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.

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 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.