.

LCCM Theory provides a methodology for identifying the conventional units of semantic structure associated with units of form in a language. Hence, a lexical concept is a unit of semantic structure conventionally associated with what I refer to as a *vehicle*. A vehicle might include a single word, a multiword expression, or a syntactic template such as the ditransitive construction (e.g., NP1 VP NP2 NP3, as evident in *John baked Mary the cake*), as discussed above. The further assumption is that lexical concepts can be combined, such that complex expressions involve the integration of various levels of semantic structure. It also provides a methodology for identifying distinct lexical concepts by examining their formal and semantic *selectional tendencies*. That is, it assumes that there are selectional tendencies in the grammatical constructions with which lexical concepts are integrated; and, the semantic arguments with which they tend to co-occur can be used to identify distinct lexical concepts. According to corpus-based research (e.g., Gries and Stefanowitsch 2006), it has become clear that part of the knowledge associated with a given semantic unit is the way in which it is used. This provides a powerful means of identifying distinct semantic units that have putative psychological reality. The methodology can be employed to distinguish distinct lexical concepts associated with the same form (polysemy), as well as when compiling a detailed description of the repertoire of lexical concepts associated with a particular domain or a distinct semantic function both within and across languages. These are issues to which I return in the next chapter.

4 Research questions

Navigation in space represents a complex computational challenge, one faced by all species that self-locomote (O'Keefe and Nadel 1978). Like other organisms, humans have specialised neuro-anatomical structures and processes dedicated to wayfaring (see Evans and Chilton 2010 and references therein). But unlike other organisms, humans have an additional means of representing space: via language. A significant recent research finding is that language makes use of complex coordinate systems in the domain of space (Fortescue 2011; Levinson 2003; Talmy 2000). These systems provide FoRs enabling the location of a particular target entity or location in space. Moreover, FoRs in the domain of space adopt a delimited number of reference strategies.

Like space, the domain of time is arguably foundational to human experience. Yet it has often been noted that the domain of time appears to be asymmetrically structured in terms of space – while time is structured in terms of space, it is much less common (and productive) to structure space in terms of time:

(16) a. a long time
b. Christmas is fast approaching

The evidence for this claim is most often based on language (e.g., Alverson 1994; Clark 1973; Evans 2004a, 2004b, 2005; Fauconnier and Turner 2008; Fleischman 1982; Gentner *et al.* 2002; Lakoff and Johnson 1980, 1999; Moore 2006, 2011; Núñez and Sweetser 2006; Shinohara 1999; Traugott 1978; Zinken 2010). However, recent findings from psycholinguistic and psychophysical behavioural experiments provide further support for the asymmetric structuring of time in terms of space (e.g., Boroditsky 2000; Boroditsky and Gaby 2010; Casasanto and Boroditsky 2008; Gentner *et al.* 2002; McGlone and Harding 1998; Núñez *et al.* 2006). For instance, in a series of psychophysical tasks, Casasanto and Boroditsky (2008) found that when duration and physical length are correlated, subjects cannot ignore physical length when reasoning about duration but are able to dissociate length and duration when reasoning about spatial extent. This finding provides strong evidence that our knowledge of length forms part of our understanding of temporal duration.[9]

While linguistic and non-linguistic evidence points to an analogous, albeit asymmetric, relationship between aspects of time and space, in certain respects space and time as domains of experience are very different (Galton 2011). For instance, while space relates to experience gleaned through sensory-motor experience (see Evans 2010a for review), time appears to relate to a range of

[9] However, see Kranjec (2013), who finds that when stimuli from the visual modality are removed, subjects are as likely to be influenced by time when reasoning about space, as vice versa.

experience types whose provenance is internal and hence subjective in origin (see Evans 2004a for review).

A further point of divergence is that space and time are formed of quite different types of substrate. The defining feature of space as a domain of experience is that it is *isotropic* – it is symmetrical in all directions; in the domain of space it is possible to proceed in any direction – forward or back, or from side to side. In contrast, time as a domain of experience is *anisotropic* – it manifests asymmetric organisation (see Galton 2011; see also Tenbrink 2007: 25). One form of this asymmetry relates to our egocentric experience of time – the distinction between future and past. While we have yet to experience the future, we have experienced the past, and, moreover, once an event is in the past we cannot experience it anew – the past is forever lost to us, except through recollection. Another form of asymmetry relates to the relationship between events – events, by virtue of forming a sequence, are inherently ordered with respect to one another. This asymmetry manifests itself as an earlier/later relationship – any given event is necessarily earlier or later than any other event in an event sequence.

This recruitment of structure from the domain of space to understand time, at least in human cognition, leads to the following research question: just as space exhibits three types of FoR, as claimed by Levinson (2003), for example, does the domain of time also make use of intrinsic, relative and absolute FoRs? In this book I examine this question and conclude that time and space do indeed appear to share, in broad terms, common underlying reference strategies.

But as we have just seen, there are also important differences in the natures of time and space – as domains of experience and in terms of their domain-specific manifestations of temporal reference they are distinct and distinguishable. This leads us to suspect that any broad, underlying similarity is countered by domain-specific manifestations. Hence, a related question concerns this: what are the differences in terms of FoRs in the domains of space and time?

In order to address these issues, my strategy involves a detailed analysis of temporal reference in a single language: English. While some languages have been found to exhibit just a single s-FoR, English exhibits all three of the s-FoRs posited by Levinson (2003). Hence, if time patterns after space in terms of FoRs, then we should also expect to find all three FoRs in the domain of time in English. And if temporal reference turns out to be distinct from spatial reference – the conclusion I come to – then English will provide a test case for this thesis.

A further reason for a detailed analysis of t-FoRs in English is that this will provide a means of building up a picture of the way in which FoRs work in the domain of time. In particular, by studying linguistic resources for encoding temporal reference in English, we will have a better insight into the similarities and differences, in terms of FoRs, across the domains of time and space.

Nevertheless, relying on one modality, namely language, to examine temporal reference may potentially lead to claims that are not generalisable beyond the modality in question. To guard against this, I review evidence for t-FoRs that comes from other modalities, in particular gesture in 3D space, and pictorial/diagrammatic representations in 2D space. The findings reviewed provide convergent evidence for the claims made on the basis of the linguistic evidence presented.

But in addressing the nature of t-FoRs, a further issue arises, leading to the second substantive research question addressed in this book. This concerns how language – and indeed other representational systems – interact in order to produce meaning in the domain of time. This issue is most acute precisely because there appears to be, at least on the face of it, an indelible link between space and time. As I noted above, there is an entire research tradition, Conceptual Metaphor Theory, which has placed priority on studying the way in which space – and perceptuo-motor experience more generally – ostensibly structures more abstract domains, time being *the* paradigm example. What then is the relationship between space and time in human cognition? Do conceptual metaphors serve to determine the nature of temporal representation via space in language? Or is the relationship explained in an alternative way?

I address this set of related issues by considering the nature of meaning construction when language users produce and interpret linguistic expressions that encode t-FoRs. This necessitates considering the nature and status of conceptual metaphors, exploring the nature of figurative language understanding more generally, and examining the range of knowledge types that are presumably involved in understanding linguistically mediated t-FoRs, expressions exemplified in examples (12) to (15) inclusive. In particular, I deploy the semantic mechanisms of compositionality posited by LCCM Theory to examine these issues. I argue that conceptual and linguistic resources play an important role in the understanding of linguistic expressions of temporal reference.

The present work offers the first large-scale study on temporal reference in a single language. It adds to the existing literature in cognitive linguistics by examining the linguistic resources – the sentence-level constructions, or in the parlance of LCCM Theory, vehicle–lexical concept associations – that subserve temporal reference, and the way in which these interface with conceptual resources in order to produce figurative meaning construction in the arena of temporal reference.

This study also adds to previous work in cognitive science. It does so by examining in detail the way in which temporal reference is similar to spatial reference, and, importantly, the significant ways in which it is different. The

proposal I make is that there are likely to be some aspects of domain-general cognitive function that facilitate broadly similar reference strategies. However, spatial and temporal reference are, in significant ways, wholly distinct. This suggests that the substrate involved – the perceptual array that makes up our experiences of space and time respectively – and the representations that are grounded in these experience types are quite different, requiring different realisations of broadly similar reference strategies. There remains much to do in describing and accounting for temporal reference. This book represents an initial enquiry, which, I hope, will demonstrate the utility of the LCCM framework.

5 An introduction to the rest of the book

The book is structured as follows. In the next chapter I introduce the perspective on temporal representation that informs the study, and introduce LCCM Theory in more detail. This theoretical approach provides the analytic framework for the study of linguistically mediated t-FoRs and the study of the nature of knowledge types involved in interpreting t-FoR expressions.

Part II of the book – Chapters 3 to 7 inclusive – is concerned with providing evidence for the existence of temporal frames of reference (t-FoRs), based on linguistic and non-linguistic evidence. Moreover, it is concerned with presenting a taxonomy for t-FoRs and examining the domain-general and domain-specific properties of FoRs. I begin in Chapter 3 with an overview of the nature of temporal frames of reference in human cognition, and examine differences between spatial and temporal reference. Chapters 4 to 6 examine, respectively, the three t-FoRs I argue for: the deictic t-FoR, the sequential t-FoR and the extrinsic t-FoR. In the light of preceding chapters, Chapter 7 then considers the relationship between time and space, based on recent research, and compares and contrasts t-FoRs with s-FoRs.

Part III of the book – Chapters 8 to 11 inclusive – is concerned with exploring how language users interpret linguistically mediated expressions for temporal reference in the process of meaning construction. This involves examining the range of knowledge types involved, including the contribution of conceptual metaphors. It is also concerned with examining the nature of the relationship between space and time. Chapter 8 is concerned with the distinctive roles in figurative meaning construction played by conceptual metaphors, on the one hand, and lexical concepts, on the other. I argue that conceptual metaphors are, on their own, insufficient to facilitate an account of figurative meaning construction in the domain of time. Chapter 9 then develops the LCCM account of figurative meaning construction, while in Chapter 10 this model is applied to expressions encoding temporal reference. A specific goal of Chapter 10 is to

identify the respective contributions of lexical concepts and conceptual metaphors in the interpretation of temporal reference utterances in language. And finally, the book concludes with a chapter that examines factors that may serve to create commonality and diversity in the cross-cultural semantics of time. Hence, this final chapter, Chapter 11, has implications for future cross-linguistic and cross-cultural work on temporal reference.

2 Access semantics

The present chapter is concerned with outlining the assumptions and theoretical orientation that inform this study. More specifically, this chapter provides a reasonably detailed overview of the Theory of Lexical Concepts and Cognitive Models (LCCM Theory). The essential insight of LCCM Theory is that *semantic structure* – the conventional semantic knowledge associated with words and other lexical units – is encoded by vehicles (e.g., word forms) which provide access to non-linguistic knowledge. This is a view that is shared with a number of recent 'encyclopaedic' approaches to lexical representation and meaning construction. The novelty of LCCM Theory lies in the fact that it provides a detailed account of the linguistically instantiated processes of integration which allow language to build complex semantic units that structure and influence the way in which access takes place. In the sections that follow I provide an introduction to the notions and theoretical constructs central to the version of access semantics developed here. This theoretical perspective is then deployed in later chapters in order to model lexical representation in the realms of temporal reference (Part II) and meaning construction (Part III).

The chapter is structured as follows. In the first section, below, I present an overview of the perspective of access semantics adopted here. I then introduce LCCM Theory, the theoretical framework that is invoked in the analyses presented in the rest of the book. And finally, the last substantive part of the chapter addresses the identification procedure, developed under the aegis of LCCM Theory, which facilitates the identification of linguistically mediated *lexical concepts* that encode temporal reference.

1 The nature of access semantics

LCCM Theory, which I introduce in some detail below, is a theory of what I will refer to as *access semantics*. Access semantics is an approach to lexical representation which assumes the following: semantic structure cannot be understood independently of the vast repository of non-linguistic knowledge representation which inheres in the conceptual system. Knowledge of the latter

kind is variously referred to as *encyclopaedic knowledge* or *background knowledge* (see Evans 2009b).

LCCM Theory, as a theory of access semantics, has a number of primary commitments:

- Lexical representations are points of access to encyclopaedic knowledge.
- Encyclopaedic knowledge is structured.
- Encyclopaedic knowledge is dynamic.
- Encyclopaedic knowledge is distinct from contextual information.
- There is no principled distinction between semantics and pragmatics.

I very briefly explore each of these commitments below.

1.1 Lexical representations are points of access to encyclopaedic knowledge

Access semantics views representations such as lexical items as venues of *access* to encyclopaedic knowledge. According to this view, words are not containers that present neat pre-packaged bundles of information. Instead, they provide access to a vast network of encyclopaedic knowledge – knowledge that is non-linguistic in nature. For instance, the lexical item *fast* provides access to a large body of knowledge concerning the experience types associated with *fast* – rapidity of motion – the relative degrees of being fast – both a cheetah and a man can run fast, but what this means in practice varies by virtue of their physical capabilities; a cheetah can reach top speeds of equivalent to 70 mph while the world's fastest athletes reach speeds equivalent to around 27 mph. The lexical item can also relate to the period of time required for an activity to be carried out, the venue of locomotion, the potential for speed (of a currently stationary entity), and so on. These scenarios are exemplified by the examples in (1):

(1) a. The cheetah ran fast
b. The man ran fast
c. We need the repairs carried out fast
d. That parked BMW is fast
e. She's driving in the fast lane

The meaning of *fast* in (1) is quite distinct in each of these examples. This is a consequence of the type of knowledge accessed in each instance. In each case the lexical item *fast* is providing access to slightly different aspects of encyclopaedic knowledge – our knowledge relating to the scenarios involving the property of being fast.

1.2 Encyclopaedic knowledge is structured

Access semantics holds that the non-linguistic encyclopaedic knowledge to which lexical representations facilitate access is not just an unstructured morass of information. In point of fact, it is highly structured, consisting of what I refer to as *cognitive models*. These are structured internally in terms of *attributes and values*. Moreover, cognitive models are organised with respect to one another, forming what I refer to as a *cognitive model profile*, as described later.

1.3 Encyclopaedic knowledge is dynamic

Access semantics holds that the knowledge to which words and other lexical representations provide access is dynamic in nature. In other words, it remains in a continuous state of modification as new experiences give rise to learning, and hence new knowledge. For instance, our knowledge of dogs continues to be modified as a result of our ongoing interaction with dogs, our acquisition of knowledge regarding dogs, and so on. Imagine that your dog returns from the garden appearing unwell, and begins suffering from muscle spasms and vomits a bright blue substance. After several days in and out of the vet's, you will have acquired the knowledge that metaldehyde – the chemical used in slug pellets – is potentially fatal to dogs and, perhaps counter-intuitively, dogs find slug pellets rather tasty. This information now forms part of your encyclopaedic knowledge potentially accessed upon exposure to the word *dog*.

1.4 Encyclopaedic knowledge is distinct from contextual information

Access semantics holds that encyclopaedic knowledge and contextual details are distinct types of information, both of which are important for linguistically mediated communication. Encyclopaedic knowledge is activated in contexts of language use, such that specific types of encyclopaedic knowledge are activated by virtue of contextual information. In other words, context can select for particular ways in which language accesses encyclopaedic knowledge. As seen above in (1), the use of *fast* can activate different knowledge scenarios, a consequence of the different contexts evoked by the utterances in which *fast* appears. What this illustrates, then, is that a linguistic sentence itself provides context which serves to activate a portion of the encyclopaedic knowledge to which the lexical item *fast* facilitates access.

Access semantics holds that there are a number of different kinds of context that collectively serve to modulate any given instance of a lexical item as it occurs in a particular utterance. These types of context include (but are not necessarily limited to) *sentential context* – the resulting sentence or utterance meaning; *prosodic context* – the intonation pattern that accompanies the

utterance, such as rising pitch to indicate a question; *situational context* – the physical location in which the sentence is uttered; and *interpersonal context* – the relationship holding at the time of utterance between the interlocutors. Each of these different kinds of context can contribute to the *contextual modulation* (Cruse 1986) of a particular lexical item, thereby affecting the pattern of access.

1.5 There is no principled distinction between semantics and pragmatics

Finally, the theory of access semantics I present below rejects the idea that there is a principled distinction between 'core' linguistic meaning on the one hand, and pragmatic, social or cultural meaning on the other. This means that, among other things, access semantics does 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. This is not to say that I am denying the existence of pragmatic knowledge. Instead, my claim is that semantic and pragmatic knowledge cannot be clearly distinguished. As with the lexicon–grammar continuum (Croft 2001; Goldberg 1995; Langacker 1987), semantic and pragmatic knowledge can be thought of in terms of a continuum. While there may be qualitative distinctions at the extremes, it is often difficult in practice to draw a sharp distinction.

There is a well-known earlier approach to access semantics. This is, of course, Ronald Langacker's development of domains and domain matrices, providing the semantic basis for his theory of *Cognitive Grammar*. Arguably more than any other researcher in (cognitive) linguistics, Langacker (1987, 1991, 2008) has been responsible for developing the proposition that lexical representations provide access to encyclopaedic knowledge. Langacker's view of access (or encyclopaedic) semantics is based on two assumptions: (i) that the semantic structure associated with words directly accesses conceptual structure, and (ii) words and other symbolic units cannot be understood independently of the larger knowledge structures, the encyclopaedic domains of conceptual knowledge, to which they serve as *points of access*. In essence, Langacker's claim is that semantic structure is equivalent to conceptual structure; that is, the semantic structure associated with a lexical form *is* conceptual structure.

LCCM Theory's version of access semantics, as developed below, offers a somewhat nuanced perspective. Langacker's account arguably blurs the boundaries between linguistic and conceptual knowledge. Marking such boundaries and establishing the differences between conceptual and semantic structure may not be required in Cognitive Grammar, which is ultimately concerned with accounting for formal properties of linguistic organisation. But when attempting to account for the role of language in meaning construction and,

specifically, the domain of time and figurative language understanding, as I am doing in this book, the fine-grained distinctions between semantic and conceptual structures must be grappled with. The claim at the heart of the theory of access semantics presented here, and one enshrined in the distinction between its two foundational theoretical constructs – the lexical concept and cognitive model – is this: the two qualitatively distinct, albeit related, aspects of semantic structure – schematic versus rich aspects of semantic content, as described by Talmy (2000) in his distinction between content encoded by open- and closed-class forms – in fact relate to very different types of representation. Moreover, these two types of representation constitute, I argue, different kinds of knowledge. While these two knowledge types interact in order to produce sentence-level meanings, they nevertheless constitute different knowledge formats, as we shall see.

2 An overview of LCCM Theory

In this section I provide an overview of the Theory of Lexical Concepts and Cognitive Models or LCCM Theory (Evans 2006, 2007, 2009a, 2009b, 2010a, 2010b, in press). While LCCM Theory assumes the symbolic thesis central to Cognitive Grammar (Langacker 2008) and Cognitive Construction Grammar (Goldberg 2006) – the view that language consists of learned pairings of form and meaning (see Evans and Green 2006 for discussion) – it differs from other cognitive linguistics theories of grammar; it provides a methodological framework for conducting semantic analysis of lexical concepts.

LCCM Theory provides a theoretical account of lexical representation and semantic composition in language understanding. It models the nature of the symbolic units in language – and in particular semantic structure – the nature of conceptual representations, and the compositional mechanisms that give rise to the interaction between the two sets of representations – the semantic and the conceptual – in service of linguistically mediated meaning construction. As noted in the previous chapter, LCCM Theory derives its name from two theoretical constructs which are central to the model developed – the lexical concept and cognitive model.

2.1 Semantic representation in LCCM Theory

The overarching assumption of the theory is that the linguistic system emerged, in evolutionary terms, much later than the earlier conceptual system. The utility of a linguistic system, on this account, is that it provides an executive control mechanism facilitating the deployment of conceptual representations in service of linguistically mediated meaning construction. Hence, 'semantic' representations in the two systems are of a qualitatively distinct kind. I model semantic

structure – the primary semantic substrate of the linguistic system – in terms of the theoretical construct of the lexical concept. A lexical concept is a component of linguistic knowledge – the semantic pole of a *symbolic unit* (in e.g., Langacker's 1987 terms) – which encodes a bundle of various types of highly schematic *linguistic content* (see Evans 2006, 2009a, 2009b). In particular, linguistic content includes information relating to the selectional tendencies associated with a given lexical concept – the range of collocational and collostructional behaviour of a given lexical concept (see Evans 2006, 2009b).

While lexical concepts encode highly schematic linguistic content, a subset – those associated with open-class forms – are connected, and hence facilitate access, to the conceptual system. Lexical concepts of this type are termed *open-class lexical concepts*.[1] Such lexical concepts are typically associated with multiple areas in the conceptual system, referred to as *association areas*.

The range of association areas to which a given lexical concept facilitates access is termed an *access site*. LCCM Theory assumes that the access site for a given *open-class lexical concept* is unique. As lexical concepts facilitate access to a potentially large number of association areas in the conceptual system, any given open-class lexical concept, in principle, facilitates access to a large *semantic potential*. However, only a small subset of this semantic potential is typically activated in *interpretation* of a given utterance.

While the linguistic system evolved in order to harness the representational power of the conceptual system for purposes of communication, the human conceptual system, at least in very broad outline, is continuous with that of other primates (Barsalou 2005; Evans to appear: especially Ch. 2), and shows a range of broad similarities with that of other species (Hurford 2007). In contrast to the linguistic system, the conceptual system evolved primarily to facilitate functions such as perception, categorisation, inference, choice and action, rather than communication. In LCCM Theory, *conceptual structure* – the semantic representational substrate of the conceptual system – is modelled by the theoretical construct of the cognitive model. A cognitive model is a coherent body of multimodal knowledge grounded in the brain's modal systems, and derives from the full range of experience types processed by the brain, including sensory-motor experience, proprioception and subjective experience including affect.[2]

The conceptual content encoded as cognitive models can become reactivated during a process referred to as *simulation*. Simulation is a general-purpose computation performed by the brain in order to implement the range of activities

[1] See Evans (2009b) for the rationale for this position.

[2] The term 'cognitive model' is used elsewhere in cognitive science, for instance, in terms of computational modelling (e.g., in John Anderson's ACT-R theory of cognition), and is widespread in this other sense. I am not deploying the term in the same way.

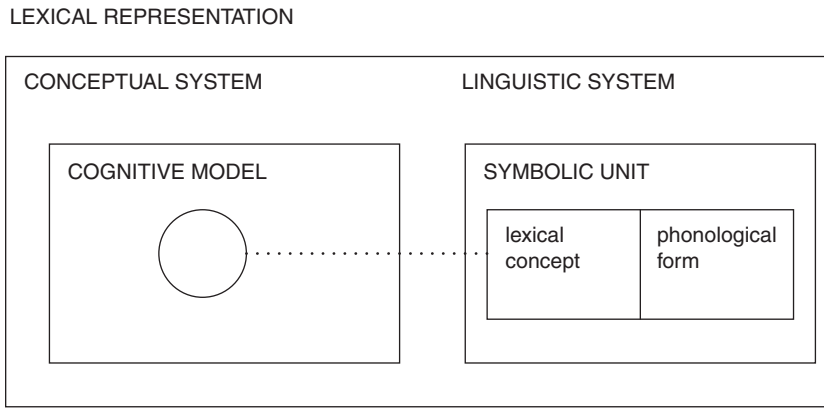

Figure 2.1 An association between an open-class lexical concept and a cognitive model

that subserve a fully functional conceptual system. Such activities include conceptualisation, inferencing, choice, categorisation and the formation of ad hoc categories.[3]

In line with recent evidence in the cognitive science literature, LCCM Theory assumes that language can facilitate access to conceptual representations in order to prompt for simulations (see Glenberg and Kaschak 2002; Kaschak and Glenberg 2000; Pulvermüller 2003; Vigliocco *et al.* 2009; and Zwaan 2004. For a review see Taylor and Zwaan 2009; see also Shapiro 2010. For more nuanced views on the role of simulations see Chatterjee 2010; Mandler 2010).

In LCCM Theory, simulations are effected by a subset of lexical concepts – open-class lexical concepts – facilitating access to the conceptual system via a number of association areas. Each association area corresponds to a cognitive model, as captured in Figure 2.1. A summary of some of the key terms deployed in LCCM Theory is presented in Table 2.1.

I now briefly illustrate the distinction between the content encoded in the linguistic system by lexical concepts and the content encoded in the conceptual system by cognitive models. To do so, consider the use of the lexical item *red* in the following examples, adapted from Zwaan (2004):

(2) a. The teacher scrawled in red ink all over the assignment
b. The red squirrel is in danger of becoming extinct in the British Isles

[3] For discussion and findings relating to the multimodal nature of conceptual representations and the role of simulation in drawing on such representations in facilitating conceptual function, see, for instance, Barsalou (1999, 2008), Glenberg (1997), Gallese and Lakoff (2005), and references therein.

Table 2.1 *A summary of key terms in LCCM Theory*

Term	Description
Linguistic system	The collection of symbolic units comprising a language, and the various relationships holding between them
Symbolic unit	A conventional pairing of a phonological form or vehicle and a semantic element
Lexical concept	The semantic element that is paired with a phonological vehicle in a symbolic unit
Linguistic content	The type of content encoded by a lexical concept. This content is of a highly schematic type that can be directly encoded *in* language
Conceptual system	The body of non-linguistic knowledge captured from multimodal experience. This knowledge derives from sensory-motor experience, proprioception and subjective experience
Cognitive model	The representational form that knowledge in the conceptual system takes, as modelled in LCCM Theory. Consists of frames which give rise to a potentially unlimited set of simulations
Conceptual content	The nature of the knowledge encoded by a cognitive model
Lexical representation	The primary substrate deployed in linguistically mediated meaning construction, and modelled in terms of symbolic units and cognitive models
Semantic representation	The semantic dimension of lexical representations, consisting of semantic structure and conceptual structure
Semantic structure	That part of semantic representation encoded by the linguistic system. Semantic structure is modelled, in LCCM Theory, by lexical concepts
Conceptual structure	That part of the semantic representation encoded by the conceptual system. Conceptual structure is modelled, in LCCM Theory, by cognitive models

In the examples in (2), *red* designates two different sorts of sensory experience. That is, while the hue derived from the use of *red* in (2a) is quite a vivid red, the hue prompted for by (2b) is likely to be closer to a dun/browny colour. Hence, what I refer to as the semantic potential of *red* is not 'there' in the word itself. Whatever *red* designates, we are not dealing with purely linguistic knowledge. Rather, the word *red* provides access to – in this case – perceptual information and knowledge, which can be simulated, which is to say, reactivated.

Put another way, the hue derived is not a function of linguistic knowledge, but relates to what I am referring to as conceptual content. This is not to say that *red* does not provide linguistic knowledge. The form *red* has an associated lexical concept that I gloss as [RED]. This encodes schematic linguistic content indicating that an entity is being referred to, that the entity being referred to

is a relation of some kind, and that the relation is specifically an attribute of a thing. In short, while linguistic content includes highly schematic semantic knowledge, conceptual concept concerns richly detailed knowledge grounded in the information captured from multimodal brain states.

2.2 *The cognitive model profile*

An important construct in LCCM Theory, and one that is essential to providing an account of meaning construction in linguistically encoded t-FoRs, as considered in Part III, is that of the cognitive model profile. As an open-class lexical concept facilitates access to numerous association areas within the conceptual system, it facilitates access to numerous cognitive models. Moreover, the cognitive models to which a lexical concept facilitates access are themselves connected to other cognitive models. The range of cognitive models to which a given lexical concept facilitates direct access, and the range of additional cognitive models to which it therefore facilitates indirect access is termed its cognitive model profile.

To illustrate, consider the cognitive model profile for the lexical concept which I gloss as [FRANCE] associated with the form *France*. A partial cognitive model profile for [FRANCE] is represented in Figure 2.2.

Figure 2.2 is an attempt to capture the sort of knowledge that language users must presumably have access to when speaking and thinking about France. As illustrated, the lexical concept [FRANCE] provides access to a potentially large number of cognitive models.[4] As each cognitive model consists of a complex and structured body of knowledge, which, in turn, provides access to other sorts of knowledge, LCCM Theory distinguishes between cognitive models which are directly accessed via the lexical concept – *primary cognitive models* – and those cognitive models which form sub-structures of those which are directly accessed – *secondary cognitive models*. These secondary cognitive models are indirectly accessed via the lexical concept.

The lexical concept [FRANCE] affords access to a number of primary cognitive models, which make up the *primary cognitive model profile* for [FRANCE]. These are hypothesised to include: GEOGRAPHICAL LANDMASS, NATION STATE and HOLIDAY DESTINATION. Each of these cognitive models provides access to further cognitive models. In Figure 2.2 a flavour of this is given by virtue of the various secondary cognitive models which are accessed via the NATION STATE cognitive model – the *secondary cognitive model profile*. These include NATIONAL SPORTS, POLITICAL SYSTEM and CUISINE. For instance, we may know that in France, the French engage in national sports of particular types, for

[4] Note that the abbreviation [FRANCE] represents the linguistic content that is encoded by the vehicle *France*, and the access site it affords to the conceptual system.

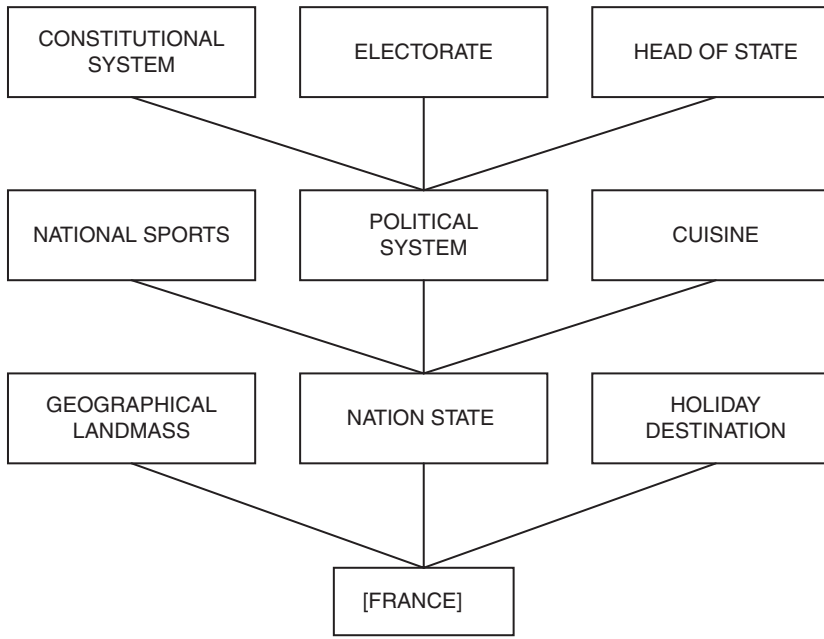

Figure 2.2 Partial cognitive model profile for [FRANCE]

instance, football, rugby, athletics, and so on, rather than others: the French don't typically engage in American football, ice hockey, cricket, and so on. We may also know that as a sporting nation they take part in international sports competitions of various kinds, including the FIFA football world cup, the Six Nations rugby competition, the rugby world cup, the Olympics, and so on.

That is, we may have access to a large body of knowledge concerning the sorts of sports French people engage in. We may also have some knowledge of the funding structures and social and economic conditions and constraints that apply to these sports in France, France's international standing with respect to these particular sports, and further knowledge about the sports themselves including the rules that govern their practice, and so forth. This knowledge is derived from a large number of sources including direct experience and through cultural transmission (including language).

With respect to the secondary cognitive model of POLITICAL SYSTEM, Figure 2.2 illustrates a sample of further secondary cognitive models which are accessed via this cognitive model. In other words, each secondary cognitive model has further (secondary) cognitive models to which it provides access. For instance, (FRENCH) ELECTORATE is a cognitive model accessed via the cognitive model (FRENCH) POLITICAL SYSTEM. In turn the cognitive model

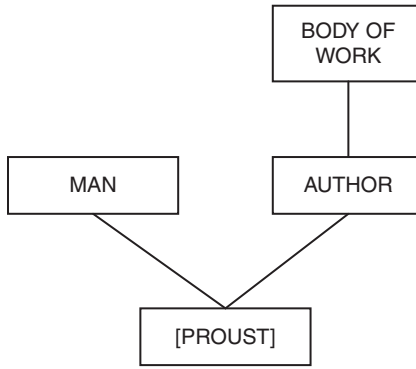

Figure 2.3 Schematic cognitive model profile for [PROUST]

(FRENCH) POLITICAL SYSTEM is accessed via the cognitive model NATION STATE. Accordingly, NATION STATE is a primary cognitive model while ELECTORATE and POLITICAL SYSTEM are secondary cognitive models.

An important consequence of assuming a distinction between primary and secondary cognitive models relates to figurative language. Specifically, some aspects of the distinction between literal and figurative language can be elegantly accounted for. For instance, consider knowledge representation for the celebrated French novelist, critic and essayist Marcel Proust. Many native speakers of English may only be dimly aware of Proust's literary contribution. Speakers in this category may simply know that Proust was a French literary figure. They may be unaware precisely when he lived, what his literary output related to, and indeed any other information about him. Cognitive model profiles relating to Proust, for these speakers, will involve knowledge inherited from *type* cognitive models. Such cognitive models facilitate inheritance of content in order to populate a cognitive model profile for an *individual*. In this case, a *schematic cognitive model profile* will be derived. Such a cognitive model profile is presented in Figure 2.3.

In the schematic cognitive model profile in Figure 2.3, there are at least two primary cognitive models, for MAN and AUTHOR, respectively. Each will consist of a range of *attributes*, inherited from type cognitive models for MAN and AUTHOR. For instance, the type cognitive model for MAN will include generic information relating to aspects of physiology, appearance, personality, socio-cultural role, dress, behavioural traits, and so on. The schematic cognitive model for AUTHOR will include generic information relating to the generic habits and qualities associated with being an author, the nature of the activities engaged in, potential for success, and so on. A salient secondary type cognitive model also inherited by the schematic cognitive model profile is likely to relate

to BODY OF WORK. This might include generic knowledge about the type and nature of the output associated with being an author, some information about the publishing process, the requirement to have a literary agent, the role of booksellers, and so on.

Now consider the following sentences:

(3) a. Proust had a moustache
b. Proust is difficult to read

The sentence in (3a) gives rise to a reading in which the man identified as Proust had a moustache. In contrast, the example in (3b) relates not to the man per se, but rather to his literary output. That is, in an example such as this *Proust* would normally be taken as referring not to the man, but rather to the literary works produced by Proust the man. Moreover, the interpretation of *Proust* in (3a) would normally be judged to be literal, while the interpretation in (3b) would be judged as figurative, and more specifically an instance of metonymy: *Proust* stands for the works created by the man – PRODUCER FOR PRODUCT. A central claim of LCCM Theory is that one reason for the distinction in literal versus figurative interpretations is a consequence of the cognitive model profile. Literal interpretations involve activation of a primary cognitive model – in this case MAN – while figurative interpretations involve activation of secondary cognitive models – in this case BODY OF WORK. And intuitively, it does seem as if there is some sense in which body of literary output is more peripherally accessed than being a human male, a man, and having a particular profession, namely being an author. In other words, the explicit claim made by LCCM Theory is that cognitive model profiles accessed by open-class lexical concepts exhibit a qualitative distinction between cognitive models that are in some sense more central to the knowledge associated with, for instance, Proust, and knowledge that is less central. While there is unlikely to be a neat distinction between primary and secondary cognitive models, and while the distinction is likely to vary from individual to individual, and indeed across discourse communities, there appears to be grounds for making a qualitative distinction of this sort.

But what is the rationale for positing a distinction between primary and secondary cognitive models, beyond such seeming to be required to account for some aspects of the literal versus figurative distinction? Empirical research over more than four decades reveals that conceptual knowledge is structured. Research arising from the programme associated with cognitive psychologist Eleanor Rosch in the 1970s (see Rosch 1978 for a survey, and Evans and Green 2006: Ch. 8 for a summary), demonstrates that human knowledge falls along a *typicality continuum*. In classic work, Rosch demonstrated that subjects provide goodness-of-example ratings on categories of entities in an inter-subjectively reliable way. That is, categories exhibit *typicality effects*; while some exemplars

of a given category of entities are judged to be more central, others are judged as being more peripheral. This finding shows that knowledge is organised into categories (or concepts), and that the categories themselves exhibit internal organisation in terms of typicality (i.e., central aspects of knowledge versus more peripheral aspects of knowledge).

For instance, in one study (Rosch 1975), various categories were found to exhibit typicality effects. For instance, American undergraduate students judged exemplars such as a robin and a sparrow as being better instances of the category BIRD than exemplars such as a bat or an emu.

One response to this empirical finding, proposed by Rosch herself, was to posit what was termed a *prototype*. Rosch argued that 'prototypes appear to be those members of a category that most reflect the redundancy structure of the category as a whole' (Rosch 1978: 260). In other words, the more frequent a particular attribute is among members of a particular category, the more representative it is. The prototype structure of the category reflects this 'redundancy' in terms of repeated attributes across distinct members, or exemplars. This entails that another way of assessing prototype structure is by establishing the set of attributes that a particular entity has (Rosch and Mervis 1975). The more category-relevant attributes a particular entity has, the more representative it is.

However, an important feature of knowledge representation – one not captured by Rosch's prototype approach – concerns relational knowledge. It is now well established that human knowledge is not an unstructured list of attributes. Rather, attributes are systematically related to one another. This manifests itself, for instance, in behavioural tasks which take a particular perspective. For instance, in one task (see Barsalou 1992 for a review) it was found that when subjects were asked to imagine filling up a car with petrol, and then asked to describe component parts of the car, they did so in a perspective-specific way. That is, in such a scenario subjects began by listing attributes of the car adjacent to the petrol cap and worked their way around the car exterior. When asked to imagine sitting in the driving seat, subjects first listed component parts in the interior of the car, moving from area to area, before proceeding to describe the exterior. This finding strongly suggests that the knowledge for a car is relational – attributes suggest other attributes to which they are related, and this knowledge structure manifests itself when subjects are asked to describe a car.

While these findings suggest that knowledge is structured in various ways, it still doesn't account for the claim that the cognitive models which embody knowledge should be modelled in terms of the distinction between primary and secondary levels. The assumption made in LCCM Theory is that cognitive models are coherent bodies of knowledge which are accessible by linguistic units. In linguistics, it is often observed that words have a core or literal

representation and a non-core representation, relating to value-laden effects associated with the literal representation. This is normally operationalised in terms of a bifurcation between *denotation* and *connotation*, a distinction introduced by the philosopher John Stuart Mill (1843; see also Lyons 1977; Allan 2007). As classically formulated, a word or other linguistic expression denotes the class of entities to which it may refer. In contrast, a word or linguistic expression connotes the qualities associated with those entities. Allan argues that the 'connotations of a language expression are pragmatic effects that arise from encyclopaedic knowledge about its denotation (or reference) and also from experiences, beliefs, and prejudices about the contexts in which the expression is typically used' (2007: 1047). For instance, for much of the English-speaking world, the word *December* refers to the last month of the year. In contrast, it connotes – at least in the Northern Hemisphere – that which is associated with this month, such as short days, cold weather and Christmas.

In his theory of Cognitive Grammar, Ronald Langacker (1987, 1991, 2008) has developed a theory of linguistic semantics that attempts to capture this intuition. Langacker models the information types that words facilitate access to in terms of *domains*, with the semantic potential that a word potentially activates described in terms of a hierarchical domain matrix. For instance, the word *knuckle* potentially activates a series of domains, as modelled in Figure 2.4.

Figure 2.4 captures the following. The word *knuckle* provides access to a potentially large number of domains, ranging from the domain of SPACE to that of HAND. However, as Langacker notes, the essential domain, the one required to facilitate an understanding of *knuckle*, is that of HAND. After all, while the example in (4a) is felicitous, the example in (4b) is semantically anomalous, as indicated by the hash sign.

(4) a. I have 14 knuckles on my hand
b. #I have 14 knuckles on my arm

Langacker takes this fact as evidence that a word designates or, in his parlance, *profiles*, just a subset of that contained by the domain matrix. In the case of *knuckle*, the essential part of the domain matrix is the domain HAND. Langacker refers to this essential domain as the *base*. Hence, on Langacker's view, while a word provides a point of access to a large body of knowledge, it directly represents a profile and the base within which the profile constitutes a sub-structure.

LCCM Theory assumes, in similar fashion, that the non-linguistic knowledge, the semantic potential, to which lexical concepts facilitate access, is also structured. A cognitive model profile captures the observation that a number of knowledge types, cognitive models, intuitively have equivalent status in terms of their readiness for activation. For instance, knowledge relating to Proust

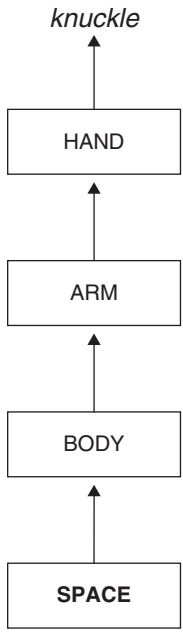

Figure 2.4 Domain matrix for *knuckle*

as a man and Proust as an author appear to be, at least in principle, knowledge types that have equal status.[5] Of course, linguistic and extra-linguistic context can influence which cognitive model receives primary activation, as discussed below when we consider meaning construction. However, all things being equal, there appear to be a number (perhaps a large number) of cognitive models to which a lexical concept has primary access.

By virtue of cognitive models being knowledge structures, and given what we know about the structured nature of knowledge representation as discussed above, the cognitive models to which lexical concepts have direct access will also be related to other cognitive models. These are cognitive models to which lexical concepts have only indirect access. That is, these are cognitive models which a lexical concept can potentially access because they are associated with the cognitive models to which a given lexical concept has direct access. Secondary cognitive models are 'secondary', therefore, by virtue of the way knowledge is organised in the conceptual system, rather than due to language per se. What makes something a secondary cognitive model derives not from

[5] Ultimately, this theoretical claim is an empirical question.

how lexical concepts access particular (i.e., 'secondary') cognitive models, but from the nature of the conceptual system itself.

While we now have a rationale for distinguishing between primary and secondary cognitive models in a single cognitive model profile, we don't, as yet, have a principled basis for making such a distinction. As noted earlier, the cognitive models to which a lexical concept facilitates direct access, its primary cognitive models, are referred to in LCCM Theory as its access site. So how do we determine which cognitive models make up the access site of a lexical concept? In the following discussion I adapt ideas from Langacker (1987) to provide principled grounds for asserting that particular knowledge types constitute primary cognitive models. Nevertheless, these proposals remain programmatic. Ongoing research will seek to determine the precise nature of the distinction between primary and secondary cognitive models.

Candidate primary cognitive models are likely to be those whose knowledge is *conventional*, *generic*, *intrinsic* and/or *characteristic*, with respect to a given lexical concept. Conventional knowledge concerns information that is widely known and shared between members of a speech community. Generic knowledge has to do with how common something is across instances. Intrinsic knowledge has to do with information that is due to the entity in question, rather than being due to external influence. And finally, characteristic knowledge concerns information that is unique to a given entity. For a cognitive model to be a likely primary cognitive model, we might expect all, or nearly all, of these cognitive models to exhibit knowledge that can be considered as conventional, generic, intrinsic and/or characteristic. This follows as knowledge that is conventional, generic, intrinsic and characteristic is likely to be central, rather than peripheral, with respect to a given lexical concept.

To illustrate, take the lexical concept [APPLE] associated with the vehicle *apple*. There appear to be at least three primary cognitive models to which this lexical concept facilitates access, as indicated in Figure 2.5.

For instance, the cognitive model for SNACK is likely to involve knowledge relating to the fact that apples are eaten, either alone or with other types of food, between main meals. Knowledge of this type is conventional, as it is widely known. In addition, the fact that apples can be eaten as a snack is intrinsic to apples, they are an edible foodstuff, and they require no preparation to be edible, which is precisely one of the reasons why they provide a convenient snack. And finally, this information is characteristic of apples. Apples, unlike many other foodstuffs, are typically eaten in this way, presumably because they require no preparation – apples don't need to be cooked, for instance, to be edible. Hence, the cognitive model SNACK, to which [APPLE] facilitates access concerns knowledge that can be characterised as meeting most – three out of four – of the criteria required for constituting a primary cognitive model.

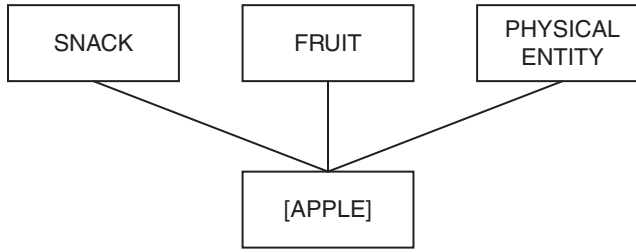

Figure 2.5 Partial listing of primary cognitive models for [APPLE]

Now consider the cognitive model FRUIT. This involves knowledge relating to the type of food an apple is, due to its provenance. An apple qualifies as an item of fruit by virtue of being an edible foodstuff that grows on a tree or bush, that is, above ground. This type of knowledge is conventional, which is to say, is widely known. It is also generic: it applies to all apples. Moreover, it is intrinsic as it is a function of an internal property of an apple: an apple is a fruit by virtue of growing in the way that it does.

And lastly, take the cognitive model PHYSICAL ENTITY. This includes knowledge such as shape, relative size and weight, colour, texture, and so on. Specifically, this cognitive model will include knowledge relating to the fact that apples are spherical, and are typically red, or green, or both. Knowledge of this type is highly conventional, so satisfies the criterion of conventionality. Moreover, such knowledge is generic – all instances of apples are spherical. Finally, knowledge that apples are both round, as well as coloured red and/or green constitutes characteristic knowledge – there are relatively few other fruit that exhibit this intersection of characteristics. As such, the cognitive model PHYSICAL ENTITY accessed by the lexical concept [APPLE] also counts, on these criteria, as a primary cognitive model.

Now let's return to the example relating to [PROUST], as exemplified in Figure 2.3 above. In that discussion, I claimed that while MAN and AUTHOR are primary cognitive models, BODY OF WORKS is a secondary cognitive model. What then constitutes a principled basis for this claim? Each of the two putative primary cognitive models relates to knowledge that is conventional, intrinsic and characteristic, matching most of the four criteria for constituting a primary cognitive model. After all, that Proust was a man, for example, is conventional knowledge. Moreover, being a man is intrinsic to Proust and is also characteristic of him. Similarly, that Proust was an author is conventional knowledge, it is intrinsic to Proust, in the sense that it arose from his own predispositions and impulses, and is characteristic of him.

In contrast, the cognitive model BODY OF WORK only counts as conventional knowledge. That is, while the fact that Proust produced a particular body of work

may be widely known, this knowledge is intrinsic to and characteristic of the fact that he was an author, rather than being intrinsic to, and characteristic of Proust himself. As such, the type of knowledge captured by the BODY OF WORK cognitive model does not meet the criterion for being a primary cognitive model.

The classification of knowledge according to four knowledge types, in fact, more properly relates to four continua along which cognitive models can be classified. These are given below:

Conventional ←→ Non-conventional
Generic ←→ Specific
Intrinsic ←→ Extrinsic
Characteristic ←→ Non-characteristic

For instance, in terms of conventionality, knowledge encapsulated by a cognitive model can be classified as falling at any point on that continuum, so that something can be known by only one person (wholly non-conventional) known by the entire discourse community (wholly conventional) or somewhere in between (for example, known by two people, a few people or many but not all people). Similarly, knowledge that is generic relates across the board while specific knowledge is just that. And while intrinsic knowledge is due to the entity in question, extrinsic knowledge concerns knowledge of the entity arising due to external factors. Finally, characteristic versus non-characteristic knowledge concerns the relative uniqueness of specific instances.

Before moving on, a caveat is in order. Cognitive model profiles are both *individual* and *dynamic*. They are individual in the sense that they relate to conceptual systems of real live language users, who are exposed to new, different and unique sets of experiences. They are dynamic in the sense that stuff happens: the world changes, moves and evolves, and individuals observe, do and learn new things. This results in a continual updating of an individual's conceptual system. This might necessitate updating an existing cognitive model, merging existing cognitive models, deleting a cognitive model and replacing it with another, or a range of other changes to mental knowledge representation. The precise details of the nature of knowledge representation, how it evolves over time and how language interfaces with it, is the subject of ongoing and projected research. That said, a programmatic sketch of a plausible model of compositionality is briefly presented below. I develop this perspective in terms of temporal meaning construction in Part III of this book.

2.3 Semantic composition in LCCM Theory

LCCM Theory is motivated, in large part, by the observation that word meanings vary across contexts of use in terms of the conceptualisation that they

give rise to. To illustrate, consider the following examples, which relate to the lexical form *France*:

(5) a. France is a country of outstanding natural beauty
b. France is one of the leading nations in the European Union
c. France beat New Zealand in the 2007 rugby world cup
d. France voted against the EU constitution in the 2005 referendum

In the first example, *France* relates to a specific geographical landmass coincident with the borders of mainland France. In the second example, *France* relates to the political nation state, encompassing its political infrastructure, political and economic influence and its citizens, including those in French overseas territories. In the example in (5c) *France* relates to the team of fifteen rugby players, drawn from the pool of rugby players of French citizenship, who represented the French nation in the 2007 rugby world cup. In the final example, *France* relates to the French electorate, and specifically that part of the electorate which voted against proceeding with ratification of a proposed EU constitution in a national referendum in 2005. These examples illustrate that a word form such as *France* appears to be protean in nature: its meaning is flexible, in part dependent upon the context of its use.

LCCM Theory accounts for variation in word meaning by proposing two compositional mechanisms which integrate information deriving from context with linguistic content and conceptual content. These mechanisms facilitate the integration of words and other grammatical constructions such that an utterance-level simulation is derived. This utterance-level simulation (informally, what we might think of as utterance meaning), is termed a *conception* in LCCM Theory.

The two compositional mechanisms are *lexical concept selection* and *fusion*. The first, lexical concept selection, serves to identify the most appropriate lexical concept associated with a given form during the processing of an utterance. As the linguistic system consists of symbolic units – conventional pairings between phonological forms and lexical concepts – a form may potentially be associated with a large number of distinct lexical concepts. To illustrate, consider the lexical form *in*, which occurs in the following examples:

(6) a. The kitten is in the box
b. The flag is flapping in the wind
c. John is in love

In each of these examples, a distinct lexical concept is selected for. The lexical concepts for *in* selected are [ENCLOSURE] for (6a), [PREVAILING CONDITIONS] for (6b) and [PSYCHO-SOMATIC STATE] for (6c).[6]

[6] For discussion of the LCCM approach to polysemy, see Evans (2010a).

Selection relies on a number of constraining factors to determine the appropriate lexical concept: the lexical concept which best fits the conception under construction.[7] Once a lexical concept has been selected, it must be integrated with other selected lexical concepts of the utterance, and, if it is an open-class lexical concept, interpreted in the light of the conceptual structure to which it affords access and the other open-class lexical concept(s) with which it has been integrated. That is, the selected lexical concept undergoes the second compositional process, namely fusion.

Fusion is the integrative process at the heart of semantic composition in LCCM Theory, and the second of the two constituent processes of meaning construction. It results in the construction of a conception. This is achieved by recourse to two sorts of knowledge: linguistic content and conceptual content. Fusion is itself made up of two constituent processes: *lexical concept integration* and *interpretation*. The first relates to the integration of linguistic content, in order to produce, informally, the 'scaffolding' for the *activation* of conceptual content. Both sorts of information, and both types of processes, are necessary for the construction of meaning and thus the formation of a conception.

Lexical concept integration involves the integration of lexical concepts in order to produce a composite unit: a *lexical conceptual unit*. The output of this process is a *semantic value*, a situated semantic attribution associated with a lexical conceptual unit based on integration of linguistic content. Hence, the semantic contribution of the lexical conceptual unit is highly schematic in nature. The lexical conceptual unit then undergoes interpretation. That is, open-class lexical concepts within the lexical conceptual unit *activate* part(s) of the conceptual content (the semantic potential) to which they facilitate access.

That part of the semantic potential that becomes activated is constrained by the nature of the semantic value for the lexical conceptual unit of which the open-class lexical concept(s) are part, and which emerges from integration. That is, interpretation – the activation of conceptual content – is constrained by integration – the *unpacking* of linguistic content. A diagrammatic representation of the processes of semantic composition in LCCM Theory is provided in Figure 2.6.

As it is interpretation – the activation of conceptual content guided by unpacked linguistic content – that is the most relevant of the compositional mechanisms for the discussion of language understanding discussed in Part III,

[7] For further discussion of this issue, see Evans (2009b).

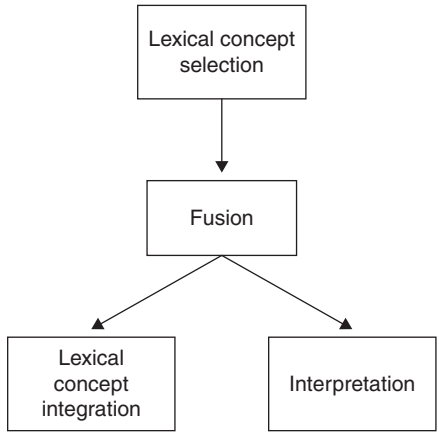

Figure 2.6 Processes of semantic composition in LCCM Theory

I focus in the remainder of this section on a more detailed discussion of interpretation.

2.4 Interpretation

In a lexical conceptual unit it is only open-class lexical concepts that undergo interpretation. The outcome of interpretation results in the open-class lexical concepts achieving an *informational characterisation*, which is to say, a semantic interpretation facilitated by simulation. This takes place by virtue of the relevant part of the semantic potential to which the lexical concepts facilitate access becoming activated. In the canonical case, when there are two (or more) open-class lexical concepts in the same lexical conceptual unit, these lexical concepts undergo interpretation simultaneously. In such cases, interpretation of the lexical concepts is constrained by a process termed *matching*. The purpose of matching is to ensure that a coherent *informational characterisation* emerges: one in which coherent parts of the cognitive model profile to which the distinct lexical concepts facilitate access are activated. Hence, interpretation is a constrained process.

To provide an immediate illustration of how interpretation proceeds, consider the expressions in (7) and (8) in the light of the partial primary cognitive model profiles for [FRANCE] in Figure 2.7, for [LANDMASS] in Figure 2.8 and for [NATION] in Figure 2.9.

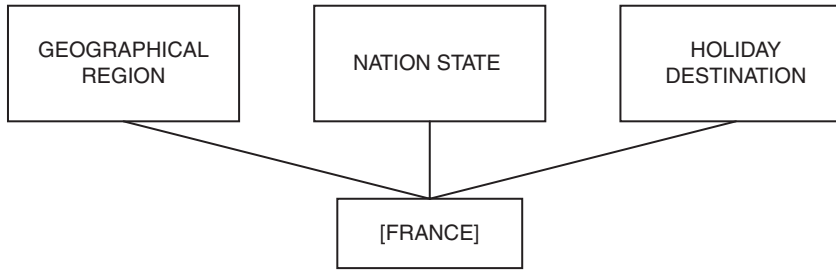

Figure 2.7 Partial primary cognitive model profile for [FRANCE]

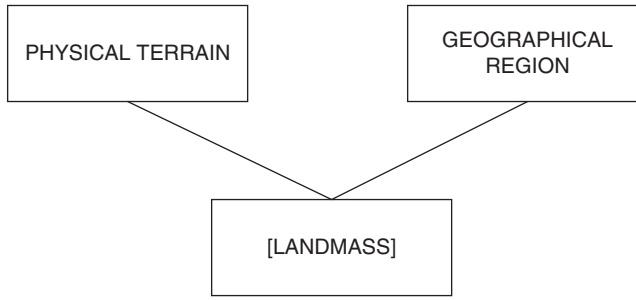

Figure 2.8 Partial primary cognitive model profile for [LANDMASS]

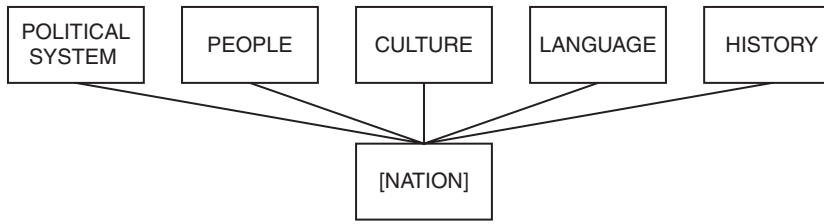

Figure 2.9 Partial primary cognitive model profile for [NATION]

(7) France, the landmass
(8) France, the nation

In each of these examples, *France* receives a distinct informational characterisation. In (7) *France* relates to a geographical area, while in (8) it relates to a political entity. My purpose here is to illustrate how it is that each of these instances of *France* receives a distinct interpretation.

As we have seen earlier, the lexical concept [FRANCE] affords access to conceptual content relating, at the very least, to France as a geographical region,

as a political entity – including knowledge relating to the French political system, the French people and their social customs and practices, their history and language and the national sports engaged in, and so forth – and to France as a holiday destination, with, perhaps, knowledge relating to the sorts of holiday activities it is possible (or typical) to engage in, in France, such as skiing (in the Alps), seaside holidays (on the Mediterranean coast), and so on.

The lexical concept [LANDMASS] – see Figure 2.8 – facilitates access, at the very least, to primary cognitive models that relate to a physical terrain – a landmass can be hilly, mountainous, may consist of plains, woodland, and so on – or to a geographical area. Figure 2.9 relates to a very partial primary cognitive model profile for [NATION]. This lexical concept, at the very least, facilitates access to cognitive models having to do with a political entity, a nation state, and hence a particular political system, a people (with common customs, traditions, cuisine, and so on), and language (and/or languages), and a common (often complex) history.

Interpretation works by virtue of the process of matching, which takes place between the cognitive model profiles accessed by the open-class lexical concepts which are subject to matching. In terms of the examples in (7) and (8), the relevant lexical concepts are [FRANCE], [LANDMASS] and [NATION]. Interpretation involves establishing a *match* between one (or more) cognitive models in the cognitive model profiles associated with the relevant lexical concepts. This process serves to *activate* the matched cognitive models. For instance, in the example in (7), a match is established between the primary cognitive model profile associated with [LANDMASS], and one of the cognitive models to which [FRANCE] affords access. This is, of course, the cognitive model GEOGRAPHICAL REGION, accessed via the lexical concept [FRANCE], which becomes activated. In the second example, the match takes place between the primary cognitive model profile to which [NATION] affords access and the NATION STATE cognitive model to which [FRANCE] affords access. Hence, the reason for different readings of *France* in (7) and (8) is because the lexical concept in each utterance receives a distinct informational characterisation. In (7) interpretation results in an informational characterisation for *France* relating to France as geographical landmass. In (8) interpretation results in an informational characterisation of a political entity: France the nation state.

The compositional mechanisms in LCCM Theory, including matching, are subject to constraints. These constraints are formalised by a number of principles that govern the operation of semantic composition. The matching operation central to interpretation is constrained by the *Principle of Conceptual Coherence*. This can be stated as follows:

(9) Principle of Conceptual Coherence
Matching occurs between one or more cognitive models belonging to distinct cognitive model profiles that share schematic coherence in terms of conceptual content.

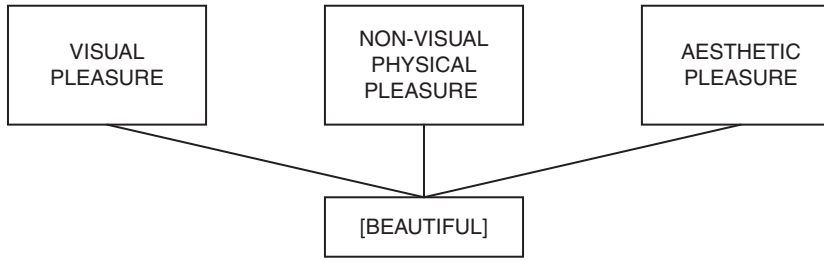

Figure 2.10 Partial primary cognitive model profile for [BEAUTIFUL]

This principle relies on a second principle, the Principle of Schematic Coherence:

(10) Principle of Schematic Coherence
The conceptual content associated with entities, participants and the relations holding between them must exhibit coherence in fusion operations.

What the principles in (9) and (10) do is to guarantee that matching takes place only when the cognitive models that undergo the matching process (i) belong to different cognitive model profiles – and hence are accessed by different lexical concepts – and (ii) exhibit coherence.

To illustrate, consider the example in (11), which again employs the lexical concept [FRANCE]:

(11) France is beautiful.

The example in (11) provides what I will term a 'geographical region' conception. A common conception arising from (11), without a further specifying linguistic or extra-linguistic context, might relate to an understanding of France as a geographical region which is physically beautiful, for instance, in terms of its landscape, and so forth. This takes place by virtue of the lexical concepts [FRANCE] and [BEAUTIFUL] undergoing matching, giving rise to an informational characterisation.

The Principles of Conceptual and Schematic Coherence in (9) and (10) determine how the matching process is constrained and hence how, in general terms, the cognitive models across cognitive model profiles to be matched are selected. To make this clear, consider the partial cognitive model profile for the lexical concept [BEAUTIFUL], given in Figure 2.10.

The lexical concept [BEAUTIFUL] facilitates access, at the very least, to cognitive models that have to do with multimodal knowledge relating to visual pleasure, non-visual pleasure (such as touch and sexual arousal, for instance),

and aesthetic pleasure, relating, for instance, to our experience of pleasure arising from an appreciation of literature, music, language, and so on.

Matching takes place by conducting what is referred to as a *search* in the primary cognitive model profiles of the two lexical concepts subject to matching, as guided by the principles in (9) and (10). That is, the primary cognitive models accessed by [FRANCE] (Figure 2.7) and [BEAUTIFUL] (Figure 2.10) are searched in order to identify a match at the level of schematic coherence across conceptual content. Put another way, the match relates not to details of similarity, but rather, how schematically coherent the conceptual content is. In terms of the three primary cognitive models given for [FRANCE] in Figure 2.7, only that of GEOGRAPHICAL REGION achieves a match in terms of schematic coherence with one (or more) of the primary cognitive models for [BEAUTIFUL]. After all, the HOLIDAY DESTINATION cognitive model has to do with the nature and types of holiday opportunities that exist in France, while the NATION STATE cognitive model concerns the nature of France as a political entity.

In contrast, the GEOGRAPHICAL REGION cognitive model might include knowledge relating to the physical beauty, particularly the visual pleasure that derives from aspects of France as a geographical region. Hence, a match takes place between at least one of the primary cognitive models accessed via [BEAUTIFUL] and the GEOGRAPHICAL REGION cognitive model accessed via the [FRANCE] lexical concept. For this reason, a match is established between the primary cognitive model profile accessed by [BEAUTIFUL] and the GEOGRAPHICAL REGION cognitive model accessed by [FRANCE]. This results in an informational characterisation 'geographical region' for [FRANCE].

3 Methodology for identifying t-FoR lexical concepts

As we saw above, lexical concepts are units of mental knowledge that encode language-specific knowledge of a semantic nature. They are assumed to hold at all levels of linguistic representation, from the word up to sentence-level constructions. As units of mental representation they license instances of language use. As such, they are idealised entities that can, in principle, be identified in language use.

Lexical concepts can be identified by deploying a principled identification procedure. The purpose of this procedure is to provide a methodology for identifying distinct lexical concepts (see Evans 2009b). This procedure is applied, in this book, in order to identify t-FoR lexical concepts, which is to say, sentence-level sense units – the focus of Part II. The procedure is principled in the sense that it provides clear decision principles for determining whether a given sentence-level expression is likely to be motivated by a unique lexical concept or not.

3.1 The identification procedure

The identification procedure[8] assumes that a lexical concept will exhibit *selectional tendencies* made up of two types of information. The first kind relates to the vehicle types that can encode the lexical concept. This is termed the lexical concept's *formal selectional tendencies*. The second type concerns the semantic arguments that make up the argument-structure lexical concept: its *semantic selectional tendencies*. The nature of the two types of selectional tendency is referred to as a *lexical profile*. The lexical profile is held to be unique for any given lexical concept. Hence, a given lexical concept will exhibit a range of formal and semantic selectional tendencies that, in principle, should be sufficient for identifying a distinct lexical concept.

The procedure is applied in the following way. The analyst begins by identifying a common semantic function across different sentences that relate to temporal reference. That is, we are looking for a semantic function relating to a temporal scene involving a *Target Event* (TE) – an event that we are attempting to fix in time – and a *Reference Point* (RP) – the event that we deploy in order to fix the TE. By way of illustration, take the following sentences:

(12) a. Christmas is getting close
b. Christmas is coming up
c. Christmas is drawing near

These sentences all appear to relate to the relative imminence of a specific TE – the occurrence of Christmas – with respect to an implicit RP – the event/location with respect to which Christmas is 'moving'. Moreover, the semantic function of relative imminence is retained regardless of the tense of the verb phrase, as we can see by placing (12c) in various past tense forms:

(13) a. Christmas drew near
b. Christmas was drawing near

What we see in (13) is that the semantic function still relates to relative imminence, regardless of whether the sentence is set in the present or the past. In contrast, consider the following sentence:

(14) a. Christmas has vanished
b. Christmas has disappeared

The example sentences in (14) relate, in contrast, not to relative imminence, but to relative occurrence, and moreover, occurrence that is 'distant': if the TE is no longer 'visible', its occurrence must be relatively distant from the RP. And as before, the reading of occurrence in these sentences is independent of the tense involved:

[8] See Evans (2009b: Ch. 7) for full details.

(15) a. Christmas is vanishing
b. Christmas will vanish

The fact that what I have labelled 'imminence' and 'occurrence' are semantically independent of tense demonstrates that they are independent of *coding time*.[9] There appears to be something common to the sentences in (12) and (13), on one hand, and (14) and (15), on the other. Those in (12) and (13) relate to a TE that is imminent with respect to an implicit temporal RP, while those in (14) and (15) concern a TE that has occurred with respect to an egocentric origo, or anchor point. In other words, we have a working hypothesis that the sentences in (12) and (13) are licensed by a single argument-structure lexical concept, while those in (14) and (15) are licensed by a distinct lexical concept.

In order to verify this, we then examine the formal selectional tendencies and the semantic selectional tendencies of these sentences. As we are dealing here with a sentence-level concept comprising complex vehicles and semantic arguments, it is highly likely that different selectional patterns in the range of vehicles and semantic arguments that make up the lexical concept will be indicative of distinct lexical concepts. Hence, if we are able to establish common selectional tendencies – whether formal or semantic – across the sentences in (12) and (13) on one hand, and (14) and (15) on the other, this will be sufficient to support the hypothesis that we are in fact dealing with two distinct lexical concepts.

Of course, a caveat is in order here. Application of the LCCM identification procedure can only generate hypotheses. Empirical support is, ultimately, required, using, for instance, corpus-based data (see Gries 2006), and/or psycholinguistic evidence (see Sandra and Rice 1995; and Cuyckens *et al.* 1997 for examples of the sorts of on-line and offline tasks that might be employed).

In terms of the sentences above, our hypothesis might be that the sentences in (12/13) are licensed by what we might term an [IMMINENCE] lexical concept – as already noted, the square brackets indicate that the term within is a gloss serving to identify the lexical concept, the bundle of different sorts of linguistic knowledge that makes up a lexical concept. In contrast, the sentences in (14/15), we might propose, are licensed by a lexical concept we can gloss as [DISTANT OCCURRENCE].

[9] English has two morphological tenses: present and past (as well as a range of complex tenses that also incorporate aspect). Futurity is most commonly signalled through the use of the modal verb *will* in English, although there are other future-based constructions. In general terms, tense is a deictic phenomenon: it signals whether an event is coincident or not with coding time, which is to say, the point in time when the utterance is made. This function is clearly related to our egocentric experience of time. However, by virtue of encoding coding time, tense does not fulfil the temporal reference function being discussed here: the fixing of an event in time. Tense can also have a range of other semantic functions. See Tyler and Evans (2001b) for a discussion of some of these. See Comrie (1985) for an insightful discussion of tense. See Fauconnier (1997) for details as to how tense functions in discourse from the perspective of Mental Spaces Theory.

We are now in a position to look at, first, the formal selectional tendencies associated with these hypothesised lexical concepts, followed by the semantic selectional tendencies. In terms of formal selectional tendencies, the sentences in (12/13) exhibit, first of all, a nominal in subject position which we can represent as an NP. The verb form consists of a verb plus spatial particle, which we can designate as VPC (verb particle complex). Finally, the sentences are intransitive, which is to say there is no object. In terms of semantic selectional tendencies, the subject position is filled (and must be filled) by an entity that can be construed as a temporal event of some kind. Moreover, the temporal entity must be discrete – a general property associated with t-FoR lexical concepts, as we shall see later, is that the subject NP slot cannot be occupied by a non-discrete temporal entity. In terms of the VPC slot, this appears to select for semantic arguments that have to do with manner-neutral directional motion – motion directed towards an implicit deictic centre – which is interpreted as the RP.

In contrast, the sentences in (14/15) exhibit quite different selectional tendencies. In terms of the VP selected for, this appears to only obligatorily select for a main verb, rather than a verb plus particle. Moreover, the sorts of verbs selected for relate to perceptual, particularly visual, inaccessibility.

Based on the different sorts of selectional tendencies associated with these two distinct semantic functions, we have a basis for supposing that these sets of sentences may indeed be motivated by distinct t-FoR lexical concepts. These can be glossed as follows:

(16) a. Vehicle: NP VPC
b. Lexical concept: [IMMINENCE]

(17) a. Vehicle: NP VP
b. Lexical concept [DISTANT OCCURRENCE]

3.2 Semantic networks

The lexical concept identification procedure discussed above arises in the tradition of semantic network theory, which views word senses as constituting category structure, and exhibiting typicality effects. This tradition, pioneered by Lakoff (1987) and developed in earlier work by Geerearts (e.g., 1997) as well as later by myself (Evans 2004a, 2009b: Ch. 8), and with my colleague Andrea Tyler (Tyler and Evans 2001a, 2003), among others, has sought to establish semantic relatedness between linguistic sense-units. The essential insight of the semantic network theory perspective is that distinct sense units exhibit family resemblance relationships, which, following Tyler and Evans (2003) and Evans (2004a) are hypothesised to reflect diachronic patterns in the semantic development of lexical items and expressions. Hence, the second motivation

for identifying distinct t-FoR argument-structure lexical concepts is to establish degrees of relatedness between them. I do this, in Part II of the book, by classifying the distinct t-FoR lexical concepts I identify into clusters. I do so based on similarity of semantic function.[10]

4 Summary

In this chapter I have been concerned with providing the assumptions and theoretical orientation that inform the study in this book. I first of all considered the nature of access semantics. I argued that this general perspective involves a number of primary commitments. These hold that lexical representations are points of access to encyclopaedic knowledge; that encyclopaedic knowledge is structured; encyclopaedic knowledge is dynamic; encyclopaedic knowledge is distinct from contextual information; and finally that there is no principled distinction between semantics and pragmatics. The chapter then proceeded by introducing the main tenets and assumptions of LCCM Theory, which provides the theoretical perspective and methodology for the analysis of t-FoR lexical concepts in Part II of the book, and the analysis of figurative meaning construction in t-FoR expressions in Part III. LCCM Theory provides a theoretical account of lexical representation and semantic composition in language understanding. It models the nature of the symbolic units in language – and in particular semantic structure – the nature of conceptual representations, and the compositional mechanisms that give rise to the interaction between the two sets of representations – the semantic and the conceptual – in service of linguistically mediated meaning construction. And finally, the chapter introduced the lexical concept identification procedure deployed by LCCM Theory. The purpose of this procedure is to provide a methodology for identifying distinct lexical concepts This procedure is applied, in this book, in order to identify t-FoR lexical concepts, which is to say, sentence-level sense units – the focus of Part II. The procedure is principled in the sense that it provides clear decision principles for determining whether a given sentence-level expression is likely to be motivated by a unique lexical concept or not.

[10] A goal for future research is to provide a rigorous classification based on a detailed analysis of semantic relatedness, making use of psycholinguistic and corpus-based methodologies, which may, of course, revise the proposals being made here.

Part II

Temporal frames of reference

This part of the book is concerned with the linguistic and conceptual resources for facilitating temporal reference. In particular, it is argued that there are three distinct reference strategies in the domain of time which have linguistic and non-linguistic reflexes. Moreover, it is further argued that while these are, in broad terms, analogous to reference strategies in the domain of space, there are, nevertheless, significant differences. This part consists of five chapters. The first of these, Chapter 3, frames the discussion by examining the nature of temporal experience, and temporal reference in particular. It introduces and motivates the theoretical constructs deployed in order to study temporal reference in later chapters. Chapter 4 considers in detail the deictic t-FoR, Chapter 5 addresses the sequential t-FoR, and Chapter 6 presents evidence for the extrinsic t-FoR. Chapter 7 compares and contrasts the domains of time and space, considering, in particular, similarities and differences in reference strategies across these two domains, as well as the possible reasons for the use of structure from space to support temporal reference.

3 The nature of temporal reference

In this chapter I provide an overview of temporal reference. This discussion thereby sets the scene for the detailed linguistic analyses of distinct temporal frames of reference (t-FoRs) in subsequent chapters. The chapter begins by considering the nature of temporal representation; it makes the case for thinking that temporal representation is grounded, at least in part, in terms of experience that is wholly temporal in nature. I then compare and contrast the domains of time and space, going on to argue that a criterial hallmark of time, and one absent from space, is *transience*. Transience, I propose, underpins t-FoRs, with distinct types of transience giving rise to distinct types of *temporal relations*. I then consider previous approaches to t-FoRs, suggesting that a nuanced account must address transience. I then introduce the theoretical constructs required for such an account of t-FoRs.

1 The nature of temporal representation

In this section I present reasons for thinking that concepts for time (temporal representations) are grounded in temporal experience types that are directly experienced. I argue that temporal representations accrue from phenomenologically real and hence perceivable experience types. Moreover, these experience types are associated with specific brain structures and are complex and multifaceted in nature. This discussion will begin to clear the way for the development of a theoretical account of t-FoRs later in the chapter.

1.1 Starting points

The starting point for my approach to temporal reference is the approach to time in Conceptual Metaphor Theory, as represented in the work of Lakoff and Johnson (1980, 1999), and the seminal work of Grady (1997b), and especially Moore (2000, 2006, 2011).

Lakoff and Johnson (1999) argue that time is grounded in human perceptuo-motor experience of moving around in the world and of perceiving objects moving in the world. More specifically, Lakoff and Johnson claim that

our experience of time arises largely by virtue of a metaphorical understanding of sensory-motor experience, especially motion events. They describe the situation as follows: 'Very little of our understanding of time is purely temporal. Most of our understanding of time is a metaphorical understanding of motion in space' (1999: 139).

Lakoff and Johnson provide primarily linguistic evidence for this claim, the following being representative of the range of examples deployed:

(1) a. The time for action has passed
    b. The deadline is approaching
(2) a. We're approaching the summer sales
    b. We're moving towards decision-time

In the examples in (1), time is conceptualised in terms of motion of an object through space: time is moving, much like an object would. In (2), time is conceptualised in terms of a human observer, 'we' moving through space, towards a 'time', conceived as a static location. An important aspect of the claim made by Lakoff and Johnson is that the metaphoric structuring is typically asymmetric: while time is structured in terms of space, the reverse doesn't typically follow.

The components of what we might dub this 'Time Is Space' view, then, are as follows:

i. our concept(s) for time are largely created by virtue of mapping inferential structure from motion events in space onto time,
ii. the mappings are predominantly asymmetric, mapping conceptual structure arising from sensory-motor experience onto, and so fleshing out, temporal representation, rather than vice versa, hence:
iii. our conceptual representations for time are grounded in our prior experience of sensory-motor (embodied) experience, specifically comparison of motion events, from which the conceptualisation and hence experience of time is abstracted.

More simply put, temporal representation is in part, perhaps large part, a consequence of structuring concepts for time in terms of concepts for space, and motion through space – concepts for space and motion through space being grounded in sensory-motor experience.

There is now a body of behavioural evidence which is compatible with the Time Is Space thesis. Evidence for the psychological reality of Time Is Space conceptual metaphors comes from the work of McGlone and Harding (1998) and Gentner *et al.* (2002). McGlone and Harding found that an ambiguous temporal question would be answered in a prime-consistent way if subjects were primed with either a Moving Ego or Moving Time version of a temporal

conceptual metaphor. Similarly, Gentner and colleagues found that in a reading comprehension task, temporal conceptual metaphors primed for faster comprehension when the prime and target sentences were consistent.

Important psycholinguistic research by Boroditsky (e.g., 2000; Boroditsky and Ramscar 2002) investigated the claim that the relationship between spatial and temporal representations is asymmetric. Boroditsky found that temporal cues *do not* prime for spatial reasoning, while spatial cues *do* prime for temporal reasoning. In more recent research, Casasanto and Boroditsky (2008), using psychophysical tasks, found a similar effect: space cannot be ignored when reasoning about time, and indeed seems to influence temporal reasoning. In contrast, temporal information appears not to influence, to nearly the same degree, spatial reasoning (cf. Ulrich *et al.* 2012).

That all said, representations of time must, presumably, be grounded in experience types which are, at least in part, purely temporal (Evans 2004a, b; Grady 1997b; Moore 2006; Tenbrink 2007; Wallington 2012). For one thing, there must logically be something that is temporal for spatial representations to be mapped onto. And indeed, this is the view developed by others in the conceptual metaphor tradition, notably Grady (1997a, b), Moore (e.g., 2006), and Wallington (2012). Grady, for instance, in his development of primary conceptual metaphors argues that temporal concepts are based on experience types which are as basic as the sensory-motor experience types that ground spatial concepts. The distinction he posits, between primary target concepts and primary source concepts, relates to a qualitative distinction in the nature of the grounding experience types. Spatial concepts, the source of primary metaphors, are *image concepts* – in Grady's parlance. Concepts of this type derive from relatively simple sensory-motor experiences. In contrast, temporal concepts are *subjective concepts*. They arise from phenomenologically real experiences which are responses to image-based experience types. Grady's main point is that temporal experiences are directly perceived and subjectively real. In the remainder of this section I substantiate this assertion.

1.2 Time is directly experienced

There is a very large body of evidence, from various branches of psychology, demonstrating the following: not only is time directly experienced; its manifestation is often independent of our experience of motion events in space.

Research on the perception of time, which has a venerable tradition dating back to the nineteenth century, reveals that we do indeed directly perceive time. Moreover, the human experience of time is, in principle, distinct from our sensory-motor experience. For instance, Flaherty (1999) has found that our

perception of duration is a function of how familiar we are with particular tasks: training can influence our experience of task duration. Ornstein ([1969]/1997) has demonstrated that the complexity of a given perceptual array influences perception of duration. And Zakay and Block (1997) found that temporal perception is influenced by how interesting a particular activity is judged to be, or whether we are paying attention to a particular activity, which suggests that working and short-term memory are implicated in our experience of time (Zakay and Block 2004).

Other research reveals that our ability to judge duration is a consequence of physiological mechanisms, which vary in inter-subjectively predictable ways. For instance, if vital functioning is accelerated by the consumption of stimulants such as amphetamines, or due to increased body temperature, this results in an overestimation of time amongst subjects (Hoagland 1933; Fraisse 1963, 1984). That is, time appears to proceed more quickly than usual. In contrast, reduced body temperature leads to an underestimation of time (Baddeley 1966): time appears to proceed more slowly than usual. In general, an increase or decrease in vital function consistently leads to overestimations and underestimations of time respectively (see Wearden and Penton-Voak 1995 for review).

Moreover, Flaherty (1999) has found that the nature of experience types can influence our experience of time. For instance, the phenomenon of *protracted duration* – the phenomenologically real and vivid experience that time is proceeding more slowly than usual – appears to be a consequence of events including boredom and near-death experiences (see Evans 2004a). In contrast, routine tasks with which we are familiar can give rise to the opposite effect: temporal compression – the phenomenologically real experience that time is proceeding more quickly than usual.

In addition, drive states such as moods and emotions influence our experience and perception of time (Droit-Volet and Meck 2007; Noulhiane *et al.* 2007; Wittmann *et al.* 2006; Wittmann 2009). In addition, both personality and lifestyle appear to be implicated in our experience of time (Rammsayer 1997). For instance, Duffy and Feist (in press) found that responses to a temporal reasoning task were influenced by how much control subjects had over their daily schedules, and whether they were an introvert or extrovert. In response to the following ambiguous question: 'The meeting on Wednesday has been moved forward two days. Which day is it now on?', Duffy and Feist found that extroverts and those whose lifestyle gave them greater freedom over their schedules tended to answer Friday. Introverts, and those with less freedom over their daily schedules, tended to answer Monday. Taken together, these findings appear to suggest that our experience of time is directly perceived. Moreover, it appears to be a consequence of a variety of factors, ranging from cognitive function, to personality, lifestyle and momentary mood states.

Returning for a moment to language, it is clear that time is frequently encoded in its own temporal terms, both in terms of lexis and in the grammatical system. For instance, English terms such as *yesterday*, *now*, *since*, *while*, *yet*, *soon*, *later*, *always*, *never*, and a raft of others lexicalise distinct types of temporal lexical concepts. Grammatical systems such as tense, aspect and modality encode different types of temporal notions in many of the world's languages. Moreover, time-specific language, in terms of both lexis and grammar, appear to consistently precede the acquisition of space-to-time metaphors cross-linguistically (Nelson 1996).

1.3 Time is not a monolithic experience type

Time, as experienced, appears to relate to a complex and multifaceted set of experiences. The neuroscientist Ernst Pöppel (1978), for instance, has argued that the human experience of time is made up of a number of quite different experience types. A subset of these, what he refers to as 'elementary time experiences', appear to be fundamental and have some claim to resulting from hard-wired neurobiological processes. These include our ability to perceive an elapse of duration, the ability to perceive simultaneity of events, the ability to perceive non-simultaneity, the ability to perceive succession (or event order), the ability to perceive the present and distinguish it from events that are set in the past, and the ability to perceive change. Indeed, a number of specific brain structures are now known to be implicated in several of these abilities, as discussed later.

Behavioural findings provide evidence that these elementary time experiences are directly perceived and appear to be distinct, or at least distinguishable. The experience of the present is vividly distinct from recollections of the past and anticipations of the future. Human subjects reliably experience duration in broadly similar ways, and can reliably evaluate the durational elapse of events (see Wearden and Penton-Voak 1995).

Linguistic evidence would appear to support this view – if we make the (presumably reasonable) assumption that diversity in the linguistic encoding of time reflects, ultimately, diversity in types of temporal experience (Evans 2004a, b; Grady 1997b; Moore 2006). For instance, the English word *time* covers a range of quite different lexical concepts (Evans 2004a). Consider the following examples:

(3) a. The time for action has arrived
    b. The time to start thinking about irreversible environmental decay is here [Lakoff and Johnson 1999: 143]

(4) a. Time flies when you're having fun
    b. Time drags when you have nothing to do

(5) a. The young woman's time [=labour/childbirth] approached
b. His time [=death] had come
c. Arsenal saved face with an Ian Wright leveller five minutes from time [BNC]

(6) a. [T]ime, of itself, and from its own nature, flows equably without relation to anything external [Newton]
b. Time flows on forever

In these sets of examples, all involving the vehicle *time*, a different reading is obtained. In (3), a discrete temporal point or moment is designated, without reference to its duration. In (3a) the moment designated relates to the point at which a particular agent should act. In (3b) the designated moment concerns the point at which environmental issues should be considered. The examples in (4) provide a reading relating to what might be described as 'magnitude of duration'. For instance, (4a) relates to the phenomenologically real experience whereby time proceeds 'more quickly' than usual – the duration, while objectively constant, as measured, for instance, against a clock, 'feels' as if it is less than it actually is. This constitutes the phenomenon of temporal compression (Flaherty 1999) discussed briefly above and in Chapter 1. The example in (4b) relates to the experience of time proceeding 'more slowly' than usual – the duration 'feels' as if it is more than it actually is. This relates to the phenomenon of protracted duration, also discussed briefly above. In (5), the readings relating to *time* concern an event. In (5a) the event relates to the onset of childbirth, while in (5b) the event designated relates to death. The event in (5c) concerns the referee blowing the whistle signalling the end of a game of soccer. In the sentences in (6), time prompts for an entity which is infinite, as in (6a), and hence eternal, as in (6b). Thus, in (6), the reading relates to an entity which is unbounded in nature. In sum, what these examples demonstrate is that *time* relates to quite different types of experience – having a single word form provides the illusion of semantic unity.

While English has one word for a range of (arguably) quite distinct experience types, other languages do not have a single word that covers all of this semantic territory. For instance, recent research on the Amazonian language Amondawa reveals that there is no equivalent of the English word *time* in that language (Sinha *et al.* 2011). To give another example of a typologically and areally distinct language, it is also the case that Inuit doesn't have a single lexeme for *time* (Fortescue p.c.). Moreover, even genetically related languages utilise distinct lexical items to describe the semantic territory covered by the single lexical form, *time*, in English.

French is a good example of this. While the lexical form *heure* ('hour') is used to describe the moment sense of time, as in (7), some of the other senses for English *time* are covered by the form *temps* ('time').

(7) C'est l'heure de manger
'It's time to eat'

What this illustrates is that word forms can provide an illusion of semantic unity (Evans 2009b) and give rise to the myth that time relates to a homogeneous set of experiences. I will return, below, to the issue of what unifies the experience types that might be considered to be temporal, especially as they relate to temporal reference.

In terms of cognitive neuroscience, a wide range of studies now reveal that our experience of time is multifaceted, subjectively real, and a consequence of neurobiological mechanisms and physiological processes. The basal ganglia and cerebellum are implicated in fundamental timekeeping operations upon which the coordination of motor control is dependent (Harrington *et al.* 1998). Other neuroscientists have argued that temporal processing is widely distributed across brain structures being intrinsic to neural function (e.g., Mauk and Buonomano 2004), and is fundamental to cognitive function (Varela 1999). Indeed, the emerging view from neuroscientific research on temporal cognition is that the exquisitely sophisticated timing structures in the brain are key to a raft of fundamental cognitive functions such as motor control and perception and may provide the cognitive 'glue' that facilitates learning and memory, behaviour planning, awareness, imagination and creativity (Pouthas and Perbal 2004; Pöppel 2009; Rubia *et al.* 2009). Temporal processing also appears to be fundamental to distinctively human symbolic behaviours, including speech (Chafe 1994), as well as music and poetry (Davies 1996; Turner and Pöppel 1983; cf. Wittmann and Pöppel 2000). In short, temporal processing is likely to play a role in virtually all aspects of cognitive function (Ivry and Spencer 2004). And in so doing, the highly distributed nature of temporal processing in the brain is likely to be a key contributor to the human awareness of time.

1.4 Time is not grounded in sensory-motor experience at the neurological level

Despite the linguistic and behavioural evidence, there is scant evidence that temporal concepts are grounded in sensory-motor experience at the level of neurological activity. On the contrary, distinct temporal concepts appear to relate to temporal experience types associated with brain regions distinct from those responsible for sensory-motor processing (Kranjec and Chatterjee 2010; Kranjec *et al.* 2012).

One aspect of temporal perception relates to our felt sense of duration. While the brain has a wide array of timekeeping mechanisms, in general terms, duration at sub-second intervals appears to be processed in specific subcortical regions. In contrast, temporal intervals at the supra-second interval, up

to an outer limit of around three seconds, are processed in cortical regions. Timing mechanisms that underlie larger-scale circadian rhythms, including the so-called 'master' circadian rhythm – the wake–sleep cycle – are located in the suprachiasmatic nucleus of the hypothalamus (Buhusi and Meck 2005). In terms of sub-second timing mechanisms, the cerebellum and basal ganglia are strongly implicated. The processing of motor and perceptual components at the supra-second level involves areas including the supplementary motor area, and left inferior frontal and superior temporal cortical structures (Wiener *et al.* 2010).

In addition, duration processing dissociates from that for processing of sequence information at the neurological level. Ordinal sequence judgements appear to be made in premotor cortical areas, distinct from the areas involved in duration processing (Schubotz and von Cramon 2001). Moreover, the brain region which stores the sequence of a motor response involves the right parietal cortex. In contrast, durational information associated with the same task is stored in the cerebellum (Sakai *et al.* 2002).

Also, there is evidence that the distinct experience types involving our experience of the present and thinking about the future and past are associated with distinct brain regions. Pöppel (2004, 2009) argues that the human experience of the present derives from the distributed neurological processes that give rise to the so-called *perceptual moment*. The perceptual moment provides a temporal window with an outer limit of between two and three seconds, within which perceptual information is integrated. In short, it provides a temporal unit which serves to update the stimuli we perceive and are consciously aware of. I will have more to say about this notion in the next chapter.

In addition to our experience of the present, there is evidence that distinct brain regions are involved in thinking about the past and future. It has long been held that being able to think about the future is contingent on our ability to remember the past (Ingvar 1985; Tulving 1983, 1985). Recent data from neuroimaging studies supports the view that the areas of the brain that are involved in recalling past events are also involved in thinking about the future (Addis *et al.* 2007; Botzung *et al.* 2008; Okuda *et al.* 2003; Szpunar *et al.* 2007). Episodic memories appear to involve a number of subcomponents. These include elements such as the retrieval of the subjective experience of duration, the multimodal elements of memory and, where relevant, the narrative structure of the memory (Hassabis *et al.* 2007). Episodic past thinking is hypothesised to involve the simulation of past events (Gilbert and Wilson 2007). Anticipated events are pre-experienced by virtue of simulations constructed based on past memories. In other words, past experiences are constructed, rather than being re-produced. And a similar process underlies pre-experience of the future (Schacter *et al.* 1998; Schacter and Addis 2007).

The brain regions implicated in thinking about the past and future appear to involve a 'core system' (Abraham *et al.* 2008) centred on the medial prefrontal cortex, the medial parietal cortex, lateral inferior parietal cortex and medial temporal lobe structures (Schacter *et al.* 2007). While not strictly speaking perceptual, it nevertheless seems to be the case that the basis for thinking about the past and future is grounded in brain regions that dissociate from those directly associated with sensory-motor processing.

Finally, it is worth briefly reviewing a study presented in Kemmerer (2005). Kemmerer provides evidence for a double dissociation between the processing of temporal and spatial meanings of English prepositions. For instance, the preposition *at* has a spatial lexical concept associated with it (e.g., *at the bus stop*) or a temporal lexical concept (e.g., *at 1.30 pm*). In tests on four brain-damaged patients with lesions in the left perisylvian region, Kemmerer found the following. Two of the patients could correctly process the spatial lexical concepts of the preposition but not the temporal lexical concepts. In contrast, two of the patients could correctly process the temporal but not the spatial lexical concepts. This provides a line of evidence that the temporal and spatial representations that underlie language can be, in principle, dissociated at the neurological level.

In sum, the findings briefly reviewed in this sub-section appear to suggest that there are a number of distinct types of temporal experience. Moreover, these experience types appear to be associated with distinct brain regions and processes, rather than those involved in the processing of sensory-motor experience. In short, at the neurological level, time appears to be, at least in principle, distinct from space, and motion through space.

1.5 Time as an intellectual achievement

The type of temporal representations I have been discussing thus far are grounded in direct experience of an array of temporal experience types. In addition, there is a type of temporal representation that appears not to be grounded in experiences of this kind. Representations of this type presume the existence of an objectively real substrate that can be physically measured or observed, in some sense. One example of this is the *matrix* conceptualisation of time (Evans 2004a), also referred to as 'time-as-such' (Sinha *et al.* 2011). This notion relates to our understanding of time as a manifold which constitutes the whole of history: *the* event within which all other events take place. This view of time is exemplified by the linguistic example in (8):

(8) Time flows on (forever)

From this perspective, it makes sense to talk of time as having a beginning, as if it were an entity that lies outside us, in some sense providing reality with structure. It is this matrix conceptualisation that is implicit in the conception of time in post-Einsteinian physics. And by virtue of time as a matrix, constituting an ontological category independent of events, we can discuss and study it, and describe its 'history', as evidenced by Stephen Hawking's book title: *A Brief History of Time*.

Another example of a temporal representation that is an intellectual achievement involves our personification of time as a causal agent of change. Linguistic evidence for the existence of such notions comes, perhaps most strikingly, from the following:

(9)
a. 'Time is the great physician' [Benjamin Disraeli]
b. 'Time is the greatest innovator' [Francis Bacon]
c. 'Time, the avenger!' [Lord Byron]
d. 'Time, the subtle thief of youth' [Milton]
e. 'Tempus edax rerum' [Ovid]
Time the devourer

In the Western philosophical tradition going back at least to Leibniz, it has sometimes been argued that time doesn't in fact exist as a thing unto itself (see Turetzky 1998 for discussion). Such a view appears to deny the existence of a subjectively real set of experiences that underlie our representation(s) of time. Instead, what is privileged is a putative objective reality of time, as if it were something external to us that, in principle, can be discovered. While various conceptions of time undoubtedly do exist as intellectual feats, arising from complex integration networks as described by Fauconnier and Turner (2008), including, for instance, time-reckoning, there can be no doubt that we also directly experience time at the phenomenological level. Representations of time as an intellectual feat arise precisely because a myriad of distinct types of temporal experiences inhere at the level of subjective experience and can be represented in our conceptual systems and in language.

2 Time versus space

In this section I compare and contrast time and space. I argue that our representations of these two domains, especially as exemplified in language, are quite distinct. I then introduce the notion of transience (Galton 2011), a feature of time that is absent from space (cf. Tenbrink 2007). I argue that transience is the hallmark of temporal reference.

2.1 Parameters for comparing time and space

In recent work, Galton (2011) has proposed a number of parameters that allow representations for time and space to be compared and contrasted. The finding

that emerges from this research is that time and space are both qualitatively distinct conceptual domains. The relevant parameters that allow the two domains to be compared are: *magnitude*,[1] *dimensionality*,[2] and *directedness* (Galton 2011). I consider and nuance each of these parameters in turn.

Magnitude The parameter of magnitude relates to the quantifiability of a given *substrate* – the stuff that makes up the domain. The substrate the makes up space is *matter*, of which two broad types can be distinguished: discrete entities (e.g., objects) and mass entities (e.g., fluids). This distinction, in types of matter, is reflected in the grammatical organisation of many languages, whereby a distinction between count versus mass nouns is encoded. This is exemplified with the following examples from English:

(10) a. A desk is useful for writing
b. *Desk is made of wood
c. *Some desk can be used to store stationery
(11) a. *A water covers three-quarters of the planet
b. Water is constituted by the chemicals hydrogen and oxygen
c. Some water every day is good for your health

In addition, the substrate that makes up a domain exhibits a particular property allowing the substrate to be quantified: the way in which the substrate can be 'cut up' into 'amounts'. The amounts, in the domain of space, relate to the property *extension*. Extension manifests itself in three distinct types – which is a function of the three-dimensionality of space, discussed further below. Space's extension involves length (one dimension), area (two dimensions), and volume (three dimensions).

The substrate that makes up time is that of *action* (Talmy 2000). As with space, action can also be broadly subdivided, as reflected in language. This relates to whether action is *bounded* versus *unbounded*, analogous to the distinction between discrete versus mass for the substrate matter. This is illustrated by the grammatical distinction between perfective versus imperfective aspect:

(12) a. John ran [perfective]
b. John was running [imperfective]

In the domain of time, the property exhibited by action, and hence the means of 'cutting up' action in amounts, is *duration* rather than extension. While duration can, self-evidently, be quantified by using *measurement systems* involving material artefacts such as clocks, duration (of relatively shorts periods) can

[1] Galton (2011) uses the term 'quantity'.
[2] Galton (2011) uses the term 'linearity'.

Table 3.1 *Comparing the parameter magnitude for space and time*

Domain	Space	Time
Substrate	Matter	Action
Property	Extension	Duration
Distinction	Discrete vs mass	Bounded vs unbounded

be estimated without the need for measurement systems such as these. Indeed, human subjects appear to be able to reliably distinguish between periods of different temporal magnitudes. Moreover, evaluation of temporal magnitude (i.e., duration) appears to be tied to neurological function, as discussed above. Moreover, and unlike the property of extension exhibited by spatial substrate, there is only one dimension with respect to which temporal substrate is quantified, to be discussed below. The distinctions between space and time in terms of the parameter of magnitude are summarised in Table 3.1.

Dimensionality Dimensionality, in physical terms, relates to the *constituent structure* of matter. The constituent structure of matter involves three distinct planes with respect to which points can be located. These are the transversal (left/right), sagittal (front/back) and vertical (up/down) planes. Hence, our everyday representation of space can be said to be three dimensional.

In contrast, in the domain of time the constituent structure of action involves *succession*: the sequential relationship that holds between distinct units and sub-units of action. In other words, our representation for time involves a relationship between units of action in a sequence. This involves just one dimension.

Physical theories that incorporate time, such as the Theory of General Relativity (Einstein 1916), treat time as the fourth dimension of space, forming a space–time continuum, or Minkowski space, after the celebrated nineteenth-century mathematician who first proposed incorporating time into space. On this view, points can be 'located' in time, where units of action are strung out, all at once, across time. Yet this view is at odds with the human phenomenological experience of time (see Evans 2004a: Ch. 19). In so far as time, from a phenomenological perspective, can be said to exhibit dimensionality, this relates to the sequential relationship between events, providing one-dimensional constituent structure.

Directedness The final parameter, directedness, relates to whether the substrate in a given domain is *symmetric* (i.e., isotropic) or *asymmetric* (i.e., anisotropic). Space is isotropic: it has no inherent asymmetry. Indeed,

it is possible to proceed in any direction: forward or back, or from side to side.[3] In contrast, time is anisotropic: it manifests asymmetric organisation. One of the most celebrated forms of anisotropy in the domain of time relates to the thermodynamic property of matter exhibited by the dispersal of energy (entropy): all things being equal, a cup of coffee cools down and cannot subsequently and spontaneously heat up again. The anisotropic nature of time, particularly at the macroscopic level of matter, led the British astrophysicist Sir Arthur Eddington (1928) to coin the term 'the arrow of time' (see also Coveney and Highfield 1991; and also Le Poidevin 2003). That said, from the phenomenological perspective, time is experienced as anisotropic at the subjective level. This concerns the anticipation of a future event, the actual experience of the event, and finally, the recollection of the event as past. This feature of time I refer to as *anisotropicity*.

2.2 Transience

In his work, Galton (2011) discusses an additional feature which he argues is exhibited by time but not by space. This he refers to as *transience*. It is worth quoting Galton at length to give a sense of what he has in mind:

> [Transience is] difficult to describe without lapsing into circularity. There are many common phrases which successfully conjure up the feelings engendered by this mysterious notion, without however going any way towards explaining it, phrases such as 'Here today, gone tomorrow', 'You only live once', 'Time and tide wait for no man'. In an attempt to spell out more precisely what is meant, we might say such things as: we only experience a time at the time we are experiencing it; a given moment only occurs once, fleetingly, at that very moment; a given time is only present when it is that time. But arguably these are no better (and in many respects worse) than the common phrases listed earlier. Like them, they may successfully convey to us a feeling for what is meant by transience, but only because in some sense we already know what it is. It seems impossible to explain this notion, to describe it in a way that would enable someone unfamiliar with it to understand. (2011: 698)

For Galton, transience is the hallmark of time, and hence part of its inalienable character. Tellingly, he observes that the conceptual metaphors that facilitate the recruitment of inferential structure from the domain of space to flesh out temporal representations in fact draw, in circular fashion, on temporal transience to do so:

[3] While space has no inherent asymmetry, Galton (2011) points out that some directions in space do nevertheless exhibit asymmetry. For instance, the vertical plane is asymmetric by virtue of the gravitational pull of the Earth, which provides an asymmetry between up versus down. Analogously, there is an asymmetry between north and south, a consequence of the magnetic core of the Earth.

All metaphors for temporal transience take some kind of change as their source, and hence themselves depend on temporal transience. We cannot describe this aspect of time without lapsing into circularity. Hence time, in its transient aspect, has a *sui generis* character that cannot be captured by metaphors that do not make use of the very notion to be described: time, as a fundamental and inalienable feature of our experience, will ultimately resist our attempts to explain it in terms of anything else. (2001: 695)

In the remainder of this section, I extend this notion of transience and argue that it forms part of a more complex set of temporal experiences which ground distinct types of temporal representation.

As a first pass at beginning to specify this notion of transience, I offer the following nuanced definition:

(13) Transience is the subjectively felt *experience* of (temporal) passage

In (13), 'passage' refers to our subjective experience of time, rather than motion, that is, physical passage. Subjective temporal passage arises from events of various sorts. These include when we engage in particular kinds of activities (e.g., a morning jog), when we perceive or experience an event (e.g., watching a movie), or experience, or are conscious of a specific state, (e.g., fatigue, hunger, love).

In addition, I argue that transience, like the larger domain of time which subsumes it, is itself not a monolithic temporal representation. I suggest that there are three types of transience, which relate to the three parameters that can be deployed to compare time and space. These transience types are duration, succession, and anisotropicity. Duration concerns the felt experience of the passage constituting an elapse – something greater than the perceptual moment (with an outer limit of around 3 seconds). Succession concerns the felt experience of the passage involving earlier and later experience types, which are sequenced with respect to each other. And anisotropicity concerns the felt experience that the passage exhibits inherent asymmetry – a felt distinction between future, present and past.[4] Table 3.2 summarises these transience types.

[4] One anonymous reviewer of this book made the point that while time may be anisotropic, we nevertheless can mentally 'travel' in time – which might, like space, appear to reveal an isotropic aspect to time. Tulving, for instance, has described our ability to reflect upon and revisit the past in our mind's eye, or visiting potential and indeed likely futures as 'mental time travel'. Stocker (2012) describes Tulving's notion of mental time travel as 'the idea that one can project oneself into one's own subjective past (remembering) or imaginally into one's own subjective future (autobiographical temporal imagining). Tulving characterizes such temporal mental actions as carried out by a "self." "But an ordinary self will not do," as Tulving says: It must be a self that can exist "in subjective time" and is capable of "traveling" within it' (Stocker 2012: 2). While we self-evidently engage in 'mental time travel', this ability constitutes an imaginative feat rather than relating directly to the sorts of sentence-level t-FoR constructions I will be studying, especially in the next chapter. The deictic t-FoR – which I consider in the next chapter – is anchored to the anisotropic transience type. It constitutes a phenomenologically real experience, which has conventional linguistic reflexes, regardless of our ability to engage in 'mental time travel'. In short, the deictic t-FoR relates to a subjectively real anisotropic experience type. 'Mental

Table 3.2 *Transience types*

Transience type	Description
Duration	The felt experience of the passage constituting an elapse
Succession	The felt experience of the passage involving earlier and later experience types
Anisotropicity	The felt experience that the passage exhibits inherent asymmetry – a felt distinction between future, present and past

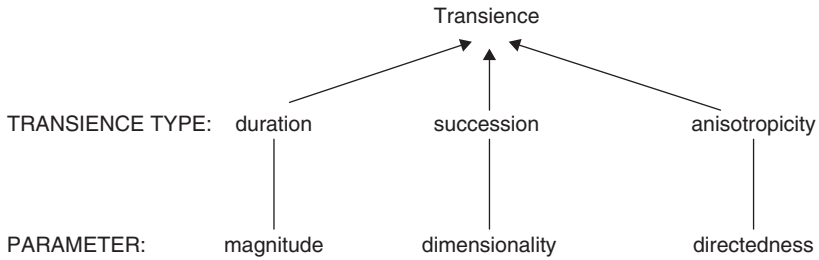

Figure 3.1 Types of transience and their parameters

The relationship between the three transience types, and the parameters which relate to space and time, is captured in Figure 3.1. The striking feature, then, of temporal experience is, in fact, less a discrete feature of time, but a consequence of the cumulative effect of the three parameters described above. That is, transience arises from temporal magnitude, which is to say duration, in conjunction with the sequential dimension of time, in which events form a sequence, with earlier events preceding later ones, combined with the anisotropic nature of time, which relates to the distinction between future and past tied to the deictic experience of the present.

The domain of time, as observed, is multifaceted. Transience types logically support more complex experience types. These I refer to as *temporal qualities*. Temporal qualities are experience types that involve comparison with respect to transience. In other words, temporal experiences of this sort involve a comparison across a specific type of transience. Examples of temporal qualities include frequency, change and synchronicity. Change, for instance, involves a comparison, or awareness of a difference, between two states at different temporal intervals and, hence, is processed with respect to transience. Frequency

time travel' represents an abstraction over autobiographical experience, as well as prospective abilities, seemingly facilitating an isotropic contour to time: we can move forwards or back in time as we engage in 'mental time travel'. But ultimately, 'mental time travel' is an intellectual achievement rather than being phenomenologically central to our perception of time.

Table 3.3 *Temporal qualities*

Temporal quality	Description
Change	A comparison or awareness of a difference between two states at different temporal intervals
Frequency	The identification of a number of iterations of experiences or experience types at different temporal intervals
Synchronicity	An awareness of two experiences or experience types occurring at the same temporal moment

involves the identification of a number of iterations of experiences, or experience types at different temporal intervals. And synchronicity involves an awareness of two experiences or experience types occurring at the same temporal moment (see Table 3.3).

There is a further class of temporal experience types: what I refer to as *temporal elements*. These are phenomenologically simple experience types that contribute to – or in some cases arise from – our experience of transience. These include felt experience types such as now, past, future, earlier and later. They are temporal elements in the sense that they are, in phenomenological terms, simpler than either temporal qualities or transience types. Indeed, in terms of complexity, temporal qualities are the most phenomenologically complex temporal experience type, followed by transience types, with temporal elements being the most phenomenologically simple.

The central claim of the remainder of this chapter, and this part of the book, is that temporal reference relates to transience. That is, the function of temporal reference systems is to fix an event in time, which is to say, with respect to the transient nature of time. I shall argue that the three t-FoRs to be described provide distinct strategies for fixing events with respect to the three distinct types of transience identified.

3 Temporal relations

In this section I make the case for the construct of *temporal relations*. These, I shall argue, arise from distinct transience types. And as each t-FoR is grounded in a specific transience type, each t-FoR accordingly gives rise to a distinct temporal relation.

It has long been noted by philosophers that time is conceptualised and lexicalised in terms of motion in space. Smart (1949), for instance, described two metaphorical conceptions for time, in which time is conceived in terms of motion towards an observer, or an observer's motion towards the future. In relatively recent times this observation has been taken up by psychologists and linguists. In characteristically insightful work, Clark (1973) modelled this

distinction in terms of a divergence in *perspectives*, paving the way for the contemporary study of temporal reference. As noted in Chapter 1, Clark distinguished between the Moving Ego (ME) and Moving Time (MT) perspectives of temporal conceptualisation:

(14) a. Christmas is approaching 'Moving Ego'
b. We are approaching Christmas 'Moving Time'

The distinction between ME and MT space-to-time motion models was formalised by Lakoff and Johnson (1980, 1999) as figure–ground reversals of the more general TIME PASSING IS MOTION conceptual metaphor (Lakoff 1993).

In more recent work, Moore (2000, 2006) has convincingly argued that, in addition to the ME and MT perspectives, there is a conceptualisation of time which is sequential in nature. Building on insights by Traugott (1978), Moore points out that in an example such as (15), time is conceptualised not in terms of an egocentric perspective-point, but rather, as being sequential in nature:

(15) Christmas comes before New Year's Eve

Moore's work is important in at least two ways. Previous research, both within and outside the conceptual metaphor tradition, while acknowledging the importance of perspective in conceptualisations of time, hadn't stressed it to the degree found in Moore's work. Moore, arguably for the first time in contemporary research, refers to 'reference frames' in order to describe space-to-time motion ascriptions.

Secondly, Moore introduces an important notion into the literature, that of 'temporal relation' (although Moore doesn't specifically use this term). In essence, Moore observes that the distinction between the examples in (14) and (15) is that the former denotes a *future/past relation*. This relation relates to, and arises from, what I have dubbed anisotropic transience. That is, this temporal relation is a consequence of the type of transience arising from the phenomenologically real experience of a present which is ceaselessly updated. In contrast, the example in (15), according to Moore, denotes an *earlier/later relation*. This relation is grounded in the transience type succession. After all, a salient feature of event sequences is the earlier/later relationship holding between two given events in the sequence.

Moore further observes that these distinct temporal relations – future/past and earlier/later – have different reference points (RP). In the examples in (14) the RP is the ego – the human egocentric experience of now – or more precisely the location here, which metaphorically corresponds to now, a distinction that is important, as we shall see later. Christmas is conceptualised by virtue of whether it is set in the future or the past with respect to the ego. In (15), in contrast, the RP is not the ego, but rather an event, New Year's Eve, which serves to fix Christmas in time.

Table 3.4 *Temporal relations*

Type of transience	Temporal relation	Name of t-FoR
Anisotropicity	Future/past	Deictic
Succession	Earlier/later	Sequential
Duration	Matrix	Extrinsic

In addition to future/past and the earlier/later temporal relations, a third temporal relation suggests itself. This concerns the relation in which time constitutes *the* event in which all others occur, which is to say, the matrix conception of time. In essence, this constitutes a boundary relation which subsumes the beginning and ending of all of existence. Just as the future/past relation arises from anisotropic transience, and the earlier/later relation arises from succession, the matrix relation arises, I suggest, from durational transience.

That said, the matrix relation is somewhat different from the previous two. Firstly, the future/past and earlier/later temporal relations appear to be grounded in phenomenologically real experience types. As I noted earlier, the matrix relation is not grounded in phenomenologically real experience. After all, the matrix relation concerns an elapse that is eternal in nature. Yet, as human life is clearly not eternal, it stands to reason that the matrix relation, while grounded in the transience type duration, must emerge from the prior conceptualisation of duration as an ontological category reified as an entity independent from the substrate that makes up the domain of time. In other words, the matrix relation emerges from a reified version of duration, conceived as being independent of events and available as a category for inter-subjective reflection in its own right.

Kranjec (2006) has provided behavioural evidence for thinking that there is a temporal reference strategy, which he dubs extrinsic, in which time is conceived as a field providing events with an 'extrinsic' frame of reference. My proposal is that this field arises from durational transience, and the temporal relation involved is the matrix relation. Table 3.4 summarises the distinct types of transience, the temporal relations involved and the reference strategies that emerge.

4 Previous approaches to temporal frames of reference

Spatial frames of reference (s-FoRs) logically involve three coordinates (e.g., Levinson 2003; Majid *et al.* 2004; see Tenbrink 2011 and Zinken 2010 for discussion). These are as follows:

- *figure* (F): which is the entity being located,
- *reference object* (RO), the entity which serves to locate F, and
- *origo* (O): the entity which fixes the coordinate system of the RO, thereby establishing the search region.

For instance, consider the relative frame of reference (in Levinson's 2003 parlance). To illustrate, consider Figure 3.2.

The relative frame of reference is exemplified by the following examples:

(16) a. The cat is in front of the tree
b. The dog is on the right side of the tree

In order to locate the F, in these examples, the cat and dog respectively, a search domain must be established. This is achieved using the RO, the tree. However, as the RO, the tree, has no inherent asymmetry, it has no inherent coordinate system that can be deployed to establish the search region. In the relative FoR, the coordinate system derives from the observer, which thus constitutes the O of the coordinate system. In Figure 3.2, the left/right, front/back axis of the observer is projected onto the tree, the C/D and A/B coordinates, respectively. The FoR is relative in the sense that it is relative to the observer and the observer's location. And once the RO has been anchored to the observer's coordinate system, it is then possible to locate the F with respect to the RO, the tree. The cat is in front of the tree because the tree – in English – reflects the inherent asymmetry of the observer.

Seminal research on temporal reference, notably Moore (2000, 2006) and Núñez and Sweetser (2006), introduced the notion of a temporal reference point (RP), as discussed earlier. This innovation allowed researchers to successfully distinguish between deictic and sequential reference. However, in important work, Zinken (2010) observes that positing a temporal RP nevertheless still doesn't fully account for temporal relations of the sort discussed above. This follows as temporal relations arise from a number of distinct coordinates, which have to be formalised in order to provide a descriptively adequate account. What was required, Zinken argued, was a theoretical approach to temporal reference that made use of the notion of a frame of reference, using the three coordinates logically required by such a theoretical construct (see also Bender *et al.* 2010 for related arguments).

More recent work, notably by Bender *et al.* (2010) and Tenbrink (2011), sought to do exactly this. While the taxonomies diverge, both in the approach taken and the complexity claimed, both approaches assume the following points. First, it is possible, and indeed desirable to provide a unified approach to FoRs in the domains of space and time. Second, theoretical constructs for FoRs from the domain of space can be mapped onto time in order to understand time, despite the apparent differences between space and time. Bender *et al.* explain the rationale for this as follows:

> How far can we get in comparing the representational systems for space and time? The two domains differ in essential aspects: time extends in one dimension only, whereas space has three and, unlike space, time has a distinct direction, which is not reversible. Given these substantial differences, are spatial frames of reference applicable for temporal relations at all? We propose that it is indeed possible to map the former onto the

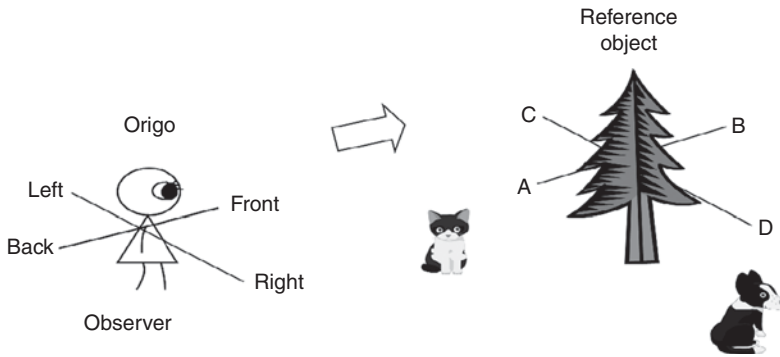

Figure 3.2 Relative s-FoR (adapted from Shinohara and Matsunaka 2010: 296)

latter because the directionality of time compensates for the deficiency in dimensions. (2010: 289)

Finally, both Bendner *et al.* and Tenbrink make use of Levinson's framework in developing their approaches to t-FoRs, assuming that, like space, FoRs in the domain of time can be divided into intrinsic, relative and absolute FoRs. Bender *et al.* are concerned with cross-linguistic variation. Tenbrink (2011) develops a taxonomy based exclusively on English; that said, the taxonomy is intended to be a language-independent conceptual framework for how languages express t-FoRs. Moreover, she impressively extends Levinson's taxonomy in the domain of space from static relations to also include dynamic spatial relations. Tenbrink then applies these insights to the domain of time.

One reason for seeking to map FoRs from the domain of space onto time is that language relating to space, as noted earlier, appears to be recruited to speak about time. And, behavioural findings indicate, as also observed earlier, that spatial representations appear to be used, and moreover, automatically activated, when reasoning about time. Taken together, these findings make it reasonable to assume that FoRs in the domain of time should be largely space-like.

Tenbrink, for instance, in providing her impressively detailed taxonomy, identifies around ten distinct t-FoRs. These include sub-types of intrinsic, relative and absolute FoRs. But the criteria for classification relate to the nature of the spatial language used.[5] For instance, consider the following example:

(17) Good times lie before me (Tenbrink 2011: 716)

[5] I hasten to add that Tenbrink does not claim that time is in some way subservient to space at the conceptual level.

This is classified as being a 'temporal static' variant of the intrinsic t-FoR. This follows as the RP, the ego, and the 'relatum' (Tenbrink's term for the entity being 'located' in time) are static. It is an example of the intrinsic t-FoR since the third coordinate in Tenbrink's taxonomy, the perspective point, is coincident with the RP. That is, the perspective point is that of the ego, and hence is making use of the RP's intrinsic orientation: the RP is directed towards the relatum which lies in front of the RP/ego.

While a taxonomy of this kind makes a lot of sense, we have seen evidence that time is, in principle, distinct and distinguishable from space. For instance, I have been arguing that transience is criterial for temporal reference and is wholly absent in spatial reference. In short, my claim is that while the work of Bender *et al.* and Tenbrink insightfully demonstrates the way in which spatial representation contributes to some aspects of temporal reference, what is still missing is the essence of what makes temporal reference temporal. After all, language users have no problem distinguishing between examples of the following kind:

(18) a. We're approaching Christmas
b. We're approaching London

And yet, presumably our understanding of the difference between the two expressions is due to more than simply representing temporal relations in terms of space – as in the work of Tenbrink (2007), and in the work of other researchers who study the way in which spatial representation is deployed to structure time – see especially Moore (e.g., 2006).

Indeed, on this very issue, recent work by Bender *et al.* casts doubt on their previously published taxonomy (Bender *et al.* 2010). In their 2012 paper, Bender and colleagues specifically sought to investigate experimentally the psychological validity of the following claim: FoRs from space are mapped onto temporal reference. In one behavioural experiment using English subjects, the experimenters made use of the expression 'move forward', which can relate to the domains of both space and time. In a spatial condition the experimenters examined which FoR was deployed (absolute, intrinsic or relative, in their terms, and based on Levinson's taxonomy). In a temporal condition, they examined which FoR speakers used for the same expression – based on their 2010 taxonomy for t-FoRs, which, as noted earlier, extends Levinson's taxonomy from space to time. Their expectation was that if s-FoRs map onto and structure t-FoRs, then time should pattern after space in terms of reference strategies.

However, much to their surprise, their behavioural experiments failed to support such a link. And the failure to map from space to time was also found to occur in languages other than English, notably German, Chinese and Tongan. It is worth quoting Bender *et al.* on this:

> The prime goal of this study was to examine whether the preferences for a specific FoR in spatial contexts would carry over to the temporal domain. Given the large body of research attesting to the link between space and time, we expected this to be the case (cf. Bender, Beller, & Bennardo, 2010). Our current findings, however, are rather discouraging in this regard. Not only did we find no correspondence between temporal and spatial references in the four languages under scrutiny, we did not even find a hint of correlation in the one case that was most promising, US-English. (Bender *et al.* 2012: 16)

This part of the book, then, is – at least in part – an attempt to tease out the spatial from the temporal representations that subserve our ability to compute temporal reference. I will argue in Chapter 7 that reference strategies may be domain-general and deploy egocentric and allocentric processes across both space and time, rather than time per se, reusing a reference strategy that originates in the domain of space. That said, there are clear domain-specific differences between the nature of spatial and temporal reference strategies. This is a consequence, I claim, of divergences in the experience types that differentially underlie temporal and spatial representation(s) respectively. This is also an issue I take up later, in Chapter 7. In particular, t-FoRs relate to transience, a property absent from the domain of space. Hence, while spatial representations do, in part, support and structure temporal representations, temporal reference is, nevertheless not an analogue of spatial reference; and the current research effort is intended to show in what ways they converge, and, importantly, the full extent to which they very much diverge.

In addition to developing an account of t-FoRs that takes the notion of transience seriously, the current research effort has a further motivation. The paradigm example of a t-FoR is a time measurement system: time measurement allows us to fix events in time, and thus provides, by definition, a temporal frame of reference. Two broad types of time measurement systems abound: event-reckoning systems (e.g., calendars) and time-measurement systems (e.g., clocks). Moreover, we use complex language to describe the temporal relations that arise from such systems. For instance, an example such as 'The time is approaching midnight' does not relate to deictic or sequential reference, but is something quite distinct, as is an example such as 'Christmas has come round again'. In what follows I develop a framework that facilitates a unified approach towards time measurement as well as sequential and deictic temporal reference. Indeed, one potential difficulty for extant taxonomies for t-FoRs is that in utilising Levinson's distinction between intrinsic, relative and absolute FoRs they blur the distinction, in temporal reference, between sequential and deictic reference. Hence, the approach I take in the present work is to base my taxonomy around the reference strategies that appear to hold in the domain of time: deictic and temporal reference (Moore 2006; Núñez and Sweetser 2006), as well as extrinsic reference (Kranjec 2006; Kranjec and Chatterjee 2010).

I posit sequential and deictic t-FoRs, and also argue for an extrinsic t-FoR which, I will propose, relates to time measurement.

The point of the foregoing discussion has not been to invalidate the value of examining the relationship between time and space and the role of space in facilitating temporal reference. On the contrary, evidence from research within the framework of Conceptual Metaphor Theory, and the supporting work accruing from behavioural studies, makes clear that spatial representation is recruited in order to support temporal representation. That said, my claim is that any account of temporal reference must consider the issue of transience, which is that aspect of time which underpins our ability to experience, and hence fix, events in time. Moreover, our experience of transience underpins our ability to represent temporal reference, including the use of spatial language and spatial representations in constructing and utilising t-FoRs.

5 The nature of temporal frames of reference (t-FoRs)

A t-FoR involves a coordinate system that gives rise to one of three types of temporal relation. A t-FoR identifies, or fixes, an event with respect to one of the three types of transience identified earlier, from which the temporal relation arises. In this section I present a detailed taxonomy of the three types of t-FoR. My main line of evidence for this, in subsequent chapters, is language, and in particular English. My assumption is that language provides reflexes of each of the three distinct t-FoRs. These take the form of sentence-level constructions involving motion ascriptions of particular kinds. What the motion ascriptions achieve is to encode a different kind of temporal relation, the hallmark, I suggest of a distinct t-FoR.

In this section, I present an overview of the main elements that make up a t-FoR, and show how these relate to temporal relations and reference strategies. In later chapters I argue for three distinct t-FoRs, presenting evidence to support my claims as I proceed.

5.1 Coordinates employed in t-FoRs

A t-FoR, as encoded linguistically, makes use of a number of coordinates in order to identify an event with respect to a specific transience type. As such, it constitutes a *coordinate system*. There are three coordinates that appear to be required to describe a linguistically encoded t-FoR:

- *target event* (TE): the event being fixed – this is the analogue of F in an s-FoR
- *reference point* (RP): the entity with respect to which the TE is fixed – this is the analogue of the RO in an s-FoR

- *origo* (O): the element that anchors the RP in one of the three transience types (duration, succession or anisotropicity) – this is the analogue of the O in an s-FoR.

To illustrate, consider the following, which minimally differs from (18a):

(19) We are fast approaching Christmas

In this example, the TE is Christmas, encoded by the form *Christmas*. This is the event being fixed. In addition to a TE, a t-FoR has an RP, with respect to which the TE is fixed. In the example, the RP is the location of the ego, encoded by *we*. A t-FoR also includes an O. This provides a means of anchoring the RP in the transience type that defines the specific t-FoR. In (19), the O is the egocentric experience of now, which constitutes the conscious experience of the present. As the ego's location correlates with the egocentric experience of now, this guarantees that the location of ego, which serves as the RP for identifying the TE, relates to a temporal – rather than a spatial – relation. In the example in (19) the temporal relation is future/past, anchored by the O, here the egocentric experience of now. By virtue of this, the TE, Christmas, is identified as being future-based with respect to the experience of transience. In other words, the metaphoric spatial relation, the relative approach of the experience with respect to a temporal landmark, can be used to 'compute' the temporal relation precisely because the O grounds the spatial relation in anisotropic transience: the temporal experience relevant here for fixing the event of Christmas. Put another way, the O, our experience of nowness, anchors the expression to our experience of anisotropicity: our experience of time as asymmetric.

Evidence for a disjunction between the constructs of an RP and an O, both of which are encoded by *we* in (19), follows from the following observation. The sentence encodes a *temporal scene* rather than a *spatial scene*. Sentence (19), despite employing the vehicle *approaching*, is not taken to refer to veridical motion, but rather to the relative imminence of Christmas. That is, it concerns a temporal relation. For that to be the case, there must be a means of fixing the TE, Christmas, with respect to the transience type that supports the temporal scene encoded by (19). The temporal relation that consequently arises – whether the TE is future- or past-based with respect to the RP – must be grounded by the egocentric experience of now, the O. If that were not the case, the experiencer's location (RP) relative to Christmas could not be interpreted in temporal terms.

A previously unremarked observation relates to 'spatial' sentences that parallel (19). Consider (20) by way of example.

(20) We are fast approaching London

One key difference between (20) and (19) is that (20) conveys veridical motion, as it must if it is to be taken to encode a spatial rather than a temporal scene.

However, in certain other respects the examples in (20) and (19) are analogous. For instance, in (20) *we* encodes location on a path relative to the landmark, London, which is the entity being approached. However, a consequence of undergoing motion, which, as noted by Galton (2011) involves transience, is that the experiencer in (20) is also associated with the egocentric experience of now, which correlates with the experiencer's present location. In other words, in (20) London is located spatially ahead of the experiencer, *and* is situated in the future, given the experiencer's current apprehension of the present. Hence, what is common to both (20) and (19), and hence to both spatial and temporal scenes, is that there is a spatial location and an egocentric awareness of now associated with the experience, as encoded by *we*. Indeed, it is plausible that the reason relative motion constructions of the sort exemplified by (20) have been extended to temporal scenes as in (19) is precisely because there is a correlation in veridical motion between location and the experience of transience.[6]

That said, there is a key difference evident upon closer examination of these sentences. As noted earlier, both Clark (1973) and Lakoff (e.g., 1993) have shown that sentences such as (19) can involve figure–ground reversals and provide a different perspective, Moving Ego versus Moving Time. Consider the example in (21) by way of contrast with (19):

(21) Christmas is fast approaching

In (21), the TE, the event being identified with respect to transience, remains the same; it is Christmas. Moreover, the RP remains the experiencer's location, tied, by the O, to the egocentric experience of anisotropicity. Yet there is a difference in the linguistically encoded perspective point (PP) – a function of the linguistic encoding of t-FoRs. In (21) the PP is fixed at the TE, which, in grammatical terms, is encoded in subject position in the sentence. That is, the relative imminence of Christmas, with respect to the egocentric experience of now is viewed from the perspective of the TE. In contrast, in (19) the PP is fixed at the RP. Hence, in (19) the scene is viewed from the perspective of the RP.

Unlike constructions encoding temporal scenes, relative motion constructions cannot take different PPs. For instance, the putative PP reversal of (20) is, for many speakers, semantically anomalous:

(22) #London is fast approaching (us)

This illustrates a key difference between s-FoRs and t-FoRs as encoded in a language such as English. Although spatial representation plays a role in a t-FoR, the underlying relation is temporal. And as such, the PP can be switched in certain cases. In contrast, an s-FoR involves a spatial relation holding between a

[6] In slightly different terms, Moore (2006) makes a related point with his discussion of the *grounding scenarios* for space-to-time motion metaphors.

Table 3.5 *Coordinates in t-FoRs*

Coordinates	Description
Target event (TE)	The event, in a temporal scene, that is identified with respect to transience
Reference point (RP)	The point which is deployed to fix the TE
Origo (O)	The point that serves to ground the RP to the transience type that defines the t-FoR
Perspective point (PP)	The perspective from which the temporal scene is viewed; this can take the perspective of the TE or the RP

figure (F) and a reference object (RO). Moreover, the grammatical structure of language appears to pattern after the focal perspective (perceptual prominence) afforded to figures, following perceptual principles of figure–ground segregation (see Evans and Green 2006; Langacker 1987, 2008; Talmy 1978). This appears to require that when encoding spatial scenes, the F occupies subject position, and it precludes a reversal of PP. Because of this, spatial scenes cannot easily be encoded in language with the same degree of flexibility in terms of PPs that is evidenced in t-FoR constructions.

In order to facilitate the discussion in this part of the book, Table 3.5 presents a summary of the key terms relating to coordinates, as well as PP employed in describing t-FoRs.

5.2 Temporal reference strategies

In this section I consider other aspects central to a description of t-FoRs. This includes, notably, the notion of a reference strategy. As each t-FoR identifies a TE with respect to a distinct type of transience, this gives rise to a distinct *reference strategy*: a unique approach to fixing temporal reference.

Coordinate systems arise on the basis of how reference is fixed amongst the coordinates. In this respect, the relationship between the RP and the O, which together serve to fix reference and hence identify the TE, is criterial. Each of the three t-FoRs identified exhibits a distinct type of reference, the consequence of a distinct reference strategy.

The deictic t-FoR involves a coordinate system that is *egocentric*. This follows as it is the egocentric experience of now which anchors reference to the anisotropic transience type. This provides an *experiencer-based* reference strategy, as temporal reference derives from the human experience of the present. A linguistic example of this type of reference strategy is exemplified by (19).

In contrast, the sequential t-FoR involves an *allocentric* coordinate system – one that is other-based, rather than being based on the experiencer in question.

This is the case as reference is facilitated by events in a sequence, which gives rise to an earlier/later temporal relation. Because of this, the reference strategy can be classified as *event-based*. An example of this type of reference strategy is exemplified in (23):

(23) Christmas precedes New Year's Eve

In this example, the TE, Christmas, is fixed with respect to an event-based reference strategy. This involves relating the position of Christmas to other events in a sequence, and specifically, New Year's Eve, with respect to which Christmas is earlier.

Finally, the extrinsic t-FoR is also allocentric; but rather than relating to events, it involves a *field-based* coordinate system. This follows as it provides a means of establishing an equably graduated field which anchors reference to a matrix – a conceptualisation of duration as an unending event in which all else occurs. The field is established by virtue of adopting a *periodicity-based* reference strategy. That is to say, reference is fixed by virtue of external periodicities – naturally recurring perceptual occurrences, of which there are many types – which can be measured in a variety of ways. Consider the following example:

(24) The time is approaching 11

In this example, which relates to the 12-hour clock, a TE is identified. This is achieved by measuring the elapse associated with the periodic behaviour of a mechanical device (e.g., a watch), thereby relating the TE, the present moment, to the RP, which is the location of 11 on a clock 'face'.

Table 3.6 presents a summary of the different reference strategies and how they relate to other features of t-FoRs.

6 Summary

This chapter has provided an overview of temporal reference. As such, it has set the scene for the detailed linguistic analysis of distinct temporal frames of reference in the next three chapters. The chapter began by considering the nature of temporal representation. I argued that our representation for time is constituted, at least in part, by directly perceived temporal experience which is, in principle, distinct from sensory-motor experience. Further arguments were then considered for distinguishing between space and time. For instance, the domains were compared and contrasted along the parameters of magnitude, dimensionality and directedness. It was concluded that each of these parameters, as they relate to the domain of time, gives rise to the experience of transience. Transience appears to be a property associated with time and not space. Moreover, temporal reference relates to transience: events are fixed

Table 3.6 *Reference strategies and their relationship to t-FoRs*

	Deictic t-FoR	Sequential t-FoR	Extrinsic t-FoR
Type of transience	Anisotropic	Succession	Duration
Temporal relation	Future/past	Earlier/later	Matrix
Type of coordinate system	Egocentric	Allocentric: events	Allocentric: field
Reference strategy	Experiencer-based	Event-based	Periodicity-based

with respect to transience. And given that temporal reference relates directly to transience, a property absent in the domain of space, it follows that spatial and temporal reference are both distinct and distinguishable, notwithstanding the use of spatial representations in structuring t-FoRs. The chapter then examined the nature of t-FoRs, considering the various elements that constitute a t-FoR, including a target event (TE) – the event being fixed with respect to transience – the reference point (RP) – the event which locates the TE – and the origo (O) – which anchors the TE to the type of transience associated with a given t-FoR. It was concluded that different types of transience give rise to distinct types of temporal relations, the hallmark of a distinct t-FoR. Three temporal relations were identified: a future/past relation, an earlier/later relation and the matrix relation.

4 Deictic temporal reference

In this chapter I turn to a detailed discussion of the deictic t-FoR and the linguistic evidence for it. This t-FoR provides a temporal coordinate system that relates to anisotropic transience: the felt experience that time evolves from future to present to past. This arises from the phenomenologically real experience of a present which is in a perpetual state of modification. This subjective experience provides a basis for distinguishing between the anticipation of an event's occurrence (the future) and the recollection of events that have occurred (the past). Hence, this type of transience gives rise to the temporal relation future/past. I begin by briefly considering the neurological basis for the egocentric experience of now, the temporal element which serves as the origo (O), anchoring this t-FoR to the transience type anisotropicity. The chapter then goes on to consider in outline the nature of the deictic t-FoR and, on the basis of linguistic evidence, shows how it is distinct from grammatical tense. I then consider the different perspective points (PP) available for the linguistic encoding of the deictic t-FoR, before providing an overview of the range of semantic clusters that show up in language. I do so employing the methodological perspective of LCCM Theory as introduced in Chapter 2. Finally, I briefly consider the phenomenon whereby expressions that give rise to deictic temporal reference may have multiple motivations.

1 The neurological basis for the deictic t-FoR

The egocentric experience of 'now' appears to have a neurological basis. Specifically, it is likely that it arises from mechanisms that facilitate the binding of perceptual information derived from different brain modalities in the formation of a coherent percept. Before discussing the deictic t-FoR in more detail, I briefly discuss the provenance of the human experience of 'now'.

The experience of 'nowness' relates to what James ([1890]/1950) referred to as the specious present: '[T]he short duration of which we are immediately and incessantly sensible' (p. 631). This short duration is more commonly referred to as the perceptual moment and appears to have an outer limit of around three seconds (see Evans 2004a for review). Cognitive neuroscientists have claimed

that the perceptual moment arises from the perceptual process itself, which serves to update perceptual processing within a short window of attention. This, in turn, appears to be a consequence of distributed timing mechanisms across different regions of the brain. Research over the last two decades or so suggests that the perceptual moment arises out of the coordinated oscillation of neurons followed by a silent interval (Pöppel 1994, 2009; see also Crick and Koch 1990; Dennett 1991; Edelman 1992; Engel, König and Schillen 1992; Mauk and Buonomano 2004; Varela *et al.* 1991). Moreover, perceptual moments appear to be ubiquitous at the neurological level, occurring at all levels of processing. They range from a fraction of a second up to an outer limit of around three seconds (see Chafe 1994; Davies 1996; Pöppel 1994, 2009).

Pöppel (1994) has argued that perceptual moments can, in broad terms, be divided into two types. The first, what he refers to as *primordial events*, last for a fraction of a second. These serve as a linking activity to integrate, or 'bind', spatially distributed information in the brain between and within different modalities. This facilitates perception of an entity, such as an object, in which sensory information is integrated in order to create a coherent percept. The second type, with an outer window of two to three seconds, links these primordial events into a coherent unity. This type, he argues, involves temporal binding – as opposed to the binding of spatially distributed activities. Pöppel proposes that it is the perceptual moment in this latter range to which our phenomenologically real experience of now (and our concept of the present) can be traced. The evidence for a perceptual moment having an outer limit of around three seconds is persuasive. Ambiguous figures such as Necker cubes have a reversal rate of about two–three seconds. This suggests that perceptual processes reanalyse input in a holistic way every two–three seconds. Similarly, there is strong evidence that stimuli can only be retained in short-term memory for around three seconds if rehearsal is not permitted (Pöppel 1994). In addition, there is evidence that basic units of human poetry (the line) and language (the intonational unit) are segmented into intervals of up to three seconds, irrespective of the speaker's age or cultural background (Chafe 1994, p.c.; see also Davies 1996; Pöppel 1994; Turner and Pöppel 1983).

2 The nature of the deictic t-FoR

In the deictic t-FoR, the O constitutes the egocentric experience of now, anchoring the system to the phenomenologically real experience of anisotropicity – the felt experience that the passage of time exhibits inherent asymmetry: a felt distinction between future, present and past. Indeed, it is this anchoring to our subjectively real experience of anisotropicity which is what makes this t-FoR deictic. One consequence of this is that the temporal relation captured by this t-FoR is a past/future relation.

That said, the linguistic evidence shows that the deictic t-FoR also makes use of spatial information as a representational medium in computing the temporal relation holding between the target event (TE) and the O. That is, events are related to a physical reference point (RP). More specifically, they are located with respect to the experiencer's location in three-dimensional space. Hence, the RP in a deictic t-FoR is the experiencer's location, anchored by the experiencer's awareness of now, the O, which is coincident with the experiencer's precise location. Consider the following example:

(1) We are moving closer to Christmas

In this example, the TE is Christmas, the event being fixed with respect to the experience of anisotropic transience. Yet the way this is achieved is by relating the TE to a spatial RP, the experiencer encoded by *we*. But as the experiencer is coincident with the egocentric experience of now, the relative motion of the experiencer with respect to Christmas provides a means of computing the relative point in time of the TE with respect to the O. And in this way, the TE is fixed with respect to anisotropic transience, giving rise to a future relation in this example. Hence, spatial information provides a means of supporting temporal reference in the deictic t-FoR.

Within this kind of t-FoR, events fixed as being in the future can be said to exhibit the property *imminence*. Events that are fixed as being coincident with the experience of now can be said to exhibit *synchronicity*. Those that are fixed as being in the past can be said to exhibit the property *occurrence*. Hence, this t-FoR provides a means of fixing events that are very much grounded in the human experience of future/present/past, corresponding to the threefold distinction between current perceptual processing (present), memory (past) and anticipation (future) – see Gell (1992) for discussion. Consider examples illustrating these relations below:

(2) Christmas is approaching (imminence)
(3) Christmas has arrived (synchronicity)
(4) Christmas has gone (occurrence)

In each of these, there is a TE, Christmas. The RP is the experiencer's location, not explicitly encoded, but implicit in the deictic motion relation (e.g., *approaching* vs *arrived* vs *gone*). The claim I am making is that these examples are linguistic reflexes of the deictic t-FoR. To demonstrate that this is so, we need to exclude the possibility that these relations are due to tense.

While not all languages feature a tense system, many do. As briefly discussed in Chapter 2, tense morphologically encodes the time reference of an event with respect to coding time: the notion of when the utterance is being made. In so doing, tense is clearly a deictic phenomenon, and thus, ultimately, also related to the ability to form perceptual moments. While some languages

exhibit reasonable complexity in terms of their tense systems – the most tenses exhibited by a single language is eleven (Evans 2009b) – a language such as English only features two (morphologically bound) tenses – present and past (or not now). Some languages, such as Mandarin, in contrast, don't encode tense. Examples of English tense are given below:

(5) a. John kicks the ball (present)
b. John kicked the ball (past)

In order to conclude that the examples in (2) to (4) exhibit a deictic t-FoR, we must be able to demonstrate that the readings relating to imminence/synchronicity/occurrence are independent of tense. To do so, consider the following sentences:

(6) a. Christmas is getting close
b. Christmas is coming up
c. Christmas is drawing near

These sentences all appear to relate to the relative imminence of a specific TE – the occurrence of Christmas – with respect to an implicit RP – the event/location with respect to which Christmas is 'moving'. Moreover, the semantic function of relative imminence is retained regardless of the tense of the verb phrase, as we can see by placing (6c) in various (complex) past-tense forms:

(7) a. Christmas drew near
b. Christmas was drawing near

What we see in (7) is that the semantic function still relates to relative imminence, regardless of whether the sentence is set in the present or the past with respect to coding time.

Now let's consider the situation with respect to occurrence:

(8) a. Christmas has vanished
b. Christmas has disappeared

The example sentences in (8) relate, in contrast not to relative imminence, but to relative occurrence, and, moreover, occurrence that is distant: if the TE is no longer 'visible', its occurrence must be relatively distant from the (implicit) RP. And as with imminence, the reading of occurrence in these sentences is independent of the tense involved:

(9) a. Christmas is vanishing
b. Christmas will vanish

In (9) the sentences still relate to occurrence, regardless of the tense – or modality, as signalled by the modal marker *will* in (9b) – involved. The fact that 'imminence' and 'occurrence' are semantically independent of tense (and

futurity, signalled by a modal marker), demonstrates that they are independent of coding time.

In contrast, a sentence can involve tense without necessarily involving a t-FoR, in the sense developed in this book. Let's return to the example of kicking the ball:

(10) John kicked the ball

The event described in (10) is a kicking event. However, the event is not being anchored with respect to anisotropic transience. Rather, the event is being straightforwardly related to coding time: the point at which the utterance is made. Past tense signals that the event occurred prior to coding time. While tense is presumably related, ultimately, to anisotropic transience, tense, as a system, provides a different semantic function from the deictic t-FoR.

3 Perspective points

A salient feature of the linguistic reflex of the deictic t-FoR is that the same temporal scene can be encoded from two distinct perspective points. The first type involves a PP fixed at the event being located in time, the TE. To illustrate, consider the following:

(11) Christmas is approaching

In this example, the temporal scene being encoded relates to a TE, Christmas, and an implicit RP, the experiencer's location. However, the TE occupies the subject position in the linguistic expression. This is the position identified by Langacker (1987, 2008) in his theory of Cognitive Grammar. It is reserved for the participant that occupies focal prominence in an utterance. He uses the term *trajector* (TR) to refer to the participant in a scene that achieves focal attentional prominence. Hence, in (11), the TE achieves focal prominence by virtue of occupying subject position. Put another way, the temporal scene is being viewed from the perspective of the TE. This can be represented diagrammatically as in Figure 4.1.

Figure 4.1 captures the following information with respect to the sentence in (11). There are two events set in time. The first serves as an RP. The second is the TE, the event being fixed with respect to the RP. In Figure 4.1 the PP is situated directly above the TE, which serves as the perspective from which the temporal relation is viewed, as indicated by the two arrows.

Now let's consider the second type of PP. This type involves a PP fixed at the RP. To illustrate, consider the following example:

(12) We are approaching Christmas

In this example, the temporal scene being encoded also relates to a TE, Christmas, and an explicitly encoded RP, the location of the experiencer, encoded by *we*, which is determined by the O, the egocentric experience of

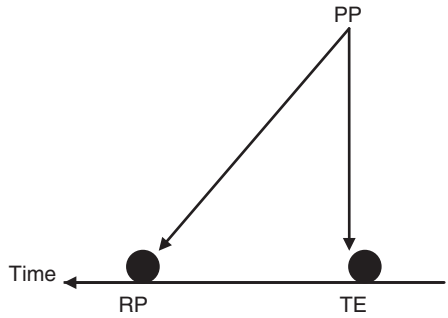

Figure 4.1 Target-event perspective point

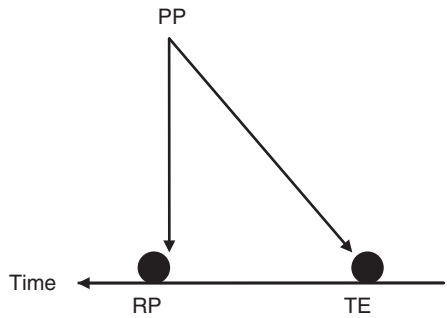

Figure 4.2 Reference-point perspective point

now. With respect to this RP, Christmas is set as future-based, and hence imminent. The two temporal events – the occurrence of Christmas (TE) and the location of the experiencer/experience of now (RP/O) – establish a relation whereby the TE is set in the future.

However, and in contrast to the example in (11), the RP occupies the subject position in (12), while the TE, Christmas, occupies the object position, and hence achieves secondary focal prominence. This is what Langacker refers to as the *landmark* (LM) (1987, 2008). Accordingly, (12) provides evidence that the PP is set at the RP, rather than at the TE. Put another way, the temporal scene is being viewed from the perspective of the RP. This can be represented diagrammatically as in Figure 4.2.

Figure 4.2 captures the following information. There is an event, our experience of now, which is coincident with the location of the experiencer. The latter serves as the RP. There is also a TE: the event being located in the temporal scene. In Figure 4.2 the PP is situated directly above the RP, which serves as the perspective from which the relation is viewed, as indicated by the two arrows.

4 Types of deictic t-FoRs

In this section, I adduce distinct lexical concepts that constitute linguistic reflexes of the deictic t-FoR. In so doing, I employ the LCCM methodology introduced in Chapter 2. I identify four distinct clusters of lexical concepts relating to the deictic t-FoR. While there are undoubtedly more, these capture a significant proportion of the way in which the deictic t-FoR is encoded in English. And as such, the four clusters identified are representative, providing evidence for the existence of the deictic t-FoR. In general terms, deictic t-FoR lexical concepts encode a relation between a TE and an RP. The RP encoded relates to the spatial location of the experiencer, and the TE is linguistically encoded as being located on either the anterior or posterior region of the sagittal (front/back) axis with respect to the experiencer. Moreover, the four clusters of lexical concepts are distributed across the two PPs exhibited by the linguistic encoding of the t-FoR. The first cluster relates to an imminence (anterior) relation. The second relates to an occurrence (posterior) relation. The third concerns the quality of the elapse involved, while a fourth cluster relates to the degree of remove holding between the RP and TE and appears to involve a greater degree of spatial language to encode this notion. Figure 4.3 provides a diagrammatic representation of the various clusters for each of the PPs encoded linguistically.

4.1 Target-event perspective point

In this sub-section I provide evidence for the four clusters encoding a target-event PP. In other words, English has, I argue, a conventional repertoire of lexical concepts encoding a TE PP. This can be glossed as follows:

(13) [EVENT X FIXED WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]

Recall from Chapter 2 that a lexical concept is a bundle of different types of linguistic knowledge; moreover, it additionally provides access to a cognitive model profile. Hence, the label in square brackets is simply a mnemonic that identifies this knowledge bundle. The mnemonic in (13) captures the following. There is a lexical concept that signals a TE. The TE is fixed with respect to an RP that takes its reference from the egocentric experience of now, the O which encodes this temporal scene from the perspective of the TE.

In addition, I present evidence below for thinking that there are specific lexical concepts that relate to the more abstract lexical concept in (13). As discussed in Chapter 2, part of the knowledge associated with a given lexical concept includes selection tendencies of two types: formal and semantic. Moreover, these two sorts of selectional tendencies can be deployed in order

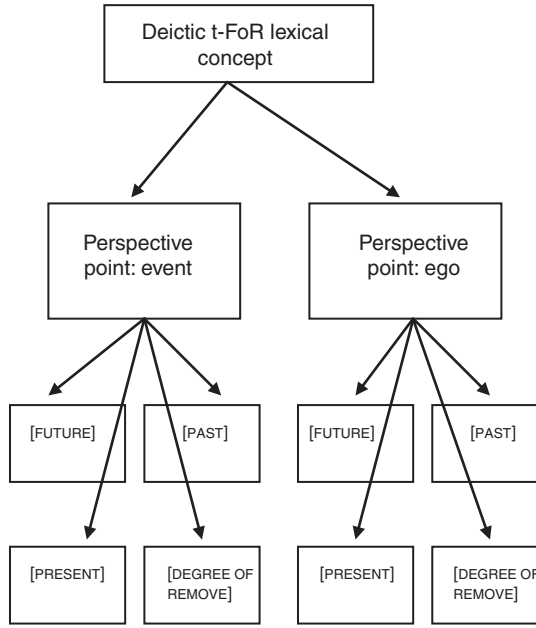

Figure 4.3 Clusters of lexical concepts of deictic t-FoRs

to ascertain whether there is indeed a distinct lexical concept conventionalised by speakers of English. A distinct pattern in either the semantic or formal selectional tendencies provides evidence for a distinct lexical concept. I use the notion of selectional tendencies to make the case for the various lexical concepts that I argue for below.

Future cluster To begin, let's consider TE PP lexical concepts relating to the notion that the TE is fixed in the future with respect to the egocentric experience of now. I argue below that it is possible to make the case for three distinct lexical concepts under this cluster. These distinct lexical concepts relate to an 'imminence' relation, a 'proximal imminence' relation, and a 'future' relation.

Preliminary evidence for a conventional lexical concept relating to the first of these, [IMMINENCE], comes from examples such as the following:

(14) a. Christmas is approaching
b. Christmas is coming up
c. Christmas is getting close/closer/near/nearer

These examples are all taken by native speakers of English to relate to an 'imminence' relation. In current parlance, this amounts to the following: the

TE, Christmas, is fixed in the near future with respect to the O, the experience of now, such that the occurrence of the TE is imminent.

In terms of semantic selectional tendencies, examples such as these suggest the following. The TE slot must be filled by a semantic argument that can be construed as being an event – which is to say, an entity with a *temporal profile*: I will have more to say about the nature and structure of events in Chapter 7. For instance, an entity that doesn't have a temporal profile cannot provide an imminence reading, as is evident from (15):

(15) #The car is approaching

For the example to have an 'imminence' reading it would have to constitute a conventional way of expressing the following: the perceptual apprehension of the car is set in the future. After all, in (14a), the experiential apprehension of Christmas is set in the future. But, in contrast, the example in (15) is normally taken to mean that the entity, the car, is currently available to perceptual apprehension, although it is not co-located with the deictic centre. That is, the sentence in (15) is not analogous to those in (14), and does not provide an imminence reading in the same way. This follows as the entity in the TE slot cannot normally be construed as referring to an event and, hence, does not have a *temporal profile*. This contrasts with the example in (16), which does feature an event in the TE slot:

(16) The earthquake is approaching

In this example the semantic argument designated by *the earthquake* does have a temporal profile – it evolves through time – and hence can felicitously provide an imminence reading.

In addition, semantic arguments selected to fill the TE slot must be events that are discrete. That is, the events selected for are temporally bounded. Unbounded events are incompatible with an imminence reading. To illustrate, consider the following example:

(17) Time flows (on forever)

The example in (17) is typically taken to refer not to an event set in the future, but rather to the matrix conception of time. In this example, the referent, *time*, is a single event, a temporal manifold, in which all else unfolds. And as such, it cannot relate to the future, as it concerns an event that encompasses all of existence, both past and future.

In addition, in the examples in (14), the verb phrase (VP) selects for motion events that involve motion towards a deictic centre: motion that is directional with respect to the RP (e.g., *come up*, *approach*, *get closer*). Motion that is not directional and hence deictic in nature, as in (18a), for instance, or motion away from the RP, as in (18b, c), is infelicitous with an imminence reading:

(18) a. #Christmas is moving
b. #Christmas is moving away
c. #Christmas has gone (intended readings: TE is set in the future)

Interestingly, in the examples in (14) there is no specification that the motion event must originate from a particular region on the sagittal plane. That is, the motion is not specified as emanating from the anterior portion of the sagittal plane.

In addition, the motion events selected for in (14) are manner-neutral, which is to say, the manner of motion is not specified. Moreover, motion events that specify manner are infelicitous with an imminence reading, as evident in (19):

(19) #Christmas is racing/whizzing/dragging/marching (intended reading: TE is set in the future)

Turning now to formal selectional tendencies, the lexical concept appears to select for an intransitive argument structure: a subject NP – filled by the TE – and a VP, but no object argument. After all, an example such as the following, in which there is a bare object, is highly unnatural in English:

(20) ?Christmas is approaching us

For an object to be possible with an 'imminence' reading, it seems that it must be encoded as an oblique, headed by a preposition:

(21) Christmas is moving towards us

Interestingly, the example in (21) requires the oblique object 'towards us', precisely because the motion event is non-deictic in nature, and thus the oblique object, with the preposition 'towards', provides the directional information that is selected for by this lexical concept. Moreover, the unnaturalness of the example in (20) contrasts with constructions encoding veridical motion:

(22) The train is approaching London

In (22), where there is a bare object, namely London, there is no difficulty at all. The fact that a bare object is possible when encoding spatial scenes but odd when encoding temporal scenes provides further evidence for thinking that the examples in (14) are indeed sanctioned by a lexical concept that is distinct from the one in (22) that encodes a scene involving veridical motion.

The semantic and formal selectional tendencies lead to the hypothesis that the examples in (14) arise from an [IMMINENCE] lexical concept. This [IMMINENCE] lexical concept can be glossed more accurately as in (23a), and has a vehicle of the type specified in (23b):

(23) a. lexical concept: [EVENT X FIXED AS BEING FUTURE-BASED AND IMMINENT, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP VP

Table 4.1 *Selectional tendencies for the [IMMINENCE] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event	The TE is integrated with a subject NP slot
The event must be discrete – bounded in time	There is an intransitive VP, which the motion ascription is integrated with
Verbal ascription must involve directional motion that is directed towards the RP	When the motion described does not intrinsically encode directional motion, an oblique object is selected for to serve this function
The motion event is manner-neutral	

What (23) captures is the following. The TE is set in the future, with respect to the experiencer's present. Further, the TE is not in the 'distant' future but is imminent, and hence in the 'proximal' future. Moreover, the way in which this is encoded sets the perspective from which this imminence relation is viewed as being aligned with the TE, rather than the experiencer. This lexical concept, as we have seen, has a number of semantic constraints that apply to the semantic roles that can fill the NP and VP slots. These are summarised in Table 4.1.

I now turn to the second of the 'future' lexical concepts. This is the lexical concept I gloss as encoding [PROXIMAL IMMINENCE]. Consider some representative examples:

(24) a. Christmas is near/close (by)
b. Christmas is nigh
c. Christmas is around the corner

While these examples also provide a future-based reading and, like those in (14), relate to a TE that is imminent, the degree of imminence is heightened. That is, the examples in (24) provide a conventional construal in which the TE is relatively proximal to the RP, and, hence, the apprehension of the future event is that it is at hand. For this reason, the shorthand gloss I provide for this lexical concept is [PROXIMAL IMMINENCE].

There are some attested examples that might suggest, on first blush, that the example in (24c) does not relate to proximal imminence:

(25) a. Christmas is just round the corner … Many people are already buying gifts
b. With Father's Day peeking its head around the corner, get in there early[1]

[1] I am grateful to Alan Wallington for providing me with these examples.

The example in (25a) appeared around seven weeks prior to Christmas. While, in relative terms, seven weeks is still a temporal 'distance' from Christmas, the expression nevertheless highlights the proximal imminence of the event: it is important to begin buying gifts. Indeed, the attested example in (25a) was part of an advertisement encouraging consumers to make Christmas purchases. It is making use of the [PROXIMAL IMMINENCE] lexical concept, I argue, in order to seek to persuade would-be consumers to make a Christmas purchase. In a similar vein, the example in (25b) is advocating a particular behaviour by invoking the [PROXIMAL IMMINENCE] lexical concept. The expression modulates this by employing the modifying expression 'peeking its head', serving to attenuate the semantic force of [PROXIMAL IMMINENCE], which is semantically compatible with the inference arising from 'get in there early' – although Father's Day is, in relative terms, proximal, it is still some temporal distance away.[2]

The evidence that this lexical concept is distinct from that of [IMMINENCE] (which sanctions the examples in (14)) comes from selectional tendencies. The semantic constraints that apply to the subject NP slot are the same on both: the subject NP must have a temporal profile, and must refer to a discrete event. However, the VP is filled not by motion events, but rather by proximal spatial ascriptions. Moreover, and like the [IMMINENCE] lexical concept, there is no designation as to which region of the sagittal plane the spatial location relates to. That is, there is no prescription that the designation must be on the anterior portion of the sagittal axis, for instance.

In terms of formal selectional tendencies, this lexical concept selects for a subject NP, an existential or situational verb (typically BE) and a locational preposition phrase (PrepP). The lexical concept [PROXIMAL IMMINENCE] can be more precisely expressed as in (26a), and its vehicle expressed as (26b):

[2] My colleague Alan Wallington conducted an internet search for the phrase 'Christmas is approaching' [IMMINENCE], versus 'Christmas is round the corner' [PROXIMAL IMMINENCE]. Wallington (email 22 November 2012) observes the following: 'It is often the case that the documents – especially blogs – have an associated date, which allowed me to determine how close the use of the phrase was to Christmas Day … I recorded the first 20 dates and have now sorted them into chronological order. It has to be said that there is considerable overlap; they do not fall into two distinct groups. However, my impression is that the "round the corner" examples are slightly closer to Christmas … of the 20 "approaching" examples, 10 appeared after the 15th November and 10 before, although of the 10 before, 4 appeared on the 14th November. Six cases appeared in December: one on the 4th, two on the 6th, one on the 7th, one on the 14th and one on the 17th. The earliest case was in mid-August, then there was a gap until two appeared on the 22nd of October. Of the 20 "corner" examples, 15 appeared on or after the 15th of November. Seven appeared in December: one on the 4th, two on the 13th, one on the 14th, one on the 16th, one on the 17th and the final one on the 23rd. The earliest example was from the 6th September and there was another case on September 23rd.' Overall, the findings arising from this sample appear to support the distinction I have argued for.

Table 4.2 *Selectional tendencies for the [PROXIMAL IMMINENCE] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event	The TE is integrated with a subject NP slot
The event must be discrete – bounded in time	There is an existential/situational VP, typically, *BE*, and a verbal PrepP, which is integrated with semantic arguments for spatial location
Verbal ascription must involve a locative designation	

(26) a. lexical concept: [EVENT X FIXED AS BEING FUTURE-BASED AND PROXIMALLY IMMINENT, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP BE PrepP

What (26) captures is the following. The TE is set in the future, with respect to the experiencer's present. Further, the TE is not in the 'distant' future but is imminent, and hence in the 'proximal' future. In addition, the imminence constitutes a heightened state of imminence, such that the apprehension of the event is almost at hand. Moreover, the way in which this is encoded sets the perspective from which this imminence relation is viewed as being aligned with the TE rather than the experiencer. Table 4.2 summarises the selectional tendencies for this lexical concept.

The third lexical concept in the 'future' cluster I gloss as [FUTURE]. Representative examples are below:

(27) a. Christmas is/lies ahead of us
b. Christmas is/lies in front of us

While these examples also provide a future-based reading, unlike the examples in (14) and (24), the examples in (27) do not relate to imminence. That is, the examples in (27) provide readings that are neutral with respect to whether the occurrence of Christmas is relatively imminent or not. For this reason, I gloss the lexical concept that underpins examples such as these [FUTURE]. A further difference between the examples in (27) and the lexical concepts previously considered is that there is designation that the TE is 'located' on the anterior portion of the RP's sagittal plane.

The evidence that this lexical concept is distinct from that of [IMMINENCE] and [PROXIMAL IMMINENCE] comes from selectional tendencies. That is, the distinct 'future' reading associated with examples such as (27) appears to be associated

with distinct patterns in terms of the semantic and formal constraints that must, presumably, form part of an English language user's entrenched knowledge of the language. Like the lexical concepts considered above, the semantic constraints that apply to the subject NP slot are the same. The subject NP must have a temporal profile, and must refer to a discrete event. However, the VP is filled by a locative ascription relating to the anterior region of the RP's sagittal plane. Moreover, different planes are not selected for. When the lateral or vertical planes are employed, as in (28a) and (28b), respectively, this fails to adduce a 'future' reading:

(28) a. #Christmas is to the left/right of us
b. #Christmas is above/below us

Moreover, other orientational systems are incompatible with this lexical concept:

(29) #Christmas is north/south/east/west of us

In terms of formal selectional tendencies, this lexical concept selects for a subject NP, and existential/situational verbs such as BE or LIE. This is followed by a prepositional phrase including an obligatory NP. The lexical concept [FUTURE] can be more precisely expressed as in (30a), and its vehicle expressed as (30b):

(30) a. lexical concept: [EVENT X FIXED AS BEING FUTURE-BASED, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP SITUATIONAL VP P NP

What (30) captures is the following. The TE is set in the future, with respect to the experiencer's present, and there is no specification as to whether the TE is imminent or not. The way in which this is encoded sets the perspective from which this future-based relation is viewed, as being aligned with the TE, rather than the experiencer. Table 4.3 provides the selectional tendencies for this lexical concept.

Present cluster I now turn to the 'present' cluster. This consists of, I argue, two distinct lexical concepts. The first involves a relation of being 'only just present', which I gloss as [IMMEDIACY OF PRESENCE]. Consider the following representative examples:

(31) a. Christmas is arriving
b. Christmas is coming

These examples provide a reading of the apprehension of the occurrence of Christmas. However, it may not be immediately clear in what way the examples

Table 4.3 *Selectional tendencies for the [FUTURE] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event The event must be discrete – bounded in time	The TE is integrated with a subject NP slot There is a situational VP e.g., *BE/LIE*, and a PrepP, including an obligatory NP. This is integrated with the locative information
Verbal ascription must involve a locative designation, set on the anterior portion of the RP's sagittal plane	

in (31) are so different from those in (14), which related, I argued above, to the lexical concept [IMMINENCE]. While tense is independent from t-FoRs, as argued above and in Chapter 2, nevertheless, different tense (and aspect) configurations can assist in making clear the distinction between the [IMMEDIACY OF PRESENCE] and [IMMINENCE] lexical concepts. To illustrate, consider the examples in (31) rendered in the present perfect in (32), and the contrast with examples relating to [IMMINENCE], from (14), rendered in (33):

(32) a. Christmas has arrived
b. Christmas has come

(33) a. ?Christmas has approached
b. ?Christmas has come up
c. ?Christmas has got(ten) close/closer/near/nearer

In the examples in (32), the reading that derives is that the TE, Christmas, has come from a future point of imminence to being present. This is facilitated by the present perfect, which provides a construal of a past event as having current relevance. In other words, the imminence of the TE, Christmas, has present relevance by having occurred and thus being 'located' in the present. In contrast, the examples in (14) are semantically unnatural in the present perfect, as illustrated by (33). This is because the [IMMINENCE] lexical concept is incompatible with the present perfect; after all, this lexical concept relates to a TE that isn't coincident with the present. Yet the present perfect provides a construal that applies at coding time which is semantically compatible with the [IMMEDIACY OF PRESENCE] lexical concept, but not the [IMMINENCE] lexical concept. These examples suggest, therefore, that what I am calling the [IMMEDIACY OF PRESENCE] lexical concept is distinct from the [IMMINENCE] lexical concept.

Evidence for the [IMMEDIACY OF PRESENCE] lexical concept comes from selectional tendencies. In terms of semantic selectional tendencies, and in common with all t-FoR lexical concepts, the TE must have a temporal profile, and must refer to a discrete event. However, the VP is filled by ascription of motion events which must be terminal in nature. That is, motion ascriptions for this

Table 4.4 *Selectional tendencies for the [IMMEDIACY OF PRESENCE] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event	The TE is integrated with a subject NP slot
The event must be discrete – bounded in time	There is an intransitive VP, which the motion ascription is integrated with
Verbal ascription must involve terminal motion that terminates at the RP	Perfective aspect is selected for on the VP
The motion event is manner-neutral	

lexical concept entail termination at the RP. This contrasts with the [IMMINENCE] lexical concept considered earlier with examples in (14). The key difference is that the motion events selected for by the [IMMINENCE] lexical concepts involve directional motion rather than terminal motion. A clear inference of the lexical concepts associated with the vehicles *come* and *arrive* is that motion terminates at the RP, which is not the case with the [IMMINENCE] lexical concept. However, as with the [IMMINENCE] lexical concept, there is no designation as to which region of the RP's sagittal plane motion must take place on.

In terms of formal selectional tendencies, the [IMMEDIACY OF PRESENCE] lexical concept selects for intransitive syntax, with a subject NP and an intransitive VP. Moreover, in terms of the VP, there is greater flexibility than is evident with the [IMMINENCE] lexical concept, allowing perfective aspect to be selected for, as is clear from the examples in (32). The lexical concept and its vehicle can be formalised as in (34). These selectional tendencies are summarised in Table 4.4.

(34) a. lexical concept: [EVENT X FIXED AS BEING JUST PRESENT, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP VP

The second lexical concept in this cluster is what I gloss as [PRESENT]. Consider the following example by way of illustration:

(35) Christmas is here

As this example demonstrates, the [PRESENT] lexical concept relates to the co-occurrence of the TE with the egocentric experience of now. It achieves this by designating the TE as being co-locational with the RP. Indeed, the VP, consisting of 'BE here' in (35) appears to be specialised for designating the [PRESENT] lexical concept. As such, the vehicle conventionally associated with

Table 4.5 *Selectional tendencies for the [PRESENT] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event	The TE is integrated with a subject NP slot
The event must be discrete – bounded in time	The VP selected for involves the existential verb *BE* and the adverb *here*
Verbal ascription must involve a locative designation, such that the TE is co-located with the RP	

this lexical concept appears to be, at least partially, lexically filled, as is evident in (36b). The [PRESENT] lexical concept can be formalised as (36a):

(36) a. lexical concept: [EVENT X FIXED AS BEING PRESENT-BASED, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP BE *here*

The selectional tendencies for this lexical concept are summarised in Table 4.5.

Past cluster I now present a representative range of deictic t-FoR lexical concepts that encode various aspects of pastness. Lexical concepts of this kind are, to various degrees, situated in the past with respect to the egocentric experience of now: they encode a relation between the TE and the RP in which the TE has occurred. I will present four lexical concepts for this cluster: [OCCURRENCE], [IMMEDIACY OF OCCURRENCE], [DISTANT OCCURRENCE] and [PAST].

The first of these, [OCCURRENCE], selects for the verbs *gone by/past* or *passed*, as illustrated below:

(37) a. Christmas has gone by/past
b. Christmas has passed

This lexical concept designates that the TE is past-based: it is set in the past, with respect to the egocentric experience of now. This lexical concept selects for manner-neutral motion that encodes motion away from the RP. In particular, the motion ascribed involves a trajectory such that it moves from one region of the RP's sagittal plane to the other, as is evident from the use of the particles *by* or *past* with *gone* in (37a), or the use of *passed* in (37b), which already includes the inference of motion from one region of the RP's sagittal axis to another. Indeed, this notion of *motion traversal* appears to be a selectional tendency associated with this lexical concept. For instance, verbs of motion that

involve motion away from a deictic centre – distal motion – are incompatible with this lexical concept:

(38) a. #Christmas moved away
b. #Christmas went away
c. #Christmas raced away (intended reading: occurrence)

These examples demonstrate that all of the verbs plus particles in (38) are semantically anomalous with the [OCCURRENCE] lexical concept.

In addition to selecting for motion traversal VPs, this lexical concept also selects for perfective aspect. Indeed, an 'occurrence' reading is incompatible with imperfective aspect, for instance, as the following example demonstrates:

(39) #Christmas is going by/past (intended reading: occurrence)

The example in (39), while incompatible with a past-based reading, would not be incompatible with a past-oriented reading, as I explain below.

This lexical concept and its vehicle are formalised in (40):

(40) a. lexical concept: [EVENT X FIXED AS BEING PAST-BASED, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP *has gone* (Part)

The selectional tendencies for this lexical concept are captured in Table 4.6.

The second 'past' lexical concept I consider is that which I gloss as [IMMEDIACY OF OCCURRENCE]. This parallels the [IMMEDIACY OF PRESENCE] lexical concept considered above, and is related to the [OCCURRENCE] lexical concept just considered. This lexical concept is illustrated by the following example:

(41) Christmas is going by/past

As this example demonstrates, the [IMMEDIACY OF OCCURRENCE] lexical concept is past-oriented, rather than past-based. It designates a TE as occurring, such that it is about to be past-based. In contrast to the previous lexical concept, this reading cannot be achieved without imperfective aspect, which this lexical concept appears to select for.

An alternative way of analysing the distinction between (41) and the examples in (37) would be to posit that these arise from essentially the same lexical concept, with an alternation in aspect (perfective versus imperfective) giving rise to the distinct interpretations, what I'm glossing as 'occurrence' versus 'immediacy of occurrence'. However, a further reason for thinking that (41) is sanctioned from a lexical concept distinct from the one that sanctions the examples in (37) comes from the following observation. While the use of *pass* with perfective aspect provides a semantically acceptable way of conveying the 'occurrence' reading, *pass* with imperfective aspect is somewhat unnatural in conveying an 'immediacy of occurrence' reading:

Table 4.6 *Selectional tendencies for the [OCCURRENCE] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event	The TE is integrated with a subject NP slot
The event must be discrete – bounded in time	The VP selected for includes VPs such as *go by/past*, and *pass* with perfective aspect
Verbal ascription involves motion traversal of the TE from one region of the RP's sagittal axis to another	

(42) ?Christmas is passing (intended reading: immediacy of occurrence)

Indeed, *pass* can convey an 'immediacy of occurrence' reading but typically when employed as a noun, as in the following attested example:

(43) Writing in 1837, Thomas Hervey laments **the passing** of the Christmas traditions

However, the use of *the passing* appears to be derived from a euphemistic meaning relating to death, which might be paraphrased as 'the loss', and hence indicate a change in state, rather than designating an 'immediacy of occurrence' reading, as is the case with the example in (41) and the target reading in (42). What this demonstrates is that there are selectional constraints which appear to apply to an 'immediacy of occurrence' reading that do not apply to an 'occurrence' reading. This supports the view that there are distinct [OCCURRENCE] and [IMMEDIACY OF OCCURRENCE] lexical concepts with distinct sets of conventional selectional tendencies.

This discussion demonstrates the following. The [IMMEDIACY OF OCCURRENCE] lexical concept is quite distinct from the [OCCURRENCE] lexical concept. It does not permit perfective aspect, presumably because the pastness of the TE has not fully occurred. In this, it is somewhat analogous to the [IMMEDIACY OF PRESENCE] lexical concept in that it concerns a *liminal relation* – in this case, a transition between presence and pastness. The [IMMEDIACY OF OCCURRENCE] lexical concept and its conventional vehicle can be more accurately represented as follows:

(44) a. lexical concept: [EVENT X FIXED AS BEING PAST-ORIENTED, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP *go* Part

Table 4.7 summarises the selectional tendencies of this lexical concept.

The third 'past' lexical concept I address is [DISTANT OCCURRENCE]. Consider some examples:

Table 4.7 *Selectional tendencies for the [IMMEDIACY OF OCCURRENCE] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event The event must be discrete – bounded in time Verbal ascription involves ongoing motion of the TE by and away from the RP	The TE is integrated with a subject NP slot The VP selected for is *go by/past*, conveyed with imperfective aspect

(45) a. Christmas has vanished
b. Christmas has disappeared

These examples appear to highlight a relation between the TE and RP where distance between the two coordinates is made salient. This gives rise to a temporal relation that is necessarily past-based: the TE must necessarily be set in the past with respect to the egocentric experience of now. However, and in addition, the degree of remove from the experience of now is such that the TE is no longer perceptually accessible. This is conveyed by verbs such as vanished and disappeared. Moreover, and unlike the [OCCURRENCE] lexical concept, the notion of 'distant remove' from the egocentric experience of now is not restricted to perfective aspect. Even when the examples in (45) are rendered in imperfective aspect the notion of distant remove remains:

(46) a. Christmas is vanishing
b. Christmas is disappearing

Indeed, because *vanish* and *disappear* relate to loss of perceptual accessibility, they appear to be well suited to providing a means of encoding the notion of 'distant occurrence', the notion that the TE is set in the 'distant' past with respect to the egocentric experience of now. After all, for the TE to 'vanish', it must have proceeded on a trajectory away from the RP such that it is no longer visually accessible, and is hence distant.

Now consider the following attested example:

(47) Christmas was fast disappearing over the horizon

While this is a relatively novel example, it demonstrates the following. Unlike the lexical concept to be considered below, the [DISTANT OCCURRENCE] lexical concept appears not to require that the 'disappearing' event, which is set in the past, be designated as occupying the posterior region of the sagittal axis. Indeed, the typical interpretation of an example such as (47) is that the TE, while set in the past, occupies the anterior region of the sagittal axis. This appears to be a consequence of the physiology of the human experiencer, the RP. Humans can

only visually perceive disappearance by virtue of the disappearing entity being located on the anterior portion of the human sagittal plane. The [DISTANT OCCURRENCE] lexical concept therefore appears to select for a designation such that the TE is located on the anterior region of the sagittal plane, a consequence of it selecting for verbal ascriptions relating to loss of visual accessibility.

Now consider another example:

(48) Christmas has gone

This example appears to be somewhat similar to the examples in (45) in so far as it evokes a reading of 'distant' occurrence. However, it does so making use of manner-neutral motion rather than an ascription of loss of visual access. Moreover, and unlike the examples in (45), which can be encoded using imperfective aspect as in (46), the example in (48) fails to retain a 'distant' occurrence reading when conveyed using imperfective aspect:

(49) #Christmas is going (intended reading: distant occurrence)

This suggests that the example in (48) may in fact be sanctioned by a variant of the [OCCURRENCE] lexical concept rather than [DISTANT OCCURRENCE].

The [DISTANT OCCURRENCE] lexical concept is formalised in (50) and its selectional tendencies are summarised in Table 4.8.

(50) a. lexical concept: [EVENT X FIXED AS BEING SET IN THE DISTANT PAST, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP VP (PrepP)

The final lexical concept in the 'past' cluster is what I term [PAST]. Consider representative examples:

(51) a. Christmas is/lies behind us
b. Christmas is/lies in back of us (N. AmE only)

This lexical concept provides a relation such that the TE is set in the past with respect to the egocentric experience of now. This is achieved, in contrast to the [DISTANT OCCURRENCE] lexical concept, by designating the TE as located on the posterior portion of the RP's sagittal plane. In particular, it selects for a preposition (e.g., *behind/in back of*) that can only be construed as relating to a vector designating posteriority. This excludes angles relating to the lateral and vertical planes:

(52) a. #Christmas is left of us
b. #Christmas is below us

It also excludes angles that relate to other orientational systems, such as cardinal points:

Table 4.8 *Selectional tendencies for the [DISTANT OCCURRENCE] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event The event must be discrete – bounded in time	The TE is integrated with a subject NP slot The VP selects for verbs of perceptual inaccessibility and can include an optional PrepP
Verbal ascription involves loss of visual accessibility, and designates that the TE occupies the anterior region of the sagittal plane	

(53) #Christmas is south of us

In addition, a key difference from the other 'past' lexical concepts considered is that here the [PAST] lexical concept is neutral with respect to degree of remove from the RP. In this it parallels the [FUTURE] lexical concept in the 'future' cluster. Recall that the [OCCURRENCE] lexical concept selects for motion ascriptions that involve a traversal from one region of the RP's sagittal plane to another. The [IMMEDIACY OF OCCURRENCE] lexical concept involves conceptions in which the TE is about to be set in the past. And the [DISTANT OCCURRENCE] lexical concept gives rise to conceptions whereby the TE is firmly set in the far past. As such, the [PAST] lexical concept simply situates the TE as set in the past, without, in principle, giving rise to further inferences. Of course, specific examples can be modified in order to provide more specific conceptions, as illustrated below:

(54) Christmas lies a long/short way behind us

However, the modification of the example in (51) with *a long/short way* is not an obligatory part of the selectional tendencies of the [PAST] lexical concept. Moreover, the example in (54) arises, I argue, due to a blend of more than one lexical concept, an issue I consider later in the chapter.

The nature of the lexical concept and vehicle can be concretely stated as in (55). The selectional tendencies are summarised in Table 4.9.

(55) a. lexical concept: [EVENT X FIXED AS BEING PAST-BASED, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP SITUATIONAL VP Prep NP

Degree of remove cluster The final cluster is that of degree of remove. This consists of four lexical concepts: [QUALITY OF ELAPSE], [TEMPORAL EXTENT DEGREE OF REMOVE], [SPATIAL EXTENT DEGREE OF REMOVE] and [PROXIMAL RELATIONS DEGREE OF REMOVE]. The characteristic of this cluster is that the lexical concepts encode the TE's degree of remove from the egocentric experience of

Table 4.9 *Selectional tendencies for [PAST] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event The event must be discrete – bounded in time Verbal ascription must involve a locative designation, set on the posterior portion of the RP's sagittal plane	The TE is integrated with a subject NP slot There is a situational VP e.g., BE/LIE, and a PrepP, including an obligatory NP. This is integrated with the locative information

now; moreover, there is no restriction on whether the TE is fixed in the future, present or past with respect to the experience of now.

I first consider the [QUALITY OF ELAPSE] lexical concept. Consider the following examples by way of illustration:

(56) a. Christmas is racing/speeding/whizzing/hurtling past/by/towards us
b. Christmas is creeping past/by/towards us

These relate to the quality of the elapse that holds between the RP and the TE. In other words, this lexical concept encodes durational quality, whether the elapse is protracted or compressed. These qualities correspond to the phenomenologically real experiences of protracted duration, and temporal compression briefly discussed in the previous chapter. This is achieved by verbal ascriptions involving rapid or slow motion events. Moreover, as indicated by the range of particles involved, the vector of motion derives from a verbal particle (*past, by, towards*, etc.).

The precise nature of the durational quality is a function of the semantic affordance deriving from the specific verb integrated with the VP vehicle slot. In Chapter 1 I defined a semantic affordance as a conventional inference associated with a lexical concept. I will have more to say about semantic affordances in Part III of this book when I address the role of meaning construction in t-FoR linguistic expressions.

While the elapse holding between the TE and its occurrence at the RP can be judged as being compressed, as in (56a), it can also be judged to be protracted, as in (56b). Importantly, and unlike previous lexical concepts considered, this lexical concept can select for verbs of motion which are not manner-neutral; *whizzing* and *creeping*, for instance, involve very specific manners of motion. Moreover, the manner of motion involves a directional oblique object, in which the RP is explicitly encoded. In addition, the directional oblique can involve a path that is co-locational, proximal or distal with respect to the RP. Hence, this lexical concept does not restrict whether the quality of duration that holds between the RP

Table 4.10 *Selection tendencies for [QUALITY OF ELAPSE] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event	The TE is integrated with a subject NP slot
The event must be discrete – bounded in time	There is a VP which is integrated with motion events of slow or rapid motion
Verbal ascription involves rapid or slow motion, directed towards, by or away from the RP	There is an obligatory OBL that is integrated with directional information

and a TE is set in the future, present or past. Again, this characteristic marks out this lexical concept as being distinct from others considered earlier. The [QUALITY OF ELAPSE] lexical concept and its vehicle are more precisely captured in (57). Its selectional tendencies are summarised in Table 4.10.

(57) a. lexical concept: [QUALITY OF ELAPSE HOLDING BETWEEN EVENT X AND RP, FIXED WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP VP OBL

The next lexical concept in this cluster is what I refer to as [TEMPORAL EXTENT DEGREE OF REMOVE]. This lexical concept facilitates potentially precise evaluations, in terms of measurements of event and time-reckoning systems, of the degree of remove holding between the TE and the RP. Crucially, however, the O for the RP does not relate to an extrinsic coordinate system, set for example, with respect to a calendar, dating or time-reckoning system. Rather, the O is the egocentric experience of now, anchoring the RP to anisotropic transience, which is what makes this a deictic t-FoR lexical concept. Examples sanctioned by this lexical concept are given in (58):

(58) Christmas is two days/months away/off

This lexical concept selects for a time period as the head noun in the object NP, which can be quantified, e.g., *two months*. It also includes a post-nominal particle (Part) relating to distal space, e.g., *off*, *away*. This allows a relatively precise evaluation of the degree of remove holding between the TE and the RP. The verbs selected for by this lexical concept in the VP vehicle slot involve situational verbs such as BE, LIE, TO BE SITUATED. Importantly, this lexical concept does not specify whether the TE is fixed in the past or future with respect to the egocentric experience of now. While language users are more likely to discuss the degree of remove of a TE when it has yet to occur, and so

Table 4.11 *Selectional tendencies for [TEMPORAL EXTENT DEGREE OF REMOVE] lexical concept*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event	The TE is integrated with a subject NP slot
The event must be discrete – bounded in time	There is a situational VP, an object NP which is integrated with a time period, and a Part, which is integrated with a distal designation
Verbal ascription involves a time period, which is designated as being distal with respect to the RP	

is set in the future, there are contexts when this lexical concept might just as easily facilitate discussion of a TE set in the past.

This lexical concept and its vehicle can be formalised as (59), and its selectional tendencies as in Table 4.11.

(59) a. lexical concept: [PRECISE DEGREE OF REMOVE HOLDING BETWEEN EVENT X AND RP, FIXED, WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP VP NP Part

The third lexical concept in this cluster I gloss as [SPATIAL EXTENT DEGREE OF REMOVE]. Consider the following example:

(60) Christmas is a long/short way off

This lexical concept is conventionally paired with the same vehicle as the [TEMPORAL EXTENT DEGREE OF REMOVE] lexical concept. However, the head noun slot of the object NP selected for by this lexical concept relates to a spatial extent (e.g., *way*, *distance*).

The semantic function of the two lexical concepts is consequently somewhat different. While [TEMPORAL EXTENT DEGREE OF REMOVE] facilitates identification of the temporal remove of the TE with respect to the RP, based on metric assessment of temporal intervals, the [SPATIAL EXTENT DEGREE OF REMOVE] lexical concept does so with respect to spatial extent. However, the semantic arguments selected for are non-metric in nature, as indicated by the unacceptability of examples such as the following:

(61) a. #Christmas is five metres away
b. #Christmas is still three miles off

Moreover, in the [SPATIAL EXTENT DEGREE OF REMOVE] lexical concept, the use of a temporal period as the head noun in the object NP is highly unnatural, and would require an unusual context in order to make it acceptable:

(62) ?Christmas is a long/short two weeks/months off/away

This suggests that the two lexical concepts proposed are likely to arise from distinct representations, stored as units in the minds of English language users.

This lexical concept and its vehicle can be formalised as (63), and its selectional tendencies as in Table 4.12.

(63) a. lexical concept: [EXTENT OF PATH HOLDING BETWEEN EVENT X AND RP, FIXED WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP VP NP Part

The final 'degree of remove' lexical concept is the one I gloss as [PROXIMAL RELATIONS DEGREE OF REMOVE]. The semantic function of this lexical concept concerns the nature of the proximal relation holding between the TE and the RP. This facilitates an awareness of the temporal remove between the TE and the O. As with other lexical concepts in this cluster, there is no designation as to whether the TE is future-based or past-based. Examples licensed by this lexical concept include the following:

(64) a. Christmas is near/close by
b. Christmas is far away/off

As we see from these examples, proximal and/or distal relations are designated in order to indicate the relative degree of remove. The difference between this lexical concept and the foregoing is that in (64) the degree of remove is not achieved by signalling a path relation, a spatial extent. Rather, it is achieved by signalling relative proximity (as in (64a)), or relative distance (64b)). This lexical concept and its vehicle can be more precisely represented as in (65):

(65) a. lexical concept: [RELATIVE PROXIMITY HOLDING BETWEEN EVENT X AND RP, FIXED WITH RESPECT TO EGOCENTRIC EXPERIENCE OF NOW, FROM PERSPECTIVE OF EVENT X]
b. vehicle: NP VP ADJ Part

Table 4.13 summarises the selection tendencies for this lexical concept.

Figure 4.4 provides an overview of the semantic network for lexical concepts that encode a deictic t-FoR from the perspective point of the target event. While all the lexical concepts represented exhibit semantic relatedness, lexical concepts within clusters are hypothesised to exhibit greater semantic relatedness than those between clusters.

Table 4.12 *Selectional tendencies for [SPATIAL EXTENT DEGREE OF REMOVE]*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event The event must be discrete – bounded in time	The TE is integrated with a subject NP slot There is a situational VP, an object NP which is integrated with spatial path designation, and a Part, which is integrated with a distal designation
Verbal ascription involves a path relation designating spatial remove of TE with respect to the RP	

Table 4.13 *Selectional tendencies for [PROXIMAL RELATIONS DEGREE OF REMOVE]*

Semantic selectional tendencies	Formal selectional tendencies
TE is an entity with a temporal profile: an event The event must be discrete – bounded in time Verbal ascription involves a spatial relation designating relative proximity of the TE with respect to the RP	The TE is integrated with a subject NP slot There is a situational VP, an ADJ and a Part

In terms of the range of lexical concepts surveyed in this sub-section, a number of commonalities emerge. The subject NP selected always concerns a temporal event that can be construed as being (temporally) discrete. Moreover, the t-FoR form–meaning pairings – the lexical concepts, and the vehicles they select for – appear to draw consistently on ascriptions deriving from motion in space, visual perception and spatial distances, extent and directionality. When semantic arguments relating to motion events are selected, the motion events can be manner-neutral (e.g., *pass*, *go*, *arrive*, *come*) or not (e.g., *whizz*, *speed*, *race*, *drag*). However, the motion ascriptions are invariably linear rather than curvilinear in nature. For instance, deictic t-FoR lexical concepts cannot *zig-zag*, for instance, or *come round again*. And finally, where a plane is involved, the one adopted is the sagittal plane rather than the vertical or lateral planes.

4.2 Reference-point perspective point

I now turn to a consideration of deictic t-FoR lexical concepts that can be characterised as encoding an RP PP. These pattern in a similar fashion to lexical concepts that take a TE PP, as described in the preceding section. There are three main differences, however. The first is that the RP rather than the TE receives focal prominence and hence appears in subject position. The second is that while the RP (in object and indirect object position) was not obligatorily marked in

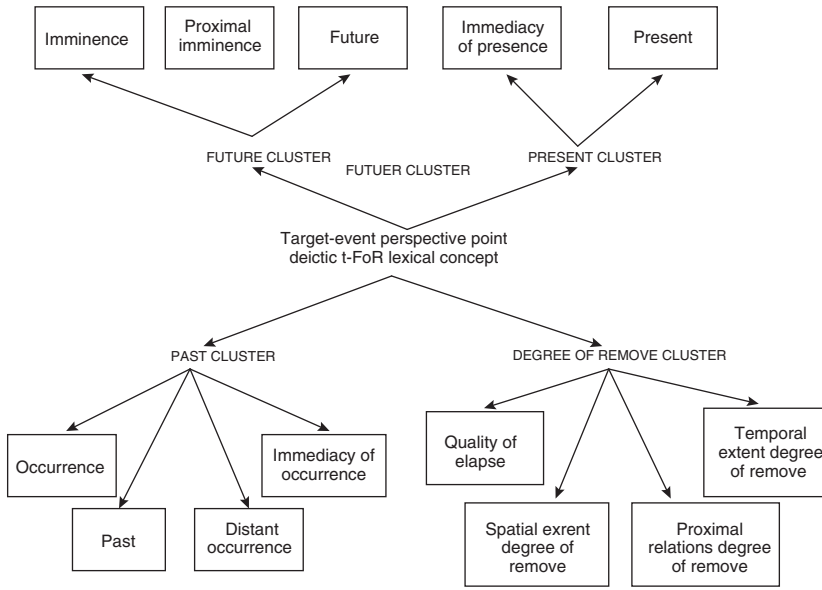

Figure 4.4 Semantic network of target-event perspective-point deictic t-FoR lexical concepts

many specific deictic TE PP t-FoR lexical concepts, in RP PP deictic t-FoR lexical concepts both RP and TE are obligatorily marked. This is because if the TE, now in (indirect) object position were not marked, the utterance would be indistinguishable from those that relate to spatial as opposed to temporal scenes. Hence, lexical concepts of this kind appear to obligatorily select for an object vehicle. The third difference is that there is a more limited set of deictic RP PP t-FoR lexical concepts compared to those that take a TE PP. And this would seem to be so for reasons that I elaborate on below. In other words, deictic t-FoRs that take an RP PP are not straightforward reversals of the TE PP variety. They form part of conventional linguistic knowledge that are constrained by factors that are, in certain cases, not relevant for the TE PP, as we shall see.

I suggested in Chapter 1 that argument-structure t-FoR lexical concepts are extended from argument-structure lexical concepts that encode spatial relations, especially motion relations – I consider the reasons for this in Chapter 7. This being the case, the analogical structure inherited from spatial scenes holds in the temporal scene encoded by the t-FoR lexical concept. What this means is that some aspects of the relational structure evident in argument-structure constructions encoding spatial scenes is preserved in t-FoR constructions.

For instance, when we perceive a spatial scene, independently of language, there is a Figure (F) and a Reference Object (RO). This distinction between F

and RO (sometimes referred to as figure–ground segregation) was first pointed out by Edgar Rubin in 1915 and forms part of our innate perceptual machinery, not just in visual perception but in other perceptual modalities, too (see Evans 2010a for a review). Argument-structure constructions that encode spatial scenes encode the figure–ground segregation by reserving the subject slot for the F and object slot for the RO, the entity with respect to which the F is located (Talmy 1978, 2000; see discussion in Evans 2010a of the properties normally associated with an F and an RO). This means that an entity construed as an RO cannot normally appear in subject position, as evidenced by the acceptable (66a), which contrasts with the semantically anomalous (66b):

(66) a. The bike is in front of the church
b. #The church is behind the bike

The reason for this follows from Langacker's observation that the subject slot is reserved for the semantic argument which receives greater attentional prominence. As the F, in perceptual terms, necessarily receives greater attentional prominence, it is encoded as the trajector (TR) (in subject position) in an argument-structure construction. And consequently, the RO is encoded in the less prominent landmark (LM) (which is to say object) position.

Now, in a deictic t-FoR lexical concept, the RP constitutes the egocentric spatial location with respect to which the TE is fixed. That is, the RP is the analogue to the RO in a spatial scene. But in a linguistically encoded spatial scene the RO must be encoded as the LM. However, in RP PP constructions, the RP is no longer in the LM position, as it achieves greater prominence, thereby occupying the TR position. In temporal expressions where the topology recruited from spatial scenes is most salient, deictic RP PP t-FoR lexical concepts are semantically anomalous. Put another way, some of the ways in which a deictic t-FoR could potentially be encoded are ruled out as they overtly flout the constraints imposed by the topology of spatial scenes, the structure of which supports the linguistic encoding of deictic t-FoRs.

To illustrate, let's reconsider the [FUTURE] deictic t-FoR lexical concept that has a TE PP (rather than an RP PP). This is illustrated above in (27), reproduced below as (67):

(67) Christmas is/lies in front of us TE PP

This is contrasted with a hypothetical [FUTURE] variant that does have an RP PP. Yet, as is evident from the example, the RP PP variant is semantically anomalous:

(68) #We are/lie behind Christmas RP PP

The intended reading of (68) is that the TE, Christmas, is in the future with respect to the RP, encoded by *we*. By virtue of placing the TE in the LM

position, the utterance appears more likely to evoke a spatial interpretation which is semantically at odds with the temporal entity being designated. The upshot of this, then, is that there is a tendency for there to be fewer corresponding instances of deictic RP PP t-FoR lexical concepts, compared to those that have a TE PP. And those that are semantically acceptable appear to be unnatural, or at best far from conventional. This is in contrast to the almost hackneyed use of the deictic TE PP t-FoR equivalents.

Future cluster Of the three TE PP 'future' lexical concepts, only two have RP PP variants: there is no [FUTURE] variant for the reason just given. For the same reason, a putative [PROXIMAL IMMINENCE] is at best highly unnatural, as in (69a), or semantically anomalous, as in (69b and c):

[PROXIMAL IMMINENCE]

(69) a. ?We are near/close by to Christmas (cf. Christmas is near/close by)
b. #We are nigh on Christmas (Cf. Christmas is nigh)
c. #We are around the corner from Christmas (cf. Christmas is around the corner)

There is, however, an [IMMINENCE] lexical concept:

[IMMINENCE]

(70) a. We are approaching Christmas
b. We are getting/moving/drawing close/closer/near/nearer to Christmas
c. We are heading towards Christmas
d. We are coming up on Christmas

Present cluster In terms of the RP PP variants of the 'present' cluster, these appear to be, at best, highly unnatural. The putative [IMMEDIACY OF PRESENCE] variant seems to be semantically anomalous, while the putative [PRESENT] variant appears to be unnatural:

[IMMEDIACY OF PRESENCE]

(71) a. #We are arriving at Christmas (cf. Christmas is arriving)
b. #We are coming to Christmas (cf. Christmas is coming)

[PRESENT]

(72) ?We are here at Christmas (cf. Christmas is here)

Past cluster As with the 'future' cluster, only one of the 'past' lexical concepts has a completely conventional RP PP variant, namely the

[OCCURRENCE] variant, as in (73). All the other putative variants appear to be semantically anomalous with RP PP variants (74–76).

[OCCURRENCE]
(73) a. We have gone by/past Christmas
b. We have passed Christmas

[IMMEDIACY OF OCCURRENCE]
(74) #We are going by/past Christmas (cf. Christmas is going by/past)

[DISTANT OCCURRENCE]
(75) a. #We have made Christmas vanish (cf. Christmas has vanished)
b. #We have made Christmas disappear (cf. Christmas has disappeared)

[PAST]
(76) #We are/lie in front of Christmas (cf. Christmas is/lies behind us)

Degree of remove Interestingly, all the lexical concepts in this cluster appear to have highly conventional RP PP variants (77–80).

[QUALITY OF ELAPSE]
(77) a. We are racing/speeding/whizzing/hurtling past/by/towards Christmas
b. We are creeping past/by/towards Christmas

[TEMPORAL EXTENT DEGREE OF REMOVE]
(78) We are two days/months away from Christmas

[SPATIAL EXTENT DEGREE]
(79) We are a long/short way off from Christmas

[PROXIMAL RELATIONS]
(80) a. We are near/close to Christmas
b. We are far away from Christmas

Figure 4.5 provides a summary of the various deictic RP PP t-FoR that appear to be reasonably conventional in English.

5 Multiple sanction

In earlier work (Evans 2009b), I observed that it is common for utterances to be motivated by more than one lexical concept. This phenomenon I refer to as *multiple sanction*, resulting in a blend arising from two (or more) lexical concepts.

To illustrate, consider the following example:

(81) Christmas is fast approaching

This example gives rise to a reading such that the TE, Christmas, is set in the future, with respect to the RP, and is relatively imminent. This reading would

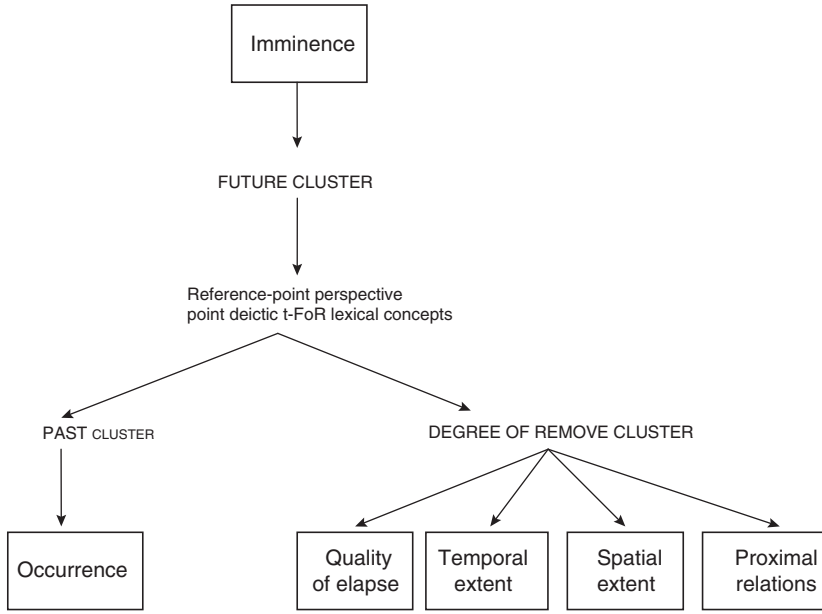

Figure 4.5 Semantic network of reference-point perspective-point deictic t-FoR lexical concepts

appear to be sanctioned by the TE PP [IMMINENCE] lexical concept. However, in addition, there is an additional aspect to the reading deriving from the use of *fast*. This gives rise to the notion that the temporal elapse holding between the RP and the occurrence of the TE is compressed, and thus relates to the [QUALITY OF ELAPSE] lexical concept. In short, the conception that arises appears to relate to both quality of elapse and imminence, creating a conception where the imminence relation is heightened by virtue of the compressed quality of the elapse being conveyed. Thus, the conception appears to arise from what I have argued to be two distinct lexical concepts.

6 Summary

This chapter has been concerned with the deictic t-FoR. This t-FoR provides a temporal coordinate system that relates to anisotropic transience: the felt experience that time evolves from future to present to past. This arises from the phenomenologically real experience of a present which is in a perpetual state of modification. This subjective experience provides a basis for distinguishing between the anticipation of an event's occurrence (the future), and the recollection of events that have occurred (the past). Hence, this type of transience gives

rise to the temporal relation future/past. I argued that this transience type, and the temporal relation that arises, derives from the phenomenologically real and neurologically instantiated experience of the perceptual moment. This gives rise to a temporal elapse with an outer limit of around two to three seconds. This experience type is plausibly the basis for the human experience of the present moment. I considered, in detail, linguistic evidence for the deictic t-FoR. Employing the methodology of LCCM Theory, I argued for a range of distinct lexical concepts for the deictic t-FoR. In particular, I suggested that these fall into four distinct clusters, relating to 'future', 'present', 'past' and 'degree of remove'. The deictic t-FoR, as encoded in language, appears to have adapted diachronically pre-existing constructions for encoding spatial scenes and relations. These constructions encode temporal relations from two perspective points: a target event PP and a reference point PP. Interestingly, t-FoR lexical concepts are far more restricted when encoding the RP PP. This is at odds with the pattern in the domain of space. As such, this provides further evidence for the disjunction between reference strategies in time versus space.

5 Sequential temporal reference

This chapter is concerned with the sequential t-FoR. My main focus is to provide linguistic evidence for the existence of this t-FoR, and to consider the way in which the sequential t-FoR is realised in language. The sequential t-FoR provides a temporal coordinate system that relates to the transience type succession. Recall that this involves the felt experience that time constitutes a sequence of events, one preceding another. This subjective experience provides the basis for distinguishing between an earlier event and a later event, and relating events to their position in a sequence. Hence, this type of transience gives rise to the temporal relation earlier/later. I begin by briefly considering the neurological basis for the nature of a sequence, a fundamentally temporal notion, from which the sequential t-FoR takes its reference. The chapter then considers in outline the nature of the sequential t-FoR, before considering the different perspective points (PP) available for its linguistic encoding. I then provide more detailed linguistic evidence for the existence of this t-FoR, and the range of semantic clusters that show up in language. Finally, I examine evidence for the sequential t-FoR from the gestural modality, and contrast this with gestural evidence for the existence of the deictic t-FoR.

1 The neurological basis of the sequential t-FoR

While a fair amount is now known about the smallest unit of duration to which we have conscious access, the perceptual moment – which, I have argued, underpins the deictic t-FoR – relatively less is known about the neurological basis of the transience type succession. Pöppel (1978), in seminal work, identifies the phenomenological experience of succession (or event order), along with duration – to be considered in the next chapter – as an *elementary time experience*. These are experience types that appear to be fundamental to the human perceptual process, are likely to be hard-wired, and as such to be maintained by the neurobiological system. The human ability to experience succession is central to our ability to function successfully in the world. Moreover, it is phenomenologically real, constituting one of the 'felt' temporal experiences that appears to be essential for normal human function. Without the means of

recognising succession, and hence event sequences, humans would be unable to distinguish between causes and their effects, with potentially disastrous consequences for learning and survival.

The ability to experience and judge succession involves the ability to recognise events, and the ability to assign them an order in a sequence. To be able to recognise an event presumably requires the prior ability to form perceptual moments. This must be so as the perceptual moment provides the means of updating the perceptual array every two to three seconds and hence identifying chunks of the perceptual array. If event perception involves the binding of different aspects of perceptual experience, as is widely assumed (see Chapter 7), then it follows that the ability to structure the perceptual process using perceptual moments underpins the human ability to perceive succession.

In addition, the ability to perceive a sequence also requires a means of coding events and storing them in memory. This would provide a way in which events are related to one another by virtue of their 'time-stamp', the particular perceptual moment(s) that facilitate their apprehension. Hence, the perception of sequences logically presupposes a perceptual process built from durational episodes such as perceptual moments. The upshot of this discussion is that sequentiality, while a phenomenologically real experience, is likely to be more complex than our ability to form perceptual moments.

Neuroscientists have identified the basal ganglia and cerebellum as possible regions of the brain that may have a role in our ability to perceive succession (Harrington *et al.* 1998). These areas of the brain appear to be implicated in the fundamental timekeeping operations responsible for the coordination of motor control, which necessarily involves processing complex sequences of activity in a specific chronological order. In addition, and as noted in Chapter 3, our ability to process succession dissociates from that for processing duration. For instance, the brain region which stores the sequence of a motor response involves the right parietal cortex. In contrast, durational information associated with the same task is stored in the cerebellum (Sakai *et al.* 2002).

2 The nature of the sequential t-FoR

In this type of t-FoR, the coordinate system is provided by a sequence of events. A given target event (TE) is fixed with respect to another event, the reference point (RP), with respect to which it is sequenced. A sequence of events is fixed with respect to an origo (O), the first event, or a salient event, in the sequence from which the RP takes its reference – note that the O can coincide with the RP. Accordingly, the O serves to anchor the RP to the transience type succession, from which the temporal relation earlier/later arises.

As with the deictic t-FoR, the primary way in which English encodes sequential t-FoR is via ascriptions of motion. However, the motion ascriptions are

quite different from deictic t-FoRs. Rather than relating to path-like motion on the sagittal axis, they concern expressions referring to sequential motion (see Moore 2006). Consider the following examples:

'Earlier'
(1) Christmas comes before New Year's Eve

'Later'
(2) New Year's Eve comes after Christmas

In these examples, there are two different TEs, Christmas, in (1), and New Year's Eve in (2). These are the events which are being fixed with respect to the transience type of succession. The RPs in these examples are respectively New Year's Eve in (1) and Christmas in (2). In these examples, the RPs are also the Os, the points that anchor the events to the transience type involved here. The consequence of the two events in each example, the TE and the RP/O, being related by virtue of sequential motion (*come before/after*) is the inference that there is a sequential temporal relation holding between the two events such that the TE, Christmas is earlier than the RP/O, New Year's Eve in (1). In contrast, in (2), the TE, New Year's Eve is later than the RP/O, Christmas.

In the sequential t-FoR, the RP and O do not have an egocentric basis, but inhere in the event sequence itself. As such, what makes examples such as (1) and (2) relate to the sequential t-FoR, rather than, for instance the deictic t-FoR, is that the earlier/later temporal relation that emerges does so as an inherent feature of the sequence of events, rather than at what point in time they are viewed. Consequently, the reference strategy adopted by this t-FoR is allocentric, as it involves reference between entities, in this case events, which are independent of the egocentric perspective of the human experience of now.

One important difference between how language encodes deictic and sequential t-FoRs is the following. In expressions relating to the deictic t-FoR, the TE is determined not by the position occupied by the event in the sentence, but by virtue of it being the sole mention of a temporal event. Consider the following examples, which relate to the deictic t-FoR:

(3) a. Easter is moving towards us
b. We are moving towards Easter

The TE in each of these examples is Easter. However, Easter occupies the subject position in (3a) and the oblique (OBL) position in (3b). In contrast, the way English encodes the sequential t-FoR suggests that the TE can occupy only the sentence subject position. This presumably is a consequence of the fact that the sequential t-FoR explicitly encodes two (or more) discrete events.[1]

[1] Alan Wallington (p.c.) has pointed out to me that as well as saying 'Christmas precedes New Year's Eve', one can also say '6.02 am precedes 6.03 am'. While these are not events per se,

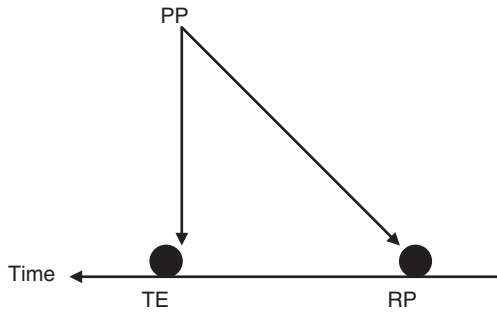

Figure 5.1 Prospective perspective point

For this reason, there is greater flexibility as to where in the sentence the TE can appear in the deictic t-FoR.

3 Perspective points

As with the deictic t-FoR, there is a broad two-way distinction exhibited by lexical concepts that encode sequential temporal reference. This relates to the PP from which the temporal scene being encoded is viewed.

The first type of PP relates to a relationship between two events, the TE and an RP, where the perspective point is fixed at the earlier event. This is illustrated by the example in (1), above. In this example, the TE, the event that receives focal prominence by virtue of being in subject position, is Christmas. It is being fixed with respect to successive transience. And this is achieved by virtue of a second event, New Year's Eve, which constitutes the RP. The relationship established between the TE and the RP is an earlier relation: it is with respect to New Year's Eve that Christmas, the TE, is earlier. And as the earlier event achieves focal prominence here, the perspective point is *prospective*: the relation is viewed from the perspective of the earlier event. This is captured diagrammatically in Figure 5.1.

In Figure 5.1 there is a directed time line, indicating an earlier/later relation continuum, regardless of when the temporal scene is viewed (by an experiencer), or when it occurs (against some extrinsic temporal reference system). The circles marked TE and RP constitute the target and reference point events, respectively. However, the relation is viewed from the PP of the earlier event, as indicated by the arrows. Hence the perspective point is prospective.

The second type of perspective point is *retrospective*. In this scenario, the earlier/later relation is viewed from the perspective point of the later event,

being clock-based measurements, they may, on occasion, metonymically stand for the events taking place at these times.

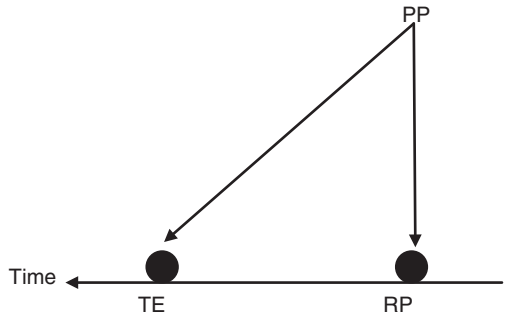

Figure 5.2 Retrospective perspective point

as illustrated by the example in (2), above. In this example, the TE, the event that receives focal prominence by virtue of being in subject position, is New Year's Eve. It is being fixed, in relation to succession, with respect to a second event, Christmas, which in this example constitutes the RP. The relationship established between the TE and the RP is a later relation: it is with respect to Christmas that New Year's Eve, the TE, is later. And as the later event achieves focal prominence in (2), the PP is retrospective: the relation is viewed from the perspective of the later event. This is captured diagrammatically in Figure 5.2.

As in the previous figure, there is a directed time line, indicating an intrinsic temporal (i.e., earlier/later) relation continuum. The circles marked TE and RP constitute the target event and reference point events, respectively. However, the relation is viewed from the PP of the later event, as indicated by the arrows. Hence the PP is retrospective.

4 Types of sequential t-FoR

There is a broad distinction that can be made in terms of the way in which the sequential t-FoR is encoded in English. This relates to the distinction in PPs we have just discussed. In this section I present a brief overview of the lexical concepts associated with this distinction. Figure 5.3 summarises the distinction.

4.1 Prospective perspective point

In this section I address what I term the [EARLIER IN SEQUENCE] lexical concept. This encodes a prospective PP. Consider examples which, I will argue, are sanctioned by the [EARLIER IN SEQUENCE] lexical concept.

(4) a. Christmas is before New Year's Eve
b. Christmas precedes New Year's Eve

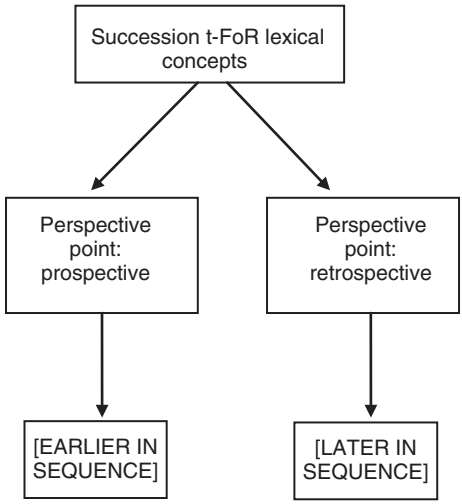

Figure 5.3 Lexical concepts encoding the sequential t-FoR

The semantic function of the [EARLIER IN SEQUENCE] lexical concept is to encode an earlier relation in a temporal sequence. In particular, this lexical concept encodes a relation such that the TE is sequenced earlier than the RP, where the earlier relation is being viewed from the perspective point of the earlier event.

As with the deictic t-FoR, this lexical concept selects for two discrete temporal events that fill the NP1 and NP2 slots. The verbal element selected is somewhat restricted in nature, as illustrated by the examples in (4). Let's firstly consider (4a). This example illustrates that the [EARLIER IN SEQUENCE] lexical concept selects for the existential verb BE, followed by an obligatory sequential marker *before*. Interestingly, not all 'sequential' markers are fully conventionalised with this lexical concept. Consider the following:

(5) a. ?Christmas is ahead of New Year's Eve
b. ??Christmas is in front of New Year's Eve

While both of these examples are possible and understandable ways of describing an earlier sequential relation, they are far less natural than the examples in (4), with native speakers generally judging (5b) to be less natural that (5a).

The reason for the tendency not to select *be ahead of/in front of* appears to have to do with the salient spatial designation associated with these expressions. They make salient a path-based relation. This appears to strongly evoke a spatial, rather than a temporal relation, even though the spatial relations evoked imply a temporal relation of succession which correlates with the

spatial relation designated. But what then gives rise to the scale of unnaturalness exhibited in (5), with (5b) typically judged as more unnatural than (5a)?

The reason for this is likely to relate to a distinction between *mirror-image alignment* versus *in-tandem alignment* (Evans 2004a; see also Tyler and Evans 2003), deriving from spatial experience. For instance, when two human interlocutors are engaged in conversation they normally face one another. This is an example of a mirror-image alignment, as when one looks at oneself in the mirror. In contrast, an in-tandem alignment is exhibited when we form a queue, for example, to buy stamps in a post office. In such a scenario, individuals are aligned in the same direction, and are not facing one another, as when cycling in tandem. A positional marker such as *ahead*, for instance, strongly implies an in-tandem alignment, and is less compatible with a mirror-image alignment. In contrast, the positional marker *in front* is neutral with respect to alignment type and compatible with either. Spatial manifestations of succession, such as a footrace, are typically compatible with an in-tandem alignment rather than a mirror-image alignment. It is plausible that it is for this reason that *in front of* is judged to be more unnatural than *ahead of*.

Now let's return to the selection of *be before*, which is highly conventional with the [EARLIER IN SEQUENCE] lexical concept. Interestingly, *before*, in its spatial sense, appears to imply a mirror-image alignment. Consider, for instance, the following somewhat idiomatic chunk:

(6) Kneel before your king/master

In this example, *before* seems to convey a similar notion to *in front of*. Moreover, it appears to imply, or at least to be compatible with, a mirror-image alignment whereby 'subject' and 'master' are aligned in face-to-face fashion. That said, Tyler and I (2003) found in our study of English prepositions that *before* no longer appears to function primarily as a spatial marker of location in contemporary English. That is, the 'in front of', spatial sense appears not to be productive, but survives predominantly in idiomatic 'fossils', such as the following excerpt from the English nursery rhyme, 'Sing a song of sixpence':

(7) 'Wasn't that a dainty dish to set before the King'

The reason that *before* appears to be compatible with the [EARLIER IN SEQUENCE] lexical concept is that it has a well-entrenched [EARLIER POSITIONAL SEQUENCE] lexical concept associated with it. Consider the following example:

(8) Jane, who was sitting behind John, got up before him

In this example, *before* cannot designate a spatial 'in front of' sense as the trajector (TR), Jane, is located behind the landmark (LM), John. However, it does convey an 'earlier sequence' reading: in this example, Jane stands up prior to John. This demonstrates that *before* has something akin to an [EARLIER

POSITIONAL SEQUENCE] lexical concept which is compatible with the [EARLIER IN SEQUENCE] sentence-level lexical concept. It is presumably for this reason that the [EARLIER IN SEQUENCE] lexical concept selects *before*.

Finally, the [EARLIER IN SEQUENCE] lexical concept also selects the verb PRECEDE, which encodes what I provisionally gloss as an [OCCUR EARLIER] lexical concept. Again, this lexical concept appears to be compatible with the [EARLIER IN SEQUENCE] lexical concept. Indeed, other verbs that fail to designate a succession relationship are incompatible with this lexical concept. For instance, all the examples in (9) are semantically anomalous if an 'earlier sequence salience' reading is intended:

(9) a. #Christmas approaches New Year's Eve
b. #Christmas comes up on New Year's Eve
c. #Christmas lies in front of New Year's Eve (intended reading: 'earlier in sequence'

The [EARLIER IN SEQUENCE] lexical concept and its vehicle can be more precisely stated as in (10):

(10) a. lexical concept: [EVENT X IS SEQUENCED EARLIER THAN EVENT Y, AND THE SEQUENCE IS VIEWED FROM THE PERSPECTIVE OF EVENT X]
b. vehicle: NP1 PRECEDE/BE *before* NP2

4.2 Retrospective perspective point

I now turn to the second of the sequential t-FoR lexical concepts: [LATER IN SEQUENCE]. This encodes a retrospective PP. Consider the following representative sentences by way of example:

(11) a. New Year's Eve is after Christmas
b. New Year's Eve follows Christmas

The semantic function of the [LATER IN SEQUENCE] lexical concept is to encode a later relation in a temporal sequence. In particular, this lexical concept encodes a relation such that the TE is sequenced later than the RP, where the later relation is being viewed from the perspective point of the later event. That is, the PP is set at the later event, which is here the TE. And at risk of labouring the point, the PP is retrospective.

In terms of selectional tendencies, this lexical concept selects for two discrete temporal events that fill the NP1 and NP2 slots. And as with the [EARLIER IN SEQUENCE] lexical concept, the verbal element selects for verbs that are compatible with a 'later in sequence' reading. For instance, *after* appears to encode a [LATER POSITIONAL SEQUENCE] lexical concept, as the following example demonstrates:

(12) Jane, who was sitting in front of/behind John, got up after him

In this example, irrespective of the relative location of Jane with respect to the LM, John, *after* can only be taken to convey a 'later positional sequence' sense. Similarly, *follow* conveys a 'later in sequence' sense, again compatible with this lexical concept. Positional markers and verbs of motion that don't convey later succession are not selected for, or are unnatural with the [LATER IN SEQUENCE] lexical concept. Consider some of the linguistic evidence for this contention:

(13) a. ??New Year's Eve is behind Christmas
b. ??New Year's Eve is in back of Christmas (AmE)

The examples in (13) demonstrate that the prepositions *behind/in back of* are unnatural with the [LATER IN SEQUENCE] lexical concept. Moreover, motion verbs that don't relate to succession are semantically anomalous:

(14) a. #New Year's Eve approaches Christmas
b. #New Year's Eve comes up on Christmas
c. #New Year's Eve lies in front of Christmas (intended reading: 'later in sequence')

The [LATER IN SEQUENCE] lexical concept and its vehicle can be more precisely stated as in (15):

(15) a. lexical concept: [EVENT Y IS SEQUENCED LATER THAN EVENT X, AND THE SEQUENCE IS VIEWED FROM THE PERSPECTIVE OF EVENT Y]
b. vehicle: NP1 FOLLLOW/BE *after* NP2

4.3 Multiple sanction

In the previous chapter I considered the phenomenon of multiple sanction. This occurs when a conception is motivated by two (or more) lexical concepts. However, I considered the case of multiple sanction by lexical concepts that encoded a single t-FoR, namely the deictic t-FoR. I now consider the case of multiple sanction by lexical concepts deriving from different t-FoRs. To illustrate, consider the following examples:

(16) a. Christmas arrives before New Year's Eve
b. Christmas comes before New Year's Eve

These examples provide, on first blush at least, a conception relating to the sequential t-FoR: there are two events which are related in terms of the transience type succession. The conception that arises involves an earlier/later relation such that the TE event, Christmas, is held to be earlier than the RP, New Year's Eve. However, the situation is likely to be somewhat more complicated than this.

The verbal vehicles involved, *arrive/come* relate to the [IMMEDIACY OF PRESENCE] lexical concept, which encodes the deictic t-FoR. Recall the following representative examples, which illustrate that particular lexical concept:

(17) a. Christmas is arriving
b. Christmas is coming

And in conjunction with the [EARLIER IN SEQUENCE] lexical concept, the [IMMEDIACY OF PRESENCE] lexical concept gives rise to a complex conception such that not only is an earlier relation evoked, but so too is the egocentric experience of now. This follows as an experiencer is implicated. The complex conception involves an earlier relation, the TE, which is experienced by the experiencer prior to the later event. In other words, the conceptions that arise on the basis of (16) involve elements from both the deictic and sequential t-FoRs.

Importantly, however, the [EARLIER IN SEQUENCE] lexical concept coerces the [IMMEDIACY OF PRESENCE] lexical concept by virtue of its formal selectional tendencies. While *arrive/come* can assume imperfective aspect, as evidenced by (17), the [EARLIER IN SEQUENCE] lexical concept does not select for imperfective aspect, as evidenced by its ungrammaticality in (18):

(18) a. *Christmas is arriving before New Year's Eve
b. *Christmas is coming before New Year's Eve

The reason for this appears to relate to a fundamental distinction in the transience types associated with the deictic versus sequential t-FoRs. Succession involves a fixed relation between two events: Christmas is always earlier than New Year's Eve. In contrast, the temporal relation holding between an experiencer and a TE in the deictic t-FoR is not stative in the same way: the event of Christmas that is at one point set in the future can come to be experienced as present. In other words, sequential lexical concepts, unlike deictic lexical concepts, encode states. Moreover, in English, states cannot be encoded using imperfective aspect, as the following examples illustrate:

(19) a. John resembles his father
(cf. *John is resembling his father)
b. The moat surrounds the castle
(cf. *The moat is surrounding the castle)

For this reason, the [EARLIER IN SEQUENCE] lexical concept selects for forms of *arrive/come* that are compatible with the stative relation being encoded in (16).

5 Gestural evidence for t-FoRs

Research on gesture in the domain of time provides evidence for distinct deictic and sequential reference strategies. For instance, English speakers primarily make use of the sagittal axis when deploying gestures to signal deictic temporal reference (Casasanto and Jasmin 2012; Cooperrider and Núñez 2009). Gestures ahead signal future time, while gestures behind signal past time. In contrast, English speakers make use of the lateral axis when signalling earlier/later relations, providing evidence that a distinct spatial axis is deployed for a sequential reference strategy (Cooperrider and Núñez 2009; Weger and Pratt 2008).[2]

While some languages, like English, make use of distinct spatial axes to signal deictic versus sequential reference, the axes that are deployed may differ, and, in at least one case, a completely different axis is used. A case in point is Aymara, an AmerInd language spoken by around 1.6 million speakers in the Andean region of Chile, Bolivia and Peru. Núñez and Sweetser (2006) have argued that when gesturing, Aymara speakers deploy a directionality on the sagittal axis that is at odds with gestures deployed by English speakers when signalling deictic temporal reference. Aymara speakers gesture to locations in the anterior region of the sagittal axis when speaking about the past, while they gesture towards locations in the posterior region when speaking of events set in the future.

In Arabic, Tversky *et al.* (1991) have found that while the lateral axis is deployed to signal sequential reference, the directionality is also at odds with English. In Arabic, earlier events are signalled by gesturing rightwards, while later events are signalled by gesturing leftwards. This contrasts with English where earlier events are signalled by gesturing leftwards, and later events by gesturing rightwards.

The differences in directionality of the gestures across these languages when representing deictic and sequential temporal relations most likely reflect conventionalised cultural distinctions. In terms of English and Arabic, the distinction in directionality on the lateral axis may reflect a difference in writing direction. While the English orthographic convention moves from left to right,

[2] Casasanto and Jasmin (2012) have found that under some conditions English speakers can gesture on the lateral axis to signal future/past relations. For instance, they found that a participant gestured leftward when uttering the following: '… and then I found a letter … from even farther back'. As they note, this challenges the claim that people make use of the sagittal axis when signalling deictic temporal reference. However, in examples such as this, the participant appears to be sequencing events that happened to be set in the past relative to the egocentric experience of now. In view of this, two temporal reference strategies appear to be in play: deictic and sequential. It is plausible that the speaker is seeking to highlight the sequential relation or finds the sequential relation more salient. It may be for this reason that in cases such as this, the lateral axis is deployed for gesturing, which is normally associated with signalling sequential temporal reference in English.

corresponding to earlier and later, the orthographic convention in some languages, including Arabic, is from right to left: in Arabic, the orthography to the right of the page occurred earlier than the orthography on the left. This would plausibly account for the observed differences in terms of where on the lateral axis English and Arabic speakers gesture when signalling earlier versus later events.

According to Núñez and Sweetser (2006), the English/Aymara difference may reflect a distinction in cultural priorities in terms of how to represent deictic temporal relations. Aymara privileges knowledge that is gained at first hand, particularly via witnessing an event with one's own eyes. Indeed, the Aymara language has a rich evidential system where the reliability of assertions must be grammatically marked. Aymara speakers obligatorily encode whether they have learned of an event via hearsay or via seeing the event with their own eyes (Miracle and Yapita Moya 1981). For this reason, Núñez and Sweetser (2006) posit, Aymara may signal temporal experience (the past) that has been directly experienced and so witnessed by gesturing along the anterior region of the sagittal axis: this is the region that can be seen as it lies to the front of the human experiencer. In contrast, the future, which hasn't yet been experienced, and so seen, is located on the posterior region of the sagittal axis. Hence, cultural priorities privilege different models for our understanding of how knowledge is gained.

English-speaking cultures, like all other well-studied European languages, and many others around the world, would appear, in contrast, to privilege an exploratory model in structuring understanding of future/past relations. The experiencer moves from locations which have been experienced (the past) towards those that haven't yet been experienced (the future). This model appears to structure how English speakers conceptualise the egocentric notions of past and future relative to the sagittal axis.[3] In contrast, one possible explanation for the divergence in Aymara gestures of time may be the following. It is possible that Aymara culture prioritises a static model, one based not on exploration by a motile experiencer, but on knowledge gleaned via visual experience. In this model, what is and has been experienced lies in front, while that which is unavailable to sense-perception lies behind. I will have more to say about this in the final chapter of the book.

While making use of the sagittal axis would appear to be the only option for signalling deictic reference in gestural space, there are other possibilities, in principle, for signalling sequential reference. In a recent study, Boroditsky and Gaby (2010) have reported a language community whose speakers make use of

[3] It is possible that this exploratory model is a consequence of the European Christian tradition, which viewed humanity's progression in terms of a state of original sin, towards salvation and hence grace (Whitrow 1988). The notion of progression and change is naturally conceptualised in terms of a journey (see Lakoff and Johnson 1999).

gesture space that does not use the human body as its point of reference when signalling earlier/later (i.e., sequential) temporal relations.

Boroditsky and Gaby have studied the Pormpuraaw, a remote Australian Aboriginal community, whose speakers make use of a variety of Aboriginal languages (including Kuuk Thaayorre, and a variety of Kugu or Wik languages). In contrast to speakers of languages such as English and Arabic, which use the lateral axis to signal sequential (earlier/later) reference, Pormpuraawans make use of cardinal points. More specifically, the Pormpuraawans use gesture space on an east–west axis, with earlier events occupying points to the east, and later events occupying points to the west. Such a gestural system for signalling earlier/later events requires a sophisticated ability to dead-reckon, as the person gesturing must be able to 'calculate' where they are with respect to cardinal points. The Pormpuraawans are indeed adept at dead-reckoning, possibly a consequence of their privileging of an absolute reference strategy in the domain of space (see Levinson 2003 for discussion of this in other Aboriginal languages). Boroditsky and Gaby propose that the motivation for the cultural selection of the east–west axis is due to the apparent movement of the sun. Earlier events correspond to that part of the sun's apparent trajectory from a position to the east, while later events correspond to the apparent trajectory towards the west.

6 Summary

This chapter addressed the sequential t-FoR, providing linguistic evidence for the existence of this. It also considered the way in which the sequential t-FoR is realised in language. The sequential t-FoR provides a temporal coordinate system that relates to the transience type succession. Succession involves the felt experience of temporal passage involving successive events. This subjective experience provides the basis for distinguishing between an earlier event and a later event, and relates events to their occurrence in a sequence. Hence, this type of transience gives rise to the temporal relation earlier/later. I considered the neurological basis for the nature of a sequence, a fundamentally temporal notion, from which the sequential t-FoR takes its reference. The chapter then considered the different perspective points available for its linguistic encoding. I then provided more detailed linguistic evidence for the existence of this t-FoR by examining the distinct lexical concepts for the sequential t-FoR, which are distinguished based on their PP. Finally, I examined evidence for the sequential t-FoR from the gestural modality and contrasted this with gestural evidence for the existence of the deictic t-FoR.

6 Extrinsic temporal reference

In this chapter I consider the third and final t-FoR that I argue for: the extrinsic t-FoR. This t-FoR relates to the duration transience type, and is closely associated with time measurement systems such as calendars and clocks. The temporal relation that emerges from the phenomenologically real experience of duration is, nevertheless, qualitatively different from the temporal relations that underpin the previous t-FoRs discussed. The temporal relations arising from transience types that anchor the deictic and sequential t-FoRs are phenomenologically real: the relations future/past and earlier/later. In contrast, the temporal relation arising from the transience type duration is the matrix relation, a conception of duration as providing a manifold or frame which subsumes all other events. In other words, the duration transience type is conceived, in the extrinsic t-FoR, as being just that, an extrinsic matrix or absolute temporal reference frame which can be deployed to fix events in time, extrinsic to the subjective experience of time – although this t-FoR is contingent on duration, which is a phenomenologically real type of temporal experience.

The matrix relation, therefore, appears to involve the reification of the duration transience type; after all, the matrix relation appears to be a property that is abstracted away from, and is, in principle, independent of the events that it is part and parcel of. This reification gives rise to a conception of time as a matrix, whereby duration is conceived as an ontological entity in its own right that provides a manifold which structures all else. In short, while the extrinsic t-FoR derives from a phenomenologically real transience type, duration, the temporal relation that emerges is an intellectual achievement in the way that the temporal relations associated with the deictic and sequential t-FoRs are not – recall the discussion of time as an intellectual achievement in Chapter 3.

As a consequence, while the ability to fix events by virtue of the future/past and earlier/later relations may be, therefore, unavoidable – something we just do by virtue of having the neuro-anatomical structures we have – it is plausible that using extrinsic temporal reference may not be something that all humans do to the extent found in cultures that have developed sophisticated time measurement system, as described below. This is an issue to which I return in Chapter 11.

In this chapter I first discuss the neurological basis of the extrinsic t-FoR. I then discuss a broad distinction that can be made in extrinsic t-FoRs, what I refer to as *event-reckoning* versus *time-reckoning*. I then provide linguistic evidence from English to support the distinction in types of extrinsic reference strategies, before discussing a distinction between mensural cyclical conceptualisations of time which, I argue, arises from the transience type duration. And finally, I present non-linguistic evidence for the existence of the extrinsic t-FoR.

1 The neurological basis of the extrinsic t-FoR

Extrinsic temporal reference relates to the phenomenologically real, albeit neuro-cognitively complex, experience of duration. Research on the perception of duration has conclusively demonstrated that human subjects do indeed perceive duration; they can estimate it in inter-subjectively reliable ways, and, it appears to have a subjective rather than an external basis. For instance, as demonstrated by classic studies, the phenomenologically real experience of duration appears to be a consequence of physiological mechanisms. For instance, if vital functioning is accelerated by the consumption of stimulants such as amphetamines, or due to increased body temperature, this results in an underestimation of duration amongst subjects (Hoagland 1933; Fraisse 1963). In contrast, reduced body temperature leads to an overestimation of duration (Baddeley 1966). In general, an increase or decrease in vital function consistently leads to overestimation and underestimations of duration respectively (see Wearden and Penton-Voak 1995 for review).

In addition, the experience of duration appears to be independent of external stimuli; it arises from the way in which the neurobiological system responds to these stimuli. For instance, Flaherty (1999) found that our perception of duration is a function of how familiar we are with particular tasks: training can influence our experience of task duration. Ornstein ([1969]/1997), in other classic work, has demonstrated that the complexity of a given perceptual array influences perception of duration, while Zakay and Block (1997) found that judgements of duration are influenced by how interesting a particular activity is judged to be.

The neurological basis of duration is likely to be closely tied to the experience of the perceptual moment discussed in Chapter 4 in relation to the deictic t-FoR. The perceptual moment underpins our experience of the present and, arguably, provides the smallest consciously available unit of duration (Pöppel 1994, 2009). It is likely that the felt experience of duration involves, amongst other things, the integration of perceptual moments forming an ordered sequence, and hence is involved in both anisotropic and succession transience types.

2 The nature of the extrinsic t-FoR

The extrinsic t-FoR is, arguably, the most complex of the three temporal frames of reference. Extrinsic temporal reference, like other t-FoRs, serves to fix an event in time. This is achieved by virtue of the target event (TE) being anchored to the transience type duration. However, due to reification of this transience type, the temporal relation that arises is an 'encompassing' *temporal matrix*, which fixes an event with respect to the system being used, regardless of one event's relationship with respect to another, or regardless of the individual human experience of time. In this way, the extrinsic t-FoR provides a means of fixing an event in an 'absolute' way, without reference to an observer. A further feature of extrinsic temporal reference is that whatever the system deployed, naturally occurring periodicities are harnessed. The consequence is that the reference strategy is *periodicity-based*, in contrast to the egocentric and event-based reference strategies of the deictic and sequential t-FoRs.

There is a broad distinction that can be made in terms of extrinsic temporal reference between *event-reckoning systems* (e.g., calendars), and *time-reckoning systems* (e.g., clocks). While both fix events with respect to the matrix – a reified version of duration – they do so in qualitatively different ways. Both types of system serve to count *periodicities*. That is, they are essentially counting systems, and thereby use the count of periodicities in order to mark when in the temporal matrix an event has occurred (e.g., *The feast occurred in November 1907* or *The feast started at 11 am*), and for how long (e.g., *The feast lasted for two days/hours*). The distinction between the two comes from their relative complexity, which allows time-reckoning systems (clocks) to facilitate counts of smaller units, thereby fixing events with finer precision against the temporal matrix. I discuss both types in more detail below.

2.1 Event-reckoning systems

An event-reckoning system provides an extrinsic t-FoR that allows events to be fixed with respect to the system being used. An event-reckoning system has an origo (O) which serves as the initial point for setting the system in operation – that is, the point from which counting begins, thereby anchoring the system in the duration transience type – a reference point (RP) which serves to locate a given event, and a target event (TE) – the event being fixed against the coordinate system. In order to illustrate the nature of event-reckoning systems, in what follows I will draw on systems prevalent in European and Mesoamerican cultures, as these provide some of the best understood and documented. In the case of the European systems, the Gregorian calendar in conjunction with the Anno Domini dating system provides the basis for the modern dating system, which today is more or less the universal civil standard.

There are three types of event-reckoning system: a *repeatable system*, an *open-ended system*, and a *closed system*. I will now focus on the two most common of these: the repeatable and open-ended types. Repeatable event-reckoning systems count units that are of equal length. This is achieved by making use of (and so counting) naturally occurring periodicities: a naturally recurring event of a fixed period. Periodicities can be of different kinds, such as the solar cycle – the period required for the Earth to orbit the sun – the period between vernal and autumnal equinoxes, lunar phases, and so on. However, the most common periodicity used is the day/night cycle.[1]

In a repeatable event-reckoning system, the periodicities that are being counted (e.g., the day/night cycle) are assigned a unique position in the system, often by assigning numerals to the periodicities. Further groupings of periodicities are also common in systems of this kind. For example, in the Gregorian calendar, days are grouped into weeks and months. Once the sequence has been completed, it is repeated, which is what makes such a system one that is repeatable.

To illustrate, consider the main event-reckoning system in Mayan culture (which was developed from earlier Mesoamerican calendar systems). This system was known as the *tzolk'in* calendar, which means 'count of days' (Coe 1992; Gell 1992; Whitrow 1988). In this system, which consists of 260 days, each successive day is numbered 1 to 13, before beginning again at 1. In addition, each day in each 13-day cycle is given a name taken from an inventory of twenty names. As each day across the 13-day cycles has a different name from its corresponding number, this allows twenty cycles of 13 days – hence a total of 260 days. Each day has a unique identifier consisting of a number (from 1 to 13) and name (from the set of 20). In other words, no day in the 260-day sequence shares both the same number and day name.

The 260-day Mayan calendar is a repeatable event-reckoning system as the 260-day sequence is repeated each time it completes. This system, moreover, does not count years (i.e., cycles of 260 days). A system such as this, for counting days in a finite sequence, provides a means of fixing events that are repeated. This calendar was used by the Maya to determine the time of religious and ceremonial events and divination. As each day is unique it provides a means of fixing a given event, such as particular religious events.

[1] The day–night cycle is an extremely salient periodicity in human experience. Indeed, its importance is such that humans deploy it in order to determine essential neuro-physical functioning. For instance, the 'master' circadian rhythm, the wake–sleep cycle, is tied very closely to the 24-hour day–night cycle, constituting a hard-wired response to this predictable aspect of our physical environment (see Evans 2004a). The phenomenon of jet-lag, for instance, results from a discrepancy between the wake–sleep cycle and day–night cycle, due to sudden removal from the location to which an individual's wake–sleep cycle is entrained.

A key feature of repeatable event-reckoning systems is that they require an O: the point which initiates the cycle. This is often derived from a periodicity external to the system (i.e., the days being counted), which thus determines how many units belonging to the system should be counted. In the main Mayan calendar this periodicity is what determined that the system should count 260 days before repeating the sequence.

We don't know for certain what the periodicity was that provided the 260-day Mayan calendar with its O – day 1 of a sequence of 260 – as the 260-day cycle appears not to be based on any geophysical or astronomical periodicity. That said, there are a number of plausible theories. One relates to the observation that the human gestation period is around 260 days – the average number of days from the first day of the first missed menstrual period until birth (Miller and Taube 1993; Tedlock 1982).[2] Another relates to the period from sowing of crops until harvest, which is roughly 260 days (Malmström 1973). Whatever the precise motivation, the external periodicity determined an initial point for the count – the O – and, as a consequence, a final point, giving rise to the 260-day sequence before reverting to the O.

Other repeatable event-reckoning systems take their O from other periodicities. Clear examples of this are those that set their O with respect to the solar cycle – the periodicity involved in a single complete orbit of the Earth around the sun. In addition to the 260-day calendar system, the Maya also used a 365-day system, set with respect to the solar cycle. The Mayan solar calendar, known as the *Haab'* in Yucatec Maya, was made up of eighteen months each consisting of twenty days, plus a period of five days at the end of the year known as *Wayeb'* ('nameless days'). The Gregorian calendar is also, essentially, a repeatable event-reckoning system, which uses the solar cycle to set its O. In contrast to the Mayan *Haab'* calendar, the Gregorian calendar consists of 365 days, and 366 days every fourth year of the sequence. The reason for an extra day every fourth iteration is that the day–night cycle and the solar cycle do not align precisely. In fact, in the Gregorian calendar, which modified the earlier Julian calendar by papal bull in 1582, a sequence actually consists of 365.2425 days – the Gregorian calendar is thus a specific sub-type of repeatable event-reckoning system, an *arithmetic repeatable event-reckoning system*, using the solar cycle to determine an 'arithmetic' and hence notional day–night unit.[3]

[2] This calculation of the gestation period differs from Naegele's Rule, which assumes that gestation is the period between the first day of the last menstrual period and birth, which is circa 280 days (or 40 weeks).

[3] One obvious advantage of using the solar cycle to set the O of a repeatable event-reckoning sequence is that it provides a ready means of fixing events in the agrarian cycle. After all, the solar cycle determines seasonal variation, and hence is the cycle most important for agriculture. Mayan society thus employed two calendars, a 260-day sequence for religious events, and a 365-day system, set with respect to the solar cycle, for fixing agricultural events such as planting and harvesting.

It is worth noting, however, that the O can in principle be set at any point in the repeatable event-reckoning system: it is not necessary that it is set as the initial point, that is, day number one. For instance, in parts of mediaeval Europe, the official New Year began on 25th March, which was Lady Day, believed to be the date when Mary was informed by an angel that she was carrying the unborn Jesus. Venice adopted 1st January as the first day of the year in 1522. England didn't follow suit until 1752.

The second type of event-reckoning system I discuss in detail is the open-ended type. This provides an unambiguous means of fixing events with respect to a unique O that is internal to the system rather than external to it, as in the case of repeatable event-reckoning systems. In Mayan culture, the system that facilitated this was known as the Long Count. The O for this system was the Mayan creation date – a notional date, equivalent to 11th August 3114 BCE in the Gregorian calendar. Days were then counted in groups of approximately twenty. This follows as the Mayan counting system operated on a base-20 scheme – rather than a base-10 system as in the Western counting system. In the Long Count system, days were divided into units of approximately 20, as indicated in Table 6.1.

In contrast, in Europe the Anno Domini dating system was developed (in AD 525). This system, which is also an example of an open-ended event-reckoning system, took as its O the presumed incarnation of Christ. The Mayan Long Count and the Anno Domini systems are both open-ended as opposed to repeatable event-reckoning systems as their O is a unique event that occurs at only one point in the system. This thereby provides the system with an anchor to the transience type duration. Dating systems such as these (in contrast to the calendar systems discussed above) work by providing each temporal unit (such as a day) with a unique reference, by virtue of its relationship with the O. This then allows the identification of an event by virtue of the day (or grouping of days, e.g., month or year) in which it occurs. Moreover, events can be fixed either side of the O: counting can proceed 'forwards' (i.e., later than the O) or 'backwards' (i.e., earlier than the O).

In practice, calendar and dating systems often (although not always) work in conjunction with one another. For instance, the Gregorian calendar adopts the Anno Domini dating system in order to identify distinct iterations of 365-day (or 366-day) sequences, while in Mayan culture, the 260-day and 365-day calendars were used in conjunction with the Long Count dating system in order to precisely fix events over longer periods.

One difference between the two types of event-reckoning systems considered concerns the temporal relation captured. Repeatable event-reckoning facilitates the fixing of event iteration. This allows the identification of what might be referred to as *cyclical time*.

Table 6.1 *Units in the Mayan Long Count*

Days	Unit equivalence	Long Count period	Approx solar years
1		= 1 K'in	
20	20 K'in	= 1 Winal	0.055
360	18 Winal	= 1 Tun	1
7,200	20 Tun	= 1 K'atun	19.7
144,000	20 K'atun	= 1 B'ak'tun	394.3

In contrast, open-ended (or dating) event-reckoning systems relate to what we can informally refer to as *linear time*. Evidence for this distinction comes from language. Consider the example below:

'Linear time'
(1) Christmas 1914 saw a football match between British and German forces

In this example, a specific event is being identified. It is identifiable precisely because it takes as its reference point a particular Christmas 1,913 years earlier (the traditional incarnation of Christ is assumed to be AD 1 in the Anno Domini system, there being no year zero), and because 1,913 iterations of Christmas have been recorded as having preceded the one being referred to. Now consider the example in (2):

'Cyclical time'
(2) Christmas has come round again

In this example, the event is being fixed not as a specific instance of this type (as in (1)), but in terms of when in a sequence Christmas as a type of event occurs. This is possible because Christmas is fixed with respect to a sequence of days that is repeatable: in this case, as determined by the Gregorian calendar, providing a sequence of 365 (or 366) days. Hence, Christmas as an event type is fixed by virtue of a repeatable event-reckoning system – a calendar. This then contrasts with linear time, where each instance of Christmas is fixed by virtue of an open-ended event-reckoning system – a dating system – which relates the time unit that coincides with the instance to an O.

In the example in (2), the TE Christmas is fixed with respect to an RP, which is the position occupied by Christmas in the repeatable sequence. The lexicalisation of this in terms of curvilinear motion *come round* is consistent with the repeatable nature of this type of event-reckoning. After all, curvilinear motion gives rise, in principle, to revisiting an earlier location, and hence repetition.

The final type of event-reckoning is a system that is closed. This is a type of dating system which, unlike the open-ended system, serves to count down the

number of units, for instance, days, from an O to an RP. An example of such a system is an advent calendar, which takes as its O the first day of December, with its RP being 25th December.

In sum, event-reckoning systems are of different types, including open-ended, repeatable, and closed systems. These often work in concert. While they facilitate extrinsic temporal reference, employing a coordinate system that provides a frame, or matrix, that is external to the TE and RP, they each do so in slightly different ways. They make use of external periodicities: predictable and regular physical occurrences that can be counted. And they involve an O, an RP determined with respect to the O, and a TE fixed by being relativised with respect to the RP. For instance, in the example in (1), the event being fixed, namely Christmas, is the TE. The RP is the date, 1914, that fixes the TE, and the incarnation of Christ is the O which anchors the RP to the transience type duration. After all, the traditional incarnation of Christ in the Anno Domini dating system ties the coordinate system to duration, rather than another transience type, given that the purpose of the system is to measure elapse from the O.

2.2 Time-reckoning systems

Like event-based systems, time reckoning harnesses the physical manifestation of natural periodicities. However, it does so in a slightly different way. Time reckoning involves a material artefact which either embodies – as in flowing sand in an hourglass – or symbolises – as in the hands moving around a clock face – the periodicity. This serves to represent the periodic behaviour and, more precisely, the durational elapse that coincides with the physical periodicity. In consequence, time reckoning goes beyond event reckoning: in addition to counting periodicities to gauge duration, it facilitates the very precise measurement of temporal elapse.

The sorts of naturally occurring periodicities employed in time reckoning have evolved over the course of several thousand years. They have ranged from the changing length or angle of a shadow as the sun moves across the sky in ancient Egypt, to the use of water clocks in various cultures, including Egypt (the oldest discovered date to around 1500 BC) and classical Greece, to the flow of sand in an hourglass, to the burning of candles of the same length and substance, to the swinging of a pendulum in a pendulum clock, invented in 1656 by Dutch scientist Christiaan Huygens, to the oscillation of quartz crystals in the twentieth century, to the decay of atoms in modern atomic clocks (see Barnett 1998 for discussion). Crucially, as the periodicity employed has a constant phase of operation, it provides a reliable record of the duration which correlates with it.

In a time-reckoning system, periodic behaviour is measured in order to represent a temporal elapse. This representation can be employed to fix an

event that coincides with it in time. For instance, in a traditional hourglass, sand flows from one chamber to another. However, the amount of sand inside the apparatus is such that when it is upturned exactly an hour is required for the sand to flow from one chamber to another. In analogous fashion, in a spring-driven analogue watch, cogs inside the watch, which are attached to the hands on the outer face, are operated by an uncoiling spring. The rate at which the spring uncoils, thus turning the cogs, is such that it takes exactly one hour for the minute hand to move once around the face of the watch. Hence, time-reckoning systems use material artefacts in order to measure and represent the elapse of time. And these timekeeping devices can then be 'read' in order to 'tell' the time.

Like event-reckoning systems, time-reckoning systems exhibit a number of different types, tailored to fulfil specific functions. A *repeatable time-reckoning system*, such as the 24-hour clock, is a system that derives its O from a periodicity external to the system itself. This system measures hours, and there is a sequence of 24 in total, with the O taken at midnight, represented by the numerals 00.00.

The other very common type of time-reckoning system is the *closed time-reckoning system*. This measures a finite period of time, for instance, the countdown until an important event that is time sensitive, such as a space rocket launch. In principle, as with event-reckoning systems, an open-ended time-reckoning system is also possible.

To illustrate the way in which time-reckoning systems work, consider the following example, which relates to a repeatable time-reckoning system:

(3) The train leaves at 13.01

In this example, a particular TE, the departure of a train, is being fixed with respect to a particular point in a time-reckoning system, here the 24-hour clock. The time indicated, 13.01, is the RP, providing a precise means of fixing the occurrence of the TE with respect to the system. However, the RP requires an O to anchor it to the duration transience type. As this is a 24-hour system, based on the day–night cycle, the O is the day–night cycle, and a point midway between light and dark, midnight, is taken to begin the measurement of durational elapse, and hence fixed as 00.00. In other words, just as we saw with event-reckoning systems, which employ a further periodicity in order to determine the O, repeatable time-reckoning systems also make use of an external periodicity in order to calibrate the system.

Before concluding this discussion of extrinsic temporal reference, it is worth observing that event-reckoning systems pre-date time-reckoning systems in human culture (see Whitrow 1988). One important reason for this, presumably, is that time-reckoning requires accurate measurement of duration at a level of sophistication not required by event-reckoning systems, which essentially count

periodicities rather than employing the count to measure their duration. Time reckoning requires material artefacts – timekeepers, or chronometers. This necessitates a reasonably sophisticated technological culture. While event reckoning appears to have existed in prehistory, the evidence is that time reckoning is relatively more recent. The earliest timekeeping devices are likely to have been sun-sticks or *gnomons* (which is Ancient Greek for 'one who knows'), for which there is evidence in Egypt dating back at least 3,500 years. These are likely to be among the world's earliest time-reckoning devices (Barnett 1998).

3 Linguistic evidence for the extrinsic t-FoR

Lexical concepts that encode the extrinsic t-FoR differ in important respects from the lexical concepts considered in earlier chapters. As we have seen, extrinsic temporal reference makes no reference to subjective aspects of temporal experience, relying as it does on external periodicities. In this it contrasts with both deictic and sequential temporal reference. While deictic t-FoRs take the egocentric experience of the present as the O, the ability to judge the TE from the RP in a sequential t-FoR derives from the subjective ability to distinguish earlier from later, and hence the notion of succession. Hence, lexical concepts encoding deictic and sequential t-FoRs are, in a fundamental sense, phenomenological, directly related to pre-conceptual experiences of time. In contrast, extrinsic temporal reference would appear to relate to what I termed, in Chapter 3, time as an intellectual achievement.

A lexical concept encoding an extrinsic t-FoR encodes a temporal scene involving a TE – a discrete temporal event of some sort – and an RP – a point in a time-measurement system, which is to say, an event-reckoning system or a time-reckoning system. The time-measurement system also has an initial (or end) point which serves as its O.

There is a wide range of event-reckoning t-FoR lexical concepts, including a range of distinct open, closed and repeatable variants. In this section I will illustrate by briefly considering just one repeatable event-reckoning t-FoR lexical concept. Consider the following example:

(4) His birthday is/falls on September the 14th

As is evident in (4), this 'repeatable event-reckoning' lexical concept selects for two discrete events that fill the NP1 and NP2 slots. The first relates to an event of some kind, which constitutes the TE, *his birthday*. The second is a point fixed with respect to some repeatable event-reckoning system, which corresponds to the RP. In the example in (4) this corresponds to *September the 14th*. The lexical concept also includes a linking relation that fills the VP slot in the vehicle. This is exemplified by the copular verbs BE or FALL ON, as exemplified in (4). The purpose of this lexical concept is to situate a TE with respect

to an RP, within a specific event-reckoning system set with respect to some O, in this case 1st January. That is, 1st January grounds the TE with respect to the transience type duration and the matrix relation that arises. Hence, the temporal matrix provides an encompassing manifold in which *his birthday* occupies a specific position, and is thereby fixed. This lexical concept can be formalised as in (5):

(5) a. Lexical concept: [TE FIXED WITH RESPECT TO RP IN THE GREGORIAN CALENDAR]
b. Vehicle: NP1 COPULAR VP NP2

I now, also briefly, provide linguistic evidence for the existence of a repeatable time-reckoning system lexical concept. Consider the following examples:

(6) a. The time is (a) quarter to/of/till/before eight
b. The time is (a) quarter after/past eight

The vehicle conventionally paired with this specific lexical concept involves a subject NP, which is typically filled with the form *the time*, although it can, in certain contexts, be filled with the form *the hour*, which historically was more frequent. The vehicle also consists of the obligatory copular verb BE, plus a prepositional phrase which includes a preposition plus an NP. The lexical concept serves to encode a relation between a TE, which corresponds to the subject NP slot, and an RP, which corresponds to the PP slot, in the 12-hour clock. In other words, the TE is the present moment, *the time*, which is being fixed with respect to an RP, *quarter to/of/till/before eight*, anchored, via the O, to duration, and hence a temporal matrix. The O is the originating point in the 12-hour clock, namely 12. The lexical concept that sanctions these examples can be represented as follows:

(7) a. Lexical concept: [TE FIXED WITH RESPECT TO AN RP (IN THE 12-HOUR CLOCK)]
b. Vehicle: *The time* BE PrepP

An interesting point of difference between some lexicalisations of the extrinsic t-FoR and other t-FoRs concerns the ascription of motion. Consider the following example:

(8) The time is approaching midnight

On the face of it, the use of *approaching* here appears analogous to ascriptions of motion in the linguistic manifestation of the deictic t-FoR, for instance. However, the basis for the motion ascription in (8) appears to be modelled on veridical motion of 'hands' on a clock 'face', unlike the motion ascriptions in deictic temporal reference. Consider Figure 6.1.

Figure 6.1 The Big Ben clock face

The clock face in Figure 6.1 represents the elapse of duration. This is achieved by virtue of the movement of two 'hands', such that the position of the big hand with respect to the little hand, which indicates a given hour, is reflected linguistically. The example in (8) shows that the linguistically mediated representation of time reflects the spatial representation of time captured by the material artefact that is the clock face. In other words, the motion of hands around a clock face is a metonymic representation for the elapse of time. And this metonymic representation is captured linguistically, providing evidence for the linguistically mediated representation of extrinsic temporal reference.

4 Mensural versus cyclical time

In principle, there is a distinction between what we might think of as *mensural time* and *cyclical time*. Mensural time has to do with the human ability to measure time, as exemplified by event- and time-reckoning systems, as described above. In contrast, cyclical time has to do with the experience that iterations of the same event types come 'round again': they are repeated at relatively regular intervals, hence the notion of cyclicity. I suggest that extrinsic temporal reference underpins both mensural and cyclical time. That is, both types of temporal assessment require an ability to conceptualise time as a matrix, providing a means of measuring time, and of assessing events as being repeated at particular intervals.

While some scholars assume that the ability to conceptualise time is universal (e.g., Lakoff and Johnson 1999), recent findings on the Amondawa language have led to the claim by Sinha *et al.* (2011) that at least some aspects of temporal awareness – what I refer to as the matrix relation; they use the expression 'time as such' – may not be universal. Their claim is that Amondawa

does not evidence a matrix relation. While the matrix relation emerges in the context of time-measurement systems – which the Amondawa appear to lack – there is no evidence that the Amondawa lack the ability to conceptualise and manipulate cyclical time. Moreover, the Amondawa have no difficulty acquiring mensural conceptions of time when they acquire other languages such as Portuguese. This suggests that while Amondawa conceptions of time may not include native mensural systems, they nevertheless have some aspects of an extrinsic t-FoR. This is an issue I return to in more detail in the final chapter.

5 Non-linguistic evidence for the extrinsic t-FoR

Unlike deictic and sequential temporal reference, extrinsic temporal reference appears not to rely on gesture space, whether relating to the body or to cardinal points. It appears to make use of non-body-based two-dimensional representational space. Examples of representational forms include the clock face and the calendar. In the case of an analogue clock face, for instance, this involves a non-body-based representational format in which two 'hands' move around a circular dial, as in Figure 6.1 above. The 12-hour clock is an example of a repeatable time-reckoning system par excellence. And as I noted earlier, such systems lend themselves to capture what I referred to as cyclical time. In the case of, for instance, wall calendars, these are often represented in terms of horizontal rows of days, sequenced prior to rows of later weeks, with later months sequenced below earlier months (see Figure 6.2), representing linear time.

An interesting question relates to why the extrinsic t-FoR should not make use of gesture space (centred around the human body). A possibility is that while gestures are ephemeral, extrinsic temporal reference concerns a cognitive level of representation in which time is conceived as an ontological substrate that has essence independent of the human experience of egocentric time. For this reason, it is, perhaps, naturally better captured by the more stable symbolic resources associated with pictorial and diagrammatic representations.

The modern Gregorian calendar system incorporates features of both repeatable and open-ended event-reckoning systems, involving a 12-month (repeatable) calendar, in conjunction with the Anno Domini dating (open-ended) system, allowing the counting of 12-month sequences. Accordingly, the prediction would be that people familiar with this complex extrinsic temporal reference system are likely to make use of linear (open-ended) and circular (repeatable) representations when conceptualising the relationships between parts of the calendar, for example months of the year.

In recent research on pictorial representations for months of the year, Brang *et al.* (2010) found that when asked to place months relative to one another on a computer screen, subjects did indeed use both linear and circular arrangements

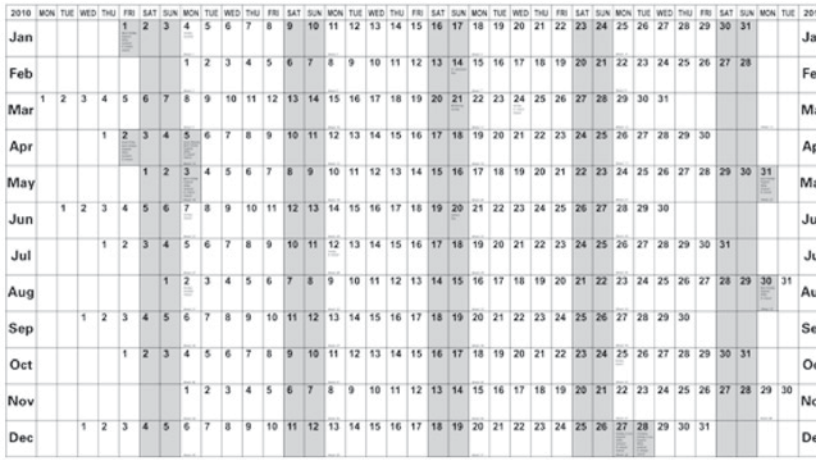

Figure 6.2 An example of a wall calendar

of months (an interesting finding was that subjects with time synaesthesia made a much higher percentage use of circular as opposed to linear arrangements). While further empirical research is required, the finding that both circular and linear representations are spontaneously deployed to represent a 12-month calendar is compatible with my proposal that open-ended and repeatable extrinsic temporal reference systems lends themselves to being conceptualised as encoding linear and cyclical time.

6 Summary

In this chapter I have addressed the third and final t-FoR that I argue for: the extrinsic t-FoR. The extrinsic t-FoR relates to the duration transience type and is closely associated with time-measurement systems such as calendars and clocks. The temporal relation that emerges from the phenomenologically real experience of duration is, nevertheless, qualitatively different from the temporal relations that arise from the other two t-FoRs. The temporal relations arising from transience types that anchor the deictic and sequential t-FoRs are phenomenologically real: the relations future/past and earlier/later. In contrast, the temporal relation arising from the transience type duration is the matrix relation, a conception of duration as providing a manifold or frame which subsumes all other events. In other words, the transience type duration is conceived, in the extrinsic t-FoR, as being just that, an extrinsic matrix or reference frame which can be deployed to fix events in time in an absolute way. This type of temporal relation, therefore, appears to involve the reification of the duration

transience type as a property that is abstracted away from and is, in principle, independent of the events that it is part and parcel of. This reification gives rise to a conception of duration as a matrix, whereby duration is conceived as an ontological entity in its own right that provides a manifold which structures all else. In short, while the extrinsic t-FoR derives from a phenomenologically real transience type, duration, the temporal relation that emerges is an intellectual achievement in the way that the temporal relations associated with the deictic and sequential t-FoRs are not.

7 Time versus space

I have been arguing that spatial and temporal reference are distinct in a number of ways. My claim is this: at an experiential level time and space are wholly distinct, and distinguishable. That said, in terms of temporal representation, spatial representation appears to be useful and, indeed, consistently used in order to support temporal reasoning and temporal language, including temporal reference. I nevertheless propose that it is incorrect to assume that temporal reference patterns after, and hence can be modelled utilising, spatial frames of reference, just because space appears to be implicated in the representation of temporal reference.

But if temporal experience is distinct from sensory-motor experience, an outstanding question remains: why does spatial representation appear to be recruited to structure and support some aspects of temporal reasoning? I argue below that this is likely to be due to temporal experience being fundamental to the perception of sensory-motor experience and, more precisely, the construction of events: our units of perception. The consequence is that temporal representation – although not underlying temporal experience which grounds, in large part, our representations for time – must be supported by correlated spatial experience and ensuing spatial representation. Without this, I hypothesise, they would be otherwise inaccessible to the (conscious) human conceptual system.

This chapter is structured as follows. I begin in the next section by considering the somewhat paradoxical relationship between spatial and temporal representation. On the one hand, on certain measures there is substantial evidence for an asymmetric relationship such that time is structured in terms of space, but apparently not vice versa. However, on other measures, the two domains appear to exhibit structural homology at a representational level, suggesting that either they are parallel but distinct conceptual domains, or else they are underpinned by a common structural function. I then consider the nature of event perception. This issue is important as it will both shed light on the nature of spatial and temporal representation and, I will argue, provide a means of understanding the space–time representational asymmetry issue. I then move on to consider the nature of temporal versus spatial reference. I

consider domain-general properties that appear to be common to both. I also consider domain-specific properties that render reference across the two conceptual domains distinct. And finally, I examine the role of conceptual metaphor in facilitating the use of structure from the domain of space to support temporal representation.

1 Asymmetric structuring of time in terms of space: the case of magnitude

The relationship between spatial and temporal representation is, in a profound sense, paradoxical. This section is concerned with attempting to work out this paradox. On the one hand, space and time are foundational domains of human experience. They are foundational in the sense that, although involving distinct types of substrate (matter versus action), they encompass the substrate in which our experience unfolds. Also, we must have evolved mechanisms for processing the properties associated with these substrates. This must be the case for us to have developed and prospered over evolutionary time, as we patently have. Indeed, the unfolding of experience relates to the time dimension (action), while the entities involved in the unfolding relate to the space dimension (matter). Moreover, and as we saw in Chapter 3, the property associated with these substrates is extension versus duration.

However, there are good reasons to think that at the representational level time and space are asymmetrically structured such that time is supported by, and arguably parasitic on spatial representation. As we saw in Chapters 1 and 3, a notable line of evidence for this interpretation, which derives from the work of Lakoff and Johnson (1980, 1999), is language.

In behavioural experiments, Lera Boroditsky (2000) has provided psycholinguistic support for Lakoff and Johnson's claim. Boroditsky adapted a classic experimental paradigm developed by McGlone and Harding (1998) which made use of an ambiguous temporal reasoning task, also discussed in Chapter 1. Boroditsky developed both spatial and temporal primes which she applied to temporal and spatial reasoning tasks. She reasoned that if spatial and temporal representations are structured symmetrically, which is to say, if temporal representation is just as useful for reasoning about space as spatial representation is for time, then spatial cues should prime for temporal reasoning, while temporal cues should prime for spatial reasoning tasks. Boroditsky found evidence consistent with an asymmetric perspective: spatial cues appear to be useful for reasoning about time, but temporal primes appear not to be used when reasoning about space.

Boroditsky's experiments follow Fillmore, and Lakoff and Johnson in assuming the moving ego (ME) and moving time (MT) perspective points. That is, her experiments relate to temporal reference and, specifically, the deictic t-FoR

(in current parlance). She illustrates that, in terms of the deictic t-FoR, and as predicted by the linguistic evidence, temporal reference appears to be supported and, in part, structured in an asymmetric way by spatial knowledge.

That said, the temporal experiences which underlie temporal representation are not of a homogeneous type. As we saw in Chapter 3, time exhibits a range of different parameters. One of these is magnitude. Indeed, I have argued that time can be evaluated, along with space, in terms of magnitude. That said, the very temporal property that exhibits magnitude, namely duration, also contributes to the property of transience. And transience is not exhibited by space. This indicates that while space and time may exhibit aspects of the same parameter – magnitude – the nature of its manifestation is domain-specific. That said, at the representational level, time is structured, in part, asymmetrically in terms of space, as observed. The question, self-evidently, is this: why?

In this section I consider in detail whether evaluations of magnitude also exhibit the pattern of asymmetry between time and space, as found, for instance, in aspects of temporal reference. Under certain conditions, as we shall see below, the same pattern of asymmetry is apparent. However, under different conditions, they appear to exhibit a symmetrical pattern. Examining magnitude, and the relationship between representations for time and space along this parameter, is instructive as it sheds light on the complex nature of the relationship between time and space.

The domains of space and time (as well as the domain of number) are all *prothetic* (Stevens 1975): they are domains populated by substrate which can be measured. For instance, while we can measure the length of an object and quantify it in terms of millimetres, centimetres and so on, we can also measure time, providing an assessment, for instance, of how many seconds and minutes a particular event lasts for.

In terms of neurological processing, the neuroscientist Vincent Walsh (2003; Bueti and Walsh 2009) argues that there is a magnitude system common to time and space (along with number). Assessments of time, space and number are linked by virtue of all being central to action and interaction in the world. Moreover, action involves the seamless coordination of these three domains. Our perception of events, for instance, involves processing information relating to distance, speed, size, duration, location and number. An action in response to an event involves judging how far, how fast, how big, how long and where.

There are a number of possibilities in terms of how information relating to events and action is integrated in the brain, and two specific proposals have been made. The first, which might be termed the *Spatial Magnitude Model*, assumes that spatial magnitudes (e.g., extension) are recycled for more general purposes, facilitating the structuring of temporal magnitude (e.g., duration) in terms of aspects of spatial magnitude (i.e., extension). A specific version of this model has been recently proposed by Bonato *et al.* (2012), and is termed

the *Mental Time Line* (MTL) hypothesis. This hypothesis posits that, at the neurological level, temporal experience is structured, at least in part, in terms of spatial characteristics.

A second possibility, which I will term the *Common Magnitude Model*, involves a single magnitude system. Such a system would provide a common metric allowing the different properties associated with the different substrates relating to the domains of time and space to be quantified and integrated. Walsh (2003; Bueti and Walsh 2009) argues for this second type – he uses the nomenclature: *A Theory of Magnitude* (ATOM). Walsh proposes that a generalised neurological mechanism, which is in place at birth, underpins the prothetic nature of these domains. In other words, the apparent specialisation of these domains results, Walsh argues, from a single generalised, neurologically instantiated magnitude system. Whichever of the two approaches, ATOM or MTL, turns out to be correct – and there are arguments in favour of both – the only candidate brain region that might facilitate the interaction between spatial and temporal experience is the inferior parietal cortex – this region of the brain is host to a series of closely related sub-areas specialised for processing time, space and number (Bonato *et al.* 2012; Bueti and Walsh 2009; Walsh 2003).

Walsh's ATOM assumes a single underlying magnitude system. This model would therefore predict that quantities in both domains should be activated simultaneously and hence symmetrically (Casasanto *et al.* 2010). That is, when quantity in one domain is activated, quantity in the other domain should also be activated, and, crucially, vice versa. If this view of the neurological interaction between time and space is correct, we would expect linguistic and behavioural evidence to reflect this.

And in point of fact, there is an important line of evidence that supports ATOM, in terms of linguistic organisation. This relates to what is known as *conceptual alternativity* (Talmy 2000). This is the phenomenon whereby some aspects of two (or more) domains can be represented via structure recruited from the other domain. This provides one line of evidence that time and space, at least in terms of magnitude, may appear, at least from this perspective, to be structurally homologous. This is exemplified by the following examples relating to the parameter magnitude:

(1) a. London is three and half hours from Bangor
    b. London is 250 miles from Bangor

The extent holding between the cities of Bangor and London can be quantified in terms of elapse (i.e., duration) as in (1a), or in terms of distance (i.e., length) as in (1b). Moreover, either of these examples is a semantically acceptable response to the question in (2):

(2) How far is London from Bangor?

Table 7.1 *The parameter magnitude and its sub-parameters*

Domain	*Space*	*Time*
Property	Extension	Duration
Substrate	Matter	Action
Parameter	Quantity	Quantity
Sub-parameters:		
Discrete	Objects	Acts
Continuous	Mass	Activity

The examples in (1) illustrate that in terms of the parameter magnitude (linguistic and presumably conceptual), representations of time and space appear to exhibit conceptual alternativity.

Further evidence comes from *conceptual conversion operations*. Talmy (2000) points out, on the basis of linguistic evidence, that acts and activity (from the domain of time) can be converted into objects and mass (from the domain of space). When a temporal concept is *reified*, this is conveyed by expressions exemplified by *a wash* and *some help* in (3) and (4) respectively:

	An act	*reified as an object*	*(discrete)*
(3)	John washed her.	John gave her a wash.	
	Activity	*reified as a mass*	*(continuous)*
(4)	John helped her.	John gave her some help.	

In example (3), the expression *washed* encodes an act, while *a wash* relates to an object. It is precisely because lexical concepts relating to time and space can be quantified, as exemplified by the sub-parameters *continuous* and *discrete* (as exemplified in Table 7.1), that they can exhibit the conceptual alternativity evident in (3).

In example (4), the expression *helped* encodes an activity, while *some help* encodes a mass lexical concept. When an act is reified as an object, it can be described in terms consistent with the properties of objects. For example, physical objects can be transferred: *to call (on the phone)* becomes *he gave me a call*. Physical objects can also be quantified: *to slap* becomes *She gave him two slaps*. As Talmy observes, however, there are constraints upon this process of reification. For example, a reified act or activity cannot be expressed in the same way that prototypical physical objects can. Example (5) illustrates that the reified act *a call* is incompatible with verbal lexical concepts that are prototypically physical.

(5) #John pushed/threw/thrust/slid Lily a call

The converse operation, which converts matter to action, is referred to as *actionalisation* (Talmy 2000). When units of matter are actionalised, they are

expressed by lexical concepts encoded by VP vehicles. This operation is illustrated by the following examples adapted from Talmy (2000: 45).

	An object	*actionalised as an act*	*(discrete)*
(6)	Jane removed the pit from the olive.	Jane pitted the olive.	
	A mass	*actionalised as an activity*	*(continuous)*
(7)	Jane has a nosebleed	Jane is bleeding from the nose	

As conceptual alternativity provides evidence for a structural homology in terms of representations for quantity across the domains of time and space, it is consistent with the prediction made by Walsh's ATOM. In contrast, the MTL hypothesis predicts that representations for time should be asymmetrically (rather than symmetrically) structured in terms of space. This follows, as it claims that it is space that gets reused to support time, rather than there be a more generic underlying magnitude metric.

In seminal behavioural research on the conceptual relationship between duration and spatial length, Casasanto and Boroditsky (2008) report on experiments whose results bear on the predictions made by both ATOM and the MTL hypothesis. Moreover, the findings reported appear to be consistent with the prediction made by MTL rather than ATOM.[1]

In a series of experiments, Casasanto and Boroditsky developed a Growing Lines paradigm: a computer was programmed so that a line would *grow* across the screen. The line would grow for a predetermined length at different speeds. This meant that the line would grow for a particular spatial extent across the computer screen and, crucially, for a predetermined duration. Moreover, the computer was programmed so that subjects were exposed to many growing lines, one after the other, each line varying in terms of both spatial extent and duration. Hence, lines could end up being long or short, and growing for longer or shorter periods of time.

The purpose of the experiments was to assess the influence of the domains of space and time on each other, by manipulating psychophysical tasks. The experiments tapped into subjects' judgements about duration (time) and extension (spatial length), without recourse to language. Subjects were exposed to growing lines, and only once the line had disappeared were they instructed to judge either the duration that the line grew for or the spatial length that it achieved. In other words, they didn't know in advance which condition they would be asked to judge.

Casasanto and Boroditsky found that lines of the same duration were adjudged as lasting for a longer period of time if they had a longer length, but

[1] I hasten to add, however, that the purpose of the experiments was not specifically to evaluate these two models of neurological processing – Casasanto and Boroditsky's research relates, after all, to how we represent time and space, rather than our (neurological) instantiation of time and space and their potential interaction at that level.

for a shorter period of time if they had a shorter length. However, lines of the same length were judged as having the same length, no matter whether they lasted for a longer or shorter period of time. Hence, when people are asked to make judgements about the duration of a line's growth, they are influenced by, and indeed appear incapable of ignoring, the irrelevant spatial information. If a line is longer (in space) people also believe that it lasted longer (in time). But if the line is shorter (in space) they judge it as also lasting for a shorter period of time. In contrast, when making judgements about spatial extent, the irrelevant temporal information does not influence their judgement at all. What this suggests is that when evaluating spatial length, evaluations of duration are not automatically activated. In contrast, when evaluating duration, assessments of spatial extent appear to be automatically activated and, moreover, influence the evaluations of duration.[2]

This finding is inconsistent with ATOM. Because that theory assumes a single magnitude system, it predicts simultaneous activation of domain-specific assessments of magnitude. In contrast, the finding is (at least partially) consistent with the MTL hypothesis. This model assumes that time and space interact in an asymmetric way, such that spatial characteristics support, in part, neurological processing of temporal magnitude.

More specifically, the Growing Lines paradigm demonstrates an asymmetric relationship between activation patterns in terms of human representations for temporal and spatial quantity. Spatial extent appears to influence evaluations of temporal duration while evaluations of temporal duration appear not to influence evaluations of spatial extent. Moreover, this asymmetric relationship in terms of the parameter magnitude across the two domains is similar to the pattern observed with temporal reference in the experiments of Boroditsky (2000).

A further finding adds to the oft contradictory pieces of the puzzle. In recent work, Casasanto and two colleagues, Dustin Merritt and Elizabeth Brannon, investigated whether other primates exhibited the same asymmetry between time and space as is exhibited by humans (Merritt *et al.* 2010). The

[2] At the time of going to press, a new study, Kranjec *et al.* (2013), added a further twist to the complexity. Kranjec *et al.* specifically sought to replicate the Casasanto and Borodistky (2008) study, but in the auditory modality. As Kranjec *et al.* note: "Because vision makes a privileged contribution to spatial processing it is unclear whether these results speak to a deep asymmetry between time and space, or a modality specific one. The present study was motivated by this ambiguity and a complementary correspondence between audition and temporal processing." (*Ibid.*, 1). Kranjec *et al.* found that in an auditory perceptual task, duration and spatial displacement judgements were symmetrically influential: irrelevant temporal information influenced spatial judgments and vice versa. What this finding suggests is that the perceptual asymmetry between domains is not generalised across modalities. This would be consistent with the proposals made by Walsh's ATOM for a common magnitude system at the neurological level.

experiment was carried out with two rhesus macaque monkeys. The monkeys, two five-year-old females, were trained to use a touch-pad computer screen and received small amounts of juice as a reward for their cooperation. Once trained, the monkeys were exposed to a very similar version of the growing lines experiment to the one that Casasanto and Boroditsky's human volunteers had previously undergone. And remarkably it was found that the monkeys were as liable to be influenced by space when thinking about time as vice versa: they exhibited a symmetric pattern, rather than the asymmetric pattern found by Casasanto and Boroditsky (2008). In short, the monkeys exhibited the pattern, in terms of behavioural tasks, that would be expected on the basis of Walsh's common magnitude model – ATOM.

Casasanto and colleagues then wondered whether humans start out like monkeys. Perhaps it's the case that human infants begin with minds which are as adept at using space to reason about time as they are at using time for evaluating space. To investigate this, Casasanto and his collaborators tested his Growing Lines paradigm on nursery-school children of around five years of age (Casasanto *et al.* 2010). And they found, that like adults, human children can use space to reason about time, but not vice versa. The human mind is, it seems, quite different from that of our near primate cousins. We reason about space and time asymmetrically.

But if our minds are so different from those of monkeys, how did this difference come about? Why do human beings make use of the domain of space to reason about time? And why is it that monkeys don't?

One possibility is that Walsh is partially correct: the parietal cortex allows us to link our experience of space and time in symmetric fashion. But our subsequent representations of time and space – what Casasanto and Boroditsky have investigated – structure time in terms of space, and in consequence, this structuring is asymmetric, at least in part. Put another way, something about the distinctive nature of our experiences of time and space and how we experience them results in our representations for time becoming asymmetrically experienced, at least in part, in terms of representations for space, as predicted by the MTL hypothesis. One possibility, then, is that while space and time are (possibly, in part at least) symmetrically organised at the neurological level, in representational systems upon which language, for instance, depends, time and space are asymmetrically organised – and indeed, the MTL hypothesis depends largely on behavioural studies to support its contention. This contrasts, at least at present, with ATOM, which does draw upon support from cognitive neuroscience that points to bidirectional interaction across space and time. Ultimately, however, there is almost no concrete evidence for the nature of interactions between time and space at the neurological level (Kranjec and Chatterjee 2010). Moreover, as things stand, no knock-down findings exist

for decisively preferring ATOM over MTL, or, indeed, some other variant. As Bonato *et al.* themselves observe:

> Both accounts [ATOM and MTL], however, need to be further developed and characterized to derive more straightforward predictions and therefore lead to new studies that might allow adjudication between them. (2012: 2270)

While the situation at the neurological level remains unresolved, we know that in terms of the conceptual system, and in terms of language, time is often asymmetrically organised in terms of space. But how do we account for this asymmetry? Lakoff and Johnson (1980) first argued, now some time ago, that the reason for the asymmetry relates to correlation in our experience of these two domains. More recently, this has been worked out in detail in the impressive and characteristically careful research of Kevin Moore (e.g., 2000, 2006). Moore posits what he refers to as *grounding scenarios*, which serve to provide correlated experiences for time and space. As observed by Walsh (2003; see also Bueti and Walsh 2009), in experience there is no such thing as being in the right place at the wrong time; as Moore makes clear, time and motion through space are tightly correlated, and distinct grounding scenarios provide the basis for our conceptual representations (conceptual metaphors) for time.

But while time and space may be correlated in experience in just the way described by Moore, a correlation (still) doesn't account for the asymmetry in our representations for time and space, and the at least partial representation of time *in terms of* (motion through) space. After all, a correlation is as consistent with a symmetrical relationship between spatial and temporal representations as it is with an asymmetric one. In order to address this specific issue, I want to now develop the relationship between time and space in terms of event perception. The reason for this is that, as I shall argue, the way in which we perceive events in part may hold the key to an explanation.

2 Event perception

In this section I am concerned with the nature of event perception. This issue is important as it will shed light on the foundational nature of spatial and temporal experience and make the case for both their correlation in experience and their qualitatively different nature. This will also provide a means of understanding the space–time asymmetry issue in terms of how these two domains are represented in the human conceptual system.

I have argued that the substrate that comprises spatial experience is matter, while in the domain of time it relates to action. I also noted, in Chapter 3, that units of action constitute 'events'. In fact, the latter claim requires qualification. Events are more than simply units relating to the substrate of temporal experience. Events are widely acknowledged to be the units of perception (Cutting

1981; Gibson 1979; Heider 1959; Johansson *et al.* 1980; Pittenger and Shaw 1975; Zacks *et al.* 2001). Indeed, Cutting (1981: 71) describes events as 'our very units of existence'.

Events appear to be centred on object/action units that are goal directed (Zacks *et al.* 2001): they involve correlated aspects of both space and time. A number of taxonomies for events have been provided in the perceptual psychology literature (e.g., Cutting 1981; Gibson 1979; Heider 1959; Johansson *et al.* 1980; Pittenger and Shaw 1975). Notable amongst these is a consensus that events consist of structure of two sorts: topographic (spatial) and dynamic (temporal). Köhler (1947) argued that the topographic structure of events involves perception of structural ratios in space, relating parts of objects – and indeed other entities – with respect to each other. These ratios may arise from ecological affordances (Gibson 1979) in the environment which provide topographic invariants (Cutting 1981).

In relative terms, far less work has been conducted on the dynamic aspects of the perception of events. Nevertheless, there is growing consensus that timing mechanisms in the brain, which may be responsible for guiding the formation of percepts, are likely to underpin the formation of events and hence facilitate perception. In seminal work aimed ultimately at modelling the provenance of conscious awareness, Crick and Koch (1990) argued that the so-called 'binding problem' – how percepts are formed in the absence of a central association area for the integration of perceptual information in the brain – is achieved via the coordinated oscillation of neurons. That is, perceptual binding may result from temporal activities which 'bind' perceptual information; binding arises via temporally coordinated activity, rather than by integrating information at a specific 'association' site in the brain. Moreover, the coordinated oscillation of neurons may be what contributes to the perceptual moment, as discussed in Chapter 4. Such a view suggests that the perceptual moment may play a pivotal role in giving an event its structure.

Furthermore, the dynamic quality of events appears to be dividable into parts and sub-parts (Cutting 1981; Zacks *et al.* 2001), providing a nested dynamic quality to their perception. In other words, events have an underlying structure, derived from the perception of sensory-motor experience, which is unpacked in, and according to the prescribed dimensions of space and time, a consequence of the innate (top-down) principles that govern our perceptual neurobiological apparatus, namely, our sensory systems and brain structures. That said, there is nevertheless a rather large body of behavioural and neurological evidence (e.g., Kurby and Zacks 2008; Rinck and Bower 2000; Zacks *et al.* 2007) which points to the conclusion that time and space are in fact perceptually as well as psychologically distinct. Moreover, under certain circumstances, people are more sensitive to temporal change than spatial change (Zwaan *et al.* 1995; Magliano, Miller and Zwaan 2001).

Our experience of the world comes to us via the perception of events, and events are temporally structured, hence – my argument is that – their very essence appears to be temporal. As such, it is this temporal structuring that facilitates the perception of our world of sensory experience. Hence, spatial awareness is facilitated by temporal mechanisms which control and facilitate perception. Gell (1992) puts this situation as follows: '[T]ime arises as an inescapable feature of the perceptual process itself, which enters into the perception of anything whatsoever.' In short, not only is there an inevitable correlation between invariant aspects of sensory-motor experience and time, but temporal experience appears to arise, in part (perhaps large part), so that the spatio-sensory world around us can be perceived in the first place.

This thesis may provide a way of accounting for the observations, deriving from both linguistic and behavioural data, that time and space are correlated on the one hand, and representations for time and space are structured asymmetrically on the other. As has often been noted, on balance, time tends to be more often structured in terms of space than vice versa (e.g., Boroditsky 2000; Casasanto and Boroditsky 2008; Lakoff and Johnson 1980, 1999). If temporal mechanisms facilitate event perception and are central to the structure of an event, then it stands to reason that temporal reflexes of sensory-motor experience are likely to be activated by representations of space when we talk and reason. Moreover, given that temporal processing facilitates sensory-motor perception, in the guise of perceiving events, then conscious temporal awareness is a consequence, perhaps an epiphenomenal one, of spatial perception. Put another way, our conscious awareness of time, and the various transience types associated with it, is a subjective response to the perception of spatial substrate upon which our evolutionary success depends. In slightly different terms, this is consonant with the insight of Grady (1997b), who presented arguments for distinguishing between target concepts and source concepts in the 'superschematic' structures that are foundational for the human conceptual system; these he termed primary metaphors.

Above the neurological level, at the level of representation in the conceptual system, time in general, and temporal reference in particular, is asymmetrically structured, in part, in terms of spatial representations, as adduced by Clark, Lakoff and Johnson and others, and as supported by the behavioural findings, notably, of Boroditsky (e.g., 2000), and Casasanto (e.g., Casasanto and Boroditsky 2008). My best guess, then, is that the reason for the asymmetry is a consequence of our ability to consciously experience and represent what may only, in fact, amount to an epiphenomenal experience. I suspect that time, our awareness of its different transient qualities, and our ability to quantify it, evolved in order to subserve and so facilitate event perception. This amounts to our ability to perceive the external sensory environment, essential

for our survival and prosperity. Time is a response to our experience of space. It is asymmetrically represented in terms of space precisely because we use time to perceive space in the first place and to coordinate sensory-motor experience and interactions with our environment more generally. And as time is not the object of perception, but the manner in which it is facilitated, our representational systems re-utilise the perceptually correlated sensory-motor reflexes for purposes of re-presentation of time in the conceptual system. While our experience of time and space are distinct and distinguishable at the neurological level, at the representational level they appear to be largely asymmetrically organised.

The asymmetric organisation of space and time in humans appears, at least in terms of assessments of magnitude, to be distinct from monkeys, on the basis of initial findings – and further work is clearly required. And a key difference between us and macaques is our symbolic prowess. Human infants, at birth, have the potential to represent temporal ideas in language and also in gesture and in the creation of material artefacts such as calendars and time-reckoning devices. There is no evidence that other primates have this ability to anything like the extent evident in humans. But temporal experience is qualitatively very different from sensory-motor experience. It is a response to the invariant topographic features of our perceptual array. It is, in all likelihood, less well connected to the representational centres of the conceptual system (see Jackendoff 1992; Evans 2004a; and the MTL hypothesis offers a similar perspective). Indeed, evidence from the recent embodied views of knowledge representation hold that abstract concepts appear to be, in part at least, constructed from sensory-motor knowledge (see Barsalou 1999; Barsalou and Wiemar-Hastings 2004 for specific proposals; and Barsalou 2008 for a review of this general perspective). In short, the representation of temporal ideas may require, or be facilitated by, structuring in terms of the spatial information which is correlated with temporal experience types in the formation of an event.

Hence, temporal reference and representations of temporal magnitude may be supported by spatial knowledge due to a privileging of the spatial representational format, rather than due to the relative ontological status of the two domains qua experience types. While time and space are equally foundational to perception, time appears to require a representational format that tends to involve the asymmetric support of space, particularly in the realm of temporal reference. Because of this, representations for space and time are asymmetrically organised such that time is activated automatically by space, but not vice versa. This gives rise to downstream consequences in terms of the conceptual organisation of time, as manifested most notably in language, but also as evident in certain types of behavioural tasks, as evidenced in the work of Boroditsky, and Casasanto.

3 Reference strategies in space and time

We saw above that it has been argued that there is plausibly a common magnitude system – Walsh's ATOM – which has been claimed to underpin (at least some of the) coordinated assessments of quantity in space and time. This would be consistent with the conceptual alternativity in evidence in language. Analogously, we would expect there to be domain-general reference strategies that underpin the FoRs in both domains, while expecting the relations involved to be wholly different – due to time exhibiting distinct reference properties from space, notably with respect to transience, as argued in earlier chapters. In this section I first examine domain-general properties before contrasting FoRs across the two domains.

3.1 Domain-general reference strategies

In Chapter 3 I argued that the three t-FoRs exhibit distinct reference strategies. The deictic t-FoR exhibits an egocentric reference strategy; the sequential t-FoR exhibits an allocentric reference strategy that is event-based; while the extrinsic t-FoR exhibits an allocentric reference strategy that is field-based. The distinction between the three reference strategies is as follows. The egocentric strategy makes use of the relationship between the ego and another event, in order to fix the event in time; in contrast, the allocentric strategy is not ego-based but other-based: it makes use of a relation between two or more events, independent of the ego – as in the case of the sequential t-FoR; or it makes use of a relation between an event and a temporal field, in order to fix the event in time, as in the extrinsic t-FoR.

In terms of reference strategies, there has been far more extensive research conducted in the domain of space than in the domain of time. Perhaps the most influential approach to s-FoRs is that of Levinson (e.g., 2003). As we saw earlier in the book, in his account of spatial reference, Levinson identifies three s-FoRs, which he dubs relative, intrinsic and absolute. Others, while in broad agreement with Levinson's approach, have made slightly different distinctions. Most notably, both Talmy (2000) and Fortescue (2011) – but see also Tenbrink (2011) – distinguish a 'landmark' type of s-FoR from a field-based s-FoR. For Levinson, a landmark s-FoR is a special case of the absolute s-FoR, which also encompasses field-based s-FoRs. The details of the arguments, and the distinctions need not concern us here, and relate to the findings from particular languages – Fortescue finds that a landmark s-FoR is crucial in order to account successfully for s-FoRs in the languages of the North Pacific Rim, for instance.

Notwithstanding the above, what is common to the various extant classifications is the following. They converge, in broad terms, upon proposing similar

Table 7.2 *Reference strategies underpinning FoRs in the domains of space and time*

Domain: Space	Reference strategy	Domain: Time
Relative s-FoR	Egocentric	Deictic t-FoR
Intrinsic s-FoR	Allocentric	Sequential t-FoR
Field/landmark s-FoR	Allocentric	Extrinsic t-FoR

reference strategies to those that I have uncovered in my study of t-FoRs, as adduced in the preceding chapters. For instance, regardless of nomenclature, all researchers who have investigated s-FoRs agree that there is something akin to what Levinson refers to as a relative s-FoR, a FoR that takes the egocentric human experience as a reference point for fixing spatial reference. Such an s-FoR appears to adopt an egocentric reference strategy. All the extant taxonomies also concur that there is an s-FoR akin to what Levinson terms an intrinsic s-FoR. This fixes spatial reference in terms of intrinsic spatial relations holding between a reference object (RO) – the locatum – and a figure (F), the entity being fixed in space. That is, in the domain of space, such a strategy is, in principle, independent of the location of the human observer. The reference strategy that underpins this s-FoR is allocentric. And finally, both landmark and field-based s-FoRs, which Levinson treats as belonging to an absolute s-FoR, involve a reference strategy that deploys invariant features of the spatial environment in order to locate the F. As such, this reference strategy can also be considered to be allocentric. Table 7.2 summarises the reference strategies that arguably underpin the range of FoRs found across both space and time.

In classic work on the nature of memory and way-finding, the neuroscientists John O'Keefe and Lynn Nadel (1978) have argued for a hard-wired distinction between egocentric and allocentric reference strategies. In order to illustrate the distinction between egocentric and allocentric mapping abilities, O'Keefe and Nadel provide an analogy which I briefly discuss here.

The analogy relates to the geographic distinction between routes versus maps. In geographic terms, a route constitutes a set of instructions which directs attention to particular objects in egocentric space. That is, routes are inflexible, identifying landmarks in order to guide the traveller, and thus do not allow the traveller freedom of choice. Moreover, routes are goal-oriented, focused on facilitating travel from a specific, pre-specified location to another. In this, routes correspond to egocentric cognitive representations.

In contrast, maps are, in geographic terms, representations of part of space. A map is constituted of places, and the places which the map represents are systematically connected and thus related to each other. Moreover, and crucially, the places captured by the map are not defined in terms of the objects

that may occupy a particular location. Thus, maps capture space that is held to exist independently of the objects that may be located at particular points in space, and independent of the human experiencer. Crucially, therefore, a map is a flexible representation, which can be used for a range of purposes. In related fashion, this notion of a map is presented as an analogy of the allocentric cognitive mapping ability that humans possess.

Map-like representations of the environment are constructed by humans, as well as by other species. Moreover, it is by now well established that humans do possess complex information structures that can be used to generate highly detailed map-like representations, used for a range of behaviours (see papers and references in Evans and Chilton 2010). Indeed, an important finding to have emerged is that place memory has a high information capacity, and it can be permanently modified by a single experience. Moreover, experiments reported on by O'Keefe and Nadel reveal that this mapping ability can be used to construct maps in a highly flexible and efficient manner.

It is also worth noting that the ability to represent space in an allocentric fashion (i.e., in map-like representations) is a trait common to a wide variety of organisms. As O'Keefe and Nadel observe, 'The ability of many animals to find their way back to their nests over large distances would appear to be based on some type of mapping system' (1978: 63). Obvious examples include the migratory and homing behaviour exhibited by many kinds of birds. Indeed, a robust finding from studies on homing pigeons is that they are able to find their way 'home' using novel routes from new release sites. Such abilities would appear to require a cognitive mapping ability.

The hard-wired allocentric mapping ability identified by O'Keefe and Nadel is, they argued, located in the hippocampus. Cognitive maps can be formed based on intrinsic relations between locations and between invariant features of the environment. These different ways of constructing cognitive maps may relate to the formation of FoRs in the domain of space – Levinson's intrinsic and absolute s-FoRs. Similarly, egocentric 'route-based' abilities appear to be related to somatosensory areas of the perisylvian cortex (Bottini *et al.* 2001).

While the work of O'Keefe and Nadel in understanding the cognitive basis of the mapping ability has focused on the domain of space, I suggest that similar strategies plausibly underlie the FoRs in the domain of time. After all, broadly similar underlying reference strategies appear to be in evidence in the t-FoRs uncovered in previous chapters.

3.2 Domain-specific strategies

While time and space appear to have broad reference strategies in common which are hard-wired, at the level of human phenomenological experience they

constitute quite different types of substrate. As such, the FoRs exhibited by the two domains exhibit a number of *domain-specific properties*. Space is a three-dimensional field that allows motion in any direction. As noted in Chapter 3, it is isotropic: it exhibits symmetry in all directions. In contrast, time arises from our perceptual processing of change: the perception of events, regardless of whether their provenance is internal or external in origin. As such, while space is experienced as relating to external reality, time arises, I have argued in this chapter, from the perception process itself. As Gell (1992) has put it, and as intimated earlier:

> [P]erception is intrinsically time-perception, and conversely, time-perception, or internal time-consciousness, is just perception itself … That is to say, time is not something we encounter as a feature of contingent reality, as if it lay outside us, waiting to be perceived along with tables and chairs and the rest of the perceptible contents of the universe.

An important consequence of this is that our experience of time is fundamentally asymmetric in nature. In contrast to space, time as a function of human experience is anisotropic: time exhibits a directionality. As I have argued, the property of time which is relevant for t-FoRs is transience, of which I have identified three different types. And transience is not a property exhibited by space.

There are a number of consequences, in terms of reference systems, that arise from this fundamental difference in the domains of time and space. One concerns the issue of secondary points of reference. In s-FoRs, it is common for a secondary reference point (or reference object) to be invoked. For instance, in a spatial scene evoked by the following linguistic example:

(8) The boulder is to the left of the tree

there is an F, *the boulder*, occupying subject position. This is the entity that we seek to locate. This is achieved with respect to the *primary reference point* (PRP), the tree. However, as a tree does not possess inherent asymmetry, on the face of it there is still no means of establishing an angle emanating from the tree to facilitate location of F. This is resolved by superimposing (or projecting) the asymmetric coordinates deriving from a human observer onto the tree, the *secondary reference point* (SRP). This is made evident by the use of the term *left*, which relates to body-based (i.e., egocentric), rather than tree-based (other-based) asymmetry. By superimposing the human lateral (left–right) asymmetry onto the tree we can determine which region around the tree we should search in order to locate the boulder.

But time is quite different from space. Time possesses an inherent asymmetry. And by virtue of this, there is a progression regardless of the events involved. As such, events in time, unlike entities in space, always exhibit an intrinsic asymmetry, guaranteed by the very nature of time, or rather, by human

phenomenological experience, from which our representation(s) for time, including temporal reference, ultimately arise.

The 'analogue' of the relative s-FoR in the domain of time is, I suggest, the sequential t-FoR. It is an analogue only in so far as both FoRs make use of a single underlying reference strategy: allocentric reference, relating not to invariant aspects of a field as in absolute/extrinsic FoRs, but to intrinsic properties of the relevant substrate, objects in the domain of space and events in the domain of time. To be sure, the sequential t-FoR, like the relative s-FoR – which the example in (8) is an instance of – does make use of an SRP, what I have referred to as the origo (O). But the O in a sequential t-FoR is coincident with the RP; indeed, the distinction between the two relates to a spatial coordinate (provided by the RP) versus a temporal coordinate (provided by the O). In contrast, in a relative s-FoR, the PRP (the analogue of RP in a t-FoR) and SRP (the analogue of O in a t-FoR) relate to distinct entities: they are not coincident.

A further difference between temporal and spatial FoRs concerns their respective functions. The three types of spatial frames of reference in Levinson's (2003) taxonomy provide a similar function: the location of an F with respect to a PRP (and if necessary with the aid of an SRP). It is for this reason, presumably, that a given language may conventionalise just one s-FoR, as has been well documented in the case of the Australian Aboriginal language Guguu Yimithirr, which eschews intrinsic and relative s-FoRs (Haviland 1993; see Levinson 2003). In contrast, the temporal relations arising from t-FoRs are of distinct types, as is clear from the discussion in the preceding chapters. The relations that arise come from different transience types and relate to a future/past relation, an earlier/later relation, and a matrix relation. These represent quite diverse types of temporal relations. Accordingly, the question that arises is whether the languages of the world can dispense with particular t-FoRs, as is the case with spatial reference. This is an issue that requires detailed empirical investigation – and in this regard, I discuss claims made for the Amazonian language, Amondawa, in Chapter 11. Recent research has claimed that Amondawa doesn't feature the temporal matrix relation ('time as such'), which, if correct, would mean that there is no extrinsic t-FoR encoded linguistically for that language.

Another difference between the reference systems arising from the two domains may relate to the relative primacy of reference strategies across the two domains. While Indo-European languages such as English and Dutch, for instance, conventionalise versions of all three s-FoRs identified by Levinson (2003), there are well-documented cases where a language makes use of just one s-FoR. For instance, Guguu Yimithirr makes use of just an absolute s-FoR in order to locate objects in space (Haviland 1993; Levinson 2003). The utility of an absolute reference strategy in the domain of space is that it makes use of invariant features of a spatial field in order to fix spatial locations and the

entities which occupy them. Moreover, by virtue of utilising the invariant features of an external environment, it is not subject to the vagaries of perspective point in locating a particular F.

In contrast, the extrinsic t-FoR, which also makes use of an invariant feature of the world, extrinsic periodicities, requires the development of sophisticated symbolic artefacts including material anchors that serve a time-measurement function. This requires, presumably, the development of temporal representation as an intellectual achievement (see Chapter 3), in order to give rise to time as an ontological category conceptualised independently of the perceptual process and the subjective flow of events. In other words, while space, as a stable and 'absolute' frame of reference, may be pre-given, existing independently of the perceiving individual, which gives rise to *affordances* (in the sense of Gibson 1979),[3] the temporal matrix as an absolute manifold for temporal reference arises, in part at least, as a cultural and intellectual achievement.

This leads to a prediction in terms of an implicational scale associated with the encoding in language of s-FoR systems, on the one hand, and t-FoR systems, on the other. In the domain of space, order of priority might relate to absolute, intrinsic and then relative reference strategies. As all three reference strategies accomplish essentially the same thing – location of a figure – the absolute s-FoR as a strategy has a clear advantage over the others. It provides certainty and arises naturally from moving around and interacting with the environment. It may be that for this reason absolute reference in the domain of space can function alone as an s-FoR in language, without recourse to other spatial reference systems, as is evident in Guguu Yimithirr.

Logically, while an absolute reference strategy for space could function alone, the next most important strategy is plausibly an intrinsic s-FoR. Such a system in the domain of space has an advantage over an egocentric reference strategy as it deploys inherent asymmetries associated with RPs and other features of the environment (as in guide-post type systems, see Talmy 2000). In contrast, an egocentric reference strategy in the domain of space, the relative s-FoR, invokes a motile RP, the human experiencer, who must project body-based axial coordinates onto the primary RP. Moreover, there are logically a range of ways in which projection can work, involving mirror-image (reflectional) versus in tandem (translational) alignments[4] (as manifested by English versus Tongan – see Bender *et al.* 2005, 2010).

[3] I take as established, following decades of research on spatial perception, that our experience of the external environment is constructed by the interaction between our sensory systems and the brain (see Evans 2010a for a review). In this sense, perception is not so much the 'discovery' of a pre-given external environment, but rather the construction of reality 'for us', a function of our embodied neuro-anatomical structures, which have adapted to the ecological niche we inhabit.

[4] For discussion of mirror-image versus in-tandem alignments in the domain of space see Tyler and Evans (2003). For discussion of these alignments in the domain of time see Evans (2004a). For properties of s-FoRs that adopt these alignments see Levinson (2003).

An egocentric reference strategy in the domain of space is arguably less reliable than the two types of allocentric reference strategies precisely because there are a greater number of variables. As a relative s-FoR requires a motile experiencer, the coordinate system is inherently unstable, dependent upon the changing location of the experiencer. Moreover, the nature of the projections can vary between reflectional and translational alignments. Hence, speakers must conventionalise a particular projection type, as evidenced by patterns evident in English versus Hausa (see Hill 1978).

However, even conventionalisation does not necessarily resolve matters. In certain circumstances, for instance, involving motion of the experiencer, in conjunction with more than one RO, which may also be in motion, Hausa speakers appear to behave much like English speakers in terms of deploying reflectional alignment.

In view of this, my prediction is that there is a plausible implicational scale in language, such that an allocentric reference strategy manifested, in slightly different ways by the absolute s-FoR and the intrinsic s-FoR, implicates a relative s-FoR. This predicts that relative reference could not exist as the sole spatial reference strategy in a language, as this is less directly tied to the spatial substrate. It requires reference to a motile, and hence a potentially unreliable RO in the otherwise relatively stable 3D environment. In contrast, the prediction is that absolute reference or intrinsic reference can exist as the sole reference strategy

Implicational scale for s-FoR systems

(9) Absolute (allocentric: field relation)/Intrinsic (allocentric: intrinsic relation) > Relative (egocentric)

In the light of all this, an intriguing research question concerns whether this implicational scale is borne out in the languages of the world. The prediction is that while a language could exhibit solely an allocentric strategy, either absolute or intrinsic reference, it could not exhibit egocentric reference without also featuring an allocentric s-FoR. This prediction is attested by a relatively small set of languages thus far: English, Dutch, Guguu Yimithirr (Levinson 2003) German and Tongan (Bender *et al.* 2005, Bender *et al.* 2010), Mopan (Danziger 1996) and the North Pacific Rim languages (Fortescue 2011). English, for instance, features both allocentric and egocentric reference strategies, while both Guguu Yimithirr and Mopan each feature just allocentric reference – an absolute s-FoR in the case of Guguu Yimithirr, and an intrinsic s-FoR in the case of Mopan. I know of no language thus far studied that exhibits solely an egocentric reference strategy in the domain of space. However, this obviously remains an empirical question, requiring sampling of a far wider range of languages.

In contrast, I hypothesise that the priority in t-FoRs is likely to be somewhat different. As our awareness of time ultimately arises from internal perceptual processing, my prediction is that an egocentric reference strategy, the deictic t-FoR, is the fundamental mode of fixing events in time, tied as it is to the metronomic perceptual moment, arising from perception itself. This will be followed, I hypothesise, by an allocentric reference strategy – the sequential t-FoR. This arises from the inherent asymmetry arising from our subjective experience of time – our awareness of the earlier/later relationship arising from the sequential nature of temporal events. We would only expect to see a full-blown extrinsic t-FoR in language and cultures that have achieved a level of temporal representation as intellectual achievement, 'time as such' in the parlance of Sinha *et al.* (2011). This situates the priority of temporal reference somewhat differently, and, perhaps notably, in the reverse order to spatial reference.

Implicational scale for t-FoR systems

(10) Deictic (egocentric) > Sequential (allocentric: event-based) > Extrinsic (allocentric: field-based)

Of course, the prediction inherent in the implicational scale in (10) comes with an important caveat: the empirical research needs to be done. Future research needs to establish exactly how other languages and cultures facilitate temporal reference.

4. The role of space in facilitating temporal reference

One of the major findings to have emerged in contemporary work in cognitive science, and further confirmed in this book, is that space appears to be central to the representation of time in human cognition. The further finding of the foregoing chapters is that the linguistic (and non-linguistic) representation of temporal reference appears also to be, at least in part, supported in terms of space. In terms of language, argument-structure lexical concepts are deployed that appear, on the face of it, to be analogues of conventional argument-structure lexical concepts deployed to encode motion in space and spatial scenes of various sorts. In terms of gestures and diagrammatic representations, we have seen that body-centred gestures – on the sagittal and lateral axes – and non-body-centred gestures – making use of absolute space – are deployed to signal relative and intrinsic temporal reference. Representations are used in planar (2D) pictorial space to represent extrinsic dating and calendar systems (yearly wall planners being a paradigm example). The next part of the book addresses in detail meaning construction in t-FoR expressions, examining the role of space in facilitating temporal reference. Consequently,

this section bridges the concerns of Part II and Part III of the book by briefly considering how space asymmetrically supports the representation of time.

While it remains something of an open question as to why time is asymmetrically structured, at least in part, in terms of space – and I have provided my best guess earlier in the chapter, we have a much better answer as to how this structuring occurs. This account is provided by Conceptual Metaphor Theory (Lakoff and Johnson 1980, 1999), and in particular a relatively recent version of the theory involving primary metaphors discussed briefly earlier (Grady 1997a, 1997b, 2005; Lakoff and Johnson 1999).

Primary metaphors constitute an association between two phenomenologically real and relatively simple experience types that share similarity of scalarity (which is to say structure) *and* arise in correlated fashion. Primary metaphors are claimed to be units of conceptual structure that establish a cognitive link between two such experience types, allowing one, the 'target', to deploy the 'source' for purposes of reasoning. Moreover, primary metaphors are held to be acquired inevitably and unconsciously, due to interaction with the world, to be universal, and to emerge prior to the onset of language. Hence, they can be considered to be foundational to the emergence of a fully functional conceptual system.

Grady argues that primary metaphors emerge in what he refers to as *primary scenes*. A primary scene is a basic experience type which consists of two relatively simple experiences being correlated. The hallmark of a primary scene is that one of the experiences relates to perceptuo-motor experience, while the experience correlated with it is a subjective response. For instance, when a line 'grows' across a computer screen, as in the experiments reported by Casasanto and Boroditsky (2008), there is a tight and recurring correlation between a perceptuo-motor experience – an increased spatial extent – and a subjective response to that experience – an increased duration. Moreover, both experience types – the perceptuo-motor experience and the subjective response – exhibit similarity of scalarity – they both constitute an increase and hence relate to magnitude. Hence, the reason for there being an asymmetry between space and time is precisely that evaluations relating to time are responses – they arise as a consequence of processing the perceptuo-motor experience of which they are subjective evaluations. On the basis of Grady's proposals, we can analyse DURATION IS LENGTH as constituting a primary metaphor.[5] The primary source concept, which has what we might refer to as *perceptuo-motor content*, is LENGTH, and the primary target concept, which involves at least partial activation of structure from the primary source concept, is DURATION, which has what Grady terms *response content*.

[5] It is worth noting that DURATION IS LENGTH was not proposed as a primary metaphor in Grady's original proposals. However, it appears to fit the criteria for being such.

In proposals that take account of and are consonant with the primary metaphor approach, Kevin Moore (e.g., 2006, 2011) has developed a contemporary conceptual metaphor account of time–space mappings. As noted earlier, Moore argues that conceptual metaphors for time emerge in what he refers to as grounding scenarios. For instance, the conceptual metaphor TIME IS MOTION OF OBJECTS (ALONG A PATH), which is held to motivate linguistic examples such as *Christmas is fast approaching*, is hypothesised to involve a grounding scenario in which an object in motion is undergoing motion towards a stationary reference point. Moore argues that in such a grounding scenario, both time and space are implicated, precisely because motion of an entity from location A to location B involves progression, the hallmark of temporal experience, and traversal over a static field, the hallmark of spatial experience. Hence, a grounding scenario naturally provides the various elements and entailments associated with the conceptual metaphor.

Since the original proposals relating to conceptual metaphors by Lakoff and Johnson (1980), psychologists have begun investigating their psychological reality through often ingenious behavioural experiments, some involving language and some not (e.g., Boroditsky 2000; Casasanto and Boroditsky 2008; Gentner *et al.* 2002; McGlone and Harding 1998, Núñez *et al.* 2006). These studies have all demonstrated that the space-to-time conceptual metaphors proposed by Lakoff and Johnson and their students appear to have psychological reality. Moreover, some of the experiments, as we have seen, explicitly investigated the asymmetry issue, a prediction also made by Lakoff and Johnson primarily on the basis of linguistic evidence. It is important to note that asymmetry in terms of conceptual metaphors, as operationalised within the theory by distinguishing between a target concept (or domain) and a source concept (or domain), is held to be a general feature of human cognition. That is, conceptual metaphors, which are held, in part, to structure the human conceptual system, involve perceptuo-motor experience types structuring more subjective experience types. It is hence worth noting that there is now experimental evidence for such an asymmetry in domains other than time. Asymmetry has been demonstrated between perceptuo-motor content and concepts including good and bad (Casasanto 2009b; Casasanto and Dijkstra 2010; Meier and Robinson 2004), number (Dehaene *et al.* 1993), emotional attachment (Williams and Bargh 2008), power (Schubert 2005), and similarity (Casasanto 2009a). In short, the conceptual asymmetry predicted by Lakoff and Johnson on the basis of language is not restricted to the domain of time.

Given the evidence for the psychological reality of (at least some of) the space-to-time conceptual metaphors that have been posited, the following does seem likely: conceptual metaphors are likely to provide the motivation for the deployment of spatial representations in facilitating the representation of temporal reference. For instance, the putative primary conceptual metaphor

NOW IS HERE may provide the motivation for the use of gestures along the sagittal axis for signalling relative temporal reference, as is clear in languages as diverse as English and Aymara (Núñez and Sweetser 2006). The difference in where on the sagittal axis future and past are metaphorically located is plausibly a consequence not of the primary metaphor, but of cultural priorities and conventions which involve more than just conceptual metaphors. This suggests that conceptual metaphors are just one factor in the recruitment of space for representing temporal reference.

In terms of language, conceptual metaphors provide, I suggest, a motivating factor for the extension of argument-structure lexical concepts from the domains of space and motion to temporal reference.[6] For instance, lexical concepts that capture the sequential t-FoR are extended from transitive motion argument-structure lexical concepts. A motivating factor is likely to be the existence of the antecedent TEMPORAL SEQUENCE IS SPATIAL POSITION (ON A LINEAR PATH) conceptual metaphor (see Moore 2006).

That said, language is a semiotic system independent of the conceptual system.[7] One consequence of this is that conceptual metaphors which inhere in the conceptual system, while playing a role in motivating the extension of argument-structure lexical concepts from spatial to temporal reference, do not directly determine the way lexical concepts are organised within the linguistic system. As the lexical concepts which populate a language's inventory represent a language-specific system independent of conceptual structure, patterns emerge which are not strictly predictable on the basis of conceptual metaphors. For instance, consider the following example adapted from one first discussed in Chapter 4:

(11) Christmas has disappeared over the horizon

While this is not a fully conventionalised means of expressing the distant pastness of Christmas, it is a somewhat acceptable expression that would be understood by the vast majority of native speakers of English. Yet, it is, on the face of it, at odds with the Moving Time conceptual metaphor (i.e., TIME IS MOTION OF OBJECTS (ALONG A PATH), see Grady 1997a; Lakoff 1993), which presumably has a role in motivating TE PP deictic t-FoR lexical concepts, of which the [DISTANT OCCURRENCE] lexical concept, exemplified by (11), is an exemplar.

The Moving Time metaphor holds that past events are located on the posterior portion of the sagittal axis. Yet, the typical reading associated with the sentence in (11) is that the past event of Christmas is in front of the perceiving entity, as it must be if it is to metaphorically 'disappear' over the horizon. Such a situation is predicted by the lexical concept posited, but is inconsistent

[6] See also Goldberg (1995) for a related argument.
[7] See Evans 2009b for discussion of, and arguments for, this perspective.

with the conceptual metaphor. What I conclude from an example such as this is that the specific types and ranges of lexical concepts that exist have developed subject to pressures arising from the linguistic system, which is sensitive to embodied experience. The general strategy of deploying spatial content in order to represent temporal reference in language, and indeed, other semiotic systems, emanates, however, from outside the linguistic system, and in part comes from the existence of conceptual metaphors.

Conceptual metaphors are not the whole story, however. I argued, in Chapter 4, when discussing 'missing' lexical concepts that take an RP PP in the deictic t-FoR, that this is a function of constraints on the way inferential structure relating to the encoding of spatial scenes can be inherited by argument-structure lexical concepts when encoding temporal scenes. This situation arises due to constraints in the perception process itself: an F is located with respect to an RP, and it is the F which has greater attentional prominence. This precludes some RP PP deictic t-FoR variants, variants that do exist with a TE PP. In other words, when recruiting from space to express temporal reference, language is sensitive not just to conceptual metaphors, both primary and complex, but also to other non-linguistic factors such as attention, figure/ground segregation and how this is encoded in spatial scenes.

And finally, I briefly introduced in Chapter 1 the notion of semantic affordances. Language facilitates the building of meaning, in part, by providing linguistically relevant information – what I have dubbed linguistic content in Chapter 2 – as well as by interfacing with non-linguistic knowledge – conceptual content in LCCM Theory terms. As words provide access to rich bodies of non-linguistic knowledge, linguistic expressions can facilitate rich simulations arising from conceptual knowledge.[8] One consequence of this is that specific words facilitate semantic affordances. These are simulations conventionally associated with specific open-class words. Semantic affordances combine with a given sentence-level lexical concept in order to provide a rich meaning: a conception. Conceptions in the domain of temporal reference are far richer than what we would expect if we assumed a direct relationship between conceptual metaphors for time and lexical concepts signalling temporal reference. This is the issue to which I now turn in Part III.

5 Summary

In this chapter I have considered the relationship between the domains of time and space, and compared and contrasted reference strategies across the two

[8] For empirical evidence for the role of language in giving rise to non-linguistic simulations, see Glenberg and Kaschak (2002); Kaschak and Glenberg (2000); for reviews see Taylor and Zwaan (2009); Vigliocco *et al.* (2009); and Barsalou *et al.* (2008).

domains. I argued that, in certain respects, time and space are homologous – they exhibit similar tendencies in that both domains are prothetic and can hence be quantified. A linguistic reflex of this was the phenomenon of conceptual alternativity. In other respects, the two domains are not homologues. For instance, they manifest quite different structuring, time being anisotropic, while space is isotropic. I also examined similarities and differences in terms of reference strategies. Both time and space provide reference systems that exhibit domain-general properties: both domains deploy egocentric and allocentric strategies for locating/fixing locations/events within their domain-specific substrates. In both domains, a FoR makes reference to the human experiencer: the hallmark of an egocentric reference strategy. An allocentric strategy involves a relation between entities in space and events in the case of time. However, there are also significant differences. Not least, while an allocentric reference strategy can function in language in the domain of space, in the absence of other reference strategies, the deictic t-FoR, which adopts an egocentric reference strategy, is plausibly the primary t-FoR in the domain of time. In more general terms, this chapter has sought to address the motivation for deploying structure derived from space to support the representation of time. In particular, I considered the way in which space appears to asymmetrically structure temporal representations. I suggested that this arises from the automatic activation of temporal experience by spatial experience, and the likelihood that spatial experience, being a phenomenological response to processing spatial information during the perceptual process, may be less well connected to the representational systems in the brain. The representation of time, making use, asymmetrically, of space, is likely to be facilitated, in part, by conceptual metaphors. However, this is unlikely to be the whole story, as I argue in detail in the next chapter.

Part III

Meaning construction and temporal reference

This final part of the book, consisting of four chapters, is concerned with exploring how language users interpret linguistically mediated expressions for temporal reference. This involves examining the range of knowledge types involved, including the contribution of conceptual metaphors. It is also concerned with examining further the nature of the relationship between space and time. Chapter 8 considers the distinctive role in figurative meaning construction played by conceptual metaphors on the one hand, and lexical concepts on the other. I argue that conceptual metaphors on their own are insufficient to facilitate an account of figurative meaning construction in the domain of time. Chapter 9 then develops the LCCM Theory account of figurative meaning construction, while in Chapter 10 this model is applied to expressions encoding temporal reference. A specific goal of Chapter 10 is to identify the respective contributions of lexical concepts and conceptual metaphors in the interpretation of temporal reference utterances in language. And finally, the book concludes with a chapter which examines factors that may serve to create commonality and diversity in the cross-cultural semantics of time. Hence, this final chapter examines implications for future cross-linguistic and cross-cultural work on temporal reference.

8 Conceptual metaphors and lexical concepts

Consider the following utterance:

(1) Christmas is approaching

The most typical conception for this presumably includes three specific inferences:

i. The utterance relates to a temporal scenario, rather than a spatial scenario involving veridical motion.
ii. The temporal event of Christmas is located in the future with respect to the hearer's understanding of the present, which is implicit, although not explicitly mentioned in the utterance.
iii. The future event of Christmas is interpreted as being relatively imminent with respect to the present.

How then do we account for the conception that these inferences contribute to? In this part of the book, I address precisely this question. In so doing, I develop an account of what I refer to as *figurative meaning construction*. The prevailing view, especially in cognitive linguistics, is that an utterance such as (1) is straightforwardly accounted for by the presumed existence of a conceptual metaphor in which time is structured by knowledge relating to the motion of objects through space. But, as I have begun to suggest, conceptual metaphors are likely to be only part of the story. In addition to conceptual knowledge, which includes structures such as conceptual metaphors, language itself constitutes a semiotic system which provides a type of semantic representation which is distinct from that apparent in the conceptual system. That is, each individual language consists of a vast inventory of language-specific lexical concepts (Evans 2009b). These include, I suggest, t-FoR lexical concepts. And as I shall argue in later chapters, these must also form part of the story in accounting for the conception that arises on the basis of the example in (1).

Moreover, there must, presumably, be various compositional mechanisms that facilitate the integration of lexical concepts – the expression in (1) includes a t-FoR lexical concept, as well as the lexical concepts associated with the specific vehicles *Christmas*, *is* and *approaching*. There must also, presumably,

be compositional processes that facilitate the integration of the non-linguistic (i.e., conceptual) knowledge as prompted by the linguistic utterance. Indeed, the version of access semantics (LCCM Theory) that I have been presenting in this book makes specific proposals in this regard.

In this part of the book I provide an account of the distinct knowledge types involved and the complex ways in which these are combined in producing the conception arising from (1). I begin, in this chapter, by providing arguments for thinking that there is a level of purely linguistic representation – the lexical concept – which (i) is independent from conceptual metaphors, and (ii) plays a role in contributing to meaning construction (in temporal reference).

The chapter is structured as follows. I begin by charting some key developments in the study of conceptual metaphor. I then argue, in the subsequent section, that Conceptual Metaphor Theory initially attempted to provide an all-encompassing account of linguistic metaphor. However, because a large body of linguistic data simply couldn't be accounted for in a straightforward way under the aegis of Conceptual Metaphor Theory, more recently one prominent conceptual metaphor scholar (Grady 1999) has acknowledged that conceptual metaphor may be a knowledge type that is distinct from other types that are also responsible for producing linguistic metaphor(s). Building on this and the work of Zinken (e.g., 2007), I adduce in detail the notion of *discourse metaphor* and contrast it with the theoretical construct of the conceptual metaphor. I then argue that discourse metaphors are in fact lexical concepts, and hence a knowledge type that populates the linguistic system. I then provide evidence, based on lexical semantic analysis and from semantic change, that there is a clear dissociation between lexical concepts and conceptual metaphors. There is, I conclude, a specifically linguistic level of knowledge representation that appears to have a central role in figurative meaning construction.

1 An overview of Conceptual Metaphor Theory

In the earliest work in the Conceptual Metaphor Theory tradition, especially Lakoff and Johnson (1980), Lakoff and Turner (1989) and Lakoff (1993), there was a tendency to claim, or at least suggest, that *linguistic metaphors* – specific instances of metaphoric expressions in situated language use – were primarily a consequence of conceptual metaphors. A conceptual metaphor, in this early work, was conceived as a series of asymmetric mappings, stored in long-term semantic memory, uniting structure from a more concrete source domain to a more abstract target domain, as in TIME IS MOTION OF OBJECTS (ALONG A PATH). Evidence for the existence of conceptual metaphor, until relatively recently, came primarily from language. The following examples, it is claimed, provide evidence for the existence of such a conceptual metaphor:

Table 8.1 *Mappings for* TIME IS MOTION OF OBJECTS (ALONG A PATH)

Source domain: SPACE	Mappings	Target domain: TIME
OBJECTS	→	TIMES
THE MOTION OF OBJECTS PAST THE OBSERVER	→	THE 'PASSAGE' OF TIME
PROXIMITY OF OBJECT TO THE OBSERVER	→	TEMPORAL 'PROXIMITY' OF THE EVENT
THE LOCATION OF THE OBSERVER	→	THE PRESENT
THE SPACE IN FRONT OF THE OBSERVER	→	THE FUTURE
THE SPACE BEHIND THE OBSERVER	→	THE PAST

(2) a. Christmas is *approaching*.
b. The time for action *has arrived.*
c. The concert *is getting close.*
d. The summer just *zoomed by*.
e. Christmas *dragged by* this year.
f. The end-of-summer sales *have passed*.

According to Lakoff and Johnson, the expressions in (2) are all motivated by an entrenched pattern in our mind: a conceptual metaphor. The conceptual metaphor, TIME IS MOTION OF OBJECTS (ALONG A PATH), is made up of a fixed set of well-established mappings (see Table 8.1). The mappings are fixed in the sense that there is a set number of them. They are well established in the sense that they are stored in our long-term memory.

What these mappings do is this: they structure ideas belonging to the more abstract domain of time in terms of concepts belonging to the more concrete domain of space. As illustrated by examples such as these, we employ the language of motion to refer to the passage of time. The regions of space in front of, co-located with and behind the observer correspond to future, present and past. In addition, we understand motion to relate to time's *passage*, as is clear by the use of *approaching* in the first sentence. The relative proximity of the entity, as in the expression *getting close*, relates to how *close* in time the event's occurrence is. And the rapidity of the motion relates to the nature of the durational elapse. For instance, an event that *zooms by* is understood in terms of a short duration, while one that *drags* has a long durational elapse.

This conceptual metaphor, sometimes referred to in the literature as the Moving Time metaphor, can be represented diagrammatically as in Figure 8.1.[1]

[1] Recent research has shown that the Moving Time metaphor in fact divides into two distinct metaphors with different reference points (see Moore 2006). Behavioural evidence for such a distinction is provided by Rafael Núñez and colleagues (Núñez, Motz and Teuscher 2006).

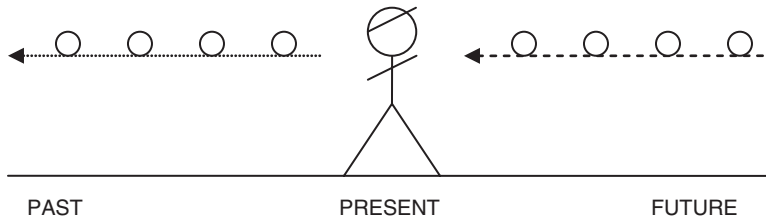

Figure 8.1 The Moving Time metaphor

In this figure events are represented by small circles. Motion is represented by the arrows. Events move from the future towards the Ego (represented diagrammatically by the stick-person in Figure 8.1) and then behind into the past.

Since its advent, Conceptual Metaphor Theory has often been presented as a perspective that supplants what I will refer to as the *received view of metaphor*. The received view treats metaphor as primarily a literary/linguistic device, in which comparisons highlight pre-existing, albeit potentially obscure, similarities between a target or tenor and a vehicle or base. This position, in which metaphor is conceived as a linguistic means for capturing perceived similarities, has a long and venerable tradition, going back in the Western scholarly tradition to Aristotle's *Poetics*. Moreover, the received view often associates metaphor with a specific form: the 'X is a Y', or predicate nominative construction, as in (3):

(3) Dew is a veil

In an example such as (3), the received view holds that properties and relations associated with dew covering grass and a veil covering a woman's face are compared. In early work on linguistic metaphor in the psycholinguistic tradition, the conceptual process assumed to underlie metaphors such as this was that of *feature mapping*. In this process, properties belonging to different entities were compared and judged to be overlapping (e.g., Ortony 1979; Tversky 1977). Moreover, there is some empirical support for this view. For instance, the degree of similarity between tenor and vehicle concepts has been demonstrated to correlate with the aptness and interpretability of linguistic metaphors (Johnson and Malgady 1979; Malgady and Johnson 1976; Marschark *et al.* 1983) as well as with the processing time required to understand a linguistic metaphor (Gentner and Wolff 1997).

However, Lakoff (1993) and his various collaborators, including Mark Johnson (Lakoff and Johnson 1980) and Mark Turner (Lakoff and Turner 1989), argued vociferously against explanations for linguistic metaphor based on similarity. After all, when we conceptualise time in terms of space, there is nothing objectively similar about the two. Moreover, if two things are similar then, in principle,

the tenor and vehicle should be equally adept at being deployed to understand the other. That is, we would expect to find a symmetric or bidirectional process, along the lines advocated by Black, for instance, in his interactional theory of metaphor (e.g., 1979). However, as Lakoff and Johnson, and Lakoff and Turner showed, and as is apparent from the discussion in the previous part of the book, expressions relating to target domains and source domains are not asymmetric in this sense. For instance, in the well-studied conceptual metaphor LOVE IS A JOURNEY, while we can describe two newly-weds as having started on their journey and be understood to be referring to the commencement of their married life together, we cannot refer to two people starting out on a car journey as having just got married and be understood to be referring to the car journey itself.

In point of fact, central to the conceptual metaphor account, as observed in the previous chapter, is the claim that conceptual metaphors are asymmetric, as reflected by the directionality of the arrows in Table 8.1, directed from the source domain to the target domain. And crucially, according to Lakoff, Johnson and Turner, what motivates the emergence of a conceptual metaphor, rather than being similarity, is the nature of embodied experience: conceptual metaphors are held to arise from tight and recurring correlations in experience. For instance, the conceptual metaphor KNOWING IS SEEING is held to be motivated by a direct grounding in experience. When we see that something is the case, *ipso facto* we know that something is the case: knowing and seeing just do correlate, in a recurring and unavoidable way, in human experience.

2 Correlation versus resemblance

While many linguistic metaphors do indeed appear to be the result of conceptual metaphors in the sense discussed in the previous section, there is a large set of figurative language expressions that don't appear to relate to a system of mappings in this way. Moreover, such linguistic metaphors appear not to exhibit a direct grounding in experience either, in contrast to primary metaphors. A case in point concerns poetic metaphor. To make this clear, consider the following translation of the poem 'Free Union' by the French surrealist poet André Breton, considered by Lakoff and Turner (1989):

> My wife whose hair is brush fire
> Whose thoughts are summer lightning
> Whose waist is an hourglass
> Whose waist is the waist of an otter caught in the teeth of a tiger
> Whose mouth is a bright cockade with the fragrance of a star of the first magnitude
> Whose teeth leave prints like the tracks of mice over snow
> Whose tongue is made out of amber and polished glass
> Whose tongue is like a stabbed wafer

There are a range of linguistic metaphors evident in this poem, in which one entity, the poet's wife, is being understood in terms of an attribute or facet of another. For example, the poet asks us to think of his wife's waist in terms of an hourglass.

In their 1989 book *More Than Cool Reason*, George Lakoff and Mark Turner provided an attempt to apply the core insights of Conceptual Metaphor Theory to poetic metaphor. Yet Lakoff and Turner were, in effect, forced to concede that a significant proportion of poetic metaphor, as exemplified by the poem above, cannot be accommodated in a straightforward way. After all, by denying a role for comparison or similarity, and claiming that linguistic metaphors are motivated by asymmetric conceptual mappings deriving from embodied experience, how are metaphors of the sort exhibited in the poem above to be accounted for?

The solution was something of a fudge. Lakoff and Turner conceded that linguistic metaphors of the sort apparent in 'Free Union' were not grounded in experiential correlation. In fact, they called metaphors of this sort *image metaphors*: an image metaphor involves understanding one entity in terms of aspects of the perceptual experience associated with another. Yet they also attempted to retain parts of the Conceptual Metaphor Theory account. They did this by claiming that image metaphors still involved conceptual mapping. However, the nature of the mapping process was a 'one-shot' mapping, involving structuring the target concept asymmetrically in terms of a single source concept. One difficulty, however, for such an account is that it cannot exclude a bidirectional relationship between target and source. After all, in Conceptual Metaphor Theory as classically formulated, the asymmetry that holds between target domain and source domain is a consequence of an apparent distinction between abstractness, as in LOVE, and concreteness as in JOURNEY. But in what sense is a female waist any more or less abstract (or concrete) than an hourglass? The poet might as well have described the splendour of an hourglass, and borrowed attributes of his wife in order to describe the hourglass.

A further problem is that, in later versions of Conceptual Metaphor Theory, with the advent of the construct of primary metaphor, which also involves a 'one-shot' mapping, there is a clear experiential basis, a correlation that motivates the conceptual metaphor. Yet poetic metaphor of the type apparent in 'Free Union', while in some ways akin to primary metaphor (involving a single mapping between two concepts from distinct domains), is not plausibly motivated by recurring and ubiquitous correlations in experience. This begs the question as to how to account, in a principled way, for the apparent disjunction between image metaphors on one hand, and primary metaphors on the other, while attempting to retain a conceptual metaphor account. In short, Lakoff and his collaborators attempted to retain a one-size-fits-all perspective for the entire gamut of metaphoric phenomena.

In addition to so-called image metaphors, there is an additional class of linguistic metaphors that pose potential difficulties for the conceptual metaphor account. These include, for instance, those linguistic metaphors that are associated with the predicate nominative form, which have traditionally been studied in the literary and philosophy of language traditions. Examples include the following:

(4) a. Juliet is the sun
b. Achilles is a lion
c. Sam is a wolf
d. My lawyer is a shark
e. My job is a jail
f. My boss is a pussycat

One of the clear difficulties with examples of this type for Conceptual Metaphor Theory is maintaining that linguistic examples of this sort have an experiential basis. Sometimes they may plausibly have, as in the following:

(5) Sally is a block of ice

Grady (1999), for instance, suggests that an example such as this may be motivated, in part at least, by the conceptual metaphor INTIMACY IS WARMTH. This primary conceptual metaphor is presumably grounded in the experiential correlation that holds between intimacy and proximity and hence warmth in human experience.

However, it is less clear how other sorts of examples that share this form might be motivated by experiential correlation. To make this point clear, consider the example in (4f). A linguistic example such as this is normally interpreted to mean that the 'boss' in question is friendly, docile, and perhaps easily manipulated. For this example to have an experiential basis, in the sense of Conceptual Metaphor Theory, the boss would have to be consistently seen with a cat. It is a recurring and inevitable co-occurrence – a correlation – which, recall, provides a conceptual metaphor – held to motivate a linguistic metaphor – with its experiential basis. However, one can deploy the expression in (4f) to refer to 'my boss' without having ever experienced a correlation between 'my boss' and a 'pussycat'.

With characteristic insight, Joseph Grady, a former student of George Lakoff, and the pioneering force behind the notion of primary metaphor, recognised that conceptual metaphor could not be maintained as providing an account for all types of linguistic metaphor (Grady 1999). In point of fact, he observed that the linguistic metaphors of the sort captured in (4) appear not to have the same basis as primary metaphors and conceptual metaphors that seem to invoke primary metaphors, namely compound metaphors such as LOVE IS A JOURNEY. To account for this observation, he invoked a distinction between what he referred

to as metaphors based on *correlation*, and those which are based on what he termed *resemblance*.

For Grady, linguistic metaphors such as those exemplified in (4) are resemblance-based: they invoke a level of functional resemblance. For instance, with respect to the example in (4f), a property associated with pussycats, their docility, is attributed to a particular individual labelled 'my boss'. Moreover, image metaphors might then be seen as also involving resemblance, the resemblance in question being perceptual rather than functional.

In sum, Grady effectively concedes that a (presumably large) subset of linguistic metaphors are, in fact, not motivated by conceptual metaphors: namely, those that are grounded in experience and hence correlational in nature. This conclusion is important in at least two ways. First, it affirms that the original claim that conceptual metaphor is the underlying motivation for all linguistic metaphors may not, in fact, hold. There may well be a class of linguistic metaphors that are motivated, in some sense, by comparison. And second, far from undermining Conceptual Metaphor Theory as a theory, it demonstrates the following. Conceptual Metaphor Theory successfully identified a type of linguistic metaphor that had not been previously studied in a systematic way. Metaphors of this kind, as evident, for example, in (2) above, plausibly have an experiential basis, and are primarily conceptual in nature.

3 The distinction between conceptual and discourse metaphors

In this section I outline some of the key differences between conceptual metaphor and resemblance, or, as I shall prefer, *discourse metaphor*. It is often argued in the literature that conceptual metaphors are automatically activated during language use. For instance, Lakoff and Turner (1989) claim that the appearance of highly conventional linguistic metaphors actually belies the reality: the more conventional something appears in language, the more entrenched it is in the conceptual system. In short, when linguistic metaphors appear so hackneyed and conventional that they no longer pass for metaphors at all, as in everyday expressions such as *long* as in *a long time*, in fact and on the contrary, this merely demonstrates that the conceptual metaphor, for instance, DURATION IS LENGTH, is alive and well. As we saw in the previous chapter, psycholinguistic and psychophysical behavioural evidence has begun to accrue which provides some highly suggestive empirical support for this view.

But now let's consider discourse metaphors. As we have already seen, there is a varied class of linguistic metaphors, including so-called 'image' metaphors, those associated with the predicate nominate 'X is a Y' form, as well as lexical blends like *frankenfood* (Zinken 2007), which appear not to be grounded in experience in the way claimed by Conceptual Metaphor Theory.

These 'resemblance' metaphors I dub discourse metaphors, a term I borrow from the work of Jörg Zinken (e.g., Zinken 2007; see Evans in press).[2] I do so as the key property associated with metaphors of this kind is that they appear to be contingent upon language use. They arise in order to facilitate communicative intentions, and, consequently can evolve over time, either becoming highly entrenched lexical 'metaphors' – established linguistic units consisting of a vehicle and a lexical concept conventionally paired with it – or dropping out of use altogether. Hence, unlike conceptual metaphors, discourse metaphors appear not to be independent of language; they arise in the context of language use. And, unlike conceptual metaphors, they need not be stable, but rather may evolve, as mediated by the ways and contexts in which they are deployed.

To take one example, consider the already introduced lexical metaphor: *frankenfood*. This term was first used in the mid 1990s, particularly in Europe, and was propagated by non-governmental organisations such as Friends of the Earth in response to the perceived dangers of foodstuffs that made use of genetically modified (GM) crops. As the perceived threat of GM foods diminished due to European food suppliers, supermarket chains and so forth boycotting GM foods, due to adverse public reaction and press coverage, the term became less frequent in public discourse (Zinken 2007). Zinken argues that discourse metaphors arise to fulfil a specific communicative function. And when that function is no longer required, the discourse metaphor may disappear from use.

However, discourse metaphors do not necessarily disappear from use. They can become lexicalised and so reanalysed as having a different semantic function from the one that they originally arose to signal. A clear example of this is the metaphoric use of the word *tart*. This was originally applied, in the nineteenth century, to describe a well-dressed or attractive girl or woman, and took the form of a positive evaluation. However, its narrowed application to a specific subset of attractive and even gaudily dressed women, namely prostitutes, led to its developing a negative evaluative function. This semantic process has continued, such that the term *tart* can now be applied widely to express a negative assessment of fidelity in a range of different semantic fields. For instance, an attested recent example in the British national press is the use of the expression *credit card tart*, referring to a consumer who serially switches from different credit card companies in order to gain the best interest rate, introductory interest-free offer and so on, on their credit card. This example demonstrates that one consequence of use of discourse metaphors is that they can take on more abstract semantic functions than those they were originally employed to express, and can fluctuate between what Carston (e.g., 2010) describes in terms of semantic narrowing and broadening. That is, discourse metaphors when first

[2] I use the term 'discourse metaphor' in a somewhat more inclusive way than the somewhat stricter definition employed by Zinken.

deployed are somewhat novel. As they become better established they appear to take on a more generic meaning, which corresponds to them becoming more entrenched. Glucksberg and Keysar (1990) and Glucksberg (2001) have argued, based on this observation, that what I am referring to as discourse metaphors in fact behave like lexicalised categories: a tart is a paradigm example of a particular category, a person whose fidelity is unreliable in any sphere.

In recent work, Bowdle and Gentner (2005) have put forward a hypothesis, the Career of Metaphor Hypothesis, that captures the observed trajectory for what I am referring to as discourse metaphors. They propose that discourse metaphors exhibit a cline in terms of conventionality, following an evolutionary 'career' reflecting their usage. When a new discourse metaphor first emerges it is highly novel. Bowdle and Gentner propose, following Gentner's Structure Mapping hypothesis (Gentner 1983; Gentner *et al.* 2001), that discourse metaphors are motivated by establishing an analogical relationship between one idea and another. In other words, discourse metaphors facilitate projection of a system of relations from one domain onto another domain, regardless of whether the source and target domains are intrinsically similar. The Career of Metaphor hypothesis contends that, over time, the inferences associated with analogical mapping become entrenched, such that the discourse metaphor becomes lexicalised. One consequence of this is that, at the conceptual level, the structure-mapping operation closes down (in contrast with conceptual metaphors, for instance, which remain active in the conceptual system). Another is that the lexicalised discourse metaphor takes on more abstract properties, serving as a reference point for a particular category of things.

To illustrate, take the word *roadblock* considered by Bowdle and Gentner. They make the following observation: 'There was presumably a time when this word referred only to a barricade set up in the road. With repeated use as the base term of metaphors such as *Fear is a roadblock to success*, however, *roadblock* has also come to refer to any obstacle to meeting a goal' (2005: 198).

There is empirical support for the Career of Metaphor Hypothesis. A robust finding in metaphor comprehension studies is that conventional metaphors are understood more quickly than novel metaphors (e.g., Blank 1988; Coulson 2008; Giora 2008). This is only to be expected if (something like) the Career of Metaphor Hypothesis is correct. After all, once discourse metaphors have become lexicalised, they become entrenched as part of the linguistic system. This should lead to faster retrieval.

In sum, I suggest that there are good reasons for distinguishing between two quite distinct 'types' of metaphor. Conceptual metaphors are mappings that inhere in the conceptual, rather than the linguistic system. They are relatively stable in long-term semantic memory and are invariably activated whether due to linguistic or non-linguistic processing. In contrast, discourse metaphors arise in language use, in order to facilitate a linguistically mediated communicative intention. They are facilitated, initially, due to generalised analogical

processing at the conceptual level. However, the inferences that arise from this process become lexicalised as part of the lexical concept associated with the discourse metaphor form, and become 'detached' from the conceptual system. This process of reanalysis results in a discourse metaphor that is more schematic and abstract in nature, one that can refer to abstract properties found in the original motivating communicative context, but which applies to a wider range of contexts. Hence, discourse metaphors evolve from novel analogies to lexicalised units which embody an abstract category.

4 Dissociation between lexical concepts and conceptual metaphors

One of the assumptions that conceptual metaphor researchers often appear to make is that conceptual metaphors directly motivate patterns in language usage. In this section, I examine and nuance this position. While conceptual metaphors are clearly important in language processing, as empirically verified by a range of behavioural studies (e.g., Boroditsky 2000; Gentner *et al.* 2002; McGlone and Harding 1998), conceptual metaphors are not the whole story. Indeed, as I argue below, it is difficult to maintain that conceptual metaphors are solely responsible for figurative language. More specifically, in this section I show that conceptual metaphors do not motivate figurative language directly. Rather, while they have a constraining influence on linguistic expressions, language represents a semiotic system that, in principle, is distinct from the conceptual system: the venue for conceptual metaphors. The linguistic system is subject to language-internal pressures that give rise to semantic units – lexical concepts, of which discourse metaphors are one type – and which are, in principle, independent from conceptual metaphors. While conceptual metaphors may have, in part, a constraining influence on the nature of lexical concepts, nevertheless, lexical concepts operate independently of conceptual metaphors. Hence, usage patterns in language are not strictly predictable on the basis of conceptual metaphors.

4.1 Evidence for a dissociation between conceptual metaphors and lexical concepts

There are good grounds for thinking that conceptual metaphors, while part of the story, actually underdetermine the linguistic metaphors that show up in language use. For instance, consider the conceptual metaphor TIME IS MOTION OF OBJECTS (aka the Moving Time mapping). It has been claimed in the conceptual metaphor literature that this conceptual metaphor motivates examples of which the following are indicative:

(6) a. The time for action has arrived
b. The time to start thinking about irreversible environmental decay is here [Lakoff and Johnson 1999: 143]

(7) a. Time flies when you're having fun
b. Time drags when you have nothing to do

(8) a. The young woman's time [=labour/childbirth] approached
b. His time [=death] had come
c. Arsenal saved face with an Ian Wright leveller five minutes from time [BNC]

(9) a. [T]ime, of itself, and from its own nature, flows equably without relation to anything external [Sir Isaac Newton]
b. Time flows on forever

As I first observed in previous work (Evans 2004a), in these sets of examples, all involving the vehicle *time*, a different reading is obtained. In (6), a discrete temporal point or moment is designated, without reference to its duration. In (6a) the moment designated relates to the point at which a particular agent should act. In (6b) the designated moment concerns the point at which environmental issues should be considered. The examples in (7) provide a reading relating to what might be described as 'magnitude of duration'. For instance, (7a) relates to the phenomenologically real experience whereby time proceeds 'more quickly' than usual – the duration, while objectively constant, as measured, for instance, against a clock, 'feels' as if it is less than it actually is. This constitutes the phenomenon of temporal compression (Flaherty 1999) discussed briefly earlier in the book (Chapter 3). The example in (7b) relates to the experience of time proceeding 'more slowly' than usual – the duration 'feels' as if it is more than it actually is. This relates, recall, to the phenomenon of protracted duration. In (8), the readings relating to *time* concern an event. In (8a) the event relates to the onset of childbirth while in (8b) the event designated relates to death. The event in (8c) concerns a referee blowing a whistle signalling the end of a game of soccer. In the sentences in (9) *time* prompts for an entity which is infinite as in (9a), and hence eternal as in (9b). Thus, in (9) the reading relates to an entity which is unbounded in nature.

The different readings associated with *time* in these examples suggest the following possibility – rather than these examples all being directly motivated by a single underlying conceptual metaphor, as proposed in Conceptual Metaphor Theory, they may be due to distinct lexical concepts, which facilitate access to distinct cognitive model profiles in the conceptual system. After all, while the examples in (6) relate to a discrete 'temporal moment', the examples in (7) relate to the notion of 'magnitude of duration'. On the face of it, these two notions are quite distinct. Similarly, particular events, such as the onset of childbirth, and death, are understood relative to particular frames of experience, such as an entire pregnancy, or the human life span, rather than other aspects of temporal experience – including experience types such as a temporal moment, or duration. Finally, the examples in (9) relate to an unbounded entity, or infinite elapse. Hence, the entity designated, what I referred to as the temporal

matrix in Chapter 6, is all-encompassing, constituting the entity within which experience unfolds. Hence, the vehicle *time*, in the examples in (6) to (9) inclusive, on the face of it, may in fact relate to four distinct lexical concepts, rather than a single underlying conceptual metaphor. The putative lexical concepts might be glossed as below, reproducing examples from above:

[MOMENT]

(6) a. The time for action has arrived
b. The time to start thinking about irreversible environmental decay is here [Lakoff and Johnson 1999: 143]

[DURATION]

(7) a. Time flies when you're having fun [TEMPORAL COMPRESSION]
b. Time drags when you have nothing to do [PROTRACTED DURATION]

[EVENT]

(8) a. The young woman's time [=labour/childbirth] approached
b. His time [=death] had come
c. Arsenal saved face with an Ian Wright leveller five minutes from time [BNC]

[MATRIX]

(9) a. [T]ime, of itself, and from its own nature, flows equably without relation to anything external [Newton]
b. Time flows on forever

Of course, as we've seen, for an open-class lexical concept, such as the proposed lexical concepts associated with *time*, to be substantiated, we require further evidence. This takes the form of an identification procedure, introduced in Chapter 2, for determining the likely existence of distinct lexical concepts. The identification procedure assumes that a lexical concept will exhibit selectional tendencies, made up of two types of information. The first kind relates to the vehicle types that can encode the lexical concept. This is termed the lexical concept's formal selectional tendencies. The second type concerns the semantic arguments that make up the argument-structure lexical concept: its semantic selectional tendencies. I consider the second of these – semantic arguments associated with putative lexical concepts for *time* – first.

To do so, consider first of all the hypothesised [MOMENT] lexical concept for time, together with the [EVENT] lexical concept. In semantic terms, these lexical concepts appear to be related. After all, the [MOMENT] lexical concept appears to prompt for an event, albeit of a restricted kind, namely the occurrence of a temporal moment. This relatedness is reflected in the selectional tendencies for semantic arguments exhibited by these lexical concepts. Both lexical concepts appear to select for verbal complements that relate to deictic or terminal motion. Other kinds of motion events produce anomalous readings in conjunction with these lexical concepts:

(10) #The time for action has flown/spun/turned around/flowed
(cf. The time for action has come/arrived/reached us, etc.)

Just as the [MOMENT] and [EVENT] lexical concepts appear to have a specific semantic selectional tendency, the [MATRIX] lexical concept appears to select a somewhat different range of lexical concepts with which it can co-occur. For instance, it cannot co-occur with semantic arguments relating to deictic or terminal motion, but selects for lexical concepts relating to ongoing or uninterrupted motion, as illustrated below:

(11) #Time is flowing towards us ['temporal matrix' reading]
(cf. Time flows on (forever))

While the example in (11) is not uninterpretable, and we could indeed construct a plausible reading for it, it is not a conventional nor readily understandable way of describing the ongoing and infinite nature of this temporal matrix conception.

Equally, the two variants of the [DURATION] lexical concept select for specific types of semantic arguments to co-occur with them. The [PROTRACTED DURATION] lexical concept selects for lexical concepts that prompt for lack of motion, as in (12a), or slow motion, as in (12b):

(12) a. Time stood still ['protracted duration' reading]
b. How the time drags! ['protracted duration' reading]

However, if the motion event prompted for relates to rapid motion then the sentence becomes semantically anomalous, as illustrated below:

(13) #Time raced by ['protracted duration' reading]
(cf. Time stood still)

Notice, however, that the example in (13) becomes readily interpretable if a 'temporal compression' reading is assumed. This follows as the [TEMPORAL COMPRESSION] lexical concept, a variant of the more generic [DURATION] lexical concept, selects for other lexical concepts that prompt for rapid motion, as in (14a), stealthy motion, as in (14b), or barely perceptible motion (14c):

(14) a. Hasn't the time sped by! ['temporal compression' reading]
b. It felt as if the time had slipped by ['temporal compression' reading]
c. Where has all the time gone? ['temporal compression' reading]

Moreover, motion events which relate to slow motion or stationariness produce a semantically anomalous reading when combined with the [TEMPORAL COMPRESSION] lexical concept:

Table 8.2 *Semantic selectional tendencies for lexical concepts associated with* time

Temporal lexical concept	Motion event selected for	Example vehicles selected
[(MAGNITUDE OF) DURATION]		
i) [PROTRACTED DURATION]	Slow motion	*drag, move slowly, etc.*
	Stationariness	*stand still, stop, freeze, etc.*
ii) [TEMPORAL COMPRESSION]	Rapid/imperceptible motion	*move fast, fly, whizz, zoom, disappear, vanish, has gone, etc.*
[MATRIX]	Non-terminal motion	*flow, move on, go on, etc.*
[MOMENT]	Deictic/terminal motion	*come, arrive, approach, get closer, move up on, etc.*
[EVENT]	Deictic/terminal motion	*come, arrive, approach, get closer, move up on, etc.*

(15) #The time seemed to stand still ['temporal compression' reading]
(cf. The time seemed to go by in a flash)

Altogether, these findings illustrate semantic selectional tendencies that pattern in ways consistent with the hypothesised lexical concepts for the vehicle *time*. These semantic selectional tendencies are summarised in Table 8.2.

Having demonstrated that the lexical concepts in question appear to exhibit distinct semantic selectional tendencies, I now turn to the second part of the identification procedure. This posits that distinct lexical concepts are likely to exhibit selectional tendencies relating to the vehicle types that can encode them: the lexical concept's formal selectional tendencies. Taken together, the two types of selectional tendencies provide converging evidence for positing distinct lexical concepts in the linguistic system.

There is a bifurcation in the grammatical behaviour of *time* in (6) to (9). For instance, while the instances of *time* in (7) and (9) are mass nouns, the uses of *time* in (6) and (8) correspond to that of count nouns.[3] Accordingly, the lexical concepts associated with *time* in (7) and (9) are sufficiently distinct from those in (6) and (8) to receive a divergent syntactic characterisation. In other words, the lexical concepts associated with (7) and (9), on the one hand, and (6) and (8), on the other, have distinct formal selectional tendencies.

However, the fact that the instances of *time* in (7) and (9) are both mass nouns doesn't entail that they encode the same lexical concept. Similarly, the fact that the instances of *time* in (6) and (8) are count nouns does not entail that these encode an identical lexical concept.

[3] Quirk *et al.* (1985: 246) demonstrate that count versus mass nouns in English exhibit divergent grammatical behaviour. While count nouns can be pre-modified by both the definite and indefinite articles, and can be inflected with the plural marker, mass nouns can only be pre-modified by the definite article and cannot be pluralised (see Evans 2004a: Ch. 6 for discussion).

To illustrate, I'll first consider the hypothesised [DURATION] lexical concept encoded by *time* in (7) and the [MATRIX] lexical concept in (9). Although these are both formally mass nouns – for example, they cannot be determined by the indefinite article – there is other grammatical evidence that they are distinct. For instance, the [MATRIX] lexical concept also appears unable to undergo determination by the definite article, as evidenced by the ungrammaticality of the following:

(16) *The time flows on forever

This contrasts with the [DURATION] lexical concept and its two variants which can be determined in this way:

(17) a. Last night at the fair, the time seemed to fly by [TEMPORAL COMPRESSION]
b. Last night while waiting in the doctor's surgery, the time just seemed to drag [PROTRACTED DURATION]

What is particularly interesting about the examples in (17) is that they provide specific reference, and the use of the definite article appears to play an important role in this. One reason why the [MATRIX] lexical concept may not select for the definite article is that the notion it facilitates access to is already specific: there is only a single unique temporal matrix, which is conceived as constituting the event which subsumes all others. For this reason, the selection of the definite article would redundantly serve to individuate an entity that is already individuated by virtue of being unique.

Let's now consider the way in which the lexical concepts associated with *time* in (6) and (8) are formally distinct. While the [MOMENT] lexical concept in (6) appears to undergo determination and can facilitate specific and non-specific reference (e.g., *The time has come for action* vs *A time will come when we'll have to act*), the [EVENT] lexical concept exemplified in (8) is unusual in that, while it can be pre-modified by an attributive possessive pronoun, or a genitive NP with possessive enclitic *–'s*, as in (18a–b), it cannot undergo determination by the definite or indefinite articles, as is clear from (18c–d):

(18) a. His time [=death], as they say, had come
b. The young woman's time had come
c. The goal was scored 3 minutes before/from *(a/the) time
d. The bar-tender rang the bell to signal/call *(a/the) time

Moreover, unlike the [MOMENT] lexical concept, which has specific or non-specific reference, the [EVENT] lexical concept appears to always have specific reference, as reflected in its formal selectional tendencies. This provides a line of evidence which distinguishes the two lexical concepts, given the similarity of the semantic selectional tendencies.

Overall, this discussion of the semantic and formal selectional tendencies for the four lexical concepts evidenced in examples (6) to (9) demonstrates the following. There are distinct and reliable differences in terms of the formal and semantic patterning of the vehicle *time*. The distinction in selectional tendencies relates to distinctions in the readings associated with uses of *time*. Moreover, this patterning is not accounted for by assuming that the usage of *time* in these ways is solely and directly motivated by an underlying conceptual metaphor: the Moving Time mapping.

This provides compelling evidence, I contend, for a level of organisation, in my terms at the level of lexical concepts, which is different from conceptual metaphors. As argued in Parts I and II, I contend that lexical concepts inhere in the linguistic rather than the conceptual system. This is not to say, of course, that lexical concepts are not cognitive knowledge units. Rather, they are schematic representations that, rather than constituting rich perceptual simulations, can contribute to the formation of simulations in order to provide a conception.

4.2 Language change

In the Conceptual Metaphor Theory literature it has sometimes been claimed (e.g., Heine *et al.* 1991; Lakoff and Johnson 1999; Sweetser 1988, 1990) that conceptual metaphors directly motivate language change. In this section, I briefly address this issue. As in the previous section, I conclude that while conceptual metaphors may have a role in constraining the directionality of language change, the linguistic facts are better accounted for by assuming that language change is effected at the linguistic level, operating at, and on, lexical concepts, driven by usage. I consider, first of all, the type of grammatical change known as *grammaticalisation*. I then briefly examine semantic change leading to the rise of polysemy.

Grammaticalisation is the phenomenon whereby a linguistic expression undergoes form–function reanalysis, such that a lexical item undergoes a shift from the open-class system to the closed-class system. Grammaticalisation can also apply to linguistic units that have already undergone grammaticalisation, resulting in more grammaticalised units. In order to be able to demonstrate that grammaticalisation is motivated by conceptual metaphor, evidence is required of a shift in an expression's function from a more concrete to a more abstract domain. An example would be a shift from SPACE to TIME, as motivated by one (or more) of the space-to-time conceptual metaphors that have been posited in the literature (e.g., Lakoff and Johnson 1999; Moore 2006).

However, as conceptual metaphors involve two domains, a source and a target, then a Conceptual Metaphor Theory account of grammaticalisation predicts that form–function reanalysis holds at the level of domains. We would

expect, if conceptual metaphors directly motivate language change, to see grammaticalised linguistic units that exhibit either a meaning relating to a concrete domain or a meaning that corresponds to the more abstract target domain. In other words, the prediction is that conceptual metaphors motivate language change such that there is a discrete shift from one domain to another. That being so, examples that fall somewhere between source and target domains might be seen as counter-evidence for the metaphorical extension account.

For example, it has been claimed that the conceptual metaphor TIME IS MOTION OF OBJECTS (ALONG A PATH) has led to the grammaticalisation of the *be going to* construction. At one point in the history of the language this construction had only an ALLATIVE (motion) function. The conceptual metaphor extension account holds that the concrete ALLATIVE meaning has evolved a more abstract and hence more grammaticalised FUTURE meaning (Heine *et al.* 1991; Sweetser 1988). These meanings are illustrated below:

(19) a. John is going to town [ALLATIVE]
b. It is going to rain [FUTURE]

However, the *be going to* construction also exhibits senses that are intermediate between those exhibited in (19). To illustrate, consider the following:

(20) a. I'm going to eat
b. John is going to do his best to make Mary happy

While the example of *be going to* in (19a) has an ALLATIVE meaning and *be going to* in (19b) reflects a purely FUTURE meaning, the example, in (20a) corresponds to an INTENTION meaning. It is also possible to view this sense as having a 'relic' of the spatial (ALLATIVE) meaning, as the speaker must actually move to an appropriate location in order to facilitate the act of eating. This contrasts with (20b) which encodes INTENTION and PREDICTION, but no spatial (ALLATIVE) sense is apparent. Examples like (20a) and (20b) are potentially problematic for a conceptual metaphor account because they illustrate that grammaticalisation involves a continuum of meanings rather than a clear-cut semantic shift from one domain (SPACE) to another (TIME).

If grammaticalisation is not directly motivated by conceptual metaphors, what then gives rise to the semantic shifts apparent? An increasing number of scholars propose that language use provides the motivating context for language change (e.g., Evans and Wilkins 2000; Traugott and Dasher 2004). The nuances in meaning apparent in examples such as (20) are better accounted for by assuming that contextualised inferences (what Traugott and Dasher refer to as *invited inferences*) that emerge in specific contexts of use, where two or more meanings are apparent (what N. Evans and Wilkins refer to as *bridging contexts*), give rise to form–function reanalysis: a form comes to be associated with a new meaning. Through recurrence of such invited inference in similar

bridging contexts, the implicature is reanalysed as constituting a new lexical concept. In other words, the implicature becomes detached from the context of use and stored as a new lexical concept in semantic memory. This account, which views language in use – rather than conceptual metaphor as the engine of change – better accords with the observable facts.

Now let's turn to the issue of semantic change itself. Semantic change results in a new sense unit coming to be associated with a lexical form: a vehicle. This results in the phenomenon known as *polysemy*: where a single form is conventionally associated with two or more related sense-units. In classic work on the preposition *over*, Lakoff (1987) reserved a central role for conceptual metaphor in the rise of polysemy. However, more recently, Tyler and Evans (2001a, 2003) have argued that the semantic networks associated with word forms, *over* being a paradigm example, are better accounted for in terms of sense extension motivated by a usage-based explanation, described above, giving rise to new lexical concepts. That is, semantic change, and the emergence of polysemy, is a consequence of changes in the linguistic system, rather than being directly motivated by the top-down explanation provided by Conceptual Metaphor Theory: the view that conceptual metaphors direct semantic change.

By way of illustration, consider the following examples, which are representative of what Tyler and I described as an [ABOVE] lexical concept and a [COVERING] lexical concept respectively for the vehicle *over*:

(21) a. The lamp is over the table
b. The clouds are over the sun

In the first example in (21), the reading that arises involves a spatio-geometric configuration such that the lamp is higher than and located in a region that at least partially overlaps with the vertical axis of the table. In contrast, in the example in (21b) no such spatio-geometric relationship holds. In fact, at least from our earth-bound perspective, the clouds are in fact lower than the sun. The reading conventionally associated with (21b) concerns a covering relationship: the sun is covered and hence occluded from view by the clouds. In other words, the reading arising – the interpretation relating to 'above' versus 'covering' – appears to be, at least in part, a function of the word *over*, which in these examples appears to have two distinct meaning units conventionally associated with it.

In terms of a diachronic relationship, the [ABOVE] lexical concept precedes the [COVERING] lexical concept. Moreover, the [ABOVE] lexical concept appears to be among the earliest, if not the earliest, lexical concept associated with *over* in the history of the language (Tyler and Evans 2003). Given that semantic change is a motivated process, it stands to reason that the covering lexical concept emerged from the [ABOVE] lexical concept – or a lexical concept that itself ultimately derived from the [ABOVE] lexical concept.

In our work, Tyler and I argued that the most plausible motivation for the emergence of the [COVERING] lexical concept was derived from usage contexts in which an [ABOVE] meaning implied a covering interpretation. That is, we proposed that semantic change resulting in the emergence of polysemy involves a bridging context. To illustrate, consider the following example:

(22) The tablecloth is over the table

This sentence describes a spatial scene involving one entity, the entity which is located 'above', that is larger than the landmark entity, the entity below. A consequence of the larger tablecloth being located higher than the table is that the tablecloth thereby covers and so occludes the table from view. In other words, covering is a situated inference: it emerges in this particular context, as a function of the spatio-geometric relation holding between the table and the tablecloth. Tyler and I argued that it is contexts such as these, and the use of *over* in such contexts, that leads to this situated implicature becoming detached from the context of use and reanalysed as a lexical concept in its own right. Following pioneering work on semantic change by Elizabeth Closs-Traugott (e.g., Traugott 1989), we referred to this process of detachment and reanalysis as *pragmatic strengthening*. In essence, the rampant polysemy exhibited by words is primarily a function of changes to the linguistic system, resulting in the emergence of new lexical concepts, driven by usage, rather than by conceptual metaphors.

5 Summary

This chapter has set the scene for a detailed account of figurative meaning construction within the LCCM Theory framework. Such an account is essential if we are to ascertain how t-FoRs are interpreted in language use. Key to this is to ascertain the role, if any, of t-FoR lexical concepts in figurative meaning construction. The received view, especially within cognitive linguistics, is that conceptual metaphors for time are central to figurative language understanding. This chapter has examined that perspective in some detail. While conceptual metaphors presumably have an important role to play, the evidence suggests that there is a level of linguistic knowledge representation – what I refer to as lexical concepts, in the sense defined in Parts I and II – that is dissociated from conceptual metaphors. I argue in the next two chapters that lexical concepts are essential for figurative meaning construction. Moreover, it is knowledge representation at this level, I have begun to suggest, that drives figurative language use. I began this chapter by providing an overview of the central ideas in Conceptual Metaphor Theory. I then argued that conceptual metaphor accounts for but one subset, albeit an important one, of figurative language. I further

posited the existence of a type of figurative language phenomenon – discourse metaphor – that is distinct from conceptual metaphor. This type of metaphor is, in essence, a lexical concept: a conventional semantic unit that is associated with a specific vehicle, and which is mediated by language use. Finally, I provided detailed evidence for a dissociation between lexical concepts and conceptual metaphors. I concluded by arguing that conceptual metaphors do not directly motivate figurative language. However, I will argue in later chapters that they have an important role to play in the construction of meaning in the context of t-FoR lexical concepts.

9 Figurative meaning construction in LCCM Theory

Having argued in the previous chapter for a principled distinction between non-linguistic knowledge (conceptual metaphors) and linguistic knowledge (lexical concepts), this chapter is concerned with theory construction. Here I develop the LCCM Theory account of figurative meaning construction. I do so in order to be able to provide an analysis of how meaning construction arises in temporal reference argument-structure constructions. Hence, in this chapter I address the factors that give rise to figurative language and pinpoint differences in the linguistic mechanisms involved in figurative versus literal language understanding. To do so, I examine recent research on the processing of figurative and literal language from the perspective of psycho- and neurolinguistics. Findings here suggest that, in processing terms at least, the traditional view (e.g., Grice 1975; Searle 1979) of a neat distinction between literal and figurative language is untenable. I argue that the difference between figurative and literal language is a consequence of three distinct factors, which I model here. These factors account for the various findings that emerge in terms of differences (and similarities) between the way in which literal and figurative language is processed by the mind/brain. Hence, this chapter is concerned with developing a theoretical account of how language users marshal linguistic and non-linguistic structures and mechanisms in the course of interpreting specific figurative utterances. The model developed will then be applied, in the next chapter, in order to provide an account of the way in which t-FoR expressions are understood.

The chapter begins by first considering the distinction between literal versus figurative language. In the subsequent section I develop the LCCM Theory account of figurative language. I then consider, in some detail, how metaphor as a type of figurative language is handled within LCCM Theory. And finally, I consider wider theoretical concerns that emerge from this process of theory construction. In particular, I argue that the LCCM perspective is continuous with the perspective developed under the framework of Blending Theory (e.g., Fauconnier and Turner 2002). I examine the distinction between LCCM Theory and Blending Theory, as well as the ways in which they complement one another.

1 Literal versus figurative language

The standard pragmatic view holds that there is a neat distinction between literal and figurative language (Grice 1975; Searle 1979). For instance, a putatively figurative expression such as *My boss is a pussycat* would first involve processing and then rejecting a literal interpretation (sentence meaning).

A second stage would then be required, in which communicative principles are deployed in order to interpret the speaker's intention (speaker meaning), giving rise to a figurative meaning. Such a view makes the following two assumptions:

i. Literal language is processed more quickly than figurative language.
ii. Literal language is processed automatically while figurative language is not. If a literal conception is available no further processing is required.

We now know that the standard pragmatic view, and the assumptions it makes, are, in fact, false. For instance, research on reading times associated with expressions that can be interpreted both idiomatically and literally, such as *kick the bucket*, *spill the beans*, and so forth, has shown that the idiomatic meanings are understood more quickly than their literal meanings (Gibbs 1980, 1994; Gibbs *et al.* 1989; Giora *et al.* 2007).

Moreover, other comprehension-time tasks have shown that well-established metaphors are understood more rapidly than literal paraphrases (see Giora 2008 for a review). Even novel metaphors can be comprehended as rapidly as comparable literal expressions as long as the novel metaphors are contextually appropriate (Blasko and Connine 1993; see Glucksberg 2008 for discussion).

Other comprehension-time tasks have found that just as figurative language can be processed as quickly as literal language, it is also processed automatically, contra the assumption made by the standard pragmatic view. One line of evidence for believing that literal language is processed automatically 'without conscious control by the listener' (Miller and Johnson-Laird 1976: 166) comes from the well-known Stroop Effect (Stroop 1935). In this classic experiment, subjects are asked to identify the colour of coloured cards. When the cards also feature a printed colour word (e.g., 'red'), if the word fails to correspond to the colour on the card, it interferes with the processing of the correct colour response, as measured by reaction time. That is, even though the task doesn't ask subjects to do anything with the printed words, they are automatically processed.

In order to test whether figurative language is also processed automatically, Goldvarg and Glucksberg (1998) presented subjects with noun–noun compounds.

While some could only be paraphrased literally, others could be paraphrased either literally or metaphorically. Such examples included 'shark lawyer',

which can be interpreted literally: e.g., 'a lawyer who acts for an environmental group', or metaphorically: e.g., 'a lawyer who is predatory and aggressive'. If literal meanings but not metaphorical meanings are processed automatically, then the literal meaning should be the preferred interpretation.

However, when subjects were asked to explain the meaning of such compounds, 75 per cent of the paraphrases produced were found to be metaphorical, even when a literal paraphrase existed. Goldvarg and Glucksberg argue that this finding demonstrates that metaphoric interpretations do indeed arise automatically. In addition, findings from neurolinguistic research also support the view that metaphoric understanding begins as early in processing as literal understanding. One technique which has been employed to investigate differences between literal and figurative language processing is the measurement of event related potentials (ERPs).

An ERP is a small voltage fluctuation in brain activity that can be measured in a non-invasive way. This is achieved by having subjects wear a cap fitted with electrodes that measure voltages as they are exposed to linguistic stimuli. ERPs are measured on a graph where relative amplitude of a given ERP element corresponds to relative electrical activity. A particularly important ERP element is the so-called N400, which peaks approximately 400 ms after exposure to a stimulus. The N400 is associated with integration of words or expressions with preceding words. In general terms, the N400 is greater when semantic integration is more difficult, which is interpreted as being an indication of greater processing cost. For instance, in sentences such as those in (1) one would expect the amplitude of the N400 to increase incrementally across (1a) to (1d):

(1) a. The gazelles ran for cover when chased by lions
b. The gazelles ran for cover when chased by rabbits
c. The gazelles ran for cover when chased by bicycles
d. The gazelles ran away when chased by jam tarts

The standard pragmatic model, recall, claims that literal language is processed first. When a literal meaning is found to be incongruous, a figurative interpretation commences. In neurolinguistic terms, this model predicts an initial effect of literal incongruity which should result in an increased N400, followed by a later ERP effect when metaphoric interpretation is activated. Pynte *et al.* (1996) tested this prediction by exposing subjects to literal and metaphoric sentences of the sort given in (2):

(2) a. Those animals are lions [literal stimulus]
b. Those fighters are lions [metaphoric stimulus]

They found that both types of stimulus elicited an N400, with the metaphoric stimulus being slightly larger. However, they didn't find a subsequent reliable

ERP effect. This suggests that, while metaphoric integration may involve a different type of processing, the time course is similar to literal sentences, contrary to the prediction made by the standard pragmatic model.

In the same study, metaphorically true sentences such as those in (3a) evoked a smaller N400 than literal (but false) sentences such as (3b):

(3) a. The divorce is a nightmare
b. The divorce is a table

This provides evidence that metaphoric interpretation occurs at least as early as literal processing and can, in fact, be easier to process. Other studies suggest that different types of literal and metaphoric interpretations involve different levels of processing complexity. For instance, Coulson and Van Petten (2002) found that, while the N400 of literal and metaphoric sentences was qualitatively the same, the amplitude increased as a function of metaphoricity. To illustrate, consider the following sentences:

(4) a. He knows whiskey is a strong intoxicant
b. He has used cough syrup as an intoxicant
c. He knows that power is an intoxicant

The first sentence provides a literal reading: whiskey is a strong intoxicant. The second sentence involves understanding cough syrup, which is not normally considered to have an intoxicating effect, as having the properties associated with intoxicants. Hence, the processing of this sentence involves integrating classes of entities that are not normally associated. Finally, the sentence in (4c) is metaphoric in nature, involving an abstract entity – power – which is being ascribed the properties of an intoxicant. Coulson and Van Petten found that the N400 increased in these sentences from (a–c), which they interpreted as being a consequence of increased complexity of semantic integration.

The findings briefly discussed above argue against a straightforward distinction, in processing terms, between the literal and the figurative. Coulson (2008) argues that processing costs are a consequence of the relative complexity of the mappings involved in integrating semantic elements. This means that while metaphoric language is often associated with a larger N400, this is not inevitably the case. We saw above, for instance, that metaphorically true assertions are processed more quickly than literally false assertions. Complexity, then, presumably involves not just integration of content from different regions of conceptual space (e.g., from different inputs of an integration network, as in Blending Theory; e.g., Fauconnier and Turner 2002), but successfully integrating semantic content which is in certain respects incongruent. An important consequence of the claim that relative complexity determines processing cost is that there are degrees of complexity, as is evident in the work of Coulson and Van Petten (2002).

In her work, Giora (e.g., 2003, 2002, 2008) also argues against assuming a straightforward literal/figurative distinction. She proposes, instead, a salient/non-salient distinction. Giora suggests that it is relative salience, rather than whether an expression is literal or figurative, which determines whether a particular meaning is processed more quickly. Empirical support for this perspective comes from the finding, discussed above, that idiomatic meanings are processed more quickly than their literal paraphrase. Moreover, novel metaphors, for example, *Her mind is an active volcano*, take longer to process than more familiar metaphors such as *Children are precious gems*, (Pexman *et al.* 2000), also in keeping with Giora's salient/non-salient distinction.

Despite the foregoing, the fact that a straightforward literal/figurative distinction is not evident in language processing does not rule out the possibility that the distinction holds at the level of knowledge representation.

Indeed, I argue below that there is a distinction in terms of the types of knowledge to which words provide access. This corresponds to the literal/figurative distinction. One of the consequences of the perspective I present is that figurativity is seen as a graded phenomenon, which is continuous in nature: interpretations exhibit degrees of figurativity.

Of course, one of the challenges for a theoretical account of figurative language understanding is to deal successfully with the range of empirical findings discussed above. I argue that figurative language understanding is influenced by three factors: levels of knowledge representation, relative salience, and relative complexity. I propose that it is the interaction of these three factors, as discussed below, that accounts for the processing findings described above.

2 Figurative language in LCCM Theory

In this section I address figurative language from the perspective of LCCM Theory. I argue that distinct *levels of knowledge representation* – the distinction between primary versus secondary cognitive model profiles, as introduced in Chapter 2 – give rise to a distinction in literal versus figurative language. However, there are two further phenomena that are relevant for language understanding: *salience* and *complexity*. As we shall see, these three factors contribute to figurative language understanding, accounting for the psycholinguistic findings reviewed in the previous section. Salience and complexity are also relevant for literal language understanding.

Salience, in present terms, relates to how well entrenched a given lexical concept is in semantic memory. Language understanding makes use of a complex repertoire of lexical concepts that are integrated – the process of lexical concept integration. As some lexical concepts are likely to be better entrenched than others, this provides one way in which the distinction between the literal and the figurative arises in language processing, as I will discuss.

Complexity, in present terms, relates to the *length of the access route* through a cognitive model profile, as I shall discuss. In language understanding, greater processing effort, and hence greater complexity, is a consequence of the relative centrality of a conceptual unit of knowledge to a lexical concept's access site. The greater the access route length – which amounts to a greater number of cognitive models becoming activated in order to facilitate matching and hence interpretation – the more complex a given conception is. As with the notion of salience, complexity is a factor that serves to blur the distinction between literal and figurative language processing, as we shall see.

LCCM Theory takes the view that literal and figurative language are probably idealised end-points on a continuum,[1] resulting from the intersection of these three distinct types of phenomena (summarised in Table 9.1). These three factors intersect during the process of language understanding to give rise to degrees of literality and figurativity. Moreover, the mechanisms provided by LCCM Theory elegantly model, I argue, findings from psycho- and neurolinguistics, as described by Coulson (2008), Glucksberg (2008) and Giora (2008), amongst others.

2.1 Literal versus figurative language understanding

In this section I present the way in which the distinction between literal and figurative language is modelled by LCCM Theory. In later sections I consider the notions of salience and complexity.

The distinction between what I will refer to as a *literal conception* – the meaning associated with a literal utterance – on the one hand, and a *figurative conception* – the meaning associated with a figurative utterance – on the other, relates to that part of the semantic potential which is activated during the process of interpretation while constructing a conception. While a literal conception canonically results in an interpretation which activates a cognitive model, or cognitive models, within the primary (i.e., default) cognitive model profile, a figurative conception arises when a *clash* arises among the primary cognitive model profiles subject to matching, as introduced in Chapter 2. This is resolved by one of the cognitive model profiles achieving a match in its secondary cognitive model profile. A figurative conception arises, therefore, when a match is achieved in the secondary cognitive model profile of one of the lexical concepts undergoing matching.

To illustrate, consider the following examples, which make use of the lexical concept [FRANCE], and relate to a literal versus a figurative conception, respectively:

[1] See also Sperber and Wilson (2008), who argue, albeit from a different perspective, that figurative language (e.g., metaphor) forms a continuum with other types of language use.

Table 9.1 *Theoretical constructs for modelling factors involved in figurative language understanding*

Phenomenon	How modelled in LCCM Theory?
Degree of literality/figurativity	Cognitive model profile structure (i.e., primary vs secondary cognitive models)
Relative salience	Degree of entrenchment of lexical concept(s)
Relative complexity	Access route length (through the cognitive model profile)

(5) France has a beautiful landscape (Literal conception)

(6) France rejected the EU constitution (Figurative conception)

A literal conception arises for the first example, in (5), by virtue of a match occurring between the informational characterisation of the lexical concepts associated with the expression *beautiful landscape* – the result of a prior match between [BEAUTIFUL] and [LANDSCAPE] – and the primary cognitive model profile to which [FRANCE] affords access, these being the only expressions in this utterance which are associated with conceptual content. This occurs as follows. The informational characterisation for [BEAUTIFUL] and [LANDSCAPE] undergoes matching with the cognitive model profile to which the lexical concept [FRANCE] facilitates access. Hence, a search takes place in the primary cognitive model profile associated with [FRANCE]. The Principles of Conceptual Coherence and Schematic Coherence introduced in Chapter 2 ensure that a match is achieved in the primary cognitive model profile of [FRANCE]. By way of reminder, I reproduce these principles here:

(7) Principle of Conceptual Coherence
Matching occurs between one or more cognitive models belonging to distinct cognitive model profiles that share schematic coherence in terms of conceptual content.

This principle relies on a second principle, the Principle of Schematic Coherence:

(8) Principle of Schematic Coherence
The conceptual content associated with entities, participants and the relations holding between them must exhibit coherence in fusion operations.

Recall that what the two principles in (7) and (8) do is to guarantee that matching takes place only when the cognitive models that undergo the matching process (i) belong to different cognitive model profiles – and hence are accessed by different lexical concepts – and (ii) exhibit coherence.

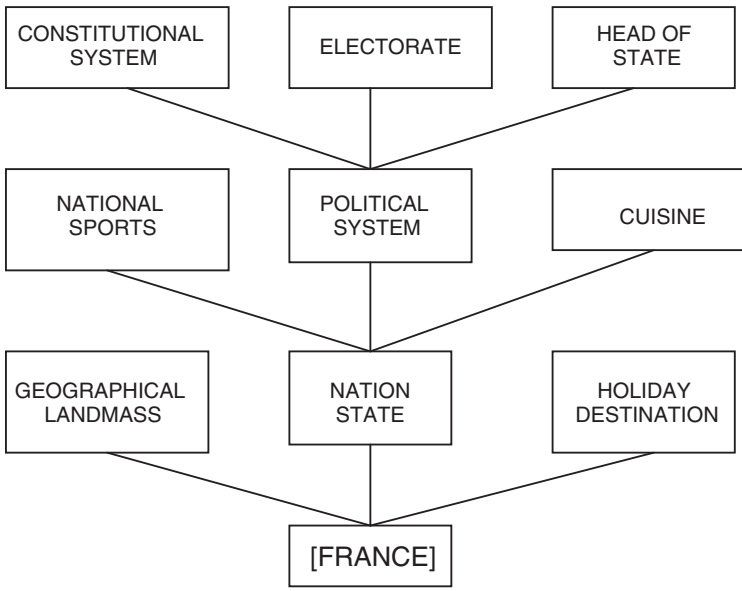

Figure 9.1 Partial cognitive model profile for [FRANCE]

In terms of activation of cognitive models for [FRANCE] in the example in (5), the Principle of Conceptual Coherence ensures that the GEOGRAPHICAL LANDMASS cognitive model for [FRANCE] is activated (see Figure 9.1, reproduced from Chapter 2). That is, it is this cognitive model which achieves a match with the informational characterisation associated with the lexical concepts associated with the expression *beautiful landscape*. Hence, the conception which arises for (5) is literal, as activation occurs solely in the primary cognitive model profile (of [FRANCE]).

In contrast to (5), the example in (6) is usually judged as being figurative in nature. While France in (5) refers to a specific geographical region – that identified by the term *France* – in the example in (6) France refers to the electorate majority who voted against implementing an EU constitution in a 2005 referendum. This figurative conception arises due to a clash arising between the primary cognitive model profile of [FRANCE], as represented by Figure 9.1, and the informational characterisation associated with the expression *rejected the EU constitution*. That is, none of the primary cognitive models to which [FRANCE] facilitates access can be matched with the informational characterisation associated with the expression *rejected the EU constitution* due to application of the Principles of Conceptual and Schematic Coherence.

The failure of matching in the primary cognitive model profile for [FRANCE] requires establishing a wider *search domain*, namely matching in the secondary

cognitive model and hence cognitive models to which the lexical concept [FRANCE] provides only indirect access. This process of clash resolution is constrained by the Principle of Ordered Search which is given in (9):

(9) Principle of Ordered Search
If matching is unsuccessful in the default search domain, which is to say, a clash occurs, then a new search domain is established in the secondary cognitive model profile. The search proceeds in an ordered fashion, proceeding on the basis of secondary cognitive models that are conceptually more coherent with respect to the primary cognitive models – and hence modelled as being conceptually 'closer' in the cognitive model profile – prior to searching cognitive models that exhibit successively less conceptual coherence.

In essence, the Principle of Ordered Search ensures the following. When there is a clash in the primary cognitive model profiles of the lexical concepts or informational characterisation(s) in question, as in (6), a larger search region is established which includes cognitive models in relevant secondary cognitive model profile(s). This principle thus enables clash resolution by virtue of facilitating a search region beyond the default search region.

With respect to the example in (6), due to application of the Principle of Ordered Search, a secondary cognitive model is identified which achieves schematic coherence, thereby avoiding a clash and thus achieving a match. The cognitive model which achieves activation is the ELECTORATE cognitive model (see Figure 9.1). Hence, in (6), the process of interpretation results in an informational characterisation for [FRANCE] which is that of 'electoral majority'. As the ELECTORATE cognitive model is a secondary cognitive model, this means that the conception is figurative in nature. In order to summarise the main distinction between the construction of literal and figurative conceptions, based on the mechanisms proposed by LCCM Theory, consider Figure 9.2.

Figure 9.2 illustrates the following. At interpretation, the primary cognitive model profiles for lexical concepts which afford access to conceptual content undergo matching. The Principle of Conceptual Coherence requires that a clash in the cognitive model profiles of the two (or more) lexical concepts undergoing interpretation is avoided. The Principle of Ordered Search ensures that if there is no match in the primary cognitive models of the lexical concepts subject to matching then clash resolution is required. In order to achieve this, a search is initiated in the secondary cognitive model profile. The secondary cognitive model profile of a lexical concept relates to knowledge that is not directly associated with a given lexical concept, as it does not form part of a lexical concept's access site. As such, the secondary cognitive model profile constitutes a very large semantic potential available for search. The Principle of Ordered Search ensures that the search in the secondary cognitive model

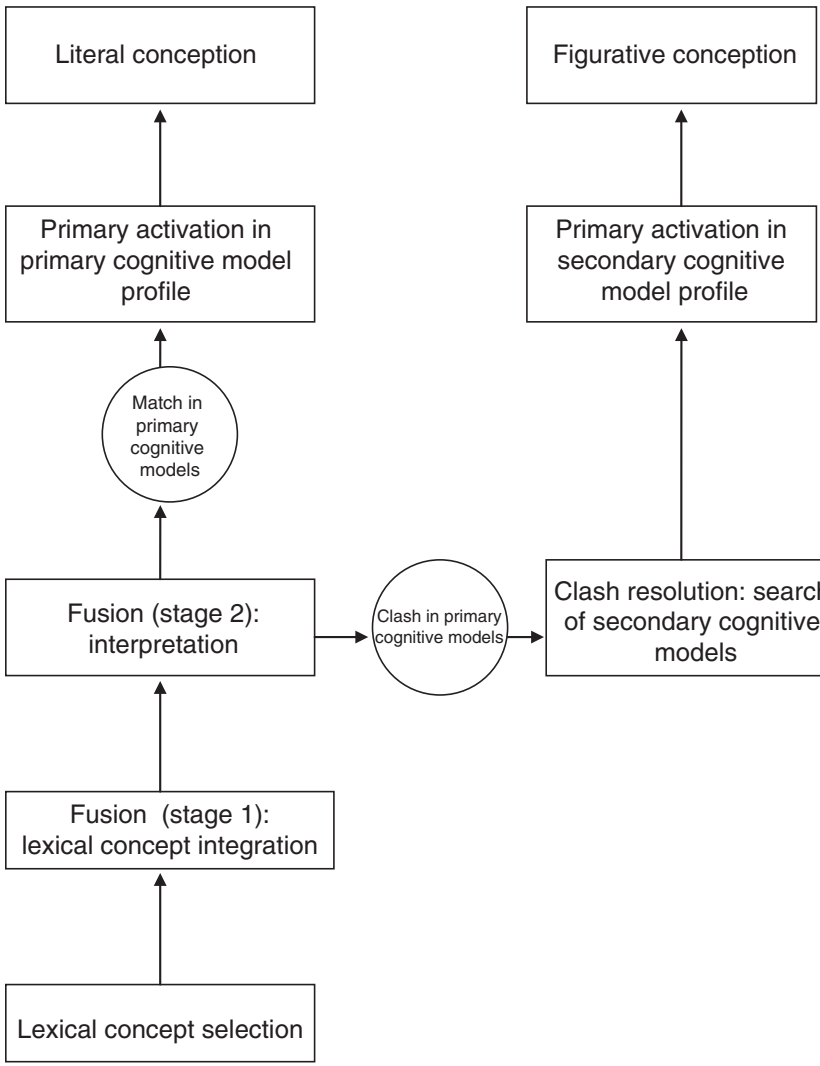

Figure 9.2 Meaning-construction processes in LCCM Theory leading to literal versus figurative conceptions

profile proceeds in a coherent way. That is, the secondary cognitive models are searched to facilitate a match based on their conceptual coherence with the primary cognitive models which form part of the lexical concept's access site. Hence, this principle ensures that secondary cognitive models are searched in the order of their relative 'distance' from the point of lexical access. Secondary

activation continues 'upwards' through the secondary cognitive model profile until a match is achieved, giving rise to activation of one or more secondary cognitive models. The consequence of this is that activation of a secondary cognitive model that is relatively further removed, in conceptual terms, from a secondary cognitive model that is relatively less removed from the default search region is likely to be judged as being more figurative in nature.

In sum, the defining feature of a literal conception is that matching occurs in the primary cognitive model profiles of the relevant lexical concepts. The defining feature of a figurative conception is a clash in the primary cognitive model profiles of the relevant lexical concepts, necessitating clash resolution and hence activation of cognitive models in the secondary cognitive model profile of one (or more) of the relevant lexical concepts. Moreover, the further the conceptual distance required in the secondary cognitive model to achieve clash resolution by virtue of a successful match, the greater the access route length in the cognitive model profile, and hence the greater the figurativity of the expression – as discussed further below in terms of complexity.

2.2 Salience

In practice, while the situation described in the previous sub-section relates to an idealised scenario, language understanding is more complex than this. For one thing, semantic structure consists of a vast repertoire of lexical concepts – the semantic poles of linguistic forms. And moreover, lexical concepts exhibit degrees of complexity as they can be *internally open* or *internally closed*. For instance, the ditransitive construction, as studied by Goldberg (e.g., 1995) and exemplified in (10), involves a lexical concept that is internally open: the lexical concept in (10b) can be integrated with other lexical concepts as exemplified by the lexical concepts conventionally paired with the vehicles in (11):

(10) a. Vehicle: NP verb Obj1 Obj2
b. Lexical concept: [ENTITY X CAUSES ENTITY Y TO RECEIVE ENTITY Z]

(11) Sally, gave, John, a kiss

In addition, vehicles can be conventionally paired with more than one internally open lexical concept. Consider the expression in (12):

(12) I hit the roof

This expression potentially instantiates two distinct lexical concepts, given in (13):

(13) a. [X EXERTS TRANSFER OF ENERGY WITH RESPECT TO Z]
b. [X BECOMES VERY ANGRY]

While the lexical concept in (13a) can be instantiated by a wide number of expressions, as in (14), which is a consequence of its form which is lexically

underspecified, the lexical concept in (13b) has a smaller range of instantiations, as illustrated in (15):

(14) a. I/he/she/we/they hit the nail/wall/box/floor, etc.
b. I/he/she/we/they kicked the wall/box/floor/man, etc.
c. I/he/she/we/they punctured the balloon/tyre/bubble/inflatable ring, etc.
and so on

(15) a. I/he/she/we/they hit the roof
b. I/he/she/we/they will hit the roof
c. I/he/she/we/they are bound to hit the roof
and so on

The instantiation in (14) of (13a) is normally described as being literal, while the instantiation in (15) of (13b) is normally described as idiomatic (or figurative). But from the perspective of LCCM Theory, both lexical concepts are, in a fundamental sense, idiomatic. They relate to distinct lexical concepts – each provides a schematic meaning that can be instantiated by the expression in (12). The different interpretations associated with (12), the 'literal' ('I physically punched the roof') reading versus the idiomatic ('I flew into a rage') reading are a consequence of two distinct lexical concepts which encode a distinct semantic value: they are semantic units which are conventionally associated with a given vehicle, and in this sense they are idiomatic.

For the present discussion, what is important to bear in mind is that the lexical concept in (13b) is more saliently associated with the vehicle in (12) than is the lexical concept in (13a). This follows as the vehicle with which the lexical concept in (13b) is conventionally paired is partially lexically specified, and includes the obligatory elements *hit the roof*, as exemplified in (16):

(16) Vehicle: Subj hit + TNS the roof

This being the case, LCCM Theory makes the claim that as the expression in (12) so closely instantiates the vehicle in (16), which is conventionally paired with the lexical concept in (13b), the most salient reading of (12) will correspond more closely to the 'idiomatic' reading associated with the lexical concept in (13b) rather than (13a). In fact, LCCM Theory makes the further prediction that this reading should be processed more quickly than the 'literal' reading, which is exactly what the psycholinguistic studies reported on above do indeed find.

In cases such as (12), where an idiomatic reading is derived, the process of clash resolution described above doesn't apply. This is because the process of interpretation follows, and is guided by, the process of lexical concept integration. The lexical concept in (13b) provides a schematic semantic unit which guides the way in which the individual lexical concepts that are integrated with

this internally open lexical concept are combined, and subsequently undergo interpretation. As there is a semantic unit that provides a holistic meaning, the entire expression functions as a single lexical concept for purposes of interpretation. That is, there is no matching to be done, and hence no clash to be resolved. And because there is no matching to be done, language understanding proceeds more quickly in the case of the lexical concept in (13b) than the lexical concept in (13a).

I now turn to a slightly different manifestation of salience. In some accounts of figurative language phenomena, examples such as the italicised lexical items in each of the following are taken to be figurative (and specifically metaphoric) in nature:

(17) a. That is a *loud* shirt
b. They have a *close* relationship
c. She is *in* love
d. That took a *long* time[2]

In these examples, the use of *loud* refers to a brightly coloured shirt, *close* relates to emotional intimacy, *in* relates to an emotional state while *long* relates to extended duration.

From the perspective of LCCM Theory, such usages relate to distinct lexical concepts rather than interpretations arising due to clash resolution.[3] For instance, LCCM Theory assumes that *long* has at least two conventionally established lexical concepts associated with it: [EXTENDED IN HORIZONTAL SPACE], and [EXTENDED DURATION]. During lexical concept selection the [EXTENDED DURATION] lexical concept is selected, as this is the most salient lexical concept associated with *long*, in view of the lexical concept that is paired with the form *time*. In processing terms, upon encountering the vehicle *long*, both the [EXTENDED IN HORIZONTAL SPACE] and [EXTENDED DURATION] lexical concepts will receive background activation. However, upon encountering the vehicle *time*, the [EXTENDED DURATION] lexical concept is selected for. And crucially, the [EXTENDED DURATION] lexical concept conventionally associated with *long*

[2] For instance, some accounts of linguistic metaphor, such as the metaphor identification criteria as developed by the Pragglejaz Group (2007), would classify these examples as being instances of metaphor.

[3] Note that, by claiming that conventional lexical concepts do not require clash resolution, I am not excluding the possibility that examples such as (17) may give rise, at the conceptual level, to distinct conceptual metaphors, (e.g., DEVIANT COLOURS ARE DEVIANT SOUNDS for 'A loud shirt', or DEGREE OF AFFECTION IS SPATIAL CONNECTION for 'They have a close relationship'), or that conceptual metaphors may have, in part, motivated the existence of the examples in the first place. I am simply making the point, from the perspective of a linguistically informed account of figurative language understanding, that there are likely to be highly conventional lexical concepts in addition to any putative conceptual metaphors. This is an issue I return to in the next chapter when I consider the status of conceptual metaphors within the LCCM account of t-FoR lexical concepts.

provides a different access site to that of the [EXTENDED IN HORIZONTAL SPACE] lexical concept – it facilitates access to a different set of primary cognitive models. The [EXTENDED DURATION] lexical concept for *long*, and the [DURATION] lexical concept associated with *time* facilitate access to cognitive model profiles which can be matched in their primary cognitive model profiles. Hence, an example such as this does not lead to a clash in the primary cognitive model profiles undergoing matching.

In examples such as these, LCCM Theory is able to account for the finding that lexicalised discourse metaphors such as these examples are processed as quickly as putatively non-metaphorical examples. In fact, in the examples in (17), the linguistic context makes salient an entrenched lexical concept. From this perspective, (17d), for instance, is only judged as being metaphoric if the [EXTENDED DURATION] lexical concept for *long*, for instance, is judged by the analyst as, in some sense, less prototypical (or more abstract) than the [EXTENDED IN HORIZONTAL SPACE] lexical concept. In terms of the prediction made by LCCM Theory, in all other respects, these examples are no different from those given in (18):

(18) a. That is a green shirt
b. They have a loving relationship
c. She experiences love
d. That took an extended period of time

As intimated in the previous chapter, the account of expressions such as *long*, as in *long time*, being adduced here, is consonant with the approach developed in the Career of Metaphor Hypothesis (Bowdle and Gentner 2005). Recall that in the Career of Metaphor Hypothesis, highly conventionalised linguistic metaphors – what I refer to as discourse metaphors – are treated as being polysemous sense units which are conventionally associated with the 'base' term, here, *long*, and which are accessed via a 'lexical look-up' process, rather than by establishing on-line structural alignments and inference projections (mappings) between a base and target.

From the present perspective, the interesting question in such cases does not concern whether these cases are metaphoric or not – they do not involve clash resolution and hence are not figurative conceptions, from the present perspective. Rather, the more interesting question concerns how an [EXTENDED DURATION] lexical concept became conventionally associated with the vehicle *long* in the first place. As noted in the previous chapter, recent work on semantic change pioneered by Elizabeth Closs Traugott (e.g., Traugott and Dasher 2004) has argued that situated implicatures (or invited inferences) can become 'detached' from their contexts of use and reanalysed as being distinct sense-units – lexical concepts in present terms – which are associated with a given vehicle. The [EXTENDED DURATION] lexical concept associated with

long might be historically derived from contexts of communication in which reference to length can be understood as reference to duration without harming expression of the communicative intention, as in communication about 'long journeys'. Through repeated use of this form in such bridging contexts (N. Evans and Wilkins 2000), which is to say, with the inferred meaning, it is plausible that *long* developed an [EXTENDED DURATION] lexical concept by virtue of decontextualisation (Langacker 1987).

2.3 Complexity

The third factor that I consider in figurative language understanding is complexity. This relates to the length of the access route, in cases of clash resolution. Access route length gives rise to degree of figurativity. That is, figurative conceptions themselves exhibit degrees of figurativity and hence are graded. LCCM Theory claims that a longer access route corresponds to a more figurative conception. Moreover, it predicts that that there is a greater processing cost associated with conceptions involving a greater access route length, for instance in terms of the amplitude of the N400 (in ERP measurements).

To illustrate, consider the following metaphoric conceptions:

(19) a. That soldier is a lion
b. That ballerina is a lion

My claim is that figurative conceptions emerge for examples such as those in (19). Clash resolution is initiated due to a failure to match in the primary cognitive model profiles to which [SOLDIER] and [LION], and [BALLERINA] and [LION] facilitate access. This involves, in both cases, establishing a search region in the secondary cognitive model profile for [LION].[4] Due to the Principle of Ordered Search, the search proceeds such that cognitive models that are conceptually closer to the access site are searched prior to those which are conceptually more distant. Due to the Principle of Conceptual Coherence, the search is only complete when a match is achieved between a cognitive model in the respective primary cognitive model profiles of [SOLDIER] and [BALLERINA], on the one hand, and the secondary cognitive model profile of [LION] on the other.

To illustrate, consider the partial cognitive model profile for [LION] in Figure 9.3. The lexical concept [LION] facilitates access to a number of primary cognitive models: its access site. These include, at the very least, bodies of knowledge relating to a lion's physical attributes, including its bodily form – its morphology, the fact that lions have a mane, lionesses don't, and so on – its social behaviour – including social groupings, mating behaviour,

[4] I will discuss later why it is that a search region is established in the cognitive model profile for [LION] rather than [SOLDIER] or [BALLERINA].

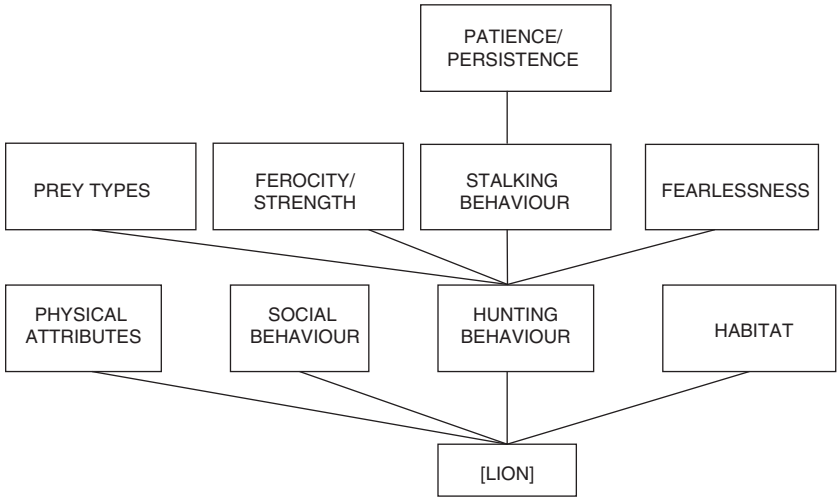

Figure 9.3 Partial cognitive model profile for [LION]

and so on – its habitat – including the geographical regions where lions are found – and its hunting behaviour. The cognitive model HUNTING BEHAVIOUR provides access to a range of secondary cognitive models including information about prey types – buffalo, wildebeest, gazelle, and so on – which can often be larger than the lion, the behaviour it exhibits in stalking and subsequently subduing prey including ferocity and strength, and the apparent fearlessness exhibited by lions in attacking prey often much larger than themselves. A further secondary model, which is presumably accessed from scenarios involving the stalking behaviour exhibited by lions, is that of the immense patience and persistence exhibited. Like all cats, lions have great acceleration but little stamina, hence they must get very close to their intended prey if they are to have a reasonable chance of catching and subduing the herbivores they prey upon before their prey can escape. Lions – and particularly lionesses – exhibit extreme patience in stalking prey in order to gain an opportunity to strike.

Returning to the examples in (19), the kinds of scenarios in which soldiers may find themselves, in which they face a strong enemy and must risk their lives, may require displays of STRENGTH/FEROCITY and/or FEARLESSNESS. Hence, when describing a soldier as a lion, LCCM Theory predicts that, without a further narrowing context, either (or both) of these secondary cognitive models becomes activated in service of facilitating clash resolution. The utterance involving a ballerina is slightly different – after all, a ballerina as part of her professional duties does not normally engage in situations which require displays of ferocity or fearlessness.

However, ballet, by its very nature, requires a vast amount of practice. And, moreover, it can require undergoing a great deal of discomfort, as evidenced by the physical deformities that experienced ballerinas can suffer due to the physically demanding nature of some of the techniques practised on a daily basis. In this context, describing a ballerina as a lion might activate the PATIENCE/PERSISTENCE secondary cognitive model associated with [LION].

While FEARLESSNESS and FEROCITY are qualities that are perhaps, self-evidently associated with lions, PATIENCE/PERSISTENCE is less obviously associated with them. Nevertheless, my claim is that some language users, especially zoologists and others who have detailed knowledge of lions, are likely to have knowledge relating to the displays of extreme patience exhibited by lions in stalking their prey. But the very fact that such a secondary cognitive model may require specialist knowledge of the hunting behaviour associated with lions demonstrates that the knowledge structure I gloss as PATIENCE/PERSISTENCE is conceptually less 'close' to the access site – the primary cognitive models – for [LION] than STRENGTH/FEROCITY or FEARLESSNESS. Put another way, to activate the PATIENCE/PERSISTENCE secondary cognitive model involves a longer access route than that required to activate either the STRENGTH/FEROCITY or FEARLESSNESS secondary cognitive models. Thus, the prediction made by LCCM Theory is that the example in (19b) would be judged as exhibiting greater figurativity than the example in (19a). And moreover, the further prediction would be that this is due to greater complexity involved in integrating the cognitive model profiles involved – that associated with [LION] with that accessed by [SOLDIER], and [LION] with [BALLERINA]. Hence, in processing terms, the prediction is that there is a greater cognitive cost involved in processing (27b) than (27a). The neurolinguistic findings discussed by Coulson (2008) seem to support such a prediction.

3 Metaphor

In this section I focus on metaphoric conceptions employing the predicate nominative (i.e., 'X is a Y') construction.[5] This has traditionally been the kind of linguistic form par excellence that has been studied under the heading of metaphor, particularly by psycholinguists (e.g., Giora 2003; Glucksberg 2001 and Gentner *et al.* 2001), philosophers of language (Leezenberg 2001; Stern 2000) and scholars in the pragmatics tradition (e.g., Carston 2002; Carston and Wearing 2011; Sperber and Wilson 1995, 2008). To illustrate, I will consider the metaphoric conception that emerges based on the example in (20):

[5] It is important to note that this particular construction forms only a small subset of the way metaphor emerges in language use, cf. *Jane is a weasel* vs *Jane weaselled out of that*. See Deignan (2005) for a corpus-based analysis of the forms that metaphoric language takes.

(20) My boss is a pussycat

What is strikingly figurative about the example in (20) is that the entity designated by *My boss* is not normally taken as being a member of the class of pussycats. Nevertheless, the predicate nominative construction is normally taken as having a class-inclusion function associated with it:

(21) My boss is a beer drinker

This expression, exemplified by the utterance in (21), involves the copular or 'linking' verb *be* which combines with a nominal, e.g., 'a beer drinker'. The nominal functions as the essential part of the clausal predicate: 'is a beer drinker'. The function of the lexical concept conventionally paired with 'be' in this symbolic unit is to signal a stative relation (Langacker 1991): namely, 'my boss is a member of the class of beer drinkers', a situation which persists through time.

The same cannot hold for the example in (20) as, in the normal course of events, someone's boss cannot literally be a pussycat. That is, the entity designated by the expression *my boss* is not normally taken to be a member of the class of pussycats. The metaphoric conception which this utterance gives rise to is derived from a property that is usually associated with pussycats, namely that they are extremely docile and often affectionate, and thus not frightening or intimidating in any way. In this utterance, we are being asked to understand the boss, not in terms of being a pussycat, but in terms of exhibiting some of the properties and behaviours often associated with pussycats as manifested towards their human owners, such as being docile, extremely friendly and thus non-forbidding and perhaps easy to manipulate.

The LCCM approach to figurative meaning construction allows us to see the similarities and differences between metaphor and the literal predicate nominative examples such as (21). An important point of similarity relates to the process of fusion crucial for meaning construction, involving interpretation in particular. As noted earlier, figurative language, of which (prototypical) metaphor is a sub-type, diverges from literal language use in terms of activation in the secondary cognitive model profile of the lexical concept which is undergoing clash resolution.

In an utterance such as 'My boss is a beer drinker', the two relevant lexical concepts for interpretation are [BOSS] and [BEER DRINKER]. This follows as these are the only two lexical concepts in the utterance which have access sites and thus provide direct access to conceptual content. Interpretation proceeds by attempting to match cognitive models in the primary cognitive model profiles associated with each of these lexical concepts, as guided by the Principle of Conceptual Coherence and application of the Principle of Ordered Search. A match is achieved in the primary cognitive model profiles of each lexical

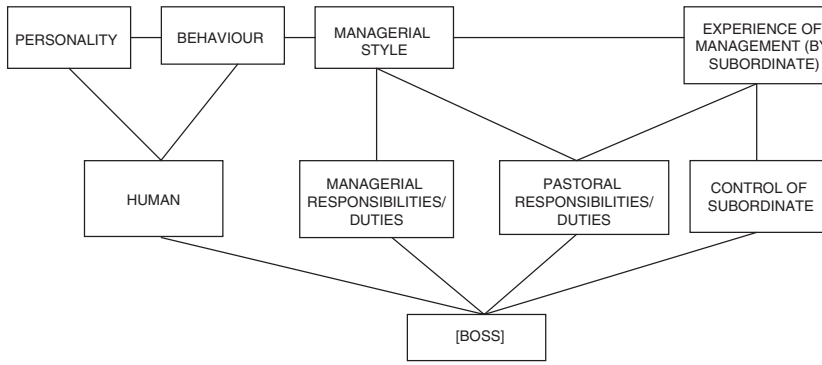

Figure 9.4 Partial cognitive model profile for [BOSS]

concept. That is, it is semantically acceptable to state that *My boss is a beer drinker* because the referent of my boss is a human and humans can (and do) drink beer.

Now let's consider how the metaphoric conception arises. In the example in (20), the process of interpretation leads to a clash in the primary cognitive model profiles of [BOSS] and [PUSSYCAT]. This is where metaphor differs from literal class-inclusion statements. A partial primary cognitive model profile for [BOSS] is provided in Figure 9.4.

The primary cognitive model profile for [BOSS] includes, at the very least, cognitive models relating to the fact that a boss is, typically, a human being, and the complex body of knowledge we each possess concerning what is involved in being a human being, that a boss has particular pastoral responsibilities with respect to those for whom he or she is line-manager, as well as managerial responsibilities and duties, both with respect to those the boss manages, the subordinate(s), and the particular company or organisation for whom the 'boss' works. In addition, there are an extremely large number of secondary cognitive models associated with each of these, only a few of which are represented in Figure 9.4. In particular, by virtue of being a human being, a boss has a particular personality and exhibits behaviour of various sorts, in part a function of his/her personality, in various contexts and situations. In addition, each boss exhibits a particular managerial style, which includes interpersonal strategies and behaviours with respect to those the boss manages. The boss can, for instance, be aggressive or docile with respect to the subordinate. Moreover, there is a clichéd cultural model of a ferocious and aggressive boss who seeks to keep employees 'on their toes' by virtue of aggressive and bullying interpersonal behaviour. By contrast, a boss who is relatively placid and can thus be treated as a colleague rather than a superior may be somewhat salient with respect to the stereotype.

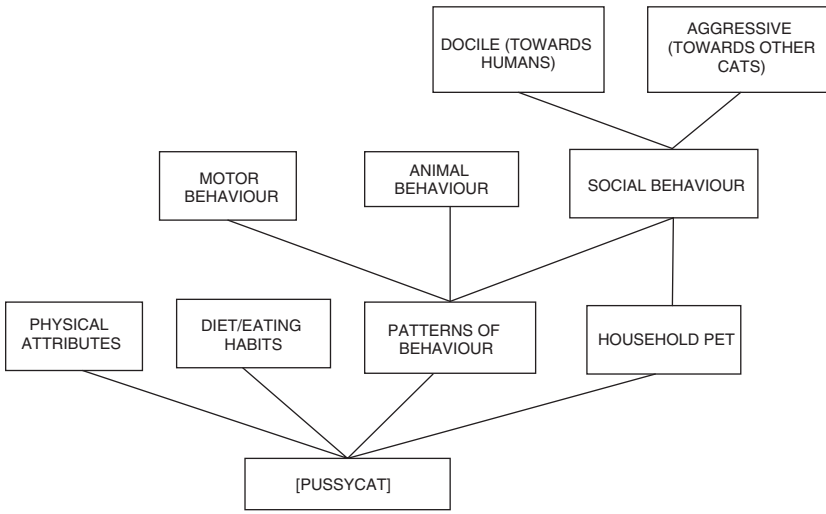

Figure 9.5 Partial cognitive model profile for [PUSSYCAT]

Just as the lexical concept for [BOSS] has a sophisticated cognitive model profile to which the lexical concept potentially affords access, so too the [PUSSYCAT] lexical concept provides access to a wide range of knowledge structures. A very partial cognitive model profile is provided in Figure 9.5.

The lexical concept [PUSSYCAT] relates to cognitive models having to do with, at least, knowledge concerning physical attributes, including body shape and size, diet and eating habits, patterns of behaviour, and a pussycat's status in western culture as the household pet of choice for many people. In terms of secondary cognitive models, there are a number that relate to our knowledge associated with the sorts of behaviours pussycats exhibit. For instance, pussycats exhibit motor behaviour of certain kinds including the particular manner of motion pussycats engage in. Pussycats also exhibit animal behaviours of certain kinds including hunting, reproduction and so forth. Finally, pussycats also exhibit social behaviour, including behaviour towards other conspecifics, and behaviour towards humans. Hence, social behaviour is a cognitive model relating to at least two primary cognitive models – those of PATTERNS OF BEHAVIOUR and HOUSEHOLD PET.

In the example in (20), a figurative conception arises due to a failure to establish a match in the primary cognitive model profiles associated with [BOSS] and [PUSSYCAT], the two lexical concepts relevant for interpretation. Hence, a clash occurs, leading to a search in a secondary cognitive model profile. In LCCM Theory, the particular lexical concept selected for clash resolution, and hence for activation in the secondary cognitive model profile, is contextually

determined. This is formalised as the Principle of Context-induced Clash Resolution. This can be stated as follows:

(22) Principle of Context-induced Clash Resolution
In cases where clash resolution is required, the lexical concept whose secondary cognitive model profile is searched to resolve the clash is determined by context. This is achieved by establishing a figurative target and a figurative vehicle, on the basis of context. The lexical concept that is established as the figurative vehicle is subject to clash resolution.

In the utterance in (20), I am assuming a discourse context in which the speaker has been discussing their boss. In such a context, the figurative target (or target for short) is the boss, as this is the topic or theme of the utterance. Informally, the point of the utterance is to say something 'about' the boss. From this it follows that the figurative vehicle (or vehicle for short), is the pussycat. Crucially, it is the secondary cognitive model profile of the vehicle, here [PUSSYCAT], rather than the target, which undergoes search in order to facilitate clash resolution. In other words, the principle in (22) serves to determine which of the lexical concepts' secondary cognitive model profiles is subject to search.

Before concluding the discussion of the example in (20), a caveat is in order. In my discussion thus far I have assumed that the literal class-inclusion statement, as in (21), involves the same symbolic unit (and hence the same lexical concept) as the metaphoric version of the predicate nominative construction in (20). I have done so for purposes of explicating the nature of metaphoric conceptions. Yet, since LCCM Theory, as discussed in Chapter 2, assumes a constructional perspective on grammatical organisation (e.g., Goldberg 2006; Langacker 2008), a difference in form and/or meaning is indicative of a different symbolic unit and hence lexical concept. Accordingly, it is likely that the lexical concepts associated with the expressions in (20) and (21) are not, in fact, motivated by a single predicate nominative symbolic unit. Rather, the fact that human agents can have attributes of animals ascribed to them highly productively, as evidenced by examples such as (23), suggests that English speakers have an entrenched symbolic unit of the type indicated in (24):

(23) Sam is a wolf/pig/lion/fox/mouse, etc.
(24) a. Vehicle: Subj BE+TNS a ANIMAL TERM
b. Lexical concept: [VOLITIONAL AGENT X HAS FUNCTIONAL ATTRIBUTE(S) OF ANIMAL Y]

From this perspective, the 'metaphoric' reading resulting from (20) is due to the lexical concept given in (24b), rather than to a 'class-inclusion' lexical concept (cf. the example in (21)). LCCM Theory therefore predicts the following in terms of processing. The 'class-inclusion' lexical concept is plausibly

better entrenched – and hence more salient without a specific context – than the lexical concept in (24b). That being so, when a language user is exposed to an example such as (20) they begin by processing the class-inclusion lexical concept. Upon encountering the animal term, lexical concept selection revision takes place, such that a new lexical concept is selected for: that provided in (24b). The prediction, therefore, is that there should be a slightly higher N400, in ERP terms, for examples such as (20) and (23) than for those such as (21).

In view of this caveat, how then should we interpret the discussion of the figurative conception for (20) given above? I hypothesise that the class inclusion lexical concept associated with the predicate nominative vehicle existed in the language prior to the emergence of the lexical concept in (24b). In fact, it is plausible that the lexical concept in (24b) emerged historically from the 'literal' class-inclusion lexical concept.[6] This process of semantic change plausibly involves usage-based bridging contexts and pragmatic strengthening, as alluded to above in the discussion of the examples in (17). Hence, the discussion of how the metaphoric conception for (20) arises is likely to relate to an earlier stage in the language, before the lexical concept in (24b) had become conventionally associated with the vehicle in (24a), that is, before it had unit-like status.

4 Front-stage versus backstage cognition

Before concluding this chapter, I want to briefly say something about how the LCCM Theory approach to figurative language relates, in general terms, to Conceptual Metaphor Theory, and in particular to Blending Theory (Fauconnier and Turner 2002). As we saw in the previous chapter, an important way in which cognitive linguists have approached the role of imagination in human thought has been to posit relatively stable knowledge structures that are held to inhere in long-term memory. These, of course, are conceptual metaphors (Lakoff and Johnson 1980, 1999), the evidence of psychological reality for which has begun to accrue.[7] In addition, conceptual metaphors are held to be manipulated by a dynamic meaning-construction process: *conceptual blending* (Coulson 2000; Fauconnier and Turner 1998, 2002, 2008; Grady 2005).

Nevertheless, neither Conceptual Metaphor Theory nor Blending Theory is primarily (if at all) a theory *about* metaphor understanding in language. Conceptual Metaphor Theory, for instance, has traditionally been concerned with the nature and the level of the various cognitive representations that serve

[6] For detailed discussion of the way in which 'metaphoric' lexical concepts may emerge from 'literal' lexical concepts, see the discussion of the emergence of the 'state' lexical concepts from the spatial senses for *in*, *on* and *at* in Evans (2010a).

[7] For discussion of the psychological reality of conceptual metaphors see, for example, Boroditsky (2000); Casasanto (2010); Casasanto and Boroditsky (2008); Gentner *et al.* (2002); Núñez *et al.* (2006); and Gibbs (1994).

to structure target domains in terms of sources domains. That is, Conceptual Metaphor Theory is a theory concerned with *backstage cognition* – the role of the non-linguistic conceptual processes that facilitate meaning construction behind the scenes – so to speak.[8] Analogously, Conceptual Blending Theory (Coulson 2000; Fauconnier and Turner 2002, 2008) is concerned with the conceptual processes involved in meaning construction, viewing language as impoverished prompts for semantic compositionality. For Fauconnier and Turner, what is really interesting about figurative language phenomena are the conceptual (rather than linguistic) processes that lie hidden from view, behind the scenes.

In addition to the backstage cognition perspective, (cognitive) linguists require, I am arguing, a theoretical account that models how language deploys and interfaces with the non-linguistic knowledge structures – the conceptual metaphors – and the conceptual mechanisms of meaning construction – the process of conceptual integration or 'blending' – during the process of figurative language understanding. That is, we require a theory that addresses *front-stage cognition* – an account that is concerned with the role of linguistic prompts and linguistic processes of semantic composition in figurative language understanding. Moreover, such an account must remain consonant with what is known about the structures and processes involved in figurative thought, in the light of the research programmes of Lakoff and Johnson, and Fauconnier and Turner, as well as others. In short, such an account of figurative language understanding must be psychologically plausible.

Another way of thinking about the proposals elaborated on here is that they provide the first reasonably detailed account of the processes involved in (linguistically mediated) *composition* – in Fauconnier and Turner's 2002 terms – during conceptual blending. Thus, while LCCM Theory (Evans 2006, 2009b) models lexical representation, it is also concerned with the way in which lexical concepts interface with non-linguistic knowledge. As such, it addresses the thorny issue of semantic compositionality. In general terms, the LCCM worldview holds that meaning arises through *integration*. Hence, it meshes with and, as I would argue, is continuous with, the conceptual blending research programme.

Conceptual blending (Coulson 2000; Fauconnier and Turner 1998, 2002, 2008) is held to be a mechanism that is central to the way we think. It provides a means of integrating and compressing often very complex knowledge, typically in the process of ongoing meaning construction. Blending involves the setting up of an integration network, the purpose of which is to facilitate

[8] It was Fauconnier who coined the term 'backstage cognition' – see Fauconnier (1994, 1997). For detailed discussion of the distinction between front-stage cognition and backstage cognition see Evans (2009b).

integration, and more precisely, the blending together of elements from a number of distinct *mental spaces* (known as inputs). Knowledge from the inputs is projected to the blend selectively, in service of the particular inference or meaning under construction. This leads to a process whereby inputs contribute some, but not all, of their content. This *selective projection* of knowledge to the blended space is then integrated in a process known as *composition*. Once this has happened, the composed elements may require further knowledge to be recruited to complete the blend that is emerging. This further process of knowledge recruitment is known as *pattern completion*. Finally, the blended space provides a means of allowing us to do inferential work. We can use the blend for ongoing reasoning, and can even extend and further elaborate the blend. This is known as *running the blend*.

The proposals in this chapter can be construed as representing a detailed account of the linguistically mediated mechanisms involved in composition: one of the central drivers of conceptual blending. After all, linguistically mediated composition presumably involves the activation of knowledge in ways that facilitate a coherent interpretation. The process of clash resolution, one of the symptoms of figurativity described above, presents a mechanism for achieving integration of knowledge leading to coherence, and hence satisfying, in principle, the various goals and sub-goals of Blending – although the way in which this might be achieved hasn't been worked out here.

That all said, meaning construction is exquisitely complex. While Blending Theory has attempted to provide a single well-articulated and coherent account of meaning construction, it is highly unlikely, to my mind, that the range of phenomena claimed to exhibit conceptual integration, in the terms of Fauconnier and Turner (e.g., 2002), in fact arise from a single mechanism. For instance, conceptual blending, a single unified mechanism, is held to be responsible for phenomena as diverse as neurological binding, solving riddles, performing mathematic calculations, the creation of novel word and word-compound coinages, as well as grammatical constructions. While these phenomena involve integration of some kind, it is far from clear that a single set of mechanisms and unified principles can adequately account for the full range of knowledge types and neurological mechanisms involved. In view of this, I suggest the following. If we allow blending to be interpreted more broadly as a research programme (rather than a theory), language (and cognitive) scientists are provided with a fresh and an important perspective for investigating meaning construction. The truly notable finding that arises from Fauconnier and Turner's research on blending is that integration does indeed appear to be ubiquitous: it is central to the way we think. It is in this spirit that the present account of figurative meaning construction is put forward.

The LCCM perspective offered in this chapter presents a reasonably detailed first pass at accounting for how knowledge accessed via linguistic

inputs undergoes composition in service of figurative meaning construction. Linguistically mediated composition, as studied here, is one of the (probably many) 'compositional' integration types that are necessary to produce meaning. The other salient integration type identified by Fauconnier and Turner is referred to as pattern completion (which itself is probably a complex category of different types of integration). Thus, LCCM Theory represents an attempt to model one specific type of composition, which is one type of integration. It forms part of what is envisaged to be a large-scale study of integration mechanisms involving linguistic and other types of knowledge in producing meaning. A significant aim of future research within the LCCM Theory framework will be to begin to work out the detail of these issues.

5 Summary

In this chapter I have been applying the mechanisms of LCCM Theory (introduced in Chapter 2) in order to provide an account of the nature of semantic compositionality in figurative language. This account relates to the role of language in figurative language understanding and the way in which it interfaces with non-linguistic knowledge. A consequence of the meaning-construction mechanisms proposed by LCCM Theory is the assumption that literal and figurative language arise from the same compositional mechanisms. They can be seen as points lying along a continuum of meaning construction, rather than being due to wholly different mechanisms. The central claim made in the chapter is that there is an interplay between three factors in meaning construction, and in figurative language understanding in particular. These factors relate to (i) degree of literality/figurativity, (ii) relative salience and (iii) relative complexity. These factors are modelled in LCCM Theory by the following theoretical notions: (i) cognitive model profile structure – which is to say, the distinction between primary and secondary cognitive models; (ii) degree of entrenchment of lexical concepts(s) – which is to say, how well established in the linguistic system a given lexical concept is. I haven't explored here factors that give rise to lexical concept entrenchment, which awaits future research. That said, I assume factors including type and token frequency, as discussed in Croft and Cruse (2004), will play a prominent role, and other factors arising from the usage-based perspective on language learning (see Langacker 2000, 2009). And finally, (iii) access route length through the cognitive model profile. While the intuition that there is a distinction between literal versus figurative language is upheld by LCCM Theory, which distinguishes between levels (primary versus secondary) of cognitive models, the empirical findings demonstrate much less of a clear-cut distinction. These findings are accounted for, in

LCCM Theory, through the interplay between the existence of conventional lexical concepts, which are integrated by means of a series of compositional mechanisms (integration and interpretation) that are constrained in a principled way. It now remains to apply this theoretical perspective to the case of meaning construction in t-FoR expressions.

10 Semantic affordances and temporal reference

Having developed an LCCM account of figurative meaning construction, I now return to the issue of t-FoR lexical concepts. And in so doing I return to the question that I posed at the start of Part III of the book. How is it that we instantly, and, apparently unfailingly, recognise an expression such as (1) as relating to a temporal scene rather than a spatial one?

(1) Christmas is approaching

In brief, the sentence in (1) is a highly conventional way of referring to the relative imminence of a temporal event: intuitively, we don't have to first process and reject a spatial interpretation then 'calculate' the temporal meaning. Indeed, the prediction is that the example in (1) is processed as rapidly as the example in (2), which relates to a spatial rather than a temporal scene:

(2) The car is approaching

While Conceptual Metaphor Theory posits the existence of conceptual metaphors as a means of explaining this observation, I have argued that this cannot be the (whole) explanation. The rich repertoire of linguistic resources a language such as English has available to express temporal reference is underspecified by the Conceptual Metaphor Theory account in the domain of time.

I argued in Part II of the book that an example such as (1) is a result of the existence of a t-FoR lexical concept – an entrenched unit of semantic structure conventionally paired with a vehicle – an entrenched unit of morpho-syntactic structure. Thus, t-FoR lexical concept–vehicle pairings constitute conventional t-FoR argument-structure constructions: sentence-level units that serve to structure particular types of temporal scenes for purposes of linguistically mediated communication.

The focus in this chapter is not to establish the existence of t-FoR lexical concepts, nor to demonstrate that conceptual metaphors cannot account for expressions such as (1) alone. Those arguments have been made in earlier chapters in the book. Here I am concerned with attempting to provide an account for how

a t-FoR expression such as (1) is understood. In other words, how do language users correctly interpret the expression in (1) to convey the following:

i. The utterance relates to a temporal scene rather than a spatial scene.
ii. The temporal event of Christmas is located in the future with respect to the hearer's understanding of the present, which is implicit, although not explicitly mentioned, in the utterance.
iii. The future event of Christmas is interpreted as being relatively imminent with respect to the present.

My account takes the following shape. There is a t-FoR lexical concept which provides the linguistically encoded temporal scene with schematic structure. This t-FoR lexical concept selects for other lexical concepts – and their conventional vehicles – which are integrated with it. This integration process results in the form the utterance takes, as exemplified in (1). The open-class lexical concepts that are integrated in the t-FoR lexical concept – in the example in (1), *Christmas* and *approaching* – facilitate access to respective cognitive model profiles. And these cognitive model profiles give rise to *semantic affordances* – conventional inferences that are selected for in utterance-specific ways to facilitate meaning construction, as I shall discuss in detail below. In addition, cognitive model profiles are, I argue, structured in terms of conceptual metaphors, which provide an additional level of structure.

One consequence, then, of the account I develop in this chapter, is that it refines (and revises) how the theoretical construct of the conceptual metaphor is viewed, treating it as but one type of knowledge which is important in figurative language understanding. Some aspects of my claims, therefore, may be at odds with Conceptual Metaphor Theory as classically formulated. Nevertheless, I emphasise that the importance and status of the notion of conceptual metaphor as a theoretical construct is maintained in the present account. The key insight of the present perspective is that the meaning construction process is guided by the argument-structure t-FoR lexical concept, allowing us to interpret (1) as relating to a temporal rather than spatial scene. However, the figurative interpretation, such that Christmas is understood as being located in the future, derives from the structuring of a cognitive model profile to which the lexical concept [CHRISTMAS] facilitates access in terms of a conceptual metaphor. And the inference that Christmas is relatively imminent derives from the semantic affordance deriving from the cognitive model profile of [APPROACHING] such that an event is relatively imminent.

A further issue that I address in this chapter concerns the motivation for t-FoR lexical concepts in the first place. More specifically, why are they apparently modelled on the presumably antecedent spatial argument-structure lexical concepts? I argue that t-FoR lexical concepts were likely to have been extended from spatial argument-structure lexical concepts. In particular,

deictic and sequential t-FoR lexical concepts were plausibly extended due to independently existing conceptual metaphors. In contrast, extrinsic t-FoR lexical concepts were plausibly extended due to metonymy, resulting from the application of physical artefacts for measuring time.

The chapter is structured as follows. In the next section I outline the assumptions that underpin the LCCM perspective with respect to how t-FoR expressions are understood. This entails detailing the distinct knowledge types involved in the meaning construction process. I then consider in detail how meaning construction arises in a t-FoR expression. In particular, I focus on the interaction between conceptual metaphors and semantic affordances. In the subsequent section, I argue that semantic affordances are, sometimes, sufficient on their own to give rise to temporal referential meaning. And finally, I consider the derivation of t-FoR lexical concepts.

1 Assembling the argument

The LCCM Theory perspective assumes that figurative language understanding involves a number of different knowledge types. One type of knowledge involves primary conceptual metaphors (Grady 1997b; Lakoff and Johnson 1999). As noted in Chapter 8, these are hypothesised to be cross-domain conceptual primitives that arise automatically on the basis of pre-conceptual and universally shared experience types. However, some of the proposed primary metaphors – for instance, what Lakoff and Johnson dub the Moving Ego and Moving Time metaphors – may not, in fact, be universal, as I discuss in more detail in the next chapter.[1]

A second knowledge type involves what have been referred to as complex metaphors (Lakoff and Johnson 1999) or compound metaphors (Grady 1997b, 2005). These are, in effect, complex bodies of knowledge arising through processes of conceptual integration (in the sense of Fauconnier and Turner 2002; see detailed discussion in Fauconnier and Turner 2008). Hence, they are a type of (often very complex) blend. Specific proposals as to how these arise have been made by Grady (1997b, 2005) and, indeed, Fauconnier and Turner (2008).

The common denominator in primary and complex metaphors is that they involve knowledge that is recruited from other regions of conceptual space, which is to say, from other domains of experience. In LCCM Theory I assume that primary and complex metaphors structure the cognitive models that make up a lexical concept's cognitive model profile, as we shall see below. Hence, on

[1] Based on linguistic and gestural evidence, the Andean language Aymara appears not to have 'motion' based ego-centred conceptual metaphors (Núñez and Sweetser 2006). While there are likely to be no more than a few hundred primary metaphors (Grady p.c.), much work still remains to establish the full set.

the present account, conceptual metaphors (whether primary or complex) form part of the knowledge to which an open-class lexical concept potentially facilitates access. Hence, they form part of the conventional body of knowledge that is potentially invoked by any given lexical concept during the process of figurative language understanding.

In addition to knowledge of this type, lexical concepts facilitate what I refer to as semantic affordances. Semantic affordances (elaborated on in more detail below) are the knowledge types that are immanent in the cognitive model profile, prior to additional structuring via conceptual metaphor. For instance, the lexical concept associated with the form *whizzed* + PARTICLE (e.g., *by/past*) provides a number of possible interpretations that arise purely on the basis of the cognitive models to which it facilitates direct access (primary cognitive models) and indirect access (secondary cognitive models). These inferences constitute semantic affordances. Moreover, semantic affordances are activated during the process of (figurative) language understanding due to the operation of the normal processes of lexical concept integration and interpretation, as mediated by context, as described in the previous chapter. For instance, semantic affordances potentially activated by the selection of the lexical concept [WHIZZED BY] might include 'rapid motion', 'a distinct audible sound', 'lack of detail associated with the object of motion', and 'limited durational elapse to observe object of motion', as well as many others. I argue below that both semantic affordances and the relational structure recruited via conceptual metaphor are important in giving rise to the interpretation associated with any given open-class lexical concept during figurative language understanding.

In order to make more explicit the respective contribution of the types of knowledge just alluded to, I present below my assumptions regarding their respective contribution in figurative language understanding, before providing details of how this works in practice in the next section.

- *Assumption 1*: conceptual metaphors underdetermine (figurative) linguistic utterances.
- *Assumption 2*: figurative semantic affordances arise when a lexical concept facilitates activation of aspects of a secondary cognitive model profile, due to clash resolution.
- *Assumption 3*: linguistically mediated meaning construction *always* involves a linguistically informed process of interpretation. In figurative language understanding this may involve activation of conceptual metaphors *and* semantic affordances.
- *Assumption 4*: conceptual metaphors (in LCCM Theory) provide a special type of knowledge structure which holds at the level of cognitive models: they provide primary cognitive model profiles with a level of structure which complements existing cognitive models (within a cognitive model profile).

I briefly elaborate on each of these assumptions.

Assumption 1: There are good grounds for thinking that conceptual metaphors, while part of the story, actually underdetermine the linguistic metaphors that show up in language use. I made the case for this in Chapter 8 by considering evidence for distinguishing between a number of lexical concepts conventionally encoded by the vehicle *time*. Four of these are exemplified here:

(3) a. The time for a decision has come [MOMENT]
b. Time drags (when you're bored) [PROTRACTED DURATION]
c. Time flies (when you're having fun) [TEMPORAL COMPRESSION]
d. Time flows on (forever) [TEMPORAL MATRIX]

As I demonstrated in Chapter 8, the reason for thinking that each of these instances of *time* relates to a distinct lexical concept comes from converging evidence provided by semantic and formal selectional tendencies. Not only does the grammatical encoding associated with the lexical concepts vary across the examples in predictable ways, so do the semantic arguments. That is, the semantic value associated with *time* in each example is paired with a restricted range of semantic arguments. For instance, the [MOMENT] lexical concept for *time* can only collocate with motion events which involve deictic (and often terminal) motion. In contrast, the [MATRIX] lexical concept, which relates to time as an ontological category – our conceptualisation of time as *the* event in which all other events occur – can only occur with non-terminal motion events. Only certain types of motion events can collocate with specific types of temporal concepts. Importantly, the various conceptual metaphors for TIME that have been proposed in the literature do not predict this fact.

Moreover, this finding is not restricted to the domain of time, but is widespread. For instance, consider the conceptual metaphor STATES ARE LOCATIONS. As I argue in previous work (Evans 2010a), this conceptual metaphor does not predict why there are different patterns in the sorts of 'states' that can be encoded by different prepositions in English:

(4) a. She is in love (cf. *She is on love)
b. The soldiers are on red alert (cf. *The soldiers are in red alert)

That is, if the conceptual metaphor STATES ARE LOCATIONS directly motivated language use, we would expect both *in* and *on* to be able to encode states such as *love* and *red alert*. As I argue in detail in Evans (2010b), the reason they cannot is due to the linguistic content of the lexical concepts specific to the vehicles *in* and *on* and language use, rather than to an overarching conceptual metaphor. Of course, this does not preclude the existence of an overarching conceptual metaphor: STATES ARE LOCATIONS. And I assume the existence of conceptual metaphors, as noted above and discussed in more detail below.

Assumption 2: A semantic affordance is an inference that is specific to a given lexical concept. It arises during figurative (and indeed non-figurative) language

understanding. It is due to activation of (part of) a cognitive model to which the lexical concept facilitates access. A lexical concept can, in principle, facilitate activation of a vast number of semantic affordances, only constrained by the cognitive model profile to which it facilitates access. Moreover, a lexical concept can give rise to more than one semantic affordance in any utterance, a consequence of the extra-linguistic context (venue, time, interlocutors), the linguistic context, and the processes of meaning construction that apply.

To illustrate, consider the following utterances:

(5) a. Christmas is approaching
b. Christmas whizzed by (this year)

Conceptual Metaphor Theory, for instance, claims that the ego-centred conceptual metaphors for Moving Time (e.g., Lakoff and Johnson 1999; Moore 2006) allow us to understand (the passage of) time in terms of the motion of objects thorough space, thereby licensing these examples. However, the vehicles *approaching* and *whizzed by* give rise to distinct and distinctive semantic affordances. These cannot be predicted solely on the basis of the common conceptual metaphor that is meant to license these examples (in Conceptual Metaphor Theory).

For instance, the semantic affordance associated with the lexical concept [APPROACHING] relates to 'relative imminence'. The occurrence of the event in question, which in (5a) concerns Christmas, is construed as imminent. In contrast, the semantic affordance associated with [WHIZZED BY] in (5b) has to do not with imminence but with the perceived compressed durational elapse associated with the observer's experience of Christmas. In other words, the semantic affordance relates to the phenomenological experience that, on the occasion referred to in (5b), Christmas felt as if it lasted for a lesser period than is normally the case. While the Moving Time conceptual metaphor (I argue below) allows the language user to apply relational structure from our experience of objects moving in space, and so interpret Christmas metaphorically as an object, part of the interpretation that arises also involves semantic affordances that are unique to given lexical concepts for motion. In other words, as the inferences just mentioned are specific to lexical vehicles, it is theoretically more accurate to assume that this aspect of meaning construction involves a bottom-up process: they arise due to activation of knowledge (i.e., semantic affordances) specific to the lexical concepts in question, rather than a top-down process of overarching conceptual metaphors.

Assumption 3: My third assumption is that conceptual metaphors and semantic affordances provide two complementary types of knowledge which are essential to figurative language meaning construction. LCCM Theory assumes that language use, and specifically figurative conceptions, draw on a number of different types of knowledge. These include purely linguistic knowledge as

well as conceptual knowledge. The semantic dimension of linguistic knowledge is modelled in terms of the theoretical construct of the lexical concept, which constitutes a bundle of different knowledge types, as briefly described in Chapter 2. Conceptual knowledge takes different forms and, as mentioned above, includes (at the very least) primary cognitive models, secondary cognitive models, and conceptual metaphors which structure primary cognitive models in terms of structure recruited from other domains. As LCCM Theory takes a usage-based perspective, I assume that any utterance will always invoke various knowledge types in producing a conception, including context of use. The difference, in terms of processing effort, associated with producing any given conception is likely to be a consequence of the factors adduced in the previous chapter, including salience and complexity.

Assumption 4: Finally, I assume that conceptual metaphors (in LCCM Theory) hold at the level of cognitive models. They structure the primary cognitive model(s) to which an open-class lexical concept facilitates access. This means that the cognitive model profile for a lexical concept such as [CHRISTMAS] has 'enhanced' conceptual structure. This lexical concept, for instance, potentially facilitates access to relational knowledge concerning the motion of objects through space in order to derive analogical inferences relating to behaviour associated with the event of Christmas. This allows language users to invoke inferences associated with objects in motion in order to understand temporal relations involving the relative 'location' in time of the temporal event Christmas. I illustrate, in the next section, how this might work in practice.

2 Figurative meaning construction in t-FoR lexical concepts

I now consider how meaning construction proceeds. In so doing, I detail the respective role(s) of conceptual metaphors and semantic affordances – the latter arising via clash resolution – in terms of figurative language understanding.

To illustrate the interaction between conceptual metaphors and semantic affordances, I make use of the example in (1), which I reproduce below:

(1) Christmas is approaching

Before discussing in more detail the conception associated with this utterance, and how this arises, I want to first focus on the cognitive model profile for [CHRISTMAS]. In particular, I focus on the way in which this cognitive model profile is structured by a conceptual metaphor.

The lexical concept [CHRISTMAS] facilitates access to a number of primary cognitive models, as illustrated in Figure 10.1. These include knowledge relating to Christmas as a CULTURAL FESTIVAL, including the exchange of gifts and other cultural practices. The second type of knowledge relates to Christmas as a TEMPORAL EVENT. This includes a whole host of temporal knowledge, as

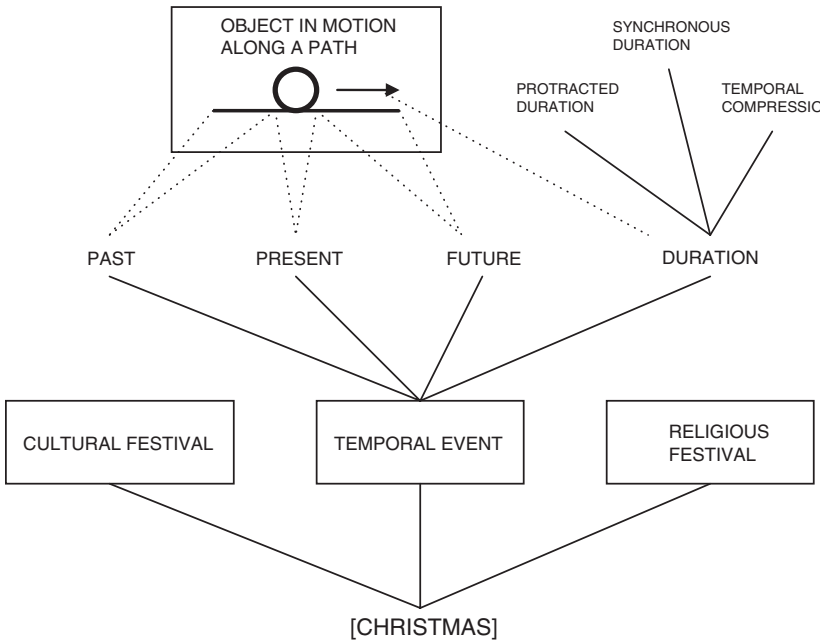

Figure 10.1 Partial primary cognitive model profile for [CHRISTMAS]

illustrated by the *attributes* and *values* associated with the TEMPORAL EVENT cognitive model – attributes and values are subsets of the knowledge that make up a cognitive model (see Evans 2009b for detailed discussion). For instance, part of our knowledge relating to a temporal event is that it can be situated in the PAST, PRESENT or FUTURE. A further attribute relates to the nature of the durational elapse associated with the event, which is to say, its DURATION. This attribute has a number of values associated with it. Moving from right to left, the first is TEMPORAL COMPRESSION – the underestimation of time, which is to say, the experience that time is proceeding more 'quickly' than usual, hence there is 'less' of it. The second is SYNCHRONOUS DURATION – the normative estimation of time, which is to say, the experience of time unfolding at its (cultural and phenomenologically) standard or equable rate. The final value is PROTRACTED DURATION. This relates to an overestimation of duration, which is to say, the felt experience that time is proceeding more 'slowly' than usual, hence there is 'more' of it. The final primary cognitive model diagrammed in Figure 10.1 is that of Christmas as a RELIGIOUS FESTIVAL. This relates to knowledge concerning the nature and status of Christmas as a Christian event and the way in which this festival is enacted and celebrated.

In addition, the primary cognitive models for [CHRISTMAS] recruit structure from other cognitive models via conceptual metaphor: as operationalised in LCCM Theory, a conceptual metaphor provides a stable link that allows aspects of conceptual content encoded by one cognitive model to be imported so as to form part of the permanent knowledge representation encoded by another. For instance, the primary cognitive model TEMPORAL EVENT is structured via a conceptual metaphor in terms of a stable, long-term link holding between it and the cognitive model relating to an OBJECT IN MOTION ALONG A PATH. As such, the cognitive model, OBJECT IN MOTION ALONG A PATH, which is represented in Figure 10.1 by a circle located on a path, with the arrow indicating direction of motion, provides the TEMPORAL EVENT cognitive model with relational structure concerning our knowledge of objects undergoing motion along a path. The conceptual content recruited via conceptual metaphor is indicated by the dashed lines.

Specifically, relational structure from this cognitive model is inherited by the PAST, PRESENT and FUTURE attributes, such that content relating to the region of the path behind the object serves to structure, in part, our experience of pastness, conceptual content relating to the object's present location serves to structure, in part, our experience of the present, and content relating to that portion of the path in front of the object serves to structure our experience of futurity. This is indicated by the dashed lines which map the relevant portions of the path of motion from the OBJECT IN MOTION ALONG A PATH cognitive model onto the relevant attributes: FUTURE, PRESENT, PAST. In addition, content relating to the nature of motion is inherited by the DURATION attribute. Again this is captured by the dashed line which links the arrow – signifying motion – with the DURATION attribute.

Now I return to addressing the figurative conception that arises for the utterance in (1). As we saw in Chapter 4, the example in (1) is sanctioned by the [IMMINENCE] lexical concept. As we saw there, this lexical concept is conventionally paired with the vehicle in (6):

(6) NP VP

Recall that the [IMMINENCE] lexical concept is a TE PP deictic t-FoR lexical concept. That is, it encodes a target event (TE) which is 'located' in time with respect to an experiencer which serves as the reference point (RP). However, the temporal location is viewed from the perspective point (PP) of the TE, as evidenced by the lexical concept selecting for the TE to be integrated with the NP slot.

This lexical concept provides a conventional construal of the imminence relation as one that culminates at the RP. In so doing, it makes salient the RP as the terminus of the imminence relation: once the TE reaches the RP it is no longer imminent.

The linguistic content encoded by this lexical concept is highly schematic in nature. It does not relate to the phenomenological experience of what it 'feels' like, for instance, to experience the passage of time. Nor does it encode phenomenologically rich notions relating to the experience of futurity. That is, this lexical concept simply encodes a relation holding between a TE and the RP, the location of the experience, which is anchored by an origo (O), the experiencer's present. In other words, what 'gets into' language, so to speak, in terms of linguistic content, is a highly parameterised version of temporal experience.[2] It says nothing about whether the event is located in the future with respect to the RP. This rich inference emerges following interpretation, once open-class lexical concepts have been integrated with the sentence-level t-FoR lexical concept.

In addition to this schematic content, and as we have seen, lexical concepts are associated with a lexical profile, which constrains the range of lexical concepts and vehicles that can 'fill' a lexical concept of the kind that sanctions the example in (1). For instance, the [IMMINENCE] lexical concept selects for the following. The NP in the vehicle must be a discrete temporal event of some kind. It selects for manner-neutral verbs such as *to approach*, and *to come*. Verbs such as these canonically encode lexical concepts that relate to terminal motion events. Motion events of this kind culminate at a particular location: the terminal point. Thus, motion events of this kind have a prescribed and hence restricted path of motion, with a predefined end point. Moreover, as the terminal point, the RP, is an inherent feature of the motion event, it is implicit in the semantic argument. For this reason, the RP often does not need to be explicitly encoded.

In a typical conception arising on the basis of (1) at least three specific inferences arise which collectively make up the conception. As noted at the outset of the chapter, these can be summarised as follows:

i. The utterance relates to a temporal scenario rather than one involving veridical motion.
ii. The temporal event of Christmas is located in the future with respect to our understanding of the present, which is implicit, although not explicitly mentioned, in the utterance.
iii. The future event of Christmas is interpreted as being relatively imminent with respect to the present.

Let's consider how the processes of meaning construction developed in LCCM Theory account for these. In terms of the first issue, I argue that the language user recognises the utterance as relating to a temporal scenario (rather than one involving motion) in precisely the same way as the idiomatic meaning

[2] See Evans (2009b) for discussion on the notion of paramaterisation in language.

of *He hit the roof* is instantly recognised. The existence of the [IMMINENCE] t-FoR lexical concept presented in (1) is highly salient, in the sense discussed in the previous chapter – it is well entrenched in semantic memory. The existence of the lexical concept serves as a frame for interpreting the open-class lexical concepts – those associated with the vehicles *Christmas* and *approaching* – allowing them to achieve an informational characterisation relating to a temporal scene.

Turning now to the second issue, how is it that the utterance is understood as relating to a temporal event which is 'located' in the future? The answer, I suggest, relates to the existence of the ego-centred conceptual metaphor TIME IS MOTION OF OBJECTS (ALONG A PATH), aka Moving Time, which structures the cognitive model profile of [CHRISTMAS].

In terms of the inference arising from (1) that the event of Christmas is situated in the future, this is due to matching between the primary cognitive model of [CHRISTMAS] – involving spatial content recruited via conceptual metaphor – and the primary cognitive model profile accessed via [APPROACHING]. That is, the conceptual metaphor structures the primary cognitive model TEMPORAL EVENT, providing it with relational structure recruited from a cognitive model relating to motion through space.

Hence, in terms of the utterance in (1), matching is achieved in the primary cognitive model profiles of both [CHRISTMAS] and [APPROACHING]. After all, because of the conceptual metaphor, [CHRISTMAS] facilitates access to relational structure derived from the motion scenario involving an object in motion. This knowledge forms part of the TEMPORAL EVENT cognitive model. This is matched with the kind of terminal motion accessed via [APPROACHING]. The cognitive model profile associated with [APPROACHING] involves motion towards an entity, and hence, the object in motion is calculated by the language user as located in front of the entity with respect to which it is 'approaching'. As the FUTURE attribute of the TEMPORAL EVENT cognitive model accessed via [CHRISTMAS] is structured in terms of that part of the motion trajectory that is in front, there is a match. And the resulting match involves an interpretation in which the temporal event of Christmas is 'located' in the future. In other words, this particular interpretation is a consequence of a special type of matching I refer to as *conceptual metaphor matching*.

Importantly, LCCM Theory assumes that in cases of conceptual metaphor matching, regular matching – as described in the previous chapter – still takes place. In other words, conceptual metaphor matching involving primary cognitive models does not prohibit additional figurative semantic affordances arising on the basis of activation in the secondary cognitive profile of one of the lexical concepts undergoing matching (and clash resolution).

The third and final issue relates to the inference that the temporal event of Christmas in (1) is relatively imminent. This interpretation arises, I argue, due to

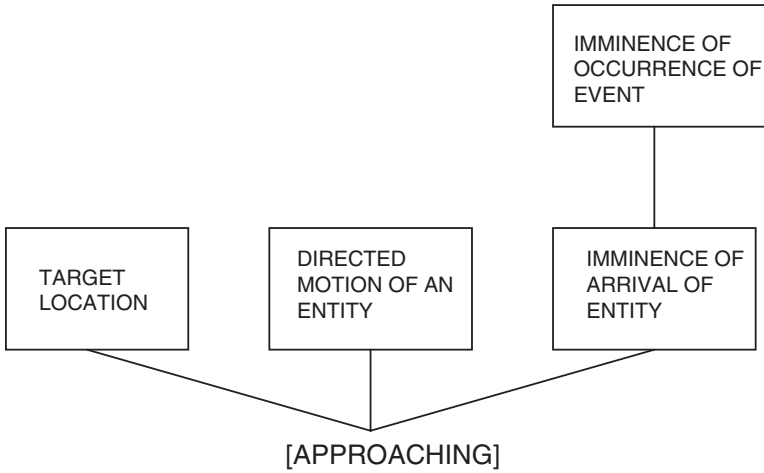

Figure 10.2 Partial cognitive model profile for [APPROACHING]

the regular process of matching as described in the previous chapter. Matching, as guided by the principles introduced in Chapter 9, attempts to build an informational characterisation for [CHRISTMAS] and [APPROACHING] by first searching the primary cognitive models of both these open-class lexical concepts. As Christmas is a temporal, cultural and religious event, and hence something that cannot undergo the sort of veridical motion implicated by the primary cognitive model profile associated with [APPROACHING], a clash arises. This necessitates clash resolution. As a result of the Principle of Context-induced Clash Resolution, [CHRISTMAS] is designated as the figurative target, and [APPROACHING] the figurative vehicle.

The consequence is that a search is established in the secondary cognitive model profile of [APPROACHING]. A very partial cognitive model for [APPROACHING] is provided in Figure 10.2. The cognitive model profile for [APPROACHING] includes primary cognitive models for a TARGET LOCATION, the DIRECTED MOTION OF AN ENTITY, and THE IMMINENCE OF ARRIVAL OF AN ENTITY. A consequence of the relative imminence of arrival of an entity is the IMMINENCE OF OCCURRENCE OF EVENT, which is a secondary cognitive model. As a temporal event such as Christmas can occur but not (literally) arrive, there is a match between the secondary cognitive model IMMINENCE OF OCCURRENCE of event and the primary cognitive model profile of [CHRISTMAS]. Hence, the interpretation of the imminence of the occurrence of Christmas is due to a semantic affordance that results from clash resolution following regular matching.

This analysis reveals that the interpretation of (1) involves more than simply a conceptual metaphor. A number of different knowledge types are involved,

and regular processes of meaning construction take place, as modelled by LCCM Theory. This involves understanding the temporal event as an object that can undergo motion (via conceptual metaphor), and hence its 'location' in the future, and understanding, through clash resolution, that the type of motion involved implicates relative imminence of occurrence, achieved without recourse to conceptual metaphor – a semantic affordance.

3 Another example

In this section I consider meaning construction in a second example:

(7) Christmas has disappeared (over the horizon)

The reason for doing so is that the example in (7) is at odds with the prediction made by the Moving Ego/Observer conceptual metaphor (Lakoff and Johnson 1999). In the example in (7), an event, the occurrence of Christmas, is set in the past. Yet, it is metaphorically structured as being 'located' on the anterior portion of the sagittal axis, contradicting the prediction made by the Moving Ego metaphor. Recall that the Moving Ego conceptual metaphor predicts that events set in the past are 'located' on the posterior portion of the sagittal axis, which is to say, 'behind' the experiencer.

There are a number of inferences associated with this utterance, of which I'd like to focus on three:

i. The scenario described relates to a temporal rather than a spatial scene.
ii. The TE is past-oriented.
iii. The TE is set in the distant past.

As before, the reason why this is automatically construed as relating to a temporal scene is due, I argue, to a pre-existing t-FoR lexical concept. The specific lexical concept is the [DISTANT OCCURRENCE] TE PP deictic t-FoR lexical concept, discussed in Chapter 4. As I noted there, the VP vehicle element that is selected for requires semantic arguments relating to events of visual imperceptibility, e.g., *disappeared.* This gives rise to a temporal relation that is necessarily past-based: the TE must necessarily be set in the past with respect to the O.

Evidence for this comes from the fact that the reading relates to a past-based event even when the present tense is deployed:

(8) Christmas is disappearing (over the horizon)

The canonical reading for (8) is that the TE is set in the past – and is located on the anterior region of the RP's sagittal axis – even though the event being described co-occurs with coding time. Hence, the first inference – that the utterance relates to a temporal rather than a spatial scene – is due to the existence of

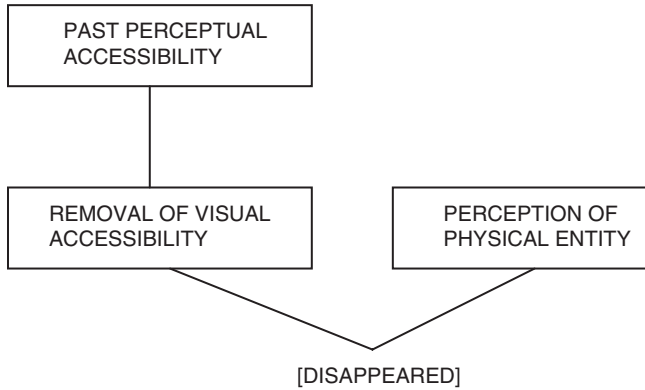

Figure 10.3 A very partial cognitive model profile for [DISAPPEARED]

the [DISTANT OCCURRENCE] deictic t-FoR lexical concept. This lexical concept sanctions the utterance in (8).

In terms of the second inference, that the TE, Christmas, is past-oriented, this again arises from the existence of the lexical concept. The lexical concept selects for semantic arguments that concern events that are (or are going to be) no longer perceptually accessible. That is, what is encoded is an event whose orientation relates to pastness with respect to the O: the experiencer's awareness of the present.

And the final inference, relating to the notion of distant past arises from a semantic affordance accessed via the lexical concept [DISAPPEARED]. In other words, the lexical concept [DISAPPEARED] gives rise to the specific inference that the past event is set in the distant past. This arises through the normal process of clash resolution. To illustrate, consider the (very partial) cognitive model profile for [DISAPPEARED] in Figure 10.3.

Figure 10.3 illustrates the following. The lexical concept [DISAPPEARED] facilitates access to at least two primary cognitive models. From left to right, these are REMOVAL OF VISUAL ACCESSIBILITY and PERCEPTION OF PHYSICAL ENTITY. That is, part of the knowledge to which this lexical concept facilitates access has to do with what it means to perceive a physical entity, and the experience of a physical entity undergoing a process such that it becomes visually inaccessible. For instance, when we travel away from a specific entity, the distance involved eventually becomes too great for our visual apparatus to continue to perceive the entity in question. Each of these cognitive models affords access to further cognitive models. Visual inaccessibility facilitates access to knowledge relating to the more general experience of PAST PERCEPTUAL ACCESSIBILITY, for example.

In terms, then, of meaning construction, the inference relating to the distant past arises from the utterance in (8) in the following way. This inference arises

due to the regular process of matching as described in the previous chapter. The matching process attempts to build an informational characterisation for [CHRISTMAS] and [DISAPPEARED] by first searching the primary cognitive models of both these open-class lexical concepts. As Christmas is a temporal, cultural and religious event, and hence neither a physical entity, nor something that can veridically become visually inaccessible, as implicated by the primary cognitive model profile associated with [DISAPPEARED], a clash arises. This necessitates clash resolution. Due to the Principle of Context-induced Clash Resolution, [CHRISTMAS] is designated as the figurative target, and [DISAPPEARED] the figurative vehicle.

The consequence is that a search is established in the secondary cognitive model profile of [DISAPPEARED]. While a temporal event such as Christmas cannot become visually inaccessible as it is not a physical entity, it can become perceptually inaccessible, for example, by no longer being 'located' in the present. When the events and experiences associated with Christmas become set in the past, the experiences that constitute it are no longer perceptually accessible. As such, there is a match between secondary cognitive model PAST PERCEPTUAL ACCESSIBILITY of the event and the primary cognitive model profile of [CHRISTMAS]. As something that was once perceptually accessible but is no longer is necessarily set in the past, the semantic affordance of 'distant past' is activated from the cognitive model profile of [DISAPPEARED] in understanding the utterance in (8).

An interesting aspect of this analysis is that the conception that arises does not depend on the Moving Observer conceptual metaphor. In fact, the Moving Observer metaphor, while structuring the primary cognitive model profile of [CHRISTMAS] is potentially at odds with the semantic affordance that arises in the case of the utterance in (8). This demonstrates that conceptual metaphors are not required for figurative conceptions involving t-FoR lexical concepts. It also demonstrates that an interpretation can arise that is potentially at odds with a conceptual metaphor that structures an element involved in the interpretation, in this case [CHRISTMAS]. This follows as metaphor matching is, I suggest, an optional process that only applies when it can. When it clashes with the primary cognitive model profile of the lexical concept with which it is undergoing fusion, it doesn't apply.

That said, while the Moving Ego conceptual metaphor doesn't appear to play a role in the conception that arises for (8), this does not mean that conceptual metaphor doesn't play a role vis-à-vis the [DISTANT OCCURRENCE] lexical concept. I will have more to say on this in the next section.

4 Derivation of t-FoR lexical concepts

In this section I consider the provenance of t-FoR lexical concepts. How did t-FoR lexical concepts arise? After all, they appear, on the face of it, to be

modelled on sentence-level lexical concepts that encode spatial scenes. If we assume that t-FoR lexical concepts developed from antecedent spatial lexical concepts, as predicted by Grammaticalisation Theory (e.g., Heine and Kuteva 2007), then a plausible explanation for the emergence of t-FoRs relates to conceptual metaphor, especially with respect to deictic and sequential reference. The account goes as follows. Due to the independently motivated existence of conceptual metaphors in the conceptual system, lexical concepts encoding spatial reference assume a temporal reference function. For this contention to hold, two issues must be accounted for. First, how do the conceptual and linguistic systems interact such that structure in the conceptual system gives rise to 'new' structure in the linguistic system? And second, which conceptual metaphors are invoked in the extension of spatial lexical concepts to the arena of temporal reference? I consider these issues in the sub-sections below.

4.1 Interaction between the linguistic and conceptual systems

The primary way in which the linguistic and conceptual systems interact is by virtue of *access sites* – introduced in Chapter 2. An access site represents a composite of the range of *association areas* that hold between an open-class lexical concept and the conceptual system. An association area is a location in the conceptual system with which a specific lexical concept is associated. In other words, an association area provides a point of convergence between the two systems, facilitating interaction between content from both. As a given lexical concept has typically many association areas, an access site constitutes the set of association areas for a given lexical concept.

All the association areas collectively form the access site for any given open-class lexical concept. Yet this being so, this gives rise to considerable complexity, providing access to a large semantic potential.

The purpose of an access site is to facilitate integration of linguistic and conceptual content in order to provide a conception: a linguistically mediated simulation – recall that cognitive models, the non-linguistic knowledge structures within the conceptual system to which lexical concepts facilitate access, are assumed to be comprised of something akin to *perceptual symbols* (Barsalou 1999) in LCCM Theory. Hence, on this account, the evolutionary motivation for the linguistic and conceptual systems to interact is in order to make use of conceptual structure inhering in the conceptual system in service of linguistically mediated communication. The mechanism whereby semantic structures from the linguistic system interact with conceptual structure is, of course, the process I refer to as interpretation.

The association areas that comprise an access site are hypothesised to arise by virtue of usage patterns: vehicles sanctioned by specific lexical concepts being used in the context of perceived things and situations. Based on such

patterns of use, statistical frequencies are extracted which serve to associate lexical concepts with the regions of the conceptual system where the relevant things and situations are represented, giving rise to association areas. Access sites are thus probabilistic, in the sense that the greater the frequency with which a language user experiences a sanctioning lexical concept and a thing/situation as co-occurring, the greater the strength of the association area.

A consequence of this interaction between the linguistic and conceptual systems is the following prediction: both lexical concepts and cognitive models (aka concepts) interact and influence one another in a bidirectional way. I consider, first, the influence of language on the conceptual system.

Cognitive models are simulators in the sense of Barsalou (e.g., 1999; see Evans 2009b for detailed discussion). They are located in the sensory-motor regions of the brain and constitute records of perceptual states. However, cognitive models also involve information from other sources (Barsalou 1999), which, it is hypothesised, is incorporated into sensory-motor representations by virtue of convergence zones (Damasio 1989). In LCCM Theory I assume that the output of the interaction between the linguistic and conceptual systems, namely conceptions – linguistically mediated simulations – can be integrated with existing cognitive models in order to provide an additional source of information which serves to update relevant cognitive models. Hence, simulations are perceptual in nature, albeit internally generated perceptual states. In essence, linguistic interactions with the conceptual system can modify the representations held in the conceptual system, by virtue of the products, simulations, serving to modify the representational states which generated them in the first place. Simply put, linguistically mediated simulations can serve to modify the conceptual system by updating existing cognitive models. In previous work I have referred to this process as *non-modal modification* (Evans 2009b).

One of the consequences of linguistic indexing of the conceptual system, and the modification of the conceptual system as a consequence, is the prediction that we should expect relativistic effects: linguistic relativity is predicted by LCCM Theory. As lexical concepts are language-specific, each language consists of a unique set of linguistically encoded concepts. As lexical concepts have unique access sites, this means that each language interacts with the conceptual system in a language-specific way. As the conceptual system can be modified as a result of the simulations arising from the interaction between language and conceptual structure, LCCM Theory predicts that speakers of different languages should have distinct conceptual representations.

The thesis that language can influence non-linguistic aspects of cognitive function and representation, the linguistic relativity principle, is also commonly referred to as the Sapir–Whorf hypothesis after the two twentieth-century linguists, Edward Sapir and Benjamin Lee Whorf, who advanced versions of this

principle. Classic work which has sought to empirically test a version of the Sapir–Whorf hypothesis has been conducted by Lucy (1992). More recent empirical work has been conducted in the domains of space (e.g., Levinson 2003) and time (e.g., Boroditsky 2001; Boroditsky *et al.* 2011). Their findings can be construed as suggestive that language does indeed influence aspects of non-linguistic cognition.

I now turn to the influence on language by the conceptual system. Language emerged relatively recently in evolutionary terms, as a system to facilitate interaction with the conceptual system. While a great many species possess sophisticated conceptual systems in order to facilitate perception, categorisation, situated action and learning, humans appear to be alone in possessing language. I contend that language emerged in order to facilitate interaction with the evolutionarily much older conceptual system. It did so to provide a means of harnessing the conceptual system for purposes of linguistically mediated communication. While the content (semantic structure) encoded by the linguistic system is qualitatively distinct from that encoded by the conceptual system (conceptual structure), it stands to reason that it should reflect, in schematic form, aspects of conceptual structure. This schematic content manifests itself, I have argued in detail in previous work (Evans 2009a), as parameters. Lexical concepts encode conceptual information, which is in analogue form, in a digitised (and hence highly schematic) form. This provides language with a way of parcellating the conceptual content it facilitates access to, in order to provide complex and precise linguistically mediated simulations, that is, conceptions. For this to work, the parameters encoded by language have to reflect pre-existing content in the conceptual system. In other words, lexical concepts must encode content that is reflective of the content which populates the conceptual system, but which is, in its format, orthogonal to it.

That said, an important design feature of language involves what I refer to as *interacting* and *non-interacting elements*. Interacting elements correspond to open-class lexical concepts. These are lexical concepts that have access sites. Non-interacting elements correspond to closed-class lexical concepts, including t-FoR lexical concepts. A t-FoR lexical concept provides a means of encoding schematic content, delineating aspects of a temporal scene. However, it must be integrated with open-class lexical concepts which can activate the semantic affordances that inhere in the conceptual system. Hence, non-interacting elements provide the structure, or 'scaffolding', to borrow Talmy's (2000) metaphor for a conception, that parcellates the conceptual content accessed via the interacting elements in service of a sophisticated linguistically mediated simulation.

For all this to be accomplished, lexical concepts – both interacting and non-interacting types – must evolve, and appear to do so on a continuous basis, many times faster than biological evolution. Just as linguistic content

is hypothesised to reflect conceptual content, albeit in parametric form, so too the principles that give rise to language change are hypothesised to reflect the principles that structure the conceptual system. One of the principles which appears to be foundational in the conceptual system is the existence of conceptual metaphors. I hypothesise that these play a role in the development of non-interacting elements. Let's consider how this might work.

While research is required to establish the role of conceptual metaphors in contributing to form–function reanalysis in non-interacting elements – such as sentence-level constructions, of which t-FoR constructions are an example – something like the following may be the case. Cognitive model profiles for events, such as, for instance, [CHRISTMAS], discussed in this chapter, are held to be structured in terms of a conceptual metaphor such that the temporal components of an event can be construed, inferentially, in terms of the relations holding within a motion event. Through an analogical process, the nature of which awaits future research, a sentence-level construction, such as, for instance, intransitive motion, can be reanalysed as encoding not veridical motion, but a temporal relation. This process would facilitate the reanalysis of, for instance, the intransitive motion lexical concept as one encoding a scene involving not motion through space, but rather temporal reference:

(9) The car is approaching (deictic spatial relation, reanalysed as …)

(10) Christmas is approaching (… deictic temporal relation)

One consequence of this view is that it is distinct from the usage-based process that gives rise to discourse metaphors such as *tart*, as discussed in Chapter 8. That process, I argued, was essentially a linguistic one, a consequence of the relationship between linguistic resources and their use – and driven presumably by pragmatic processes (see Carston 2010, for instance), as well as usage-based pressures (see Traugott and Dasher 2004). In contrast, the motivation for sentence-level lexical concepts relating to spatial reference taking on a temporal reference function is not directly motivated by language use. I suggest, instead, it is motivated by conceptual metaphor, which inheres in the conceptual, rather than the linguistic system.

4.2 Extension via conceptual metaphor

I now consider the role of conceptual metaphor in motivating t-FoR lexical concepts. The claim then is that lexical concepts which encode a spatial scene are extended, via a process involving conceptual metaphor, to encode a temporal scene. To illustrate, I consider the two t-FoR lexical concepts I examined in earlier sections above:

(11) a. Vehicle: NP1 VP
b. Lexical concept: [IMMINENCE TE PP]
c. Example: Christmas is approaching

(12) a. Vehicle: NP VP (PrepP)
b. Lexical concept: [DISTANT OCCURRENCE TE PP]
c. Example: Christmas has vanished (over the horizon)

These are both deictic t-FoR lexical concepts. But the extension from lexical concepts encoding spatial scenes plausibly involves distinct conceptual metaphors. For instance, the lexical concept in (11b) is most likely motivated by the Moving Time metaphor, such that a lexical concept encoding motion through space is reanalysed as encoding temporal imminence.

In contrast, I suggest that the lexical concept in (12b) is not extended from lexical concepts involving motion through space, but from scenes involving removal of visual accessibility:

(13) The white rabbit vanished (in the magician's hat)

The extension is plausibly motivated by the conceptual metaphor KNOWING IS SEEING. This conceptual metaphor plausibly extends visual perception of a scene to a scene involving knowledge or experience of something, such as the experience of Christmas.

While these conceptual metaphors plausibly motivate the extension of deictic t-FoR lexical concepts, they appear not to be involved in sequential t-FoR lexical concepts. Consider an example of the temporal reference strategy [LATER IN SEQUENCE], which is a retrospective PP t-FoR lexical concept:

(14) a. Vehicle: NP1 VP *after* NP2
b. Lexical concept: [LATER IN SEQUENCE]
c. Example: New Year is after Christmas

In addition to being motivated by a distinct t-FoR, the lexical concept in (14b) is slightly different from those considered in (11) and (12). This is because its vehicle is partially lexically filled. That is, its vehicle features the obligatory vehicle *after*. Moreover, this vehicle, *after*, is conventionally associated with at least two lexical concepts, a 'spatial' lexical concept [SUBSEQUENT POSITION ON A PATH], and a 'temporal' lexical concept [SUBSEQUENT POSITION IN A SEQUENCE]. The polysemy exhibited by *after* plausibly arises due to the usage-based factors described in Chapter 8. In other words, polysemy arises due to linguistic use in specific contexts – it is a linguistic, rather than a conceptual phenomenon, in the sense that it arises due to pressure within the linguistic rather than the conceptual system. As being located after, in many contexts of use, implicates being sequenced after, this is likely to have led to this situated inference becoming reanalysed as a distinct lexical concept associated with *after*.

That said, the reason for the existence of a [LATER IN SEQUENCE] sentence-level lexical concept is likely to be facilitated by the existence of the [SUBSEQUENT POSITION IN A SEQUENCE] lexical concept associated with *after*. We see then that in this case, LCCM Theory predicts that conceptual metaphor does not motivate the existence of the [LATER IN SEQUENCE] lexical concept. Hence, while conceptual metaphors plausibly do have a role, in some cases, in the derivation of 'temporal' sentence-level lexical concepts, language is a complex system and lexical concepts can be derived in a number of ways, with language use being an important driver of form–function reanalysis.

4.3 Extension via conceptual metonymy

Finally, I consider the motivation for emergence of extrinsic t-FoR lexical concepts. To do so, reconsider an example such as the argument-structure construction in (15), and examples of this in (16):

(15) a. Vehicle: *The time* BE PrepP
b. Lexical concept: TE FIXED WITH RESPECT TO AN RP (IN THE 12-HOUR CLOCK)]

(16) a. The time is (a) quarter to/of/till/before eight
b. The time is (a) quarter after eight

The lexical concept in (15b) appears to be based on a spatial template. However, in this case, it is not due to conceptual metaphor, nor due to language-internal, which is to say, usage-based form–function reanalysis. Rather, the motivation appears to be metonymic in nature: the symbolic representation of the 12-hour clock as a clock 'face', as represented in Figure 10.4 (first discussed in Chapter 6).

The clock face represents time's elapse by virtue of the movement of two 'hands', such that the position of the big hand, with respect to the little hand, which indicates a given hour, is reflected linguistically. Moreover, the motion of the big hand is also reflected in language, as is evident from (17):

(17) The time/hour is approaching midnight

What the examples in (16) and (17) show is that the linguistically mediated representation of time reflects the spatial representation of time captured by the material artefact that is the clock face. In other words, the motion of hands around a clock face is a metonymic representation for the elapse of time. And this metonymic representation is what linguistic representation captures in service of the linguistically mediated communication of extrinsic temporal reference.

What we see, then, is that there are multiple motivations for sentence-level lexical concepts for time. These are motivated by pressures emanating from

Figure 10.4 The Big Ben clock face

the conceptual system (conceptual metaphors), from the linguistic system (usage-based form–function reanalysis) and material artefacts (metonymy).

5 Summary

In this chapter I have provided an LCCM Theory account of how temporal reference expressions are understood. Central to this account is the existence of a t-FoR lexical concept. This, I have argued, provides a linguistically encoded temporal scene, serving as a schematic template for the integration of other lexical concepts and interpretation via non-linguistic content. In particular, I have argued that meaning construction, being a process constrained by application of principles, involves the integration of two non-linguistic knowledge types. These include conceptual metaphors, which structure cognitive models, and semantic affordances. The latter arise from the cognitive profile which a given open-class lexical concept facilitates access to. Crucially, I have argued that while conceptual metaphors play a role in the interpretation of t-FoR lexical concepts, this is not inevitably the case. Some t-FoR lexical concepts can be interpreted by deploying semantic affordances alone. In this chapter I have also considered the motivation for t-FoR lexical concepts having arisen in the first place. I argued that there appear to be several distinct motivations, involving conceptual metaphors, usage-based form–function reanalysis and metonymy.

11 Universals and diversity in the cross-linguistic representation of time

In this final chapter, I deal with the issue of putative universals and diversity in the temporal representation of time in language. My point of departure, in the next section, is to reconsider the nature of temporal reference strategies in the light of findings relating to the Amondawa language (Sinha *et al.* 2011). In the subsequent section, I then address conceptual metaphors for time. I consider grounds for distinguishing between those conceptual metaphors for time that are likely to be universal and those that are not. In the following section I turn to the issue of lexical concepts and distinguish between types of lexical concept, and suggest that one type is more likely to show up cross-linguistically, invoking the earlier (Chapter 3) distinction I made between temporal representations that are grounded in phenomenologically real temporal experience and those that appear to be a mental achievement. Finally, before concluding, I briefly consider the interaction between conceptual metaphors and lexical concepts in facilitating and so constituting temporal reference in human cognition.

1 Temporal reference strategies

In this book I have provided arguments and evidence for thinking that the domain of time exhibits three reference strategies. These, in broad terms, appear to be underpinned by reference strategies (egocentric versus allocentric) that also underpin spatial reference. That said, the form these very general strategies take is domain-specific. In the domain of time I have argued for the specific t-FoRs: deictic, sequential and extrinsic. While a language such as English provides the linguist with good evidence for the existence of all three strategies, it remains an open question as to whether all three t-FoRs necessarily manifest themselves across all languages. Indeed, in Chapter 7, I noted that recent findings relating to the Amondawa language by Sinha *et al.* (2011) might be construed as arguing against the universality of extrinsic reference. In this section I consider the relevant issues relating to this.

Extrinsic temporal reference is grounded in the duration transience type, and gives rise to a matrix relation – a view of time as the event in which all others

unfold. In other words, extrinsic reference relies on the reification of temporal experience – and specifically duration – as a category independent of the phenomenological experience from which it arises. This gives rise to a category that is available for conscious and hence inter-subjective reflection. A clear manifestation of this is the material artefacts we deploy in order to 'measure' (different aspects of) time, such as clocks and calendars.

In recent work on Amondawa, Sinha *et al.* (2011) present evidence for thinking that the Amondawa people do not have a category for time as an ontological entity. Moreover, the Amondawa appear not to have indigenous systems for 'measuring' time, as would, therefore, be expected. Put another way, Sinha *et al.* argue that the Amondawa appear to lack extrinsic temporal reference, in their parlance: 'time as such'.

Amondawa is an indigenous South American language spoken by a small tribe of around 115 people located in remote western Amazonia. Official contact was not made until 1986. Based on their fieldwork with, and their linguistic analysis of, the Amondawa, Sinha and colleagues make two claims:

1. In contrast to, for example, Indo-European languages, including English and Portuguese, Amondawa does not make use of ascriptions from spatial language or language relating to motion to talk about time.
2. Amondawa does not make reference to time as an ontological category independent of events themselves. They maintain that there is no evidence from the Amondawa language or culture that the Amondawa have time available, per se, as an object of conscious (inter-subjective) reflection.

In terms of claim 1, Sinha *et al.* observe that it is widely assumed – especially by cognitive linguists – that conceptual metaphors from space to time are universal – due to the existence of primary metaphors. However, extensive fieldwork on Amondawa challenges the universality of space–time metaphors in language. Although the Amondawa have a rich lexicon and grammar of space, and have lexical and constructional resources to import space into time, they do not appear to have conventionalised metaphors to ascribe space to time. For instance, there is no evidence from Amondawa for the existence of the Moving Time and Moving Ego conceptual metaphors.

Sinha and colleagues are at pains, however, to point out that from this it doesn't follow that the Amondawa can't think about time using space. In fact, Sinha *et al.* make use of what they term a 'dinner plate' installation task, which tests whether the Amondawa can sequence temporal events making use of dinner plates as symbolic representations for specific events. The task demonstrated that the Amondawa can indeed produce spontaneous linear ordering of events in a temporal sequence. Moreover, a further elicitation task showed that the Amondawa have the ability to create novel space–time metaphors when coaxed. Furthermore, there is no evidence that they have trouble

acquiring Portuguese, or of using Portuguese cultural artefacts for measuring time – Portuguese is much like English in terms of its space-to-time conceptual metaphors. Nevertheless, Sinha and colleagues conclude, from this, that the cognitive capacity to create mental metaphors from space to time does not automatically result in the creation of conventional space–time metaphors in language or other cultural artefacts deployed for 'measuring' time.

Now I turn, briefly, to claim 2. Sinha and colleagues observe that in English and other languages, some words name time intervals that are event-based (e.g., *lunch, Christmas*), and others name time intervals that are time-based (e.g., *week*, *anniversary*). In contrast, all of the time terms in Amondawa appear to be event-based. The Amondawa do not appear to lexicalise time-based time intervals. There is also no evidence for time-based time intervals in their non-linguistic artefacts (e.g., calendars). There is no evidence, therefore, that they pick out time as an ontological category independent of events themselves, or that they consciously reflect on time as a category, per se, abstracted away from particular events.

Again, as Sinha *et al.* are quick to point out, this doesn't mean that the Amondawa lack the subjective experience of time. And it doesn't mean that they can't reflect on 'time as such' and reason about it when encouraged to. After all, and again, there is no evidence that the Amondawa have trouble acquiring Portuguese and using Portuguese cultural artefacts. Nevertheless, they argue, the cognitive capacity to represent 'time as such' does not mean that time is necessarily picked out by a culture as an object of inter-subjective reflection.

In sum, the Amondawa seem to lack space-to-time motion metaphors in language and cultural artefacts, although they can still think about time using spatial schemas, at least when coaxed. There is no evidence for thinking that what Sinha *et al.* call 'time as such' exists in the Amondawa language and culture. Of course, we need to insert a caveat here. While there is no evidence that the Amondawa entertain 'time as such' as a concept, it would be a logical error to conclude they don't think about 'time as such' from the fact that they don't talk about it; after all the absence of evidence is not evidence of absence.

While Sinha *et al.* have found no evidence for Ego-RP space-to-time conceptual metaphors (discussed below), it would be a surprise if other sorts of conceptual metaphor were entirely absent, notably what I refer to as DURATION IS LENGTH, discussed earlier in the book, and TEMPORAL SEQUENCE IS POSITION ON A PATH (Moore 2006). Indeed, the installation task discussed very briefly above provides some evidence that the Amondawa can and do conceptualise temporal sequence as predicted by the latter conceptual metaphor.

In terms of the present enquiry, where do these preliminary findings relating to the Amondawa leave us? The lack of evidence for artefacts for 'measuring' time, and the lack of evidence for temporal interval terms in Amondawa

suggest that the Amondawa may lack some of the manifestations of an extrinsic temporal reference strategy. As I have argued, extrinsic temporal reference requires a level of temporal representation such that time is reified as a category independent of the events and perceptual arrays that give rise to our phenomenological experience of it – time as an intellectual achievement. And it is therefore to be expected that, in diachronic terms, linguistic and other symbolic manifestations of this type of temporal reference are likely to emerge later than those for deictic and sequential reference. Yet, as noted, the lack of evidence is not evidence for an absence of extrinsic reference. That is, the claim that Sinha *et al.* make is very strong, and it is not clear to me that there is evidence to support it. Sinha *et al.* argue that the Amondawa do not have material artefacts that facilitate time and event reckoning precisely because, without having the conceptual category 'time as such' in their culture, they are not readily able to deploy an extrinsic temporal reference strategy. That is, they claim that the Amondawa, in effect, do not have the matrix conceptualisation for time.

I argued in Chapter 6 that the matrix relation underpins both mensural and cyclical construals of time. While the Amondawa appear not to have indigenous mensural construals, as evidenced by the lack of linguistic and material artefacts such as time-measurement systems, they do, nevertheless, appear to have an understanding of cyclical aspects of time. They can talk, for instance, of wet and dry seasons, and are perfectly cognisant of the fact that these seasons are cyclical. To have such an understanding, I would claim, the Amondawa must have something akin to the matrix relation.

Part of the basis for the claim made by Sinha *et al.* is a result of their finding that the Amondawa appear not to exhibit/have space-to-time motion conceptual metaphors. That finding may be correct (or at least partially correct). However, as I have been at pains to point out in this book, the existence of conceptual metaphors is, in principle, a separate issue from the presence of temporal reference systems in the human mind. Indeed, extrinsic reference, I have argued, while deriving from conscious reflection, nevertheless has a phenomenological and neural basis, grounded in our experience of duration. In other words, extrinsic temporal reference is distinct from our experience of space, and motion through space. The putative lack of a certain class of conceptual metaphors should not, therefore, be taken to imply that the Amondawa lack the matrix relation (what Sinha *et al.* term 'time as such'). After all, and as already noted, the Amondawa have no difficulty in acquiring great facility in deploying mensural time when using Portuguese, for instance.

In view of this, I draw the following conclusions. The Amondawa language may lack a (subset of a) class of space-to-time motion metaphors. However, there is evidence for some aspects of what I refer to extrinsic temporal reference, despite the claims made by the authors. In addition, the existence of different types of temporal reference strategies has to be considered independently

from the putative existence, or otherwise, of conceptual metaphors for time. Conceptual metaphors neither create our experience of time, nor are they necessary for us to experience temporal experience. While they are important for structuring and facilitating temporal representations and temporal reference, especially in symbolic representation, other types of knowledge are equally important for these purposes, including lexical concepts encoded in language and conceptual metonymies, as well as semantic affordances that inhere in cognitive model profiles in the conceptual system.

2 Conceptual metaphors for time

In the conceptual metaphor tradition, Moore (2000, 2006) has argued that conceptual metaphors for time can be distinguished based on their reference point (RP). Moore distinguishes between Ego-RP (e.g., *Christmas is approaching*) and Time-RP[1] (e.g., *Christmas comes before New Year*) conceptual metaphors for time – these conceptual metaphors correspond to the distinction between relative temporal reference (Ego-RP) and intrinsic temporal reference (Time-RP) in present terms. Moreover, Moore argues that Ego-RP conceptual metaphors are grounded by the scenario of relative motion, in which an object moves relative to the ego or the ego moves relative to an object. In contrast, he proposes that Time-RP metaphors are grounded by the scenario whereby earlier entities are sequenced ahead of later entities on a path. While previous research has provided behavioural evidence for the psychological reality of space-to-time motion metaphors (e.g., Boroditsky 2000; McGlone and Harding 1998; Gentner *et al.* 2002), Núñez *et al.* (2006) have provided behavioural evidence for the psychological reality for a Time-RP conceptual metaphor for time distinct from an Ego-RP conceptual metaphor.

In addition to these space-to-time motion metaphors, a number of other types of conceptual metaphor for time have been identified in the literature. One type consists of space-to-time metaphors, that is, spatial metaphors for time, without motion. One example of this is the Time Orientation metaphor (Lakoff and Johnson 1999), discussed in Section 2.2 below, which builds on Grady's (1997b) proposal for the primary metaphor NOW IS HERE, introduced in Chapter 7. Another relates to the putative DURATION IS LENGTH (e.g., *The relationship lasted a long time*) conceptual metaphor, discussed in Chapter 7. While this conceptual metaphor hasn't been explicitly identified as such in the literature, there is good evidence for thinking it does have independent psychological reality. This comes from the behavioural findings reported in Casasanto and Boroditsky (2008), also discussed in Chapter 7.

[1] 'Ego-RP' and 'Time-RP' are the terms deployed by Núñez and Sweetser (2006), who apply Moore's taxonomy in their work on the representation of time in Aymara.

Table 11.1 *A (non-exhaustive) taxonomy of types of conceptual metaphor for time*

Type	Conceptual metaphor	Example
Motion	Ego-RP	*Christmas is approaching*
	Time-RP	*Christmas comes before New Year*
Space	Time Orientation	*Christmas is here*
	DURATION IS LENGTH	*a long time*
Commodity	TIME IS A RESOURCE	*He's wasting time*
	TIME IS MONEY	*His time is expensive*

Finally, another type of metaphor relates to time conceived as a commodity. Variants include time as a precious resource, such that time can be *saved*, *wasted* and *lost*, and time as money (e.g., *His time is very expensive*). These different types of conceptual metaphor for time are summarised in Table 11.1.

In important work within the conceptual metaphor tradition, Grady (1997b) has argued that there is a type of conceptual metaphor, primary metaphor, which he claims is universal – recall the discussion in Chapter 8. Conceptual metaphors of this sort involve relatively simple aspects of phenomenologically real experience which share structure at what he describes as the *superschematic* level (Grady 2008), and which are correlated with experience in a tight and recurring way (Grady 1997a, 1997b). In other words, primary conceptual metaphors arise automatically and inevitably as a function of embodied experience, rather than being due to culture-specific predispositions. Grady's proposal provides the analyst with a ready means of examining which of the conceptual metaphors for time discussed above are likely to be primary and hence universal. I consider each of these in turn.

2.1 Ego-RP and Time-RP Moving Time metaphors

As is evident in Table 11.1, there are two variants of this conceptual metaphor, the so-called Moving Ego (or Observer) and the Moving Time variants. Grady (1997b) tentatively suggests that these conceptual metaphors meet the criteria for being primary metaphors.

However, this conclusion would, in fact, appear to be not quite correct. For a conceptual metaphor to be primary, the target concept must relate to a subjectively real and phenomenologically simple aspect of experience. Yet, in the Ego-RP mappings, the target concept in fact amounts to the matrix relation for time, time as such (in the parlance of Sinha *et al.* 2011). In other words, the Ego-RP conceptual metaphors deploy the motion of objects in space in order to structure time qua reified ontological category. This means, then, that the Ego-RP

metaphors actually amount to what Grady refers to as complex metaphors – they are not comprised of phenomenologically simple facets of embodied experience. In view of this, if Grady's supposition regarding primary metaphors is correct, we should expect that the Ego-RP metaphors for time are not universal. And, indeed, Sinha *et al.* (2011) found no evidence of Ego-RP conceptual metaphors in Amondawa. If a conceptual metaphor does not exist in the conceptual systems of even a single linguistic community then it cannot count as a universal.

In addition, in recent research, Núñez and Sweetser (2006) appear to confirm that Aymara also lacks evidence for both mobile variants of the Ego-RP conceptual metaphor. Aymara is a native AmerIndian language spoken by about 1.6 million people in South America (notably in Bolivia, Peru and Chile). What is particularly striking about this language is that it appears not to have Ego-RP metaphors, at least not the motion variants. This finding illustrates the following: space-to-time Ego-RP motion metaphors do indeed appear not to be universal – there is no evidence that Aymara lexicalises time in terms of motion (of objects) on the sagittal axis; this is consistent with the findings from Amondawa.

While Aymara doesn't appear to have Ego-RP Moving Time metaphors, it does have the Time-RP moving time metaphor (the TEMPORAL SEQUENCE IS POSITION ON A PATH, proposed by Moore 2006). Indeed, this conceptual metaphor does not relate to time as an ontological entity independent of events. It arises as a result of the correlation between temporal and spatial sequence. This conceptual metaphor qualifies as a primary metaphor, as, in present terms, the primary target concept – succession – arises at the phenomenological level of temporal experience and representation. Moreover, and in addition, in so far as the Amondawa were able to be coaxed to produce space-to-time motion metaphors, as reported by Sinha *et al.* (2011), these were of the Time-RP type. In the light of this, the present prediction would be that Time-RP conceptual metaphors are plausibly universal, as they relate to experience types that are grounded in direct phenomenological experience, rather than arising from a more complex set of experience types.

2.2 Space-to-time metaphors

I now briefly consider space-to-time conceptual metaphors. The first of these is the Time Orientation metaphor. In their work, Núñez and Sweetser (2006) found that Aymara has a version of the Time Orientation metaphor that is at odds with the English, Portuguese and Spanish counterparts. Moreover, this divergence is supported by both linguistic and gestural evidence. In Aymara, the future is conceptualised and lexicalised as being on the posterior portion of the sagittal axis, while the past is conceptualised as being located on the anterior portion. As is evident from the following examples, the lexical item relating

to the past in Aymara literally means 'front time', while the term for the future literally means 'back time':

(1) *nayra pacha* ('past time') literal gloss: eye/sight/front time
(2) *nayra mara* ('last year') literal gloss: eye/sight/front year
(3) *qhipa pacha* ('future time') literal gloss: back/behind time
(4) *qhipa marana* ('in the next [immediately future] year') literal gloss: back/behind year in/on/at

On the face of it, the Time Orientation metaphor would appear to be a complex metaphor, rather than qualifying as a primary conceptual metaphor. This follows as it brings together a number of phenomenologically simple target concepts, namely, future, present and past – these I referred to as temporal elements in Chapter 3 – and structures them in terms of distinct regions of the sagittal axis. However, what is common to both Aymara and Indo-European languages is that the Time Orientation metaphors in each has a common RP centred on the ego. In other words, the metaphor NOW IS HERE, which provides the Time Orientation metaphor with its ego-centred RP and hence its axial coordination, appears to be the common element in the various versions of the Time Orientation metaphor. Put another way, the Time Orientation metaphor itself appears unlikely to be a primary metaphor. In contrast, NOW IS HERE, an integral component of Time Orientation metaphors, would appear to be primary, and indeed shows up in languages as diverse as English and Aymara.

The view that NOW IS HERE is universal is predicted by the proposals made in this book. After all, this conceptual metaphor relates to relatively simple aspects of experience which presumably arise at the phenomenological level. In view of this, the fact that this metaphor occurs in Aymara, while the Ego-RP Moving Time metaphors do not is consistent with the proposals put forward here.

The second space-to-time metaphor I mentioned was DURATION IS LENGTH. Again, as this involves simple aspects of phenomenological experience, DURATION and LENGTH, it would be expected (and predicted) that this metaphor is universal. Behavioural evidence on English, Dutch and Greek subjects provides compelling evidence that this conceptual metaphor has psychological reality in the conceptual systems of speakers of those languages (Casasanto and Boroditsky 2008; Casasanto *et al.* 2010). While there is not yet evidence that this conceptual metaphor exists in Amondawa or Aymara, my prediction would be that these languages do indeed exhibit this conceptual metaphor. Further fieldwork is clearly needed.

2.3 Commodity metaphors

In conceptual metaphors of this type, time is conceived as a commodity. However, as with Ego-RP metaphors, for time to be conceived as a resource it

must first be reified as an entity independent of the events from which it arises. In other words, conceptual metaphors of this type require a reification of time as an ontological category which is hence available for inter-subjective reflection. This leads to the supposition that commodity metaphors for time are not universal. Indeed, anecdotal evidence suggests that such metaphors are cultural constructs relating to modern industrial societies that reward time in active labour with financial recompense. This is illustrated by MacDonald (1999), with the following observation relating to the Inuit language and people:

> A generation ago, in the Arctic Quebec community of Kangiqsualujjuaq, a government development officer was explaining the virtues of hard work and efficiency to a rather polite Inuit audience. During his talk the enthusiastic official used the expression 'time is money' and his interpreter, confused but compliant, translated this tenet of capitalistic wisdom as 'a watch costs a lot!' (1999: 92)

3 Lexical concepts for time

One common misconception of LCCM Theory has been to assume that I am somehow claiming that a lexical concept – qua unit of a linguistic system – is distinct from the conceptual system, that is that lexical concepts are not cognitive entities. That is not my claim. My proposal is that the human cognitive ability to produce meaning has specialised systems for processing and constructing meaning. Lexical concepts are cognitive entities. It just so happens that the kind of content they encompass is of a digitised and schematic type. This contrasts with the analogue and multimodal representations that form the cognitive models which populate the conceptual system (or simulation system). Both types of representation are necessary for the construction of conceptions – the rich simulations we produce when we engage in linguistically mediated communication.

That said, positing distinct levels (or types) of representation does not entail a modular view of mind, a position that, as classically formulated (Fodor 1983) would appear to be untenable. What I am saying, in the simplest terms, is that meaning arises due to integration of different types of information.

In previous work on temporal language and temporal cognition (Evans 2004a, 2004b, 2005) I argued that, at the level of lexical concepts, time is a rich and multifaceted domain. Based on a detailed analysis of the English vehicle *time*, I argued that there are at least eight distinct lexical concepts conventionally paired with this form. I present a summary of those findings as Table 11.2.

In that earlier work, I argued that lexical concepts for *time* can broadly be divided into two kinds, what I termed *primary lexical concepts*, and *secondary lexical concepts*. Primary lexical concepts are those that relate to common aspects of human cognitive processing. That is, they relate to experiences such

Table 11.2 *Summary of lexical concepts for* time

Name	Meaning	How elaborated	Grammatical encoding
Duration Sense	Assessment of magnitude of duration	Length, e.g., *a long time*	Mass noun; can appear with definite article and some quantifiers
Sub-sense 1: protracted duration			
Sub-sense 2: temporal compression	Duration 'slower' than usual	Slow motion, e.g., *time drags*	
	Duration 'faster' than usual	Fast motion, e.g., *time flies*	
Moment Sense	A discrete temporal 'point'	Ego-centred motion, e.g., *the time is approaching…*	Count noun; can appear with definite and indefinite articles
Instance Sense	An occurrence of some kind	N/A	Count noun; can appear with ordinal and cardinal numbers
Event Sense	A boundary-event of some kind	Ego-centred motion, e.g., *Her time is approaching…*	Count noun; cannot take articles, but can be preceded by pronouns and possessive noun phrases
Matrix Sense	An unbounded elapse conceived as the event subsuming all others	Non-terminal motion, e.g., *Time flows on forever*	Mass noun; cannot be preceded by definite or indefinite articles
Agentive Sense	A causal force responsible for change	Agent-centred action, e.g., *Time devours*	Proper noun; cannot be preceded by definite or indefinite articles
Measurement-system Sense	A means of measuring change and other behaviours, events, etc.	Motion events oriented with respect to an inanimate centre, e.g., *The time is moving towards 10*	Proper noun or mass noun
Commodity Sense	A resource	The manipulation of resources, e.g., *We're spending time together*	Mass noun

as duration, simultaneity, assessment of a temporal 'point', the experience of now, etc. Experiences of this kind can be traced to underlying perceptual mechanisms and processes. Accordingly, concepts of this kind are likely to be more common in the languages of the world, and when they occur they are

likely to be more similar across languages. Primary lexical concepts include the following lexical concepts encoded by the vehicle *time*: [DURATION], [MOMENT], [EVENT] and [INSTANCE]. In short, our experience of duration and a temporal moment, the ability to perceive and apprehend events, and the ability to categorise particular temporal moments and events as constituting instances of event types, would seem to constitute foundational mental abilities which enter into almost every aspect of perceptual processing and cognitive evaluation. In short, the processes and mechanisms that such lexical concepts are ultimately grounded in and reflexes of, suggest themselves, with good reason, as being among the most foundational in our mental life as it relates to the domain of time. Accordingly, primary lexical concepts would appear to arise from what, in this book, I have referred to as the phenomenological level of temporal experience; they are representations directly grounded in temporal experiences.

Primary lexical concepts can be contrasted with *secondary lexical concepts*. Rather than relating to fundamental aspects of cognitive function, these, I hypothesised, are cultural constructs, and thus may often be culture specific. A good example of this is the concept of time as a commodity, in which time is conceptualised as being a valuable resource that can be bought and sold just like physical merchandise. Just as there appear to be conceptual metaphors for time as a commodity, at the level of linguistic representation there is good evidence for thinking that there are independently existing lexical concepts that relate to time as aspects of a commodity. Other secondary lexical concepts for *time* include the [MATRIX] lexical concept, the [AGENTIVE] lexical concept and the [MEASUREMENT-SYSTEM] lexical concept (see Evans 2004a for detailed discussion).

As lexical concepts are units of semantic structure, conventionally associated with lexical vehicles, they hold at various levels of complexity. While the lexical concepts discussed in Evans (2004a) were conventionally associated with a mono-lexemic vehicle, the form *time*, in this book I have been dealing with lexical concepts which are, arguably, more complex. For instance, t-FoR lexical concepts are typically argument-structure constructions.

4 The complex nature of temporal frames of reference

Based on the findings and arguments presented in this book, temporal frames of reference would appear to be complex conceptual representations. They are complex in the sense that they rely on non-linguistic knowledge structures, including conceptual metaphors, both primary and complex. And they have linguistic reflexes, t-FoR lexical concepts, which provide linguistic resources for prompting the integration of conceptual metaphors and other conceptual knowledge structures in the construction of meaning in the domain of time.

I have made programmatic proposals for how this might be achieved in the preceding chapters in this part of the book.

That said, t-FoR lexical concepts and conceptual metaphors for time appear, on the face of it, to be distinct levels (or types, if the term 'level' is problematic) of representation. I have presented arguments that have attempted to show how they diverge. And indeed, at least some t-FoR lexical concepts appear not to be motivated by conceptual metaphors but arise as reflexes of attentional and figure/ground perceptual phenomena, as discussed in earlier chapters.

Nevertheless, the two sets of representations converge in order to produce linguistically mediated meaning, designating subtle and complex temporal relations. While I see the foregoing as a step towards providing a programmatic account of the nature of linguistic and conceptual knowledge, and how they combine, in the arena of temporal reference, it represents only a start. And some, perhaps much, of the foregoing may turn out to require (significant) revision as findings accrue. Nevertheless, it is a starting point from which to build.

5 Conclusion

In the foregoing I have attempted to uncover the nature of temporal reference in thought and in language. I have done so by making use of the theoretical architecture developed within the framework of LCCM Theory (Evans 2009b). In this book, I have attempted to achieve the following:

i. to provide a taxonomy of temporal reference strategies in human cognition,
ii. to provide an (admittedly programmatic) account of the integration between different knowledge types in linguistically mediated meaning construction as it relates to temporal reference,
iii. to compare and contrast, and explore the interrelationship between the domains of time and space,
iv. to tease out and critically evaluate various perspectives from the debate surrounding conceptual metaphors for time and their relative status, in terms of universality or otherwise, and,
v. to provide a detailed application of LCCM Theory in two ways: identifying structures available in lexical representation, and charting the meaning-construction processes involving those structures as well as non-linguistic knowledge structures. This then amounts to a detailed case study that, I hope, begins to substantiate the claims and theoretical architecture of LCCM Theory as developed in earlier work (especially Evans 2009b).

I have argued for three temporal reference systems in human cognition. Such temporal reference systems have to be in place if we are to account for

the material artefacts that abound relating to time, and to account for the distinct patterns of symbolic representation evident in both language and gesture. I have provided reasonably detailed evidence from a single language, English, for three distinct temporal frames of reference. Moreover, I have argued that such strategies reveal a domain-general reference functionality evident in the domains of time and space. The findings presented in this study also reveal that the way in which temporal reference is represented makes use of conceptual and symbolic resources relating to space. This was clear, for instance, by the extension of argument-structure lexical concepts from spatial to temporal scenes, and the deployment of gesture space to signal temporal reference of different types. While it is not yet completely clear what the root cause of this apparent recycling of space to structure time is – and I have presented my best guess given the current state of our knowledge – a number of cognitive structures appear to be implicated. One must be the priorities for processing perceptual experience, some of which are hard-wired, such as the top-down strategy of figure/ground segregation. This has implications for the way language encodes not only spatial scenes but also temporal reference, as we have seen. Another is the probable existence of conceptual metaphors, although more work needs to be done on identifying which of the likely primary and complex metaphors have psychological reality, and which of these are involved in specific temporal reference strategies.

A particularly important goal for future research is to examine temporal reference in languages other than English and to catalogue the range of argument-structure lexical concepts that provide evidence for this. It is only by studying less well-known languages, ones that are genetically and areally unrelated, that a clearer picture will emerge as to the similarities and differences between reference strategies in the domains of time and space. In this task, the identification procedure associated with LCCM Theory as presented in this book provides, I hope, a useful methodology to generate hypotheses as to the range and nature of lexical concepts in a given language. Used in conjunction with corpus-based techniques, this is likely to provide a powerful tool for examining the semantic space associated with language and languages.

And finally, I have proposed building on and extending seminal insights of the philosopher Anthony Galton (2011) that the essence of temporal reference relates to transience. I have proposed a distinction between transience, temporal qualities and temporal elements. And I have posited three distinct types of transience – anisotropicity, succession and duration, to which the three t-FoRs are respectively anchored.

Since the dawn of experimental psychology in the nineteenth century, the scientific investigation of time has been a frequent topic of study. There is, in fact, a staggeringly large literature in various branches of psychology stretching back well over a century. And over the last forty years or so, large literatures

relating to time have developed in linguistics, in (cognitive) anthropological traditions, and in neuroscience. Yet despite the large amount of data and the range of theories across a number of disciplines, it is striking how much remains to be understood about time in language and thought. The application of FoRs from the domain of space to time has only begun to be developed. But it is not clear how successful such an enterprise might be (Bender *et al.* 2012). I have advocated a more nuanced tack: to explore transience as the origin of temporal reference. In so doing, I have proposed an architecture for t-FoRs. The theoretical, linguistic and cognitive tools presented in this book will also promote, I hope, a more nuanced way of examining meaning construction in this area. And in this, I hope that new avenues will have been opened that facilitate our further exploration and understanding in the domain of time, in terms of temporal reference in particular, and in terms of meaning construction more generally.

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