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A unified account of polysemy within LCCM Theory

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Abstract

Within the cognitive linguistics tradition, polysemy has often been viewed as a function of underlying entries in semantic memory: word forms have distinct, albeit related, lexical entries, which thereby give rise to polysemous word senses in language use (e.g., Evans, 2004; Tyler and Evans, 2001, 2003). In this paper, I seek to broaden out the study of polysemy within this tradition by tackling it from three slightly different angles. I argue that polysemy can also arise from the non-linguistic knowledge to which words facilitate access. This phenomenon I refer to as *conceptual polysemy*. I illustrate this with an analysis of the lexical item *book*. Moreover, polysemy also arises from distinct, albeit related, conventionalised sense-units associated with the same linguistic form: the phenomenon I refer to as *lexical polysemy*. I illustrate with an analysis of the polysemy exhibited by the form *in*. And finally, semantic relatedness can be discerned as arising from different word forms which, at least on first blush, appear to share a common semantic representation. This phenomenon I refer to as *inter-lexical polysemy*. I illustrate with a case study involving an analysis of the prepositional forms *in* and *on*. In presenting my account of these three types of polysemous phenomena, I introduce a contemporary account of lexical representation: the Theory of Lexical Concepts and Cognitive Models, or LCCM Theory for short (Evans, 2006, 2009, 2010b, 2013). This provides a common theoretical architecture which facilitates a joined-up account of these specific phenomena, and of polysemy more generally. Finally, the paper introduces a new construct within the theory—the notion of a *meaning spectrum*—which facilitates analysis of aspects of lexical and inter-lexical polysemy.
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1. Introduction

The issue I address in this paper relates, on the face of it, to three distinct types of polysemous phenomena. The first type concerns examples of the following kind, where a single lexical item—in this case *book*—obtains distinct readings in different contexts of use. For reasons to be explained below, I shall refer to this phenomenon as *conceptual polysemy*:

Phenomenon 1:
(1)   a.   That's a heavy book.   'tome'
      b.   That antiquarian book is illegible. 'text'
      c.   That's a boring book.   'level of interest'
      d.   That's a long book.   'duration'

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In each of these examples, *book* means something slightly different. In (1a), *book* refers to the physical artefact, and the fact that as a physical artefact books can be heavy—this might be dubbed the 'tome' reading. In (1b), *book* again obtains a reading that concerns the physical properties of books; but here, specifically, the reading relates to the physical text with which a reader engages—this might be dubbed the 'text' reading. In (1c) *book* is understood to refer to the activity of reading, and specifically the level of interest achieved by the reader—what we might think of as a 'level of interest' reading. And finally, in (1d), which again concerns the activity rather than the physical properties of the book, the reading concerns length of time taken to read the book—what might be dubbed a 'duration' reading. Collectively, these examples illustrate how an open-class lexical item can take on different interpretations in different linguistic contexts.

I refer to this phenomenon as conceptual polysemy as some analysts, (e.g., Evans, 2009; Langacker, 1987) have suggested that this type of polysemy arises in the following way: linguistic context can serve to differentially highlight different aspects of the non-linguistic or *encyclopaedic knowledge* to which a word form facilitates *access*. The polysemy is made possible precisely because our knowledge representation for a book is not a monolithic structure, but consists of a complex array of interdependent components. For instance, Langacker (1987) accounts for polysemy such as this as being due to *active zones*: distinct facets of our conceptual representation for the physical artefact 'book' become active during language use, triggered by linguistic context. As such, context plays a role in *modulating* (Cruse, 1986) exactly which parts of conceptual representation become activated during language understanding.

The second type of polysemous phenomenon I investigate involves what we might think of as lexical ambiguity: a single lexical form has multiple, distinct meanings, that appear to be conventionalised, but are nevertheless semantically related. This phenomenon I shall term *lexical polysemy*. Consider the following examples:

Phenomenon 2:
(2)   a.   We are in a room.   'container'
      b.   We are in love/shock/pain.   'state'

The difference between conceptual polysemy versus lexical polysemy turns on the traditional distinction between *ambiguity* versus *vagueness*. Ambiguity has to do with two distinct conventional readings for a given form. In contrast, vagueness concerns the role of context in facilitating or ''filling-in'' the precise semantic details associated with a given lexical form, on a particular instance of use. What I shall be arguing is that the theoretical framework I introduce in this paper, the Theory of Lexical Concepts and Cognitive Models, (or LCCM Theory, Evans, 2009, 2013) provides an elegant account of this fundamental distinction in polysemous phenomena. This is facilitated by the two central constructs associated with the theory: the *lexical concept*—a unit of linguistic knowledge—versus the *cognitive model*—a unit of non-linguistic knowledge—which play a differential role in the two types of polysemy.

Of course, a criterial distinction between lexical versus conceptual polysemy turns on the issue of conventionalisation: the hallmark of what I am referring to as lexical ambiguity. A number of scholars have pointed out that the traditional tests for ambiguity versus vagueness are not necessarily decisive (e.g., Geeraerts, 1993), suggesting that lexical polysemy is not an all-or-nothing affair: word senses appear to always be, at least in part, construed in contexts of use (Croft and Cruse, 2004; Evans, 2009). This research suggests that conventional senses may exhibit overlap, forming sense continua, rather than neatly, circumscribed lexical units in the mind. Again, this observation is elegantly accounted for by LCCM Theory, which posits that a word sense—its lexical concept in current parlance—consists of a number of distinct atoms of meaning—what I refer to as *parameters*. And as a lexical concept consists of several parameters, these may overlap across distinct lexical concepts. In this way, conventionalised lexical concepts associated with the same form may give rise to a *meaning spectrum*—a continuum of semantic representation, with the precise details of the lexical concept being construed in the specific context of use.

The third type of polysemous phenomenon relates to distinct lexical items, in this case, the English prepositions *in* and *on*, appearing to have, at least on the face of it, broadly similar readings: a phenomenon we might term *inter-lexical polysemy*.

Phenomenon 3:
(3)   a.   We are in love/shock/pain.   'state'
      Cf.   We are in a room.   'spatial'
      b.   We are on alert best behaviour/look-out/the run.   'state'
      Cf.   We are on the sand.   'spatial'

In these examples, the prepositions *in* and *on* both appear to have distinct 'state' lexical concepts—which contrast with a spatial sense associated with each preposition. But while the 'state' senses of *in* and *on* are broadly similar, the referents—in the sense of the semantic arguments that can co-occur with each preposition—are markedly distinct, as we see from the following examples:

(4) a.   *We are in alert/best behaviour/look-out/the run. (Intended meaning: 'state')
      b.   *We are on love/shock/pain.   (Intended meaning: 'state')

The examples in (4) demonstrate the following: the range of semantic arguments that the 'state' senses of *in* and *on* can take are in contrastive distribution; the 'state' senses associated with *in* and *on* are not, in fact, identical. In previous research (Evans, 2009: Chapter 8; Evans, 2010a) I sought to provide evidence that the 'state' lexical concepts for prepositions such as *in* and *on* are distinct. In this paper, I go further, developing an account of the notion of a meaning spectrum, showing how the theoretical construct of the parameter, an important aspect of LCCM Theory, is able to distinguish between both lexical polysemy, and the phenomenon of inter-lexical polysemy.

On this last point, a note on terminology is in order. One reviewer of an earlier version of this paper has taken exception to my use of the term 'inter-lexical polysemy', complaining that the phenomenon under the microscope does not actually count as an instance of polysemy, as it relates to distinct lexical forms. While that might be true, it is nevertheless useful to address this phenomenon as part of a more general consideration of semantic relatedness across and within the semantic representations associated with lexical forms. The overall, and novel, contribution of the present paper is to provide a unified account of, on the face of it, disparate semantic relatedness phenomena. In so far as we are dealing with semantic relatedness, albeit across two lexical forms, I contend that it is useful to think of this phenomenon in terms of non-prototypical polysemy; and the term I use, does stress that the phenomenon is inter-lexical, and hence does not apply to a single form. In any case, and quibbles aside about terminology, this is a real linguistic phenomenon that awaits an account, and can be usefully considered alongside other semantic relatedness phenomena such as conceptual and lexical polysemy. And with apologies to the reviewer in question, I will hence continue to use the term 'inter-lexical polysemy'. My proposal is that LCCM Theory provides a natural theoretical framework that enables us to account for, and so understand, the nature of these various phenomena, including what I dub inter-lexical polysemy.

In earlier work (Evans, 2009, 2010a), the first work I am aware of concerning inter-lexical polysemy, I argued that this distinction arises from distinct sets of parameters associated with the 'state' lexical concepts for *in* and *on*. While I develop the notion of a parameter in some detail later in this article, briefly, a parameter is a schematic unit, or 'atom' of linguistic knowledge. The claim I defend below is that word senses are constituted of an assortment of parameters: atoms of schematic linguistic meaning that, collectively, give rise to a word's lexical concept.

This construct of a lexical concept provides, I shall argue, a means of distinguishing, in a principled way, between comparable senses across distinct lexical items—the phenomenon of inter-lexical polysemy—as well as the distinction in distinct senses associated with a single word form—lexical polysemy. In contrast, the phenomenon of conceptual polysemy arises, I shall argue, from the non-linguistic knowledge to which lexical items facilitate access. Non-linguistic knowledge is constituted of what I refer to as cognitive models. And lexical concepts facilitate access to a set of cognitive models: a word's *semantic potential*. While conceptual polyemy arises due to the nature and organisation of non-linguistic knowledge, linguistic context nevertheless plays a role in guiding what sorts of non-linguistic knowledge are activated, in order to give rise to the requisite readings obtained, as evidenced by the examples in (1).

The two theoretical constructs—the lexical concept and the cognitive model—that I use to account for these two types of polysemy arise under the aegis of LCCM Theory; moreover, they give the theory its name. This theoretical model provides an account of lexical representation and compositional semantics (Evans, 2006, 2009, 2010b, 2013). In this paper, my objective is to make use of the architecture of LCCM Theory in order to provide a unified account of conceptual, lexical and inter-lexical polysemy. The approach I develop is not 'unified' in the sense that these distinct phenomena can receive a single account. Rather, with a psychologically-appropriate account of language and its relationship with conceptual structure (i.e., LCCM Theory), these distinct types of polysemy can be viewed as distinct, albeit predictable, symptoms of our universal meaning-making capacity.

Accordingly, my argument amounts to this: meaning construction involves linguistic and non-linguistic representations; and these representations inhere in the linguistic and conceptual systems respectively. The representations that are purely linguistic in nature—lexical concepts—account for both lexical and inter-lexical polysemy. In contrast, the representations that are non-linguistic in nature—cognitive models—account for conceptual polysemy. As LCCM Theory provides a joined-up account of the role of both linguistic and conceptual knowledge in meaning construction, this affords a unified account of these three distinct types of polysemy. Moreover, and more generally, the paper makes the case for the distinct and differential role of linguistic and non-linguistic knowledge in accounting for (distinct types of) polysemy in particular, and lexical representation more generally.

The paper is structured as follows. In the next section, section 2, I provide an overview of the theoretical architecture associated with LCCM Theory. Section 3 addresses conceptual polysemy, section 4 deals with lexical polysemy, while inter-lexical polysemy is the subject of section 5. In the light of the analyses presented, section 6 develops the notion of a meaning spectrum, which is used to address some outstanding issues in the study of polysemy. Section 7 pulls together some important theoretical considerations, in the study of lexical semantics, as a consequence of the analyses presented; and finally, section 8 offers some brief conclusions.

2. LCCM theory

In two book-length treatments (Evans, 2009, 2013) I have developed a theoretical account of lexical representation and semantic composition dubbed the *Theory of Lexical Concepts and Cognitive Models*, or LCCM Theory for short. The claim at its heart is enshrined in the distinction between its two foundational theoretical constructs—the *lexical concept* and *cognitive model*: there is a qualitative distinction between the representations captured by these theoretical constructs. This distinction relates, ultimately, to the bifurcation between *analogue* versus *parametric knowledge*, which respectively structure lexical concepts and cognitive models. The essential insight is that the knowledge that makes up the conceptual system—populated by what I term cognitive models—is rich, multi-modal, and analogous to the rich perceptual and interoceptive experience we encounter in our daily lives (analogue knowledge). In contrast, the linguistic system—populated by lexical concepts—consists of parametric knowledge: knowledge that is schematic, digitised and highly partial. Lexical concepts consist of bundles of parameters—units of parametric knowledge. What makes the semantic representation of a given lexical concept distinct, on this account, concerns the make-up of its parameters: a different confection of semantic parameters gives rise to a distinct lexical concept.

In LCCM Theory, it is assumed that the conceptual and linguistic systems play distinct, although complementary roles in the process of situated meaning construction. The linguistic system emerged, in evolutionary terms, much later than the earlier conceptual system (Evans, 2009). The utility of a linguistic system 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.

2.1. Lexical concepts in LCCM Theory

The primary representational substrate of the linguistic system—the lexical concept—can be thought of as functionally akin to the semantic pole of a *symbolic unit*—in Langacker's (e.g., 1987) terms. While lexical concepts are parametric in nature—encoding highly schematic 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 collectively facilitates access is termed an *access site*. LCCM Theory assumes that the access site for any 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 lexical concepts are mental representations, they underspecify the range of situated meanings associated with a given form in an individual utterance. Thus, LCCM Theory makes a fundamental distinction between lexical concept *qua* mental unit, and its context-dependent realisation in an utterance. This is akin to the distinction in Phonological Theory between the abstract notion of a phoneme and the actual unit of realised context-dependent sound, the allophone. My claim is that there is an essential distinction between lexical representation and meaning. While meaning is a property of the utterance, lexical representations are the mental abstractions which we infer must be stored as part of the language user's knowledge of language, in order to produce the range of novel uses associated with situated instances of a particular word form.

There are a number of important properties associated with lexical concepts. I briefly review some of the most relevant here (for detailed discussion see Evans, 2009). Firstly, and as noted above, *linguistic units*, as I use the term, are conventional pairings of form and meaning. From this it follows that lexical concepts are *form-specific*. Secondly, although lexical concepts are form-specific, a single form can be conventionally associated with a potentially large number of distinct lexical concepts which are related to degrees as attested by the phenomenon of polysemy.[2] That is, forms are not *lexical concept-specific*. A consequence of this is that the lexical concepts which share the same form can be modelled in terms of a *semantic network* (see Evans and Green, 2006: Chapter 10 for discussion).

Thirdly, the definitional property of any given lexical concept is that it has a *lexical profile*, its unique 'biometric' identifier. A lexical profile is an extension of criteria presented in Evans (2004), and akin to the notion of an *ID tag* (Atkins, 1987) and *behavioural profile* (Gries, 2006). While a lexical concept associated with a particular form can be provided with a semantic gloss, stated, in LCCM Theory, in square brackets as follows: [STATE], whether a particular usage of a form relates to one lexical concept rather than another is a matter of examining the *selectional tendencies*—arising from the

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[1] See Evans (2009) for the rationale for this position.
[2] See Evans (2005) and Tyler and Evans (2001, 2003) for detailed discussion of polysemy.

lexical concept's lexical profile—associated with a given usage of the form. Hence, and as we shall see below when we consider lexical polysemy, a lexical profile provides the basis for testing, using an appropriate methodology, to be discussed, whether a particular usage of a form is being sanctioned by a distinct lexical concept or not. Two sorts of information form a lexical concept's lexical profile. The first relates to *semantic selectional tendencies* (Evans, 2009). The second relates to formal or *grammatical selectional tendencies* (Evans, 2009).

To provide a preliminary illustration of the construct of the lexical profile, I briefly consider two lexical concepts, both of which I provisionally gloss as [STATE]—and which are conventionally encoded by the English prepositional forms *in* and *on*. These are evidenced by the following examples:

(5)   a.   John is in trouble/danger.
      b.   Jane is in love/awe.
      c.   Fred is in shock.
      d.   Jake is in a critical condition.

(6)   a.   The guard is on duty.
      b.   The blouse is on sale.
      c.   The security forces are on red alert.

While both *in* and *on* have 'state' lexical concepts conventionally associated with them, the lexical profile for each is distinct. For instance, the [STATE] lexical concept associated with *on* selects semantic arguments which relate to states which normally hold for a limited period of time, and which contrast with salient (normative) states in which the reverse holds. For instance, being *on duty* contrasts with being *off-duty*, the normal state of affairs. Equally, being *on sale* is, in temporal terms, limited. Sales only occur for limited periods of time at specific seasonal periods during the year (e.g., a winter sale). Similarly, being *on red alert* contrasts with the normal state of affairs in which a lesser security status holds. Further, the states in question can be construed as volitional, in the sense that to be *on duty/sale/red alert* requires a volitional agent who decides that a particular state will hold and takes the requisite steps in order to bring such a state of affairs about.

In contrast, the semantic arguments selected for by the [STATE] lexical concept for *in* relate to states which do not necessarily hold for a limited period of time, and do not obviously contrast with a 'normal' state of affairs. Moreover, while states encoded by *on* are in some sense volitional, states associated with *in* are, in some sense, non-volitional. That is, we do not usually actively choose to be in love, shock or a critical condition, nor can we, by a conscious act of will, normally bring such states about. That is, these states are those we are affected, constrained and influenced by, rather than those which are actively (in the sense of consciously) chosen.

The fourth and final property of lexical concepts that I review here concerns the position that they have bipartite organisation. That is, lexical concepts encode parametric knowledge *and* facilitate access to the conceptual system— cognitive models—consisting of analogue knowledge.

To illustrate the notion of a parameter, consider the complex range of expressions that a language user might employ, in English, in order to 'locate' themselves with respect to time, thereby facilitating time-reference. Any one of the following could conceivably be employed, depending upon context: *today, May, 2014, the day after yesterday, the day before tomorrow, this moment, now, this second, this minute, this hour, today, this week, this month, this quarter, this year, this half century, this century, this period, the 2nd day of the month, this era, this millennium*, and so on. A potentially unlimited set of finer and finer distinctions can be made (e.g., *1 s ago, 2 s ago, 1 h 4 min and 3 s ago, 2 days ago*, etc.), reflecting any manner of temporal distinctions we might care to make.

In contrast, paramaterisation functions by dividing all the possible permutations relating to a given category, such as time-reference, into a small, delimited set of divisions: parameters. Such parameters might distinguish between the past, for instance, and the non-past. Indeed, this is the basis for the (morphological) tense system in English, as illustrated by the following:

(7)   a.   He kicked the ball.   Past
      b.   He kick**s** the ball.   Non-past

English morphologically encodes just two parameters that relate to Time-reference: Past versus Non-past, as exhibited by the examples in (7), and thus manifests a binary distinction. Some languages, such as French, have three (morphologi-cally-signalled) parameters: Past, Present and Future. Some languages have more than three parameters, distinguishing additionally remote past from recent past, for instance. The language with the most parameters for linguistically encoding time-reference is an African language: Bamileke-Dschang with eleven. Crucially, parameters are encoded by specific lexical concepts, and thus form part of the knowledge 'bundle' that constitutes a lexical concept. For instance, the
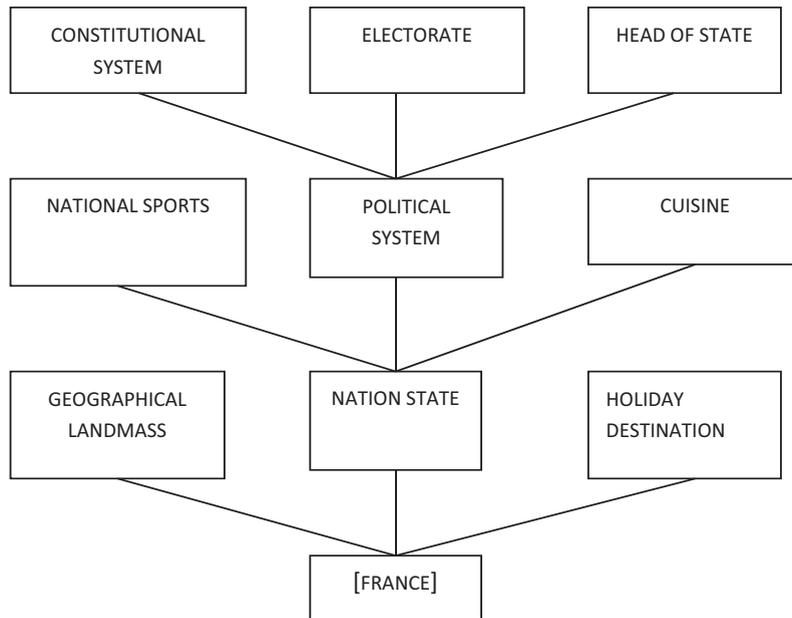
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Fig. 1. Partial cognitive model profile for [FRANCE].

parameter 'past' is encoded by the lexical concept associated with the –*ed* form in (7a). However, other lexical concepts also include the parameter 'past' such as the lexical concepts associated with the following forms: *sang*, *lost*, *went*, and so forth.

I argue, then, that a key feature of linguistic (as opposed to conceptual) content is that it only encodes knowledge in parametric fashion. This is not to say that conceptual content does not parameterise knowledge. Indeed, parameterisation is simply a highly reductive form of abstraction: it serves to abstract across the complexity exhibited by a particular category. The point, however, is that the parameters encoded by linguistic content serves to 'strip away' most of the differences apparent in the original perceptual experience, thereby reducing it to a highly limited numbers of parameters, suitable for encoding and externalisation via the medium of a linguistic system.

2.2. Cognitive models in LCCM Theory

In LCCM Theory, and as already intimated, 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 directly grounded in the brain's modal and interoceptive systems, and derives from the full range of experience types processed by the brain including sensory-motor experience, proprioception and subjective experience including affect.

On this account, meaning construction arises by virtue of cognitive models becoming re-activated by lexical concepts during language use. This leads to a *simulation* process, simulation being the re-activation of brain states that sub-serve meaning construction.[3] The way this is achieved is by virtue of lexical concepts—in the linguistic system—conventionally interfacing with part of the conceptual system—association areas. Recall that the range of cognitive models to which a lexical concept directly interfaces is collectively referred to as its access site. But while the cognitive models, to which a lexical concept may be connected, are connected to further cognitive models, a lexical concept may potentially facilitate access to a large body of analogue knowledge structures. This semantic potential—all the cognitive models to which a lexical concept potentially facilitates access—is referred to as the *cognitive model profile* for a given lexical concept.

To illustrate, consider the (admittedly partial) cognitive model profile for the lexical concept which I gloss as [FRANCE], and associated with the form *France*. This partial cognitive model profile for [FRANCE] is represented in Fig. 1.

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[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.

Fig. 1 is an attempt to capture (a subset of) the sort of knowledge that language users might typically have access to when speaking and thinking about France. The lexical concept is denoted by the term in small caps and in square brackets: [FRANCE]. This is a mnemonic for the semantic content encoded by the lexical concept, which may include a cluster of parametric knowledge: parameters.

In contrast, cognitive models are denoted by terms in small caps without square brackets. As illustrated by Fig. 1, 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— and I reiterate, a cognitive model represents a coherent body of complex information: multimodal information, gleaned through sense-perception, interoceptive experience, and so forth. It may also be derived via propositional information achieved via cultural learning, language and other channels. Each of these cognitive models provides access to further cognitive models.

In Fig. 1, 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 instance, football, rugby, athletics, and so on, rather than others: the French do not 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, famous French sportsmen and women, 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, Fig. 1 illustrates a sample of further secondary cognitive models which are accessed via this cognitive model. Hence, 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 (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.[5]

The utility of the LCCM Approach is that it provides a ready means of accounting for meaning construction. To illustrate, consider the following sentences all involving the lexical item *France*.

(8) 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 each of these examples, the semantic contribution associated with the form *France* is slightly distinct: the reading for *France* varies across these distinct utterances. France, in (8a) has a geographical landmass reading; in (8b) it is France as a political entity, a nation state; in (8c), it is the 15 players who make up the French Rugby team; and in (8d) the reading involves that proportion of the French electorate who voted 'non' when presented, in a national referendum, with the proposal to endorse a constitution for the European Union. The key insight of LCCM Theory is that the reason for this variation is due to differential activation of non-linguistic knowledge structures within the cognitive model profile to which the lexical concept associated with *France* affords access.

The differential readings associated with the examples in (8) arise as follows. In (8a) the interpretation associated with the form *France*, which relates to a particular geographical region, derives from activation of the GEOGRAPHICAL LANDMASS cognitive model. Individual language users have knowledge relating to the physical aspects of France, including its

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[4] Note that the abbreviation [FRANCE] represents the linguistic content that is encoded by the vehicle *France*.

[5] The rationale for distinguishing between primary and secondary levels of cognitive models has been laid out in detail elsewhere (e.g., Evans, 2013: Chapter 2).
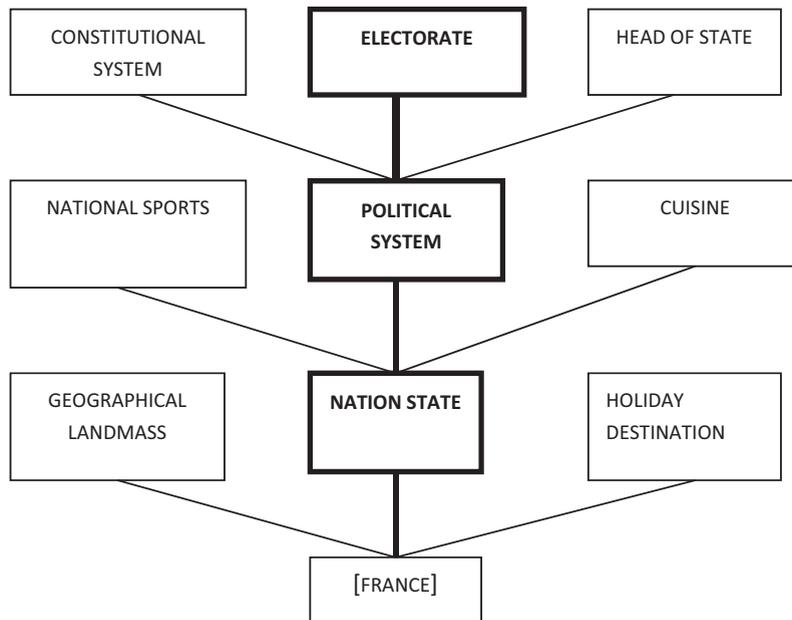
Fig. 2. Access route established by the interpretation of [FRANCE] in the utterance *France voted against the EU constitution*.

terrain, and its geographical location. In this example, the utterance context serves to activate this part of the cognitive model profile accessed by the lexical concept [FRANCE]. In the second example, the utterance context serves to activate a different part of the cognitive model profile to which the lexical concept [FRANCE] affords access. In this example, the reading derives from activation of the NATION STATE cognitive model. The use of *France* in the example in (8c) relates to the group of 15 French individuals who play as a team and thereby represent the French nation on the rugby field. In the example in (8d) the form *France* relates not to a geographical landmass, nor a political entity—a nation-state—nor to a group of 15 rugby players who happen to be representing the entire population of France. Rather, it relates to that portion of the French electorate that voted against ratification of the EU constitution in a referendum held in 2005. Accordingly, what is activated here is the ELECTORATE cognitive model.

This last example provides an elegant illustration of the way in which activation of a cognitive model serves to provide a situated interpretation of a lexical concept by giving rise to an access route through the semantic potential. In this example, interpretation requires that an access route is established through the cognitive model profile accessed via the lexical concept [FRANCE] in a way that is consistent with the lexical concepts associated with the other linguistic forms and units in the utterance. The interpretation associated with *France* in this example has to do with the French electorate, and specifically that part of the French electorate which voted against ratification of the EU constitution. In other words, [FRANCE] in this example achieves an interpretation which is facilitated by activating the cognitive models which are shown in bold in Fig. 2.

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 of 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 Fig. 3.

In the schematic cognitive model profile in Fig. 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.
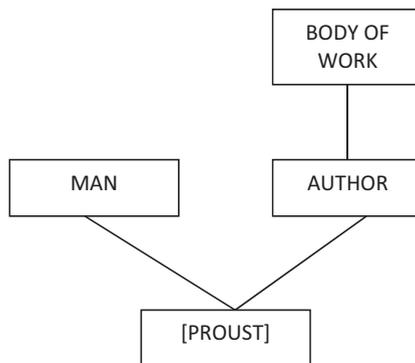
Fig. 3. Schematic cognitive model profile for [PROUST].

Now consider the following sentences:

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

The sentence in (9a) gives rise to a reading in which the man identified as Proust had a moustache. In contrast, the example in (9b) 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 (9a) would normally be judged to be literal, while the interpretation in (9b) 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, and a distinction, therefore, in terms of the range of analogue concepts directly and indirectly accessed by the lexical concept. 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 the body of literary output is more peripherally accessed by the lexical concept [PROUST], than that of being a human male, a man, and having a particular profession, namely being an author. In short, 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 a sound basis for making a qualitative distinction of this sort.

3. Conceptual polysemy

Now let's return to the first of the phenomena under the microscope in this paper: conceptual polysemy. I reproduce the relevant data below as (10):

Phenomenon 1:
(10)   a.   That's a heavy book.   'tome'
        b.   That antiquarian book is illegible. 'text'
        c.   That's a boring book.   'level of interest'
        d.   That's a long book.   'duration'

The issue to be accounted for is as follows: how is it that the lexical item *book*, comes to be construed, in slightly different ways, in each of the four distinct linguistic contexts in (8)? While the form *book* relates to a physical artefact, made of particular materials that a reader interacts with, on each occasion of use, what we might refer to as the sense-boundary for *book* is construed differently, providing four distinct readings. In the example in (10a), *book* is construed as referring to the physical tome. In (10b) *book* is construed as referring, specifically, to the textual element of the tome. In (10c) *book* refers to the level of interest that arises from a reader interacting with the text. And in (10d), *book* refers to the temporal aspect of

the interaction between reader and the book's text. In each of these examples, we would not want to say, presumably, that *book* has distinct, conventional word-senses. Rather, the challenge is to account for how it is that sense-construal arises in these specific contexts of use.

From the perspective of LCCM Theory, polysemy of this kind, arising from situated, sense-boundary construal, can be accounted for in terms of the cognitive model profile to which a lexical concept facilitates access. In short, sense-boundary construal arises from differential activation of the encyclopaedic knowledge to which a lexical concept facilitates conventional access. While this solution to this phenomenon is similar to previous accounts in cognitive linguistics, notably Croft and Cruse's notion of *purport*, and Langacker's construct of a *domain matrix*, LCCM Theory provides the most detailed account of the nature of the encyclopaedic knowledge that subserves polysemy of this kind, and how lexical concepts interact in giving rise to conceptual polysemy.

In LCCM Theory terms, the polysemy that arises in the examples in (10) is a consequence of differential activation of regions of the cognitive model profile—the vast semantic potential—to which the lexical concept [BOOK] facilitates access. To see how this works, let's examine the sorts of knowledge to which the lexical concept [BOOK] must afford access.

Let's consider the cognitive models accessed via [BOOK]. As illustrated in the partial cognitive model profile given in Fig. 4, the knowledge accessed by [BOOK] includes, at the very least, that a book is a physical entity and is interacted with via a process of reading. These two distinct sorts of knowledge—knowledge relating to an artefact, on one hand, and the process of reading, on the other—are captured in Fig. 4 by the two cognitive models: PHYSICAL STRUCTURE and READING ACTIVITY, respectively. The two cognitive models are related by virtue of a reader—the entity that interacts with the physical artefact by handling the tome and reading the printed text. Relationships of this sort holding between cognitive models I refer to as a *structural invariant*: a stable knowledge structure that is relational in nature. I capture the structural invariant in Fig. 4 by a double-headed arrow, and the specific relation involved is signalled by the mnemonic READER. In addition, cognitive models consist of a large, detailed, but structured, body of knowledge: what I refer to as *attributes*. Fig. 4 provides two attributes for each of the cognitive models which [BOOK] provides access to.

The cognitive model PHYSICAL STRUCTURE relates to the physical artefact, consisting of, at the very least, knowledge as to the physical structure and organisation of a given book. This includes detailed knowledge concerning the material aspects of the artefact, including its dimensions, weight, binding (paper or cloth), and so forth. This aspect of our knowledge about books I refer to as the TOME attribute. In addition to the physical organisation and construction of a book, books consist of text which is interacted with through the process of reading. This I refer to as the TEXT attribute.

The READING ACTIVITY cognitive model relates to the process involved in interacting with books, especially the nature of the interaction with the text itself. One consequence of this interaction is that reading takes up a period of time, which I refer to as the DURATION attribute. Depending on the amount of text involved, reading can take lesser or greater amounts of time. Another consequence of interaction with books is the level of interest that a given book holds for the reader. This I refer to as the LEVEL OF INTEREST attribute. While the reader might judge the book to be interesting another might be judged to be boring, and so on.

Now let's return to the specific type of polysemy under the spotlight in this section. Each of the utterances in (10) involves a distinct interpretation of the [BOOK] lexical concept. This is achieved by virtue of each instance of *book* being interpreted in a way consistent with the utterance context: consequently, a slightly different access route is established through the cognitive model profile accessed via the lexical concept [BOOK].

For instance, the readings that result from (10a) and (10b) have to do with activation of the PHYSICAL STRUCTURE cognitive model. However, each involves differential activation of attributes associated with this cognitive model—a process I term
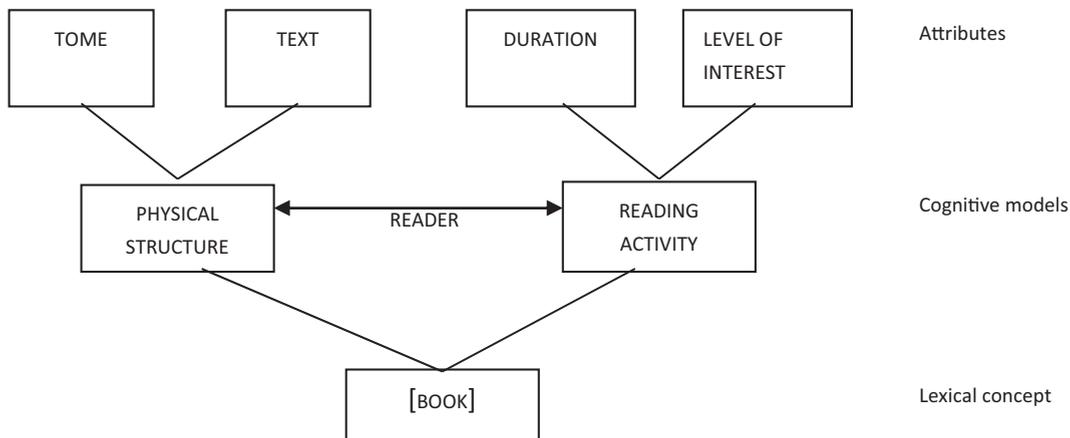

Fig. 4. The relationship between lexical concepts, cognitive models, and attributes and values.

highlighting (Evans, 2009). While the reading associated with *book* in (10a) involves highlighting of the TOME attribute, the reading associated with *book* in (10b) involves highlighting of the TEXT attribute.

In contrast, the readings that result from the utterances in (10c) and (10d) have to do with activation of the READING EVENT cognitive model accessed via [BOOK]. The reading associated with *book* in (10c) results from highlighting of the DURATION attribute. The reading associated with *book* in (10d) results from highlighting the LEVEL OF INTEREST attribute.

4. Lexical polysemy

With lexical polysemy, the problem is slightly different. Unlike conceptual polysemy, we are not dealing solely with the construal of linguistically-mediated sense-boundaries. Rather, there appears, intuitively, to be a number of distinct conventional sense-units—lexical concepts in the parlance of LCCM Theory—associated with a single form. Let's consider some data, by way of illustration, focusing on an instance of the rampant polysemy of the English preposition *in*.

Phenomenon 2:
(11) a. The kitten is in the box.
      b. The cow is in milk.
      c. The girl is in love.
      d. He's in banking.

In the first sentence, (11a), *in* refers to a spatial relation of containment. But in the remaining examples, *in* does not appear to concern this relation, or even, arguably, a spatial relation at all. In (11b) *in* is mediating a physical condition, specifically here, lactation. In the example in (11c) the relation holds between an individual, and a state—an emotional/psycho-somatic state. And finally, in (11d), the relation mediated by *in* concerns an individual, and his mode of employment.

In terms of lexical polysemy, the challenge is not just to figure out how situated sense-boundaries are construed, but establishing that we are dealing with distinct, which is to say, conventionalised, sense-units. Hence, it is the second theoretical construct, the lexical concept, from LCCM Theory that is of critical importance to this endeavour.

As indicated earlier, a lexical concept constitutes a bundle of different types of knowledge, including semantic parameters, about which I will have more to say when I address inter-lexical polysemy. But for present purposes, the most important aspect of a lexical concept's semantic structure concerns its lexical profile. Recall that LCCM Theory claims that a lexical concept is the semantic pole of a symbolic unit, such as a word. The hallmark of a distinct (=conventionalised) lexical concept is that it has a unique lexical profile: a habitual patterning in terms of the semantic and grammatical *selectional tendencies* associated with the lexical concept. In informal terms, the claim is that part of what we know about any given lexical concept concerns the other symbolic units that it habitually co-occurs with, including the grammatical constructions in which it occurs, and the sorts of semantic arguments with which it co-occurs.

So, let's now get a clearer sense of what, exactly, it means to say that a lexical concept's lexical profile specifies selectional tendencies: what exactly, then, is a selectional tendency? For instance, the lexical concepts associated with the following lexical items: *stale, rotten, sour* and *rancid*, as applied to particular foodstuffs exhibit the following restrictions (or tendencies) in terms of their selectional tendencies:

(12) a. stale bread/cake/cheese, etc.
      b. rotten fruit/eggs/vegetables, etc.
      c. sour milk/yoghurt, etc.
      d. rancid butter/oil, etc.

In terms of the examples in (12) we see that the lexical concepts associated with the forms *stale*, *rotten*, *sour* and *rancid* exhibit quite distinct selectional tendencies. While *stale* applies to certain foodstuffs, such as bread, cheese, and so on, it cannot apply to others, such as fruit, for instance. This reveals that *stale* has a tendency to select certain semantic arguments with which it co-occurs.

As noted earlier, a selectional tendency for any given lexical concept can be divided into *semantic selectional tendencies* and *formal selectional tendencies*. Semantic selectional tendencies have to do with the (range of) lexical concepts with which a lexical concept co-occurs and in which it can be embedded. Formal selectional tendencies have to do with the (range of) forms with which a given lexical concept co-occurs, or in which it can be embedded. Consider, first of all, the semantic selectional tendencies associated with what I will dub the [PLACEMENT] lexical concept encoded by *put on*:

(13) a. Jane put the butter on the table.
      b. <actor> *put* <thing> <location>

The [PLACEMENT] lexical concept selects for semantic arguments that can be construed as, respectively, an actor, a thing and a location. In other words, part of our knowledge concerning this lexical concept involves knowing what kinds of lexical concepts it can co-occur with.

In terms of formal selectional tendencies, part of our knowledge of the same lexical concept is knowing the order in which the forms associated with the actor, thing and location lexical concepts occur, with respect to the form *put on*. That is, part of our knowledge involves knowing where the actor, thing and location slots are located relative to the form *put on*. Together these two types of knowledge form the lexical profile for the [PLACEMENT] lexical concept.[6]

In addition, formal selection tendencies need not be restricted to knowledge of word order. It can also include knowledge concerning the nature of the permissible forms that can co-occur with a given lexical concept. For instance, the [LOCATE] lexical concept associated with the form *found* exhibits a distinct formal selectional tendency from the [REALISE] lexical concept exhibited by the same form:

(14)   a.   Jane found the cat.   [LOCATE]
       b.   Jane found that the cat was missing.   [REALISE]

The examples in (14) reveal that while the [LOCATE] lexical concept selects for a direct object, the [REALISE] lexical concept selects for a sentential complement.

According to LCCM Theory, this linguistic patterning—a lexical concept's lexical profile— enables the analyst to examine whether a lexical concept is distinct or not, in the sense of being a conventional unit of knowledge stored in semantic memory. After all, if we discern a distinct lexical profile in usage-patterns associated with a putatively-distinct lexical concept, then we can hypothesise that we have a distinct lexical concept on our hands.

To enable the analyst to discern whether a lexical profile—and hence a lexical concept—is distinct, LCCM Theory provides a principled methodology for examining a putative lexical concept's lexical profile. The methodology consists of application of two criteria, as follows:

The semantic selectional criterion:

> A distinct lexical profile—by definition encoded by a distinct lexical concept—provides unique or highly distinct patterns in terms of the nature and range of the lexical concepts with which a lexical concept can co-occur or in which it can be embedded, or in the case of an internally open lexical concept, which occur within it.

The formal selectional criterion:

> A distinct lexical profile—by definition encoded by a distinct lexical concept—provides unique or highly distinct patterns in terms of the *vehicles*—aka lexical forms/constructions—with which a lexical concept can co-occur or within which it can be embedded, or in the case of an internally open lexical concept, the nature of the alignment between vehicles and the internally closed lexical concepts that lexically fill the internally open lexical concept.

While successful application of only one of the two criteria will normally be sufficient to point to the likelihood of a distinct lexical concept, in the final analysis, identifying the existence of a given lexical concept requires converging evidence employing a number of lines of support and deploying a complementary set of methodologies. Recent work in this regard, which can be used to support the evidence from linguistic analysis presented below, includes techniques from psycholinguistic testing (see e.g., Cuyckens et al., 1997) as well as corpus-based tools and methodologies (e.g., Gries, 2006).

So, now let's apply these criteria to the example sentences for *in* in (11). The first thing to observe is that, in terms of formal selectional tendencies, each of the examples deploys the same vehicle: each example makes use of the same sentence-level construction. Each instance of *in* mediates a relation between a sentential subject, and a noun-like object. Hence, the formal selectional criterion appears to be unable to distinguish between putative lexical concepts. However, in each of the example sentences, the object-like noun is quite distinct. And this distinction correlates with a clear divergence in the nature of the relation mediated by *in*. In (11a), the semantic argument selected for the object position corresponds to a physical entity that can serve as a container. In this example, the subject is thereby contained by the object argument. But in contrast, in (11c), the object argument refers to a psycho-somatic state—*love*—rather than a physical container. And correspondingly, the relation designated by *in* has to do not with physical containment, but rather, immersion in a psycho-somatic state.

One way of viewing this would be to suppose that it is the object argument, *love*, that is nuancing the relation encoded by *in*: that *in* has to do with abstract containment, the precise details of which are filled in by context. Put another way, we might claim that *in* is, in fact, *monosemic*, rather than polysemous: it provides a rather abstract semantic representation, allowing it to be deployed in semantic contexts where physical or abstract containment are in play. But evidence against such a monosemous perspective comes from examples such as the following:

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[6] See Goldberg (2006) for discussion of how the item-based knowledge which comprises the lexical profiles of lexical concepts are acquired.

(15) a. *We're in war.
      b. We're at war.

(16) a. *The army is in red alert.
      b. The army is on red alert.

While the example in (11b) concerns an abstract state, namely *love*, the examples in (15) and (16) show that the preposition *in* cannot be applied to just any kind of abstract state. To describe being in a state of war, *in* cannot be deployed, as evidenced by the ungrammaticality of (15a). Rather, the preposition *at* must be used in English. Similarly, *in* cannot mediate a state of red alert, as evidenced by its ungrammaticality in (16a). Instead, the preposition *on* must be used. Together, these lines of evidence point to the view that the acceptability of *love*, in (11c), is a consequence of a putative [PSYCHO-SOMATIC STATE] lexical concept being conventionally associated with *in*. While states such as red alert and war are not psycho-somatic in this sense, the semantic selectional criterion leads us to hypothesise that semantic arguments that concern psycho-somatic states are sanctioned by this distinct lexical concept; we have evidence that a [PSYCHO-SOMATIC STATE] state lexical concept is conventionally associated with *in*. And indeed, the preposition *in* does appear to productively allow such semantic arguments, as evidenced by the following examples, which is consistent with this hypothesis:

(17) a. She's in despair.
      b. He's in a depression.
      c. John's in deep grief.
      d. Clare's in deep rapture.

Similarly, the semantic arguments associated with the examples in (11b) and (11d) are also distinct. The state mediated by *in* in (11b) appears to concern a physiological state, rather than a psycho-somatic one. This example points to the fact that a particular mammal is currently lactating. In contrast, in (11d) the semantic argument concerns a state of employment: the individual mentioned works in the banking industry.

If distinct types of semantic arguments are predictive of distinct semantic selectional tendencies, and hence distinct lexical concepts, then we might expect ambiguities to potentially arise. And this does appear to be the case. Consider the following example, where I have minimally changed (11b) to the following:

(18) She's in milk.

This example is now potentially ambiguous. It could refer to an adult, female human who is lactating. Or, it could be construed as describing the professional manifestation of the individual, such that the sentential subject works in the dairy industry. And these two, ambiguous readings, are consistent with the view that *in* manifests two distinct lexical concepts, as evidenced by two distinct sets of semantic selectional tendencies: a [PHYSIOLOGICAL STATE] lexical concept, evidenced by (11b), and a [MODE OF EMPLOYMENT] lexical concept, evidenced by the example in (11d).

Taken together, these lines of evidence support the hypothesis that with the examples in (11), we are dealing with distinct lexical concepts, with polysemy. While the examples, intuitively, appear to be semantically related, we are nevertheless dealing with distinct sense-units, with unique lexical concepts, stored in long-term semantic memory. This would appear to be more consistent with the evidence and data reviewed, than assuming, for instance, that there is a single relatively abstract, monosemic representation for *in*, in semantic memory. And the notion of a lexical profile, adduced by LCCM Theory, and the formal criteria for examining the selectional tendencies manifested by a lexical concept's lexical profile, provide a mechanism enabling the analyst to form falsifiable hypotheses about potentially distinct lexical concepts. Such hypotheses can then be examined deploying usage-data in the context of corpus-based methodologies.

5. Inter-lexical polysemy

Now let's consider the final type of polysemy under the microscope: inter-lexical polysemy. The challenge, here, is not to make the case for distinct lexical concepts—which was the challenge with respect to lexical polysemy. After all, in this type of semantic phenomenon, as we are dealing with distinct lexical forms, the corresponding lexical concepts are necessarily distinct. Nevertheless, the challenge is to account for apparent similarities in the nature of lexical concepts associated with distinct lexical forms. To illustrate this challenge, consider some representative data, focusing on the prepositions *in* versus *on*:

Phenomenon 3:
(19)   We are in love/shock/pain.   'state'
(20)   We are on red alert/best behaviour/look-out/the run.   'state'

What is interesting about these two sets of examples is that both *in* and *on* appear to mediate relations concerning abstract states. However, the 'state' lexical concepts for *in* and *on* appear to have quite distinct semantic selectional tendencies. For instance, if we invert the examples in (19) and (20), exchanging the prepositions, as in (21) and (22), the sentences now become semantically infelicitous:

(21)   #We are on love/shock/pain.
(22)   #We are in red alert/best behaviour/look-out/the run.

These data reveal that the 'state' lexical concept associated with *in* selects for semantic arguments which access conceptual structure concerning emotional or psychological 'force' such as being *in love*, *in pain* and so on. In short, *in* appears to have a [PSYCHO-SOMATIC STATE] lexical concept conventionally associated with it.

In contrast, the semantic arguments that co-occur with *on* relate to content that has to do with time-restricted activities, as well as actions which involve being currently active. These include being *on alert*, *on duty*, and so forth. In short, *on* appears to have what I shall dub an [ACTIVE FUNCTIONING STATE] lexical concept associated with it. The data in (21) reveal that semantic arguments which are associated with on-going psychological and/or emotional 'force' are semantically incompatible with this preposition. In contrast, states that are active for a delimited period of time, and those that appear to be under voluntary control and/or decision-making, such as being *on duty*, or *on sale*, appear to be compatible with *on*. In short, *on* appears to select for semantic arguments that relate to states that are (i) temporally-bounded, and (ii) volitional. Hence, they relate to a state that we can gloss as concerning an *active function*.

While both *in* and *on* appear to have 'state' lexical concepts associated with them, the methodology deployed by LCCM Theory, based on the construct of the lexical profile, enables us to hypothesise whether we are dealing with similar or distinct lexical concepts. While, in the case of *in* and *on*, we might consider these prepositions to relate to 'state' lexical concepts, an analysis of distributional data for co-occurring semantic arguments suggests that the 'state' lexical concepts are in fact quite distinct.

Nevertheless, a word of caution is in order: while LCCM Theory, and its methodology, do not on their own provide conclusive proof for the conventionalisation of a given lexical concept, they do lead to falsifiable hypotheses. And in conjunction with suitable empirical methods, including corpus data, and on-line and off-line psycholinguistic experiments, we have a ready basis for testing the predictions made.

6. Meaning spectrum phenomena

In this section I take up two outstanding issues associated with lexical polysemy. The first concerns the way in which lexical concepts are construed in context. In section 4, I contrasted lexical polysemy with conceptual polysemy: conceptual polysemy arises from sense-construal in context, a function of relevant encyclopaedic knowledge becoming activated, enabling the most linguistically-appropriate construal to arise. This phenomenon relies on one of the two central constructs of LCCM Theory, namely the notion of a cognitive model, and the related notion of a cognitive model profile, to which a word form's lexical concept facilitates access.

But in addressing the phenomenon of lexical polysemy in section 5, I focused on the conventional nature of lexical concepts: they are instantiated, as discrete sense-units, in long-term semantic memory. But the relatively stable nature of a lexical concept, *qua* discrete sense-unit, does not also preclude lexical concepts also being construed in context, guided by appropriate linguistic and non-linguistic context. For instance, the prototypical lexical concept for the English preposition *in* is often taken to relate to spatial [ENCLOSURE] (Evans, 2009, 2010a):

(23)   The honey is in the jar.

But, as Herskovits (1986, 1988) first observed, spatial prepositions such as *in* are often used in more flexible ways. For instance, consider an expression such as the following:

(24)   The pear is in the basket.

This sentence can be successfully deployed to describe a scenario where the pear is on another piece of fruit such that the pear mentioned is not, itself, actually enclosed by the confines of the basket. This is captured in Fig. 5.
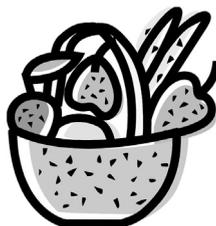
Fig. 5. The pear is in the basket.

What this reveals, as pointed out by Herskovits, is that the spatial lexical concept for *in* is far more flexible than earlier analyses allowed for. More generally, this linguistic behaviour reveals that word meanings are highly protean. Of course, it could be the case that the lexical concept for *in*—its [ENCLOSURE] lexical concept—achieves a broader range of situated interpretations due to its cognitive model profile, achieved via conceptual polysemy. However, a prediction of LCCM Theory is that closed-class lexical concepts do not directly facilitate access to cognitive models: closed-class lexical models do not have a cognitive model profile (see Evans, 2009). Hence, the polysemy evident for *in*, would, on that basis, not arise due to conceptual polysemy. And given that we would not want, presumably, to claim that (23) and (24) arise from wholly distinct lexical concepts, we need a way of modelling the protean semantic behaviour of words and other symbolic units.

In LCCM Theory this is provided by the notion of parameters: a lexical concept consists of a bundle of parameters— atoms of meaning—that encode pre-packaged schematic content specialised for being directly encoded in language. These parameters take a form that is qualitatively distinct from the analogue knowledge encoded by cognitive models (see Evans (2015) for theoretical and empirical arguments for the distinction between parametric (linguistic) versus analogue (non-linguistic) knowledge types).

The utility of assuming the existence of parameters, *qua* discrete units of schematic, knowledge that comprise a lexical concept's *semantic value*, is that it provides a ready means of accounting for aspects of a word's semantic variation, over and above the encyclopaedic knowledge to which lexical concepts facilitate access. In short, it enables the analyst to account for the variation in language use apparent in the two examples in (23) and (24) respectively. And more precisely, what this reveals is that, as a lexical concept consists of a bundle of semantic parameters, this nuances the classical, dictionary view of word-meanings as single, fixed, conventional senses (see Evans and Green, 2006, for discussion and critique). Instead, a lexical concept, rather than constituting a single, fixed entry in semantic memory, constitutes what I shall term a meaning spectrum: it provides a range of semantic elements which are more or less apparent in various contexts of use. And this provides a lexical concept with the flexibility apparent in usage behaviour.

The second phenomenon, I discuss here, is the emergence of new lexical concepts, aka *sense-extension*. A previously intractable problem in lexical semantics has been how to account for the rise of new lexical concepts. While we now know that new sense-units—lexical concepts in LCCM Theory terms—arise from *bridging contexts* (Evans and Wilkins, 2000) due to invited inferences from specific, and recurring usage contexts (Traugott and Dasher, 2002), positing a meaning spectrum, consisting of a bundle of semantic parameters conventionally associated with a single lexical concept, provides a mechanism that, I suggest, elegantly accounts for the linguistic facts. Hence, my argument, in this section, amounts to a theoretical extension of LCCM Theory, in order to account for two phenomena, arising from the phenomenon of lexical polysemy:

(i) sense-construal of lexical concepts in context, and
(ii) sense-extension, leading to the emergence of derived lexical concepts

6.1. A meaning spectrum for in

In this sub-section, I introduce the theoretical claims for a meaning spectrum encoded by *in*. As noted above, the prototypical 'spatial' lexical concept associated with *in* I gloss as [ENCLOSURE]. This lexical concept encodes, I propose, the parameter Enclosure—parameters are glossed, in LCCM Theory, with a capital initial letter. This parameter constitutes an abstraction across the spatio-geometric properties associated with bounded landmarks, such as a box, as lexicalised by the example in (23). The key spatio-geometric components associated with a bounded landmark, such as a box, is that it has the structural elements interior, boundary and exterior (see Tyler and Evans, 2003: Chapter 7 for detailed discussion). There are a diverse range of complex conceptualisations across which the parameter Enclosure is abstracted. This includes, at the very least, experiences relating to the range of entities enclosed, and a bounded landmark which serves to

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enclose the figural entity. Bounded landmarks themselves consist of many types even in everyday experience. For instance, a bounded landmark includes an interior, which further subsumes an interior surface, and the volumetric interior bounded by the interior surface. It also subsumes a boundary, which can be rigid, as in a metal safe, or non-rigid, as in a plastic carrier bag. The boundary also has other physical characteristics such as permeability and degrees of opacity. Finally, the bounded landmark has, by definition, an exterior: that region which constitutes the inverse of the volumetric interior. Accordingly, part of the exterior includes the exterior surface.

As numerous scholars have observed, word meanings give rise to invited inferences, in usage contexts (e.g., N. Evans and Wilkins, 2000; Langacker, 1987; Traugott and Dasher, 2002). In the case of spatial scenes, Andrea Tyler and I, in earlier research (Evans and Tyler, 2004; Tyler and Evans, 2003), dubbed these *functional consequences* of humanly-relevant interaction. Due to our interaction involving enclosures, *in* is associated with a number of functional consequences: there are a number of identifiably distinct sorts of functional consequences associated with spatial scenes involving enclosure. These include Location with Surety, Occlusion and Affecting conditions. My claim is that these consequences of interacting with enclosure give rise to conventionalised parameters becoming associated in semantic memory with the lexical concept [ENCLOSURE]. And this results in the spatial lexical concept for *in* encoding a meaning spectrum consisting of at least four identifiably distinct parameters.

So, let's briefly illustrate each of the parameters I am positing. The first, Enclosure, arises from bounded landmarks that contain a motile entity, as in the case of the example in (23). But more than this, bounded landmarks—landmarks with the spatio-geometric properties of a container—are specialised for providing a Location with Surety function. After all, containers can provide a support function by virtue of containing (i.e., holding and restricting) the location of the motile entity. This is evident from spatial scenes involving a bulb partially contained in a ceiling socket, whereby the socket can be described as being in the socket, even though only part of the socket is actually contained by the socket (see Fig. 6). The point, of course, is that the socket is holding and thus fixing the location of the bulb with surety, a consequence of the partial enclosure.

The next parameter, Occlusion, is a consequence of certain bounded landmarks, due to the opacity of the material which forms the boundary. In such spatial scenes, the figure located on the volumetric interior is occluded, and hence hidden from view.

The third parameter, which I dub, Affecting conditions, relates to the fact that an enclosure provides a delimited environment which thereby affects the entity located on the volumetric interior. For instance, a prisoner held in solitary confinement in a windowless sound-proofed room is thereby subjected to a particular (impoverished) physical and sensory environment, which is a direct consequence of the nature of the bounded landmark in which s/he is located.

I propose that these functional consequences—and perhaps others—arising from the spatio-geometric property of Enclosure, have become abstracted as distinct parameters. Put another way, abstracting across different sorts of exteroceptive experiences, namely the spatio-geometric properties associated with enclosures, gives rise to an Enclosure parameter. Abstracting across re-occurring functional consequences of the spatio-geometric properties associated with enclosure gives rise to further parameters notably Location with Surety, Occlusion and Affecting Conditions. These parameters, which arise from spatial scenes involving enclosure, are diagrammed in Fig. 7.

Fig. 7 is meant to capture the following claim: the prototypical spatial lexical concept for *in*, which I gloss as [ENCLOSURE], encodes a meaning spectrum. This meaning spectrum consists of four distinct parameters, which manifest themselves, to varying degrees, in different contexts of use. And the rationale for positing a meaning spectrum of this sort is that it provides the most elegant means of accounting for the observable linguistic facts, the issue to which I now turn.

6.2. Sense-construal in context

A particular challenge that has faced analysts, at least since the work of Herskovits (1986), has been how best to account for the spatial semantics of spatial markers, such as English prepositions. To get a sense of the challenge, consider the following examples:
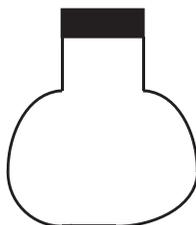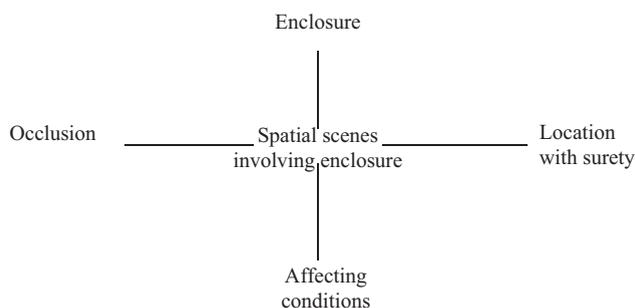

Fig. 6. A light bulb in a socket.

Enclosure

Occlusion ——————— Spatial scenes ——————— Location
involving enclosure with surety

Affecting
conditions

Fig. 7. A meaning spectrum for *in*.

(25)   The toy is in the box.

(26)   a.   The bulb is in the socket.
        b.   The flower is in the vase.
        c.   The umbrella is in his hand.

The difficulty arises from what Herskovits dubs the *simple relations model* of prepositions (see Evans, 2010a for a review). Traditional accounts of spatial semantics assumed that geometric relations were sufficient to account for the range of ordinary usages to which spatial markers were put. But as revealed by the examples in (25–26), *in* can relate to a range of non-prototypical spatial relations, involving only partial enclosure, or even non-enclosure, as in the example in (24), above. Subsequent researchers, as already intimated, have attempted to account for the semantic variation of spatial words by adopting various functional accounts (see, for representative examples, Feist, 2010; Vandeloise, 1994; Tyler and Evans, 2003).

The utility of positing a meaning spectrum, made up of discrete parameters, is that this account, while applicable to spatial semantics, is, in principle, generalisable to the analogous behaviour of other lexical classes. Most lexical classes appear to be protean in just this way (Evans, 2009). Hence, the notion of a meaning spectrum provides a theoretical perspective that attempts to account for the observable variation in word meaning, in short, the linguistic facts.

With a meaning spectrum—a bundle of semantic parameters which provide a lexical concept with its indigenous semantic content—one, or a subset of parameters, will be more salient. It is for this reason that I dub the prototypical 'spatial' lexical concept [ENCLOSURE], based on the most salient parameter. Moreover, each instance of use need not make obvious use of the entire meaning spectrum, but rather a subset of parameters. The example in (25) is, I suggest, a consequence of the two parameters: Enclosure and Location with Surety. That is, by virtue of being located in the interior portion of the bounded landmark, the motile entity is thereby enclosed. Moreover, by virtue of being enclosed, the figure is located with surety: if the box is moved, so also, is the figure—the toy—as a direct consequence. That is, Location with Surety is entailed by Enclosure.

Evidence for thinking that the Location with Surety and Enclosure parameters are, nevertheless, distinct units of knowledge encoded as part of a lexical concept's linguistic content comes from spatial scenes involving partial enclosure. In the examples in (26), the figure, in each case, is only partially enclosed by the bounded landmark: only the base of a bulb is enclosed by the socket as illustrated in Fig. 6, above; only the stem, and not the whole flower, is enclosed by the vase (see Fig. 8); and only the umbrella handle is enclosed by the hand (see Fig. 9). Indeed, the reason that the form *in* can relate to spatial scenes involving partial, as well as full, enclosure is due to the parameter of Location with Surety. I propose that it is precisely because the bounded landmark that partially encloses the figure serves to provide location with surety that the form *in* is sanctioned in these instances.

On the basis of the examples in (24) and (25), there is no reason, however, to be convinced that Enclosure and Location with Surety constitute distinct parameters, and hence distinct knowledge units encoded as part of the linguistic content associated with the [ENCLOSURE] lexical concept. However, the example in (27) illustrates a crucial disjunction between the two. While the figure, the bottle, is partially enclosed by the bounded landmark, the cap, in exactly the same way as the relationship between the bulb and the socket as depicted in Fig. 6, this use of *in*, in (27), to describe an analogous spatial relation is semantically anomalous, as indicated by the hash sign. In the spatial scene described by this example, the bottle is not located with surety by virtue of being partially enclosed by the cap. That is, the bottle's location is not determined by being partially enclosed by the cap—although access to its contents are. Hence, in a situation where partial enclosure applies, but location with surety does not, the [ENCLOSURE] lexical concept associated with *in* cannot be applied. This suggests that in the absence of the Location with Surety parameter, *in* cannot be applied to spatial scenes involving only partial enclosure.
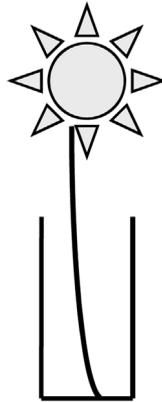
(27)   #The bottle is in the cap

Fig. 8. The flower is in the vase.

We must next examine whether the Location with Surety parameter can be employed independently of the Enclosure parameter. Evidence for such a state of affairs is provided by the example in (24), which I re-produce below, and which concerns the spatial scene depicted in Fig. 5.

(24)   The pear is in the basket

In this example, the pear (in the centre of Fig. 5) is not enclosed by the basket, as it is supported by other fruit; although the supporting fruit are enclosed by the basket. Yet, the form *in* can be applied to this spatial scene, as is evident in (24). I suggest that this is due to a [LOCATION WITH SURETY] lexical concept which sanctions this particular usage. While the [ENCLOSURE] lexical concept apparent in (25) and (26) encodes the Enclosure and Location with Surety parameters, the [LOCATION WITH SURETY] lexical concept encodes the Location with Surety parameter but not the Enclosure parameter as part of its linguistic content. This difference in the meaning spectra between the two putative lexical concepts explains the difference in linguistic behaviour in the examples just considered. The [ENCLOSURE] lexical concept requires full enclosure, or partial enclosure plus location with surety. However, in (24) neither full nor partial enclosure is apparent, yet *in* is sanctioned. This follows, I suggest, as the independent, but semantically related (and hence polysemous) [LOCATION WITH SURETY] lexical concept sanctions this use. Thus, we see that there are, plausibly, at least two 'spatial' lexical concepts associated with *in*, [ENCLOSURE] and [LOCATION WITH SURETY], which encode different configurations of parameters, and hence, subtly distinct meaning spectra.

6.3. Sense-extension

I now move on to the most speculative part of the paper. The notion of parameters making up a meaning spectrum for a lexical concept is also useful, I suggest, in accounting for the development of polysemy. I suggest that the emergence of the parameters: Location with Surety, Occlusion and Affecting Conditions, associated with the linguistic content encoded by *in*, can, under certain conditions, give rise to new 'state' lexical concepts. While the parameter Enclosure, entails, under

Fig. 9. The umbrella is in his hand.

certain conditions, all of the other parameters illustrated in Fig. 3, the other parameters do not necessarily entail the Enclosure parameter. For this reason, as I shall argue, the Enclosure parameter can be seen to be primary; the other parameters arise from spatial scenes in which Enclosure is a key attribute.

The means whereby new lexical concepts arise is due to a disjunction between the various parameters. My hypothesis is that by virtue of interacting in humanly relevant ways with the spatio-topological relation Enclosure, a number of distinct functional consequences arise. These functional consequences become conventionalised as schematic parameters—semantic 'atoms'—forming part of the bundle of linguistic content encoded by the [ENCLOSURE] lexical concept. In essence, the lexical concept [ENCLOSURE] encodes the spatio-topological relation Enclosure, a schematic unit of knowledge akin to a parameter, and the parameters—arising from the encoding of distinct functional categories—Location with surety, Occlusion and Affecting Conditions.

How then does polysemy arise? Due to the multiplicity of parameters encoded by a single lexical concept, under certain conditions, a parameter (or parameters) that is (or are) particularly salient in a given context of use can become reanalysed as a distinct sense-unit, giving rise to a new lexical concept in its own right. For example, I proposed earlier that *in* conventionally encodes a [PSYCHO-SOMATIC STATE] lexical concept:

[PSYCHO-SOMATIC STATE] (i.e., subjective/internal state)

(28)   a.   John is in shock/pain (over the break-up of the relationship)
          b.   John is in love (with himself/the girl)

This does not mean, for instance, that the [ENCLOSURE] lexical concept loses the Affecting Conditions parameter from its linguistic content. Rather, the Affecting Conditions parameter can become established as the core parameter of a new lexical concept.

In terms of an LCCM account of the emergence of the 'state' lexical concepts for *in*, the trajectory is as follows. Situated implicatures arise in *bridging contexts* (see discussion in Evans, 2009). These are contexts in which a usage sanctioned by the relevant 'spatial' lexical concept, such as the [ENCLOSURE] lexical concept, also gives rise to a situated implicature, such as an affecting condition. If the prepositional form is repeatedly used in such bridging contexts, the situated implicature may give rise to the formation of a new parameter, or the detachment of an existing parameter, as the core parameter of a new lexical concept. I argue below that bridging contexts involving the parameter Affecting Conditions may have given rise to the formation of a number of related but distinct 'state' parameters, and hence lexical concepts.

In order to trace the development of the parameter Affecting Conditions, we need to consider spatial scenes that might provide appropriate bridging contexts. To illustrate, consider the following expressions:

(29)   a.   in the dust
          b.   in the sand
          c.   in the snow

While dust, sand and snow are physical entities which can 'enclose' they cannot, normally, fulfil the functions provided by, for instance, containers: they do not typically serve to locate with surety, circumstances such as quicksand and avalanches excepted. For instance, dust, sand and snow, by virtue of enclosing, do not normally have the structural attributes that allow an entity to be supported and thus transported (cf. a bucket, or a coffee cup), nor do they normally restrict access in the way a prison cell does, for instance.

Nevertheless, these examples exhibit some of the spatio-topological properties associated with the [ENCLOSURE] lexical concept. This is a consequence of the properties associated with these 'bounded' landmarks: they provide an affecting condition, an environmental influence which affects our behaviour. For instance, they determine the kinds of apparel we wear, and how we behave when we are exposed to the dust/sand/snow, and so on. As such, these contexts of use provide bridging contexts: both enclosure and affecting conditions are implicated, and either (or both) may be understood. While entities such as sand, snow and dust can be construed as enclosures with boundaries, there are other related examples of what we might refer to as Prevailing Conditions which are much less clear-cut in terms of the nature of the boundaries involved:

(30)   a.   the flag in the storm
          b.   the flag in the wind

I suggest that the instances of *in* in (30) *are* sanctioned by virtue of the existence of a distinct parameter Affecting Conditions, which forms part of the linguistic content encoded by a distinct [PREVAILING CONDITIONS] lexical concept. Hence, the next stage in the development of a new lexical concept is for the parameter—Affecting Conditions, in this case—to be re-analysed as a core component of an independent lexical concept. Clearly a storm and wind are much less prototypically enclosures, and more saliently provide prevailing conditions which thereby constitute an environment which

Enclosure

Occlusion ———— Spatial scenes ———— Location
                involving enclosure   with surety

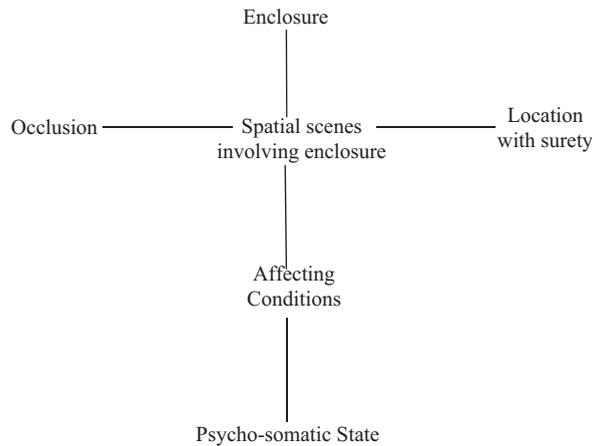Affecting
Conditions

Psycho-somatic State

Fig. 10. Parameters for *in*.

affects us. As such, spatial scenes involving more prototypical enclosures have given rise to the functional consequence affecting conditions, which has led to the formation of a distinct Affecting Conditions parameter in semantic memory. The existence of a distinct [PREVAILING CONDITIONS] lexical concept, as evidenced by examples in (30), provides suggestive evidence that such a distinct Affecting Conditions parameter exists.

I argue that the distinct 'state' lexical concepts associated with *in* evidenced in (28) encode the parameter Affecting Conditions, but not Enclosure. Indeed, this lexical concept invokes, in some sense, affecting conditions. Moreover, these examples are relatively, and to degrees, far removed from the physical notion of enclosure from which they developed. In essence, once an Affecting Conditions parameter becomes conventionalised, it can be applied to distinct kinds of affecting conditions, even those that are non-spatial in nature, such as states. This has led to the development of a new lexical concept. Affecting conditions can be caused by psycho-somatic states, such as grief, happiness and sadness which are internal in nature. This 'state' gives rise to a [PSYCHO-SOMATIC STATE] lexical concept associated with *in*. The full meaning spectrum for *in*, including the proposed Psycho-somatic state parameter, central to the [PSYCHO-SOMATIC STATE] lexical concept for *in*, is captured in Fig. 10.

7. Word meaning in LCCM Theory

This article has attempted to advance the utility of LCCM Theory in two ways. The first relates to the range of applications to which the theory can be put. I have considered, on the face of it, disparate polysemous phenomena (assuming that inter-lexical polysemy can be treated under the heading of 'polysemy'). And in so doing, I have argued that LCCM Theory, with its principled separation between linguistic and conceptual knowledge types (lexical concepts versus cognitive models), provides a ready, and even an elegant, means of analysing these three distinct types of semantic/ polysemy phenomena. I have argued this provides a joined-up account, enabled by adopting a cognitively-realistic, and holistic theory of lexical structure and compositional semantics.

Second, I have advanced an important aspect of the theory, by proposing and developing the notion of a meaning spectrum: a lexical concept consists of a bundle of semantic parameters, which plausibly account for aspects of lexical polysemy, as well as providing a promising framework for understanding the diachronic emergence of lexical polysemy. While my analysis, in this regard, is meant to be suggestive, the detailed diachronic analysis awaits further research. And in view of this, the details of the diachronic arguments I have made may require revision in the light of that. In this section, I draw out some of some consequences of the LCCM Theory approach to word meaning, in view of the analyses I have presented in this paper.

7.1. Access semantics

LCCM Theory, which I introduced above, is a theory of what I refer to as *access semantics* (Evans, 2013). Access semantics is an approach to lexical representation and compositional semantics 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, 2009). LCCM Theory, as a theory of access semantics, has a number of primary commitments, which can be summarised as follows (see Evans, 2013: Chapter 2 for details):

- 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.

Over and above that, one of the conclusions of the current article is that the non-linguistic knowledge—the cognitive model profile—to which a lexical concept facilitates access is not, on its own, entirely sufficient to account for some aspects of a word's polysemous behaviour. I have argued for the theoretical construct of a lexical concept. While this is a unit of conceptual knowledge, it encodes content that is of a qualitatively different sort from the cognitive models that populate the conceptual system. In particular, an important construct is that of the parameter: a lexical concept consists of parametric knowledge, made up of a number of schematic knowledge units. Together these provide a lexical concept with a unique meaning spectrum. This notion of a meaning spectrum, in conjunction with a lexical concept's unique cognitive model profile, enables us to provide a joined-up account of a range of polysemous phenomena.

According to LCCM Theory, parameters derive from the humanly-relevant scenes with which words are associated during language use. Any such scene involves a number of situated implicatures, associated with the scene. Implicatures that re-occur in usage contexts associated with the same lexical form can come to be stored as parameters—schematic units of semantic structure—conventionally associated with a distinct form. And over time, some parameters can come to be reanalysed as being more salient than others, allowing a lexical item to gradually be used in new contexts of use. And when this happens, we are provided with evidence that a new lexical concept associated with the form has emerged, with a revised inventory of parameters vis-à-vis the prototypical spatial lexical concepts—in the case of *in* and *on*.

7.2. The anatomy of lexical structure

In this sub-section, I sketch the architecture of lexical representation, in the light of the analyses developed during the paper. According to LCCM Theory, language is made up of symbolic units known as *constructions* (e.g., Goldberg, 2006). A linguistic unit is a construction in the sense that it is constructed from two components: a semantic pole—a semantic representation—and a phonological pole—a unit of form (e.g., Langacker, 1987). For instance, a particularly salient linguistic unit is the word, for instance, *cat* or *dog*. Words, like all constructions, are conventional pairings of form and meaning. They involve a sequence of one or more mental units of form (e.g., phonemes, or a syntactic template in spoken languages, signs in sign languages—I use the term *vehicle* to cover these different sorts of forms), and a semantic representation that is conventionally associated with the vehicle.

But as I have argued in this article, the semantic representation paired with a linguistic vehicle potentially consists of knowledge of two, qualitatively distinct sorts. It consists, I have proposed, of a meaning spectrum: a bundle of schematic units of linguistic knowledge (parametric knowledge) that convey sparse details of the thing that it represents. For the vehicle *cat*, this might include schematic information such as 'animal', 'behaviour', and 'habitat'. In addition, the linguistic vehicle facilitates access to a semantic potential—a region in our conceptual system—that embodies our rich, analogue information associated with cats; this amounts to the cognitive model profile to which the open-class lexical concept, [CAT], facilitates access. This arrangement is captured in Fig. 11.

Fig. 11 shows the following. The vehicle, /kæt/ is linked, symbolically, to the linguistic representation associated with the vehicle. This is signified by the dashed *symbolic link*. The linguistic representation—the lexical concept—is made up of semantic parameters. These comprise schematic atoms of meaning. They are in a representational format that is non-analogue in nature. This means that their content is in a more abstract form than the aspects of experience they are representations of. The rich details associated with what an animal is, the type of biological motion it can undergo, the nature of different patterns of animal behaviours, and what it means to share a human dwelling—a house and home—are all left out. Language appears to draw on a system of parameters that abstract away from these rich embodied (=analogue) meanings. And it provides a system of parametric knowledge—a meaning spectrum—that both allow us to package richer, analogue meanings in the conceptual system, and a means of linking to rich analogue concepts. In this way, language enables us to bootstrap the analogue concepts in our conceptual system for purposes of communicating, via language. The semantic parameters designated by 'animal', 'behaviour', and 'habitat', may not be all the parameters the vehicle /kæt/ encodes. And further research is needed. But based on the analyses presented in this article, and based on research within the LCCM Theory tradition, it seems likely that language does have an indigenous repository of meanings, ones that are qualitatively distinct from those in the conceptual system. And finally, Fig. 11 shows some of the analogue concepts that these semantic parameters correspond to. The analogue concepts, in this figure, are enclosed in square boxes. As previously, the terms I am using in these boxes are a mnemonic: they are meant to represent the rich, multi-modal experiences that make up our detailed, encyclopaedic knowledge concerning the physical attributes of a cat. Everything we know, and have acquired through direct experience, learning, cultural transmission, and so on, makes up

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Analogue concepts:

DIET/EATING HABITS	MOTOR BEHAVIOUR	SOCIAL BEHAVIOUR

PHYSICAL ATTRIBUTES	PATTERNS OF BEHAVIOUR	HOUSEHOLD DWELLER

Parametric concept: ['animal' 'behaviour' 'habitat']

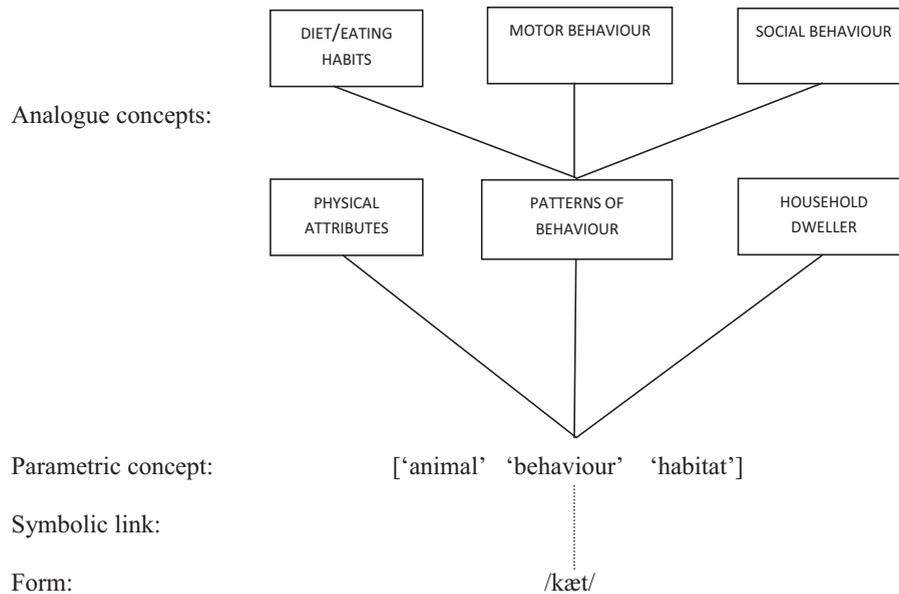Symbolic link:

Form: /kæt/

Fig. 11. Linguistic construction for *cat*, and its access to the conceptual system.

the rich information—the rich semantic potential—we potentially have access to, for cats. And finally, the analogue concepts form a network of representations in our minds, one that is partially shared across other minds, but partly constrained by individual experience: no two conceptual systems are the same. And of course, our analogue knowledge is in a continual state of modification. Each time we step out of the door, and into the hustle-bustle of the world, we are perceiving new sights and sounds. And our analogue concepts are updated and modified, whether we want it or not, as we proceed through our daily lives. The range of analogue concepts in Fig. 11 is, accordingly, probably highly partial, at best. And the sorts of concepts we hold, in our minds, for *cat*, that I present here may turn out not to be fully accurate. But this, nevertheless, provides an indicative representation of the sorts of things we must know, to be able to successfully use the word in the range of ways we clearly do, on a daily basis.

8. Conclusion

Polysemy is often defined, in the literature, as the relation between two distinct, albeit related sense-units associated with the same lexical form. For instance, the relation between the following usages of *over* would normally be considered polysemous:

(31)	The lamp is over the desk.	'above'
	The ball is over the wall.	'on the other side'
	The clouds are over the sun.	'occlusion'
	The relationship is over.	'completion'
	He prefers red over white wine.	'preference'

The focus of much research within language science, and especially within cognitive linguistics, has been on trying to account for the relationship between such relatively stable, albeit distinct, interpretations associated with a single form. One view, dubbed monosemy (e.g., Ruhl, 1989), takes the view that polysemy arises from the filling-in of context. On this account, a form such as *over* would possess a relatively abstract underlying representation that is filled in by context. Pustejovsky (1995) provides an impressively detailed attempt to account for the sorts of ways in which words might get contextually filled-in.

In the cognitive linguistics tradition (see Evans and Green, 2006), polysemy has been viewed as a function of underlying entries, stored in long-term semantic memory. On this view, the lexical form has the interpretations evident in (31) not because context fills in, or modulates its underlying abstract meaning. But rather, *over* already has these distinct sense-units stored in semantic memory (Tyler and Evans, 2001, 2003).

In this paper, I have tackled polysemy from a slightly different angle than this bifurcation. Polysemy arises, in part, from non-linguistic knowledge, I have proposed. The complex conceptual representations to which words facilitate access

provide a vast semantic potential which we deploy during language use and meaning construction. As my discussion of *France*, *Proust* and *book* has shown, polysemy arises, in large measure, from the sorts of non-linguistic knowledge we possess, and which we draw upon during language understanding.

Moreover, in my discussion of lexical and inter-lexical polysemy, we see that polysemy arises from the semantic lineages of words: any given word has a usage history, which relates to the usage contexts and humanly relevant scenes which correlate with its use. And these, in the guise of my notion of a parameter, and a meaning spectrum, can come to embellish and modify a word's representation. Over time, this can lead to new lexical concepts, which deviate from the originating, or *sanctioning lexical concept*, although in a lineage-specific way: the 'state' lexical concepts for *in* are different from *on* precisely because of the originating spatial semantics that gave rise to them.

In the final analysis, what this reveals is that polysemy is a complex and multifaceted phenomenon. It is probably overly simplistic to assume, as has sometimes been done (e.g., Tyler and Evans, 2001, 2003) that discussions of polysemy boil down to the polemic of monosemy on the one hand, versus the multiple distinct sense-units of the *principled polysemy* approach that I espoused with Andrea Tyler in our 2003 book. This bifurcation is too neat, and consequently ignores some of the very phenomena that I have been addressing in this paper. While polysemy as viewed through the eyes of Charles Ruhl (1989) is surely empirically flawed, it is fair to say that the view of polysemy developed in Tyler and Evans (2003) is probably also too simplistic. There we argued for neat semantic networks, where word-senses constituted clearly-demarcated, discrete nodes within a radiating lattice of semantic memory, which we thought, ultimately, would be locatable in the brain.

But what I have shown in this paper is that polysemy derives from different sources, and in various ways. To account for what I have termed conceptual polysemy, we need to understand the nature of non-linguistic knowledge to which a word facilitates access. And to account for lexical and inter-lexical polysemy, we need to know how word-senses develop, and hence, the linguistic knowledge that words contain as part of their semantic structure—what I have referred to as parameters, and the meaning spectra that are populated by parameters. In short, we require an account of the nature of semantic structure—a representational format unique to language—and conceptual structure—a representational format that is wholly non-linguistic in nature. LCCM Theory provides just such an account: it offers a psychologically-plausible way of viewing the qualitatively distinct and distinguishable types of representations—the linguistic (parametric) and the non-linguistic (analogue)—that are essential to understanding linguistically-mediated meaning construction. And in so doing, LCCM Theory affords a joined-up account of polysemy.

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