Operationalising Cognitive Grammar: Experimental and theoretical approaches

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Abstract

One of the main advantages of cognitive linguistics (and in particular Cognitive Grammar) over other approaches to the study of language structure is the fact that every descriptive construct is defined in psychological terms. This means, ideally, that any cognitive linguistic description of a word or grammatical construction constitutes a hypothesis about the mental representation of that structure. It should thus be possible to verify such descriptions, or to decide between competing analyses of a phenomenon, by experimentally testing the hypotheses that they entail. Such tests have been rare, however, due to the difficulty of operationalising many of the semantic notions used in Cognitive Grammar.

The present thesis reports on attempts to operationalise and test (using questionnaires, production tasks, and reaction time measurements) four descriptive claims formulated in the framework of Cognitive Grammar: that finite complementation constructions are headed by the complement-taking predicate; that the first object in a three-argument clause is more "figure-like" than the second object; that impersonal *there* in an existential clause refers to the locative scene as a whole; and that non-finite clauses encourage the hearer to imagine the described event as a single gestalt, whereas finite clauses encourage them to imagine it unfolding over time. These grammatical analyses crucially involve the notions of "profiling", "focal prominence", and "mode of scanning", which are central to Cognitive Grammar.

None of the experiments conducted produced conclusive results, leaving open the question of whether the descriptive constructs used in the analyses are really necessary. Accordingly, the second part of the thesis presents an attempt to reconceptualise Cognitive Grammar using only descriptive constructs that are known to be easily operationalisable; in particular, giving prominence to notions from discourse pragmatics and prosodic phonology.

Preface

The work that led to this thesis started in 2009, when I first read Ewa Dąbrowska's review of the *Oxford Handbook of Cognitive Linguistics*, which had just appeared in *Language* (Dąbrowska 2009). By that point, I had become enamoured of construction grammar (in all its varieties), and its twin promise of descriptive comprehensiveness and psychological realism—promises that seemed most nearly fulfilled by Cognitive Grammar, which almost alone seeks to describe the whole of language (not only syntax and semantics, but also phonology, morphology and discourse) in terms of psychological notions (Langacker 1987, 1991, 2008a). Yet Dąbrowska (2009: 723) made me realise that Cognitive Grammar, as it had been developed up to that point, relied on "semantic notions…which are very difficult to operationalize", and thus it might not entirely live up to its claims of psychological plausibility. Thus began an obsession with operationalising Cognitive Grammar.

While no-one (to my knowledge) had tackled the full scale of this problem, there were a few studies that insightfully addressed parts of it: for example, Forrest (1992) and Tomlin (1997) on subjecthood, Madden & Zwaan (2003) on perfective vs. imperfective aspect, and Matlock (2004) on fictive motion, to name a few. This existing work largely formed the basis of the ideas that I initially proposed to work on for my thesis (see Chapters 2–4).

But there remained deeper questions which (I felt) hadn't been given due attention in existing experimental work. By far the most important of these was the question of how to operationalise the notion of "profile"—what an expression designates. The vast majority of semantic analyses in Cognitive Grammar consist of claims about what a particular grammatical formative profiles; if there was no way of empirically determining this, then there seemed little hope of making Cognitive Grammar analyses experimentally testable.

To be clear, what was at issue was not how to determine the profile of full phrases or utterances such as *my chair* and *I'm hungry*; such things seemed sufficiently accessible

to intuition to not require much by way of experimental evidence. The issue was how to determine the profile of sub-phrasal units: grammatical morphemes such as *the*, *my* and *should*, as well as words like *chair* and *hungry* which generally do not appear on their own. This is the problem that Tomasello (2003: 92) refers to, in the context of language acquisition, as "blame assignment"; but to my knowledge it is not addressed there or anywhere else (though see Langacker 2005, 2009).

For a few years (see Kalyan 2012a,b), I tried approaching this problem using the notion of "cue validity" (e.g. Goldberg 2006: 107–113): basically, since *chair* generally appears as part of a noun phrase referring to a chair, its profile would have whatever properties are common to the real-world referents of these noun phrases—in other words, the properties of a chair. Likewise, since *my* always appears as part of a noun phrase referring to something possessed by the speaker, its profile would have whatever properties are common to the real-world referents of these noun phrases—in particular, the property of belonging to the speaker.[1] This of course raised the question of how to account for the distributional differences between noun phrases, determiners, and head nouns, a question that I addressed by unwittingly reinventing the basics of Categorial Grammar (Lambek 1958; Steedman 2000). (See e.g. Kalyan 2013a,b.) The question of how to experimentally test this theory remained (given that I was dealing with meanings that are not all easily accessible to intuition); but I managed to come up with a suitably baroque set of experimental procedures which could be argued to suffice.

The framework I was developing held out the promise of making cognitive analyses of meaning testable by tying meaning directly to real-world referents; and along the way, providing a natural account of language acquisition. However, by the end of 2013, it had dawned on me that an approach to meaning based on cue validity would have no way of dealing with mental-space phenomena of any kind (Fauconnier 1985)—including reported speech, questions, negation, or even definiteness. In effect, I had rediscovered the shortcomings of behaviourism (Chomsky 1959); obviously, it was time to start over.

Slowly, I began to rethink my approach to the notion of profiling, and eventually decided to define it in terms of the entities that an expression makes available as discourse

[1]Encouragingly, this confirmed the analysis in Langacker (1991) of grounding predications as profiling the grounded entity rather than the grounding relationship.

referents. This seemed a promising approach, as it is quite easy to test (without recourse to subtle experimental methods) whether an entity has been activated as a discourse referent: simply check if it can be referred to anaphorically. Furthermore, rebuilding the descriptive framework on the basis of discourse activation revealed that many of the types of salience appealed to in Cognitive Grammar could be done away with (Kalyan 2015).[2] Additionally, I started to realise that (contrary to my earlier understanding of Cognitive Grammar) perhaps not every morpheme has an identifiable, independent meaning; perhaps the only units of speech that are capable of bearing meaning are full prosodic constituents (an idea which is present in Categorial Grammar: Steedman 2000, and turned out to have precedents in late American structuralism: Trager & Henry Lee Smith 1957, as well as Cognitive Grammar itself: Langacker 1987: 337–338). These ideas, with a few further refinements, define the framework that is laid out in Chapters 5 and 6 as (what ended up being) an attempted reformulation of Cognitive Grammar.

[2]This was roughly the point at which I abruptly had to expand my thesis topic, since the experiments reported in Chapters 2–4 had all turned up inconclusive. It's fortunate that by this point, my theoretical ideas had solidified to the point where they could be committed to writing.

Acknowledgements

I would firstly like to thank Mirjam Fried and Adele Goldberg for introducing me to construction grammar and cognitive linguistics, and for encouraging me in pursuing fundamental questions. Unfortunately, they both had to put up with the embarrassingly half-baked ideas I had in my early years of thinking about Cognitive Grammar. I thank them for their patience, and hope they're not too dissatisfied with my progress.

I thank Ron Langacker for always being generous with his time at conferences, patiently verifying my understanding of the concepts of Cognitive Grammar. At our last meeting (at ICLC-13), he indicated that he would like to see my ideas worked out in greater detail than what I was able to provide orally; while much remains to be done, I hope that the explanations and illustrations in Chapters 5 and 6 are sufficiently clear and thorough.

Many thanks to Ewa Dąbrowska for agreeing to be my supervisor, even after I had to move back to Australia at the end of my first year; for her confidence in my ability to produce satisfactory work, even after I had to drastically expand the scope of my thesis in the middle of my third year; and most importantly for her comments on my drafts, which unfailingly pinpointed the exact holes in my reasoning. Thanks to Andriy Myachykov for his enthusiasm about my topic, and his valuable advice on running experiments; and thanks to James Street and Tore Nesset for several enjoyable discussions over the years on earlier ideas that led to my thesis.

At the Australian National University, Evan Kidd kindly provided access to lab space in the Research School of Psychology, as well as equipment and software, and guidance on experimental procedure and recruitment of participants. No less importantly, Nick Evans provided me with an academic home as a visitor in linguistics at the College of Asia and the Pacific, and as an affiliate member of the ARC Centre of Excellence for the Dynamics of Language. Being surrounded by field linguists, typologists and historical linguists (both

recently as well as before my PhD) has exerted a great influence on the way I think about language—an influence that may be discerned from the bibliography of this thesis. It has also led to a number of valuable friendships—too many to list exhaustively, but certainly including Avery Andrews, Mark Donohue, Owen Edwards, Mark Ellison, Alex François, Yishan Huang, Piers Kelly, Harold Koch, Stephen Mann, Billy McConvell, Julia Miller, David Nash, Jen Plaistowe, Malcolm Ross, Aung Si, Hedvig Skirgård, and Charlotte van Tongeren. This has offset my inability to participate in academic and social life at Northumbria after returning to Australia.

Finally, I would like to thank my extended family, and particularly my grandparents, for their support and encouragement of my education throughout my life.

Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

The content of Chapter 2 was presented jointly with Ewa Dąbrowska at the 13th International Cognitive Linguistics Conference in 2015 at Northumbria University (Kalyan & Dąbrowska 2015). An early version of the ideas in Chapter 5 was presented by myself at the same conference (Kalyan 2015).

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the Faculty Ethics Committee on February 17, 2014, and by an external committee (at the Australian National University) on June 2, 2014.

I declare that the Word Count of this Thesis is 50,156 words.

Name:

Signature:

Date:

Contents

List of abbreviations

Interlinear glosses follow the Leipzig Glossing Rules (`http://www.eva.mpg.de/lingua/resources/glossing-rules.php`). The following abbreviations will be used multiple times in the body text and in diagrams:

A	set of entities that are currently active in the discourse
CHAR	x is characterised by property y
E	event time
INV	eventuality x involves eventuality y
IU	intonation unit
LOC	x is located at/in y
OCC	x is a state of affairs constituting the occurrence of eventuality y
PAV	propositional-attitude verb
R	"reality" mental space
S	speech time
SEP	Schema Extraction Procedure
STAT	x is the statement resulting from a speech act conveying the state of affairs y
TEMP	x is temporarily in state y

Other (single-use) abbreviations will be introduced and explained as needed.

Chapter 1

Introduction

1.1 Psychological realism as a goal of linguistic theory

The idea that grammatical descriptions should be understood as models of the human mind is usually traced back to the Port-Royal Grammar (Arnauld & Lancelot 1660), which explicitly treated Latin grammar (the default framework for grammatical description at the time) as a model of logical thought. In fact, this idea can probably be traced back further: as has been pointed out by Vandeloise (2001) among others, the conceptual categories in Aristotle's work seem to be closely based on the grammatical categories of Attic Greek. (See also Coward 1980 for similar trends in 7th-century Indian philosophy.)

The use of grammar to model thought can also be seen in writings from the "language psychology" (*Sprachpsychologie*) tradition at the turn of the 20th century, e.g. von der Gabelentz (1901); Paul (1886); see Lambrecht (1994: 2, 122 *et passim*) for discussion. However, in the early twentieth century, American structuralists began to reject the idea that grammatical descriptions should make claims about mental representations, and in particular that they should have anything to say about meaning. Partly this was a result of the emphasis placed on documenting endangered languages; untangling the complex phonological and morphological systems of North American languages generally left little time for pondering their conceptual structure. Partly, too, it was a result of discomfort with the introspective methods that had dominated psychology up to that point, and a feeling that linguists should leave such speculations to those who specialise in them. In the words of Bloomfield (1933):

> ...we define the meaning of a linguistic form, wherever we can, in terms of some other science. Where this is impossible, we resort to makeshift devices. (Bloomfield 1933: 140, cited in Harris 1995: 26)

However, things changed with the early work of Noam Chomsky (1959, 1965):

> Chomsky came to see any study of language that didn't attend to its mental tendencies as completely sterile, and began promoting linguistics as a fundamentally psychological enterprise, coupling this promotion with a crushing attack on behaviorism. (Harris 1995: 68)

That Chomsky saw his new framework of transformational grammar as a model of how language is represented in the mind is shown by quotations such as the following:

> What we are suggesting is that the notion of "understanding a sentence" be explained in part in terms of the notion of "linguistic level". To understand a sentence, then, it is first necessary to reconstruct its analysis on each linguistic level; and we can test the adequacy of a given set of abstract linguistic levels by asking whether or not grammars formulated in terms of these levels enable us to provide a satisfactory analysis of the notion of "understanding". (Chomsky 1965: 87)

Thus it was only natural that researchers in the newly emerging field of cognitive psychology (a field that itself traced its roots to the attack on behaviourism by Chomsky 1959) would try to operationalise the descriptive constructs and analyses of transformational grammar, and test them using psychological experiments. Perhaps the most famous example of this was G. A. Miller (1962), who cited evidence for the psychological reality of syntactic categories (and in particular, the distinction between content words and function words); of syntactic constituency; of the preference for left- and right-branching over center-embedding; and of transformations. Other studies in this tradition include Fodor & Bever (1965); Garrett, Bever & Fodor (1966); Levelt (1970a,b). While these kinds of studies may now seem somewhat dated, the tradition is carried on by articles such as Friedman et al. (2008), which purport to find experimental evidence for particular kinds of syntactic movement.

As is well known among linguists, generative grammar went through a series of convulsions in the 1960s and 1970s—the debate between interpretive semanticists and generative semanticists, which eventually came to be known as the "linguistics wars" (Harris 1995). There is neither space nor pretext for entering into the historical details of this period; but by the end of it, scholars from other disciplines—and in particular, psychologists—had for the most part lost interest in generative grammar. It is hard to describe the situation more eloquently than Harris (1995: 215–216):

> For one thing, [Chomsky's program] wasn't panning out experimentally. Psychologists had come up with a very pretty cognitive theory of transformational grammar that had clear empirical consequences: The more transformations involved in a sentence, the longer it should take for someone to understand it. A passive sentence should take longer than its active counterpart. A negative should take longer than a positive. A negative-passive should take proportionally longer than a positive-active. You get the picture. At first, this model—known as the *derivational theory of complexity*—seemed spectacularly successful, giving a psychological boost to transformational grammar, a grammatical boost to cognitive psychology, and an empirical boost to the hybrid fledgling, psycholinguistics. It *did* take people longer to understand sentences with more transformations in their derivation. But all too soon, when sentence length and meaning were factored in (passives are longer than actives, for instance, and have subtle differences in meaning; negatives are slightly longer than positives, and very different in meaning), transformations receded in importance; at best, they now seemed untestable. Worse, transformations which had no differences in length or meaning (relating sentences like *Debbie called up Jeff* and *Debbie called Jeff up*) also had no appreciable impact on comprehension time. A similar story unfolded for experimental attempts to confirm the psychological reality of deep structure: initial success, followed by reinterpretations of that success considering other factors, and then outright failure.
>
> Even more problematically, the consequences of Chomsky's theoretical and methodological positions in *Aspects* were beginning to make psychologists nervous.

> In particular, the confluence of three factors—his competence-performance distinction, his insistence that transformational-generative grammar directly concerned only competence, and his focus on ideal constructs—seemed like a conspiracy of sneaky maneuvers to relieve his work of any empirical responsibility. "The adventure into transformational grammar," recalls Eric Wanner, looked to many psychologists to have "reached a dead end" (1988: 150).

Around this time, a number of alternative grammatical frameworks began to arise, each stressing empiricism and psychological plausibility to a greater or lesser degree. Notable among these are Lexical-Functional Grammar (Bresnan 1981; Kaplan & Bresnan 1982), which initially billed itself as a "realistic transformational grammar", and concerned itself with processing and acquisition from an early stage; Generalised (and later Head-Driven) Phrase Structure Grammar (Gazdar et al. 1985; Pollard & Sag 1994), which emphasised usability in computational modelling; and of course, Cognitive Grammar (originally "space grammar"; Langacker 1982, 1987, 1991). Of these, it was the last that made psychological plausibility its overarching concern, and addressed this concern by seeking to define every descriptive construct in terms of notions that were already known from perceptual and cognitive psychology.[1]

Cognitive Grammar was only one strand in what eventually came to be known as "cognitive linguistics". The other major strand was the work of George Lakoff, in particular his application of prototype theory (Mervis & Rosch 1981) and fuzzy logic to the description of gradient phenomena in syntax such as those uncovered by J. R. Ross (1967) (Lakoff 1987; see Langacker 1988 for a cautious appraisal). This approach also strongly emphasised the psychological plausibility of the proposed models, indeed enshrining this as a guiding principle:

> For me, cognitive linguistics is defined by two primary commitments, what

[1] Cognitive Grammar was not, however, the most self-consciously empiricist framework that arose; that distinction would go to Victor Yngve's "hard-science linguistics" (Yngve 1986, 1996). Yngve advocated a complete rejection of descriptive constructs such as "word", "noun", "sentence", and "utterance", on the basis that these do not refer to anything directly observable. Instead, he advocated an approach that claimed inspiration from the natural sciences (and was effectively a reversion to behaviourism), combining acoustic phonetics with the formal analysis of simple signalling systems (see Yngve 1989: esp. 244 for his critique of Cognitive Grammar as "yet another type of grammar grow[ing] up in the thicket" of conflicting theories). However, as noted by Sampson (1998), this conception of linguistics narrows the scope of the discipline in a way that would severely limit the usable insights that could be derived from it.

> I will call the Generalization Commitment and the Cognitive Commitment….
>
> The cognitive commitment forces one to be responsive to a wide variety of empirical results from a number of disciplines. Examples include:
>
> > Categorization results from cognitive psychology, developmental psychology, and anthropology that demonstrate the existence of basic-level categorization and prototype effects.
> >
> > Psychophysical, neurophysiological, anthropological results about the nature of color perception and categorization.
> >
> > Results from cognitive psychology concerning human imaging capacities and the association of conventional imagery with language.
> >
> > Results from cognitive neuroscience and connectionism regarding the computational mechanisms of the brain.
>
> If we are fortunate, these commitments will mesh: the general principles we seek will be cognitively real. If not, the cognitive commitment takes priority: we are concerned with cognitively real generalizations. (Lakoff 1990: 40–41)

Also joining this tradition were the works of Fauconnier (1985), Talmy (2000b), and Fillmore (1975), which again took psychological plausibility as a central concern.

There has periodically been a certain amount of soul-searching concerning whether cognitive linguistics can truly (or exclusively) be called "cognitive". In particular, as noted by Gibbs (1996: 28–29):[2]

> There has been great debate as to whether the cognitive commitment is a defining or characteristic feature of cognitive linguistics…. Various people complained [in 1991] that linguistics has *always* been cognitive and that research in other cognitive disciplines confirms many of the ideas touted by generative linguists….Some critics stated that there is nothing special about cognitive linguistics to warrant calling itself *cognitive*….Over the past year many psychologists have conveyed to me their skepticism about the term *cognitive linguistics* because it implies that there is something missing from what they do as cognitive psychologists in studying language and language users.

[2]See also Lazard (2007) for a related view from a linguist outside the Anglo-American tradition.

See Gibbs (1996: 29 ff.) for arguments that cognitive linguistics is indeed cognitive in a way that sets it apart from other approaches to linguistics, notably by adhering to the Content Requirement (see further below).

More seriously, Peeters (1998: 226–227) argued that

> …many linguists, or more precisely many Cognitive Linguists, don't seem to care about [the work of neuroscientist] Edelman nor perhaps even about cognitive science.…
>
> The question must be asked how strong the cognitive commitment of Cognitive Linguists really is. Personally, I have grave doubts as to whether Cognitive Linguistics is cognitive linguistics. It would seem to me that the latter is the sort of linguistics that uses findings from cognitive psychology and neurobiology and the like to explore how the human brain produces and interprets language.…[L]arge numbers of linguists have avoided dealing with the cognitive infrastructure of human beings. Many would not want to admit it, but others are not at all ashamed to profess that they believe issues of mind and brain to be fundamentally irrelevant to the linguistic profession.…Is th[e] openness of Cognitive Linguistics [to the other cognitive sciences] reflected in any serious attempts to link psychological and neurological mechanisms to the mechanisms of language? Regrettably, the answer is (all too often) "no". Many do not seem to realize that they are not really doing any cognitive work at all.… Doing what one has always done, while paying lip-service to the old claim that somehow the study of language will give us insights into the inner workings of the mind, carries no genuine entitlement to the adjective *cognitive*. Many do not seem to realize that what they do is not dramatically different from what is done elsewhere…

Similar concerns can be found in the course of the debate on the mental representation of polysemy that took place in the pages of *Cognitive Linguistics* between 1995 and 2001 (Croft 1998; Sandra 1998; Sandra & Rice 1995; Tuggy 2001).

Nevertheless, over the last couple of decades, there has been an increasing awareness that the claims of cognitive linguistic theories to psychological plausibility need to be sub-

jected to experimental scrutiny. Peeters (1999) quotes Langacker as saying, "Are we really doing so badly? I notice that the pages of *Cognitive Linguistics* are starting to fill up with the results of experimental investigations, and that is symptomatic of what is happening in the field in general". To cite just a few examples, Gibbs & Colston (1995) have experimentally studied image schemas; Coulson & Van Petten (2002) blending (see also Gibbs 2000); Casasanto (2009) conceptual metaphors; and Cienki (2008) mental spaces (see also Sweetser 2007).

In the domain of grammar, Verfaillie & Daems (1996), Tomlin (1997) and others have run experiments on subject assignment which Langacker (2001: 31–32) takes to support the analysis of subjects as profiling trajectors; Kellogg (1996) has studied the neurological basis of part-of-speech categories (Langacker 2008a: 95); and de Vega et al. (2007) have tested Talmy's (2000a) analysis of complex sentences in terms of figure-ground relations. In addition, there is a huge experimental literature on construction grammar and its consequences for processing and acquisition (Ambridge, Pine et al. 2009; Bybee 2001, 2010; Dąbrowska 2004, 2008; Goldberg 2006; Tomasello 2003).

Still, only a small fraction of the analyses of grammatical phenomena proposed by cognitive linguists have been the object of experimental studies. To a good extent, this is because (despite the commitment to using only concepts known from psychology) it is often far from clear how a given analysis should be operationalised. Dąbrowska (2009: 722–723) cites an example of this, with reference to the chapter on "Complementation" in the *Oxford handbook of cognitive linguistics* (Geeraerts & Cuyckens 2007):

> Achard [(2007)] notes that [in French] when the main and subordinate clauses have the same subject, the subordinate verb normally occurs in the infinitive (*Marie aime aller au cinéma*), and when they have different subjects, the subordinate verb is finite (*Marie aime que son frère aille au cinéma avec elle*), and proposes that this is because
>
> > the presence of a finite complement…reflects an objective construal of the scene coded in the complement….Because the vantage point from which it is construed is external to its scope of predication…, the whole scene, including the subject of the subordinate process, is

> part of the objective scene and thus profiled. (792)
>
> But how does one determine if the scene is construed objectively or subjectively, whether the vantage point is external or internal to the scope of predication, or even which parts of the scene are profiled? Achard offers no hint of how any part of the explanation could be independently verified. This is a serious problem, since linguists often disagree even about seemingly straightforward issues such as what a particular construction profiles. For instance, Achard himself, Langacker (1991), and Boye & Harder (2007) maintain that in a complex sentence like *I know she left* the main clause is the profile determinant (the sentence designates a process of knowing, not leaving). But S. A. Thompson (2002), Verhagen (2005), and others have claimed that it is normally the complement clause that conveys the speaker's communicative intention, while the main clause acts as an epistemic/evidential/evaluative fragment expressing speaker stance toward the content of the subordinate clause. Langacker (2008: 419) suggests that both views are right, and that we need to distinguish 'various kinds of prominence and dimensions of subordination'. This is almost certainly correct: but how does one determine which kind of prominence, or which dimension of subordination, is relevant for explaining a particular aspect of linguistic organization?

The questions raised in the above passage (and elsewhere in Dąbrowska 2009), both specifically about complementation as well as more generally about the operationalisation of the semantic notions used in cognitive linguistic analyses, will serve to motivate this thesis.

1.2 Thumbnail sketch of Cognitive Grammar

Before discussing how the descriptive constructs and analyses of Cognitive Grammar might be operationalised, it will be useful to summarise these descriptive constructs and analyses. What follows is a heavily abridged description of the framework laid out in Langacker (1987, 1991, 2008a) and in numerous articles.

1.2.1 Methodological principles

The main guiding principle of Cognitive Grammar, which serves as the ultimate test of any proposed analysis, is the **Content Requirement** (Langacker 1987: 53–54):

> [T]he only structures permitted in the grammar of a language…are
>
> 1. phonological, semantic, or symbolic structures that actually occur in linguistic expressions;
> 2. schemas for such structures;
> 3. categorizing relationships involving the elements in (1) and (2).

Phonological structures are constructs that are known from structuralist approaches to phonology: mainly phonemes, suprasegmentals (such as stress), and prosodic units (such as moras, syllables, phonological words and intonation units). (Autosegmental tiers are needed for phonological analysis in many languages, particularly for tone and intonation; these are not discussed by Langacker, but they are presumably not excluded.) Taylor (2002: ch. 5), in a chapter on phonological structure in Cognitive Grammar, explicitly uses the prosodic hierarchy of Nespor & Vogel (2007); see also Uehara & Kumashiro (2007). Underlying representations are forbidden by the Content Requirement, as they do not "actually occur in linguistic expressions"; thus, Cognitive Grammar approaches to phonology tend to be constraint-based (Nathan 2008; Nesset 2008; Uehara & Kumashiro 2007).[3]

Semantic structures are described in terms of concepts from perceptual and cognitive psychology (especially Gestalt psychology: cf. Koffka 1963 [1935]; Wertheimer 1923); for example, attention, categorisation, comparison, and figure–ground organisation.[4] In addition, linguistic meanings are assumed to be of the same kind as actual experiences; the mental operations involved are the same ones as in perception or action, but "attenuated"

[3] An approach that is even more in the spirit of the Content Requirement, however, is Declarative Phonology, which "captures [only] generalizations that are always surface-true of the phonology" (Bird & Ellison 1994: 87), and where "surface forms and generalizations about them are stated directly in a hierarchical lexicon" (Bird & Ellison 1994: 65). Unfortunately, Declarative Phonology was soon eclipsed by Optimality Theory, which is easier to use for phonological analysis, but permits the positing of underlying representations. I am not aware of any attempt to link Declarative Phonology with Cognitive Grammar (though see Bird & Klein 1993 for an integration with head-driven phrase structure grammar). I am grateful to T. Mark Ellison for bringing this research to my attention.

[4] Interestingly, this could be said to mark a return to the American structuralist approach of "defining meaning in terms of some other discipline" (Bloomfield 1933: 140).

(e.g. Langacker 1987: 105). (This is what later came to be known as "simulation semantics" or "embodied meaning"; see also Barsalou 1999; Johnson-Laird 1983; Zwaan 2015.)

Symbolic structures are (Saussurean) signs, involving a "phonological pole" in the rôle of signifier, and a "semantic pole" in the rôle of signified. (See Verhagen 2009 for some long-needed cautions regarding the equation of signifier and signified with phonological pole and semantic pole; and see e.g. Yngve 1989: 240 for the suggestion that symbolic structures may need to have three sides, as in Peircean semiotics.) The relationship of "symbolisation" linking the phonological pole with the semantic pole is taken to be atomic, and self-explanatory.

Schemas are abstractions that are derived from actual usage events by "blanking out" those aspects of structure that are not shared, and retaining only those aspects that are shared exceptionlessly (see Langacker 1987: 68, 132–138; Tuggy 1993: esp. fn. 7; Tuggy 2007). Schemas may be phonological, semantic or symbolic; and they may exist at varying levels of generality. For example, [TREE] would be a semantic schema extracted from lower-level schemas such as [PINE TREE], [OAK TREE], etc., and /V/ ("vowel") would be a phonological schema extracted from lower-level schemas such as /a/, /i/, /u/, etc.[5] Schemas are not claimed to be represented separately from their instantiations, but are rather said to be "immanent" in their instantiations (cf. the "schematic-transparency principle" in Langacker 1987: 438). Another way of looking at this (e.g. Dąbrowska 2000: 93–95), which has some support from neurology (Singer 2000), is that the mental representations of individual usage events "overlap" in various ways, and it is these regions of overlap that we call schemas.

The relation between one schema and another is called a "categorising relationship" or "relationship of schematicity" (e.g. Langacker 1987: 74): a schema is said to "fully categorise" (or "be fully schematic for") the schemas from which it is extracted (e.g. Langacker 1987: 470), and "partially categorise" (or "be partially schematic for") all other schemas (e.g. Langacker 1987: 69).

[5] A phoneme is a schema extracted from its allophones, and ultimately from its realisations in particular utterances; see e.g. Mompeán (2006).

1.2.2 Types of entities

The bulk of analytical effort in the framework of Cognitive Grammar has been devoted to the semantic explication of grammatical constructions; thus it is important to give an overview of the semantic notions that are used in Cognitive Grammar.

Every meaningful unit (or **predication**) has a semantic pole that consists of some **conceptual content**, to which is applied some **construal**. Conceptual content can be thought of as mental simulation of objects and events, disregarding the particular viewpoint one takes. For example, the verbs *give* and *receive* have the same conceptual content, as they represent different ways of viewing the same event of transfer. Construal mainly involves various types of **salience**, most importantly **profiling** and **focal prominence** (see Croft & Cruse 2004: §3.2 for a fuller listing).

The entity profiled by a predication is the one that it "designates"; this notion of "designation" is taken to be self-evident, and is not explicated further—but see Chapters 2 and 5 below. Focal prominence refers to figure/ground organisation; the primary figure in a conception is called the **trajector**, and the secondary figure the **(primary) landmark**. There may in some cases be a tertiary figure or "secondary landmark"; and any entity that is not a figure is part of the ground. Cognitive Grammar claims that the subject of a clause is the trajector, the (first) object is the (primary) landmark, and the second object (e.g. in a ditransitive) is the secondary landmark.

The entities that a predication might profile are divided into two major classes: **things** and **relations**. A "thing" is defined as "a region in some domain" (Langacker 1987: 189), where a "domain" is prototypically space or time, but may also be an abstract scale (such as happiness), a multidimensional conceptual space (such as colour), or even a mental space (such as "everything the hearer knows"). (As pointed out by Clausner & Croft 1999, the notions "domain", "base", and "frame" are more or less interchangeable.) For example, a *beep* is a thing that is a region in the domain of time as well as in the domain of frequency. A major claim of Cognitive Grammar is that all nominal expressions (including nouns, pronouns, noun phrases, and nominalised clauses) profile things.

Typically, a thing is bounded in at least one of its domains; Cognitive Grammar claims that a count noun (such as *puddle*) is bounded in its "primary domain of instantiation"

(in this case, space), whereas a mass noun (such as *water*) is unbounded in its primary domain, but is usually bounded in some other domain (such as "quality space"); see Langacker (1987: 206–208).

A **relation** is a set of connections between entities. Typically, when apprehending a configuration of entities (such as the points that make up a square, or the people who make up a sports team), we execute a number of "comparison events" among those entities, to verify that they are indeed in that configuration (see Langacker 1987: 103 ff.; see also Goodman 1977 for a possible intellectual precursor). The entities in the configuration collectively constitute a thing (which may be profiled by *square* (noun) and *team*); but the comparison events collectively constitute a relation (which would be profiled by *square* (adjective) and *together*).

Within relations, a distinction is drawn between simple (stative) relations, and "complex" relations (Langacker 1987: 220). The difference lies in whether there is any conceived change in the relation over time. A claim of Cognitive Grammar is that adjectives and adpositions profile stative relations—relations whose change over time is not relevant.

Within complex relations, a distinction is drawn between complex atemporal relations and processes (Langacker 1987: 220). These differ by whether the temporal extension of the complex relation is part of the profile—or alternatively, whether the complex relation is "summarily scanned" or "sequentially scanned". Sequential scanning is what occurs when one imagines an event unfolding over time, as if watching a video of it; summary scanning is what occurs when one imagines the entire course of an event in a single gestalt, as if viewing a multiple-exposure photograph. Cognitive Grammar claims that finite verbs and finite clauses profile processes, whereas non-finite verbs and clauses profile complex atemporal relations. Note that stative verbs profile processes, and not stative relations, because the profiled relation is specifically conceived as *persisting* over time, whereas this is not the case with the relations profiled by adjectives and adpositions, where persistence over time is not even considered relevant.

(An alternative way of classifying relations is as temporal relations (processes) versus atemporal relations; and within atemporal relations, complex atemporal relations versus stative relations.)

1.2.3 Grounding

Things and processes (but not atemporal relations!) may be "(epistemically) grounded", i.e. situated with respect to the speech situation (Langacker 1987: 126–129, 489). A grounded thing is one that has an identifiability (or "definiteness") value—i.e., is marked for whether it is already known to the speaker and/or addressee (Langacker 1991: 53). A grounded process is situated with respect to the here-and-now by means of tense and modality (Langacker 1991: 240); see Langacker (2010b) for a discussion of the relation between the grounding of things and the grounding of processes (and see Chapter 5 below for an alternative view). Cognitive Grammar claims that full noun phrases, as well as determiners, profile grounded things (Langacker 1991: 53–54, 89–95), and that finite verbs and clauses, as well as tense and mood inflections and auxiliaries, profile grounded processes (Langacker 1991: 240, 261). Conversely, bare noun stems profile ungrounded things (Langacker 1991: 51), and uninflected verbs in finite clauses (e.g. *come* in *He will come*) profile ungrounded processes (Langacker 1991: 32–33).

1.2.4 Constructional schemas

The above descriptive constructs can clearly be used to describe individual morphemes or monomorphemic words. What about internally complex, analysable expressions? These are described using **constructional schemas** (Langacker 1987: 84–85). A constructional schema consists of a **composite structure** (the analysable expression itself), and one or more **component structures**. Typically, one of these component structures profiles the same entity as does the composite structure (e.g. in *jar lid*, *lid* designates the same entity as does the entire compound, whereas *jar* does not); this component is called the **head** or **profile determinant** (Langacker 1987: 235). It is possible that there may be no component structure that profiles the same entity as the composite structure; or alternatively, it may be that there is more than one such component structure (Langacker 1987: 285). In either case, we say that there is no profile determinant (though see Croft 2001: 256–257, who proposes to define a head of a construction schema as a "profile *equivalent*", thus allowing for the possibility that there is more than one head).[6]

[6]Construction schemas exist for phonological structures as well as symbolic and semantic ones; however, the notion of "profile determinacy" does not really apply for phonology, *pace* Taylor (2002: 252).

A component structure in a construction may be *autonomous* or *dependent*. Dependence means that the semantic pole contains a salient substructure (an "elaboration site" or "e-site") that corresponds to the semantic pole of some other component structure (Langacker 1987: 304). For example, in *above the tree*, the relation profiled by *above* has the two spatially-related objects (i.e. the trajector and landmark) as salient substructures; the landmark corresponds to the thing profiled by *the tree*, and so we can say that the semantic pole of *above* is dependent on that of *the tree*. In general, relations are usually conceptually dependent, with the focal participants being the e-sites (except in the case of the relation profiled by a full clause, where the focal participants are all specified). Things are usually conceptually autonomous, but it is possible for a thing to be at least somewhat dependent, as in the case of relational nouns such as *uncle* and *beard* (Langacker 1987: 218; Langacker 1991: 204), which saliently evoke some entity that is related to the profiled thing (e.g. the Ego with respect to whom the uncle is an uncle, or the person possessing the beard).

1.2.5 Sanctioning

A grammatical framework not only needs to be able to provide a structural description for every encountered utterance, but also provide a procedure for discriminating ungrammatical utterances from grammatical ones. In Cognitive Grammar, this is accomplished by comparing a usage event (an utterance, or some part thereof) with the (symbolic) schemas that are part of the speaker's mental grammar. Some of these schemas will be fully schematic for the usage event, i.e. **fully sanction** the usage event; others will only **partially sanction** the usage event (Langacker 1987: 372). Further, some schemas will be highly **salient**, while others will be low in salience. Salience of a schema is a function of both the frequency with which the speaker encounters instances of the schema (i.e. the **entrenchment** of the schema) as well as the specificity or (low) **elaborative distance** between the schema and the usage event (Langacker 1987: 414). Clearly these two factors are in opposition (highly entrenched schemas are often nonspecific, and highly specific schemas are often low in entrenchment); the most salient schemas are thus those that are at a medium level of generality.

A usage event is judged grammatical if it is fully sanctioned by a number of salient

schemas. It is judged ungrammatical if it is only partially sanctioned by some highly salient (and relevant) schema. For example, the past-tense form **drinked* is judged ungrammatical, even though it is fully sanctioned by the general [V-*ed*] schema, because it is only partially sanctioned by the schema for the conventional form *drank*, which is both relevant and highly entrenched (Langacker 1987: 432–433). (The issue of which schemas are "relevant" for grammaticality judgment is quite involved, and has not yet been systematically addressed; see Bybee 2010; Kalyan 2012c for discussion). For more on grammaticality judgment by means of "schema competition", see Nesset (2008); Uehara & Kumashiro (2007).

Finally, it is worth noting that in the domain of morphology, it is necessary to distinguish between "source-oriented schemas" and "product-oriented schemas" (Bybee 2001: 126; Kapatsinski 2009). A source-oriented schema specifies a particular relation between the phonological pole of a morphologically basic form and that of a derived form (e.g. the addition of /d/ to form regular past-tense forms in English), whereas a product-oriented schema merely constrains the phonological pole of the derived form and "doesn't care how you get there" from the basic form. Evidence for product-oriented schemas is found in errors made by L1 learners (e.g. failure to add /d/ in the past tense to verb stems that already end in a /d/; see Bybee & Slobin 1982), and in cases of "morphological haplology" (e.g. *friendly* as an adverb, not **friendlily*; see Bybee 2001: 128; Stemberger 1981 for further examples). Croft & Cruse (2004: 313–318) as well as M. D. Ross & Teng (2005) have argued that there also exist product-oriented schemas in syntax.

In Cognitive Grammar, source-oriented schemas may be modeled using "second-order schemas" (Nesset 2008: 18–21): schemas that are extracted not from individual usage events, but from *morphologically-related pairs* of usage events, such as *fill* : *filled*, *push* : *pushed*, *arrive* : *arrived*, etc. Product-oriented schemas may be modeled using "first-order schemas" (Nesset 2008: *ibid.*), i.e. schemas as conventionally understood, such as $[\ldots ly]_{Adv}$; these do not specify a particular base form, and will sanction any derived form of the appropriate shape, however it may be constructed. See Nesset (2008) for a detailed exploration of how first- and second-order schemas may be used to capture morphological generalisations.

1.3 Outline of the rest of the thesis

Operationalising all of the descriptive constructs and analyses described in the previous section would obviously be a monumental undertaking. For this thesis, I have thus decided to concentrate on three central constructs: profile determinacy, focal prominence, and sequential vs. summary scanning. In particular, the analyses I propose to test are the following:

1. In finite complementation (e.g. *I know she left*), the complement-taking predicate (*know*) is the head (or profile determinant) of the sentence, not the content clause (*she left*). (Langacker 1991: 436)

2. In both the prepositional-object and direct-object alternants in the dative alternation (e.g. *She gave a book to the boy* vs. *She gave the boy a book*), the first object (*a book* and *the boy*, respectively) is the primary landmark, and the second object (*to the boy* and *a book*, respectively) is the secondary landmark; and in both the locative and existential alternants in the existential alternation (e.g. *A book is on the table* vs. *There is a book on the table*), the subject (*a book* and *there*, respectively) is the trajector or primary figure. (Langacker 2008a: 393–394; Langacker 2010e: 147)

3. Finite clauses (e.g. *She said that he wiped the table*) profile a sequentially-scanned process, whereas non-finite complements of perception verbs (e.g. *She saw him wipe the table*) profile a summarily-scanned process. (Langacker 1991: 442–445)

Chapters 2, 3, and 4 attempt to operationalise the above analyses (respectively), based on a close reading of the psychological intuitions underlying them. They also report the results of experimental tests of these operationalisations. Chapters 5 and 6 analyse the theoretical consequences of this research for the framework of Cognitive Grammar; and Chapter 7 suggests consequences for other branches of linguistics.

Part I

Operationalising Cognitive Grammar

Chapter 2

Profile determinacy in propositional-attitude constructions

2.1 Introduction

The topic of this chapter is sentences that express propositional attitudes, such as the following:

(1) I **know** that she left.

When discussing sentences such as this, I will refer to the verb in bold as the *propositional-attitude verb* or *PAV* (since it expresses a state of mind with respect to a proposition), and the underlined finite clause as the *content clause* (since it expresses the content of the said proposition—this usage follows Huddleston & Pullum 2002: 62).

Traditionally, the PAV is considered to be the "head" of the sentence, determining its essential content, and the content clause is considered to be "embedded" as a complement of the PAV; accordingly, the PAV is also known as the "matrix verb" or "main verb", and the content clause is also known as the "(finite) complement clause" or "subordinate clause". This is the analysis that is assumed, e.g., in Langacker (1991), Halliday (1994), Van Valin & LaPolla (1997), etc. (considering just functionalist frameworks; see S. A. Thompson 2002: 128, 131 for further references).

But what exactly does it mean to say that the PAV is the "head" of a propositional-attitude construction? In Cognitive Grammar—the theoretical framework adopted in this

thesis—the "head" of a grammatical construction is defined as the component that designates (or "profiles") the same entity as the composite structure; in other words, the "profile determinant". Thus, to say that the PAV is the head of the sentence is to say that the sentence as a whole designates the same entity as does the PAV: "*I know* ***she left*** designates the process of knowing, not of leaving" (Langacker 1991: 436; boldface in original).

Unfortunately, it is not universally agreed that the profile determinant of a propositional-attitude construction is the PAV. S. A. Thompson (2002: 130–136), for instance, argues against this analysis. She interprets profile determinacy in terms of "prominence", and understands Langacker's (1991: 436ff) analysis as being a claim that the content of the PAV is more "prominent" than that of the content clause.[1] However, she finds extensive evidence from conversational data showing that in actual usage, it is typically the content clause, not the PAV, that is more "prominent", in the sense of "accomplishing the action towards which the [speech-act] participants are oriented" (S. A. Thompson 2002: 132).

(2)
```
1 JOANNE:  % % you know,
2          as much as he's abu=sed his liver,
3          and %all other .. other things in his
4                            life,
5          he's still healthy as an o=x.
6    ...
7 JOANNE:  yet he's still healthy.
9          he reminds me [of my brother].
10 LENORE:               [he's still walking around,]
11         I don't know how healthy he is.
```

(S. A. Thompson 2002: 133)

In this example, the action towards which Joanne and Lenore are oriented is that of "arguing about the health of their friend"; the talk which fulfils this purpose (shown in boldface) takes the form of monoclausal utterances (in lines 5, 7, and 10) and then a content clause (line 11).

S. A. Thompson (2002: 134) also notes that the most frequent subject-PAV combinations in spoken (American) English (*I think* and *I guess*) are so secondary to the content clause that they have been "reanalyzed as epistemic parentheticals, that is, epistemic adverbial phrases" (as in (3)), and thus cannot on any grounds be considered to be "heads" (see S. A.

[1] Whether this is in fact an accurate understanding of the notion of profile determinacy is a question that I will return to later.

Thompson & Mulac 1991 for further details).

(3) because she uh= has had enough **I guess**.

A similar point regarding the relative prominence of PAVs and content clauses is made by Verhagen (2005), for written Dutch (and English). In the example below (Verhagen 2005: 96), the "matrix clauses" and content clauses in a short text have been separated into two columns. It is obvious that the essential content of the text can be gleaned by looking at just the right-hand column, but not at all by looking at just the left-hand column.

(4)

'Main' clauses	**'Subordinate' clauses**
I have reported before that	there has already been success in breeding clones of mammalian embryos.
From the above it may now be concluded that	it will become possible in the near future to make new embryos with the DNA of full-grown animals as well.
The director of GenTech even expects that	this will happen as soon as next year.
Others believe that	it may take somewhat longer,
but nobody doubts that	the cloning of a full-grown sheep or horse will be a reality within ten years.
The question is whether	society is mentally and morally ready for this,
or whether	we will once again be hopelessly overtaken by the technical developments.

Finally, Diessel & Tomasello (2001: 132), looking at language acquisition data, find that in the "vast majority" of propositional-attitude structures produced by children, "[t]he composite structure contains…only a single proposition expressed by the COMP-clause [content clause]. The CTV-clauses [PAV-containing clauses] are propositionally empty".

Boye & Harder (2007) argue for a compromise between the traditional analysis and the discourse-based approaches just mentioned. They suggest that it is possible that in a sentence instantiating finite complementation, the PAV-containing clause can be the primary predicate "at the level of structure", while the content clause can be the primary predicate

"at the level of usage". Boye and Harder's proposal will be considered further in §2.3.4.

Dąbrowska (2009: 723) argues that the question of which clause in a biclausal structure is the "profile determinant" should ultimately be resolved empirically. She points out that there has so far been no attempt to even define "profile determinant" operationally, in such a way that analyses formulated in terms of this concept might in principle be empirically verified. This operationalisation is all the more important, as it cannot be taken for granted that S. A. Thompson's (2002: 131) notion of "prominence" (or that of other authors) necessarily corresponds to Langacker's notion of "profile determinant", at least with regard to the analysis of finite complementation.

In the next subsection, I look again at the definition of "profile determinant" in Cognitive Grammar, and then suggest a way of operationalising this concept so that analyses of grammatical constructions that make use of it can in principle be verified experimentally. The rest of the chapter reports on two experiments based on this operationalisation, which aim to determine, for a range of sentences exhibiting finite complementation, whether it is the PAV or the content clause that is the head.

2.1.1 Operationalising profile determinacy

As mentioned before, in Cognitive Grammar, the head of a construction is defined as that component which designates, or "profiles", the same entity as the composite structure; it is the component that determines the composite structure's profile, hence, the "profile determinant" (Langacker 1987: 288). For example, in a nominal compound such as *jar lid*, the profile determinant is *lid*, because the composite structure *jar lid* designates (profiles) the lid, and not the jar; a jar lid is a lid, and not a jar.

A consequence of this definition is that the profile determinant is necessarily more "schematic" than (i.e., more general than) the composite structure (Langacker 1987: 467). In other words, all of the semantic properties contributed by the head are present among those of the composite structure; the head has no semantic properties that are not present in the composite structure (although the composite structure often has semantic properties not contributed by the head). For example, in the compound *jar lid*, all of the properties of *lid* (e.g. "flat", "round", "covering", etc.) are present among the properties of *jar lid*; *jar*,

however, has many properties that do not apply to *jar lid* (e.g. "long", "hollow", etc.).

In an analogous fashion, we can say that if the PAV in (1) is the head of the sentence, this means that the semantic properties of *know* (e.g. *awareness*, *certainty*, etc.) are all present among those of *I know that she left*; whereas if it is the content clause (*she left*) that is the head, then the properties of the content clause (e.g. *movement*, *increasing distance from the deictic centre*, etc.) are all present among those of the sentence. It is also conceivable that both may be profile determinants, or that neither may be fully profile-determining; in these cases the sentence could have properties of both the PAV and the content clause.[2] Examples of these three situations are given below (see §2.3.3 for the empirical evidence):

(5) a. I suspect that he had read the book. (p.d. = matrix clause)

b. She realised that he had broken the law. (p.d. = complement clause)

c. She suggested that he had crossed the border. (p.d. = both clauses)

I propose that it is possible to empirically determine which of the above situations holds, for any given sentence, by eliciting semantic features of the PAV and of the content clause, and measuring the extent to which speakers feel that the features of each are applicable to the sentence as a whole. This is intended as a way of operationalising the definition of the profile determinant as the component whose meaning is schematic for that of the composite structure, i.e., whose semantic properties are all present among those of the whole sentence.

An experiment that implements this operationalisation is described in the following two sections. The experiment proceeds in two stages. In the first stage, each subject is shown sixteen sentences exhibiting finite complementation; the task is to list the semantic properties of either the PAV or the main verb of the content clause (depending on the condition). The features thus elicited are used to create the stimuli for the second stage (the main experiment). In this stage, each subject is shown the same sixteen sentences as before, but each sentence is now followed by four (or three) elicited features of the PAV, four (or three) of the content-clause verb, and an equal number of fillers (all in a randomised order). The task is to pick among the features those that apply to the sentence as a whole. For a given sentence, if subjects pick all and only the features of the PAV, then this is evidence that the

[2] In other words, the sentence may designate two separate events at once; or it may not fully designate either one.

PAV is the profile determinant; if they pick all and only the features of the content-clause verb, then this is evidence that the content clause is the profile determinant; and if they pick some of both, then we have an intermediate situation.

2.2 Feature elicitation for Experiment 1

2.2.1 Participants

Initially, an online version of this task was distributed via the mailing lists for first- and second-year students in various undergraduate programmes at Northumbria University. In this manner responses were collected from sixteen participants, one of whom was a non-native English speaker (this person's response was thus discarded). Subsequently, responses were collected from a further seventeen members of the Northumbria University community by approaching them in person; of these responses, one was from a non-native speaker of English (and hence discarded).

In total, responses from **31** participants were used.

2.2.2 Materials

Sixteen sentences exhibiting finite complementation were created; each of these was eight words long, and conformed to the pattern [{*She*/*I*} V-ED *that* [*he had* V-EN *the* N]]. Each sentence exemplified a different PAV in the first verb slot (V-ED). (The sixteen sentences are given in (7)–(10).)

These matrix verbs were arrived at by searching the British National Corpus (at `http://corpus.byu.edu/bnc/`: Davies 2004–) for "`[vv0*] that`" (i.e. a base-form verb followed by *that*), and for "`[v?d*] that`" (a past-tense verb form followed by *that*). The combined results were then (intuitively) sorted into the four semantic classes given in (6); this was done simply in order to be able to take a (hopefully) representative sampling of PAVs across semantic space, and not for the purpose of making comparisons between different verb classes. The four verb classes used, drawn from the classifications in Langacker (2010c), were as follows:

(6) a. **Inclination**: The subject is inclined towards accepting the truth of the proposition coded by the content clause, but has not yet done so.

EXAMPLES: *believe*, *think*, *suppose*, *imagine*, etc.

NOTE: These verbs are often called "bridge verbs", and form the class of NEG-raising verbs in English (Langacker 2010c: 317).

b. **Action**: The proposition coded by the content clause undergoes a change in epistemic status relative to the subject, from "unknown" to either "accepted as part of reality" or "rejected from consideration".

EXAMPLES: *learn*, *realise*, *notice*, *decide*, etc.

c. **Result**: The subject has accepted the proposition coded by the content clause as part of their conception of reality, or has rejected it.

EXAMPLES: *know*, *understand*, *remember*, *forget*, etc.

NOTE: Verbs in this class tend to be factive verbs (i.e., presuppose the truth of the proposition coded by the content clause).

d. **Communication**: More than one conceptualiser interacts with the proposition coded by the content clause; one of these conceptualisers is coded as the subject, and the other(s) may be left implicit.

EXAMPLES: *say*, *ask*, *persuade*, *confess*, etc.

Once the [V *that*] sequences had been sorted into verb classes, they were then sorted (within each class) by frequency (total number of hits in the corpus). Table 2.2 shows the highest-frequency results in each verb class (with the verbs eventually selected shown in boldface).

Notice that different inflected forms of the same verb were kept separate; this is because different forms of a verb may have different behaviour (in terms of whether they tend to make the content clause the profile determinant).

From each of the four classes, four verb-forms were chosen. I chose the most frequent verb-forms in each class except when:

1. they are unable to appear with a third-person singular subject (e.g. *think*, *know*: cf. **She think*, **He know*);

Table 2.2: Most frequent complement-taking verbs in the BNC in each class.

Action		Inclination		Result		Communication	
item	freq.	item	freq.	item	freq.	item	freq.
found	3408	think	5395	know	4917	said	9660
realised	1815	**says**	3760	**knew**	3487	**showed**	2273
saw	1424	**believe**	3248	believes	1401	**suggested**	2182
decided	1311	**thought**	2500	believed	1386	**claimed**	1747
find	1201	felt	2351	**remember**	1268	argued	1564
concluded	997	say	2227	see	948	**announced**	1435
discovered	842	feel	1599	agree	926	stated	1197
noticed	609	argues	1429	**agreed**	881	reported	1145
heard	583	states	933	knows	832	claims	998
estimated	364	argue	924	held	821	insisted	869
accepted	321	suppose	737	understand	702	indicated	867
ruled	290	claim	480	assume	646	added	734
observed	289	thinks	471	accept	620	noted	729
learned	251	**suspect**	466	**admitted**	488	revealed	702

2. they are morphological variants of verbs that have already been selected (e.g. *believed*, *knows*); or

3. their classification is ambiguous or unclear (e.g. *said*, which can either suggest Inclination towards a proposition, or be neutral).

The eventual choice of verbs was perhaps not optimal, as it did end up including three verb forms that are incompatible with a third-person singular subject (*believe*, *suspect* and *remember*); for these verb-forms, I used a first-person singular subject. A further study will of course have to include a larger number of verbs, and ideally multiple inflected forms of each verb.

The content-clause verb phrases were arbitrarily chosen by searching the British National Corpus and the Corpus of Contemporary American English (Davies 2008–) for "`had [v?n*] the [nn*]`" (i.e. [*had* V-EN *the* N]), and manually looking through the results for sixteen semantically well-distributed verb phrases. (The reason two corpora were used is that I was not able to find enough appropriate results in the BNC.) These verb phrases were not controlled in any other way (e.g. by matching lemma frequencies of the verbs, or their concreteness etc.).[3]

[3]Perhaps because of the way the BNC and the COCA were compiled, many of the verb phrases chosen seem

The sixteen sentences that were finally used are given below, sorted by the semantic class of the PAV: (Notice that in this experiment, each PAV appeared with only one content clause; Experiment 2 below used all combinations of PAVs and content clauses.)

(7) Action:

a. She **found** that he had closed the door.

b. She **realised** that he had broken the law.

c. She **saw** that he had called the police.

d. She **concluded** that he had seen the man.

(8) Inclination:

a. She **thought** that he had left the room.

b. She **says** that he had found the body.

c. I **believe** that he had heard the sound.

d. I **suspect** that he had read the book.

(9) Result:

a. She **knew** that he had pulled the trigger.

b. She **agreed** that he had stopped the car.

c. I **remember** that he had taken the money.

d. She **admitted** that he had joined the army.

(10) Communication:

a. She **announced** that he had got the job.

b. She **showed** that he had won the battle.

c. She **suggested** that he had crossed the border.

d. She **claimed** that he had solved the problem.

The sentences were presented to participants in the following, interleaved order: (7a)–(8a)–(9a)–(10a)–(7b)–(8b)–(9b)–(10b)–etc.

to exemplify a "journalistic" or "crime novel" genre (see below). It is hard to imagine, though, what effect this could be expected to have on the results of the experiments.

2.2.3 Procedure

There were two conditions, the "PAV condition" and the "content-clause verb condition", to which participants were randomly assigned. In both conditions, participants were given the following instructions:

> For each of the following sentences, please describe what you think the capitalised word means, *in this particular context*, using up to ten features. Don't worry if you can't think of ten features for every word; write in as many as you can easily think of. Once you are done with an item, please do not go back over it.
>
> The following is an example of the sort of response you could give:
>
> She INVITED him to her house.
>
> make a request
> friend
> come over
> event
> joint activity
> welcome
> polite action
> (etc.)

followed by all sixteen sentences, each with either the PAV in capitals (e.g. *She FOUND that he had closed the door*), or the content-clause verb in capitals (e.g. *She found that he had CLOSED the door*). Each sentence was followed by some space in which to type (or write) the features of the highlighted word. At the beginning of the form (in the online version) or at the end (in the printed version) were two questions, asking for the participant's native language ("English" or "Other (please specify):"), and whether they had already participated in the study before. If a participant indicated their native language as "Other", or that they had already participated in the study once before, they were excluded from the analysis. (In fact, no participants were excluded on the basis of the latter criterion in this study.)

2.2.4 Results

The features most commonly generated for each PAV and its corresponding content-clause verb (i.e. those features produced by at least two different people each) are shown in Tables 2.7–2.10 in the Appendix, together with the percentage of respondents who produced each feature. (Features which differed only morphologically were counted together: thus, "saw"

includes both "see" and "saw". In the tables, I have given only the most frequent or representative form of each feature.)

For each verb, the features shown in boldface underneath it are the ones which were chosen for use in the stimuli for the applicability-judgment study described in the next section. (I chose four features for each verb, unless there were too few commonly-generated ones, in which case only three were chosen. The number of features used for the PAV and content-clause verb in a sentence was always the same: thus, only three features were used for *solved*, even though more were available, because there were only three features available for the corresponding PAV *claimed*.) Notice that the features that were chosen were not always the features at the tops of the lists. This was for two reasons:

1. A feature was not chosen if it was morphologically related to the verb it describes (e.g. I did not choose *think* as a feature of *thought*);

2. The average frequency of the PAV features was roughly matched with the average frequency of the features for content-clause verbs. This usually meant discarding some of the super-high-frequency features of complement verbs: e.g., I did not choose *phone* and *ring* as features of *called*, as this would have made the features of the content-clause verb in *She saw that he had called the police* too much more frequent than the features of PAVs (taken as a whole).

One could argue about whether the features that best describe a concept can really be found by looking for the ones that participants come up with most frequently. An informal inspection of Tables 2.7–2.10 reveals that some of the infrequently-generated features are in fact quite appropriate, and some of the frequently-generated features can be somewhat off the mark. In Experiment 2, this shortcoming was addressed by having participants rate each feature for appropriateness, and using these ratings as the basis for selecting features to be used in the experiment.

2.3 Experiment 1

This experiment directly tests, for each of the sixteen sentences in (7a)–(10d), to what degree the PAV and the content clause are profile determinants. It does so by having participants

look at a list of features, among which are the features of the PAV and the features of the content-clause verb selected in the previous (norming) study, and having them select those features which they judge as applying to the overall meaning of the sentence. The more features of the PAV are selected, the more profile-determining the PAV can be concluded to be, and likewise for the content clause.

2.3.1 Participants

A hundred and six responses for this study were collected by distributing it via the mailing lists for first- and second-year students in various undergraduate programmes at Northumbria University. Out of these hundred and six responses, three were from non-native speakers of English, one was from a person who had already participated in the study once, and one was a duplicate response; these five were excluded from the analysis.

Additionally, responses were collected from six participants by approaching them directly. Out of these, one was discarded, as it came from a native speaker of French.

In total, **106** responses were used.

2.3.2 Materials and procedure

The same 16 sentences were used as in the feature elicitation task. Each sentence was followed by four features of the PAV, four features of the content-clause verb, and four filler features (except for the sentences with *agreed* and *claimed*, for which only three features of each type were used; see above), all presented in a random order. There were four versions of the stimuli, each with a different random order for the features following each sentence.

Participants were given the following instructions at the beginning of the questionnaire:

> Each of the following sentences is followed by a list of words. Tick (or circle) those words which you think are most closely related to the **overall meaning** of the **entire** sentence—not just related to one of the words in the sentence.
>
> The following is an example of the sort of response you could give:
>
> She stole the muffin.
> [ ] baked
> [x] took
> [x] sneaky
> [ ] sweet
> [x] not allowed

[ ] edible
[ ] None of the above

Notice that "baked", "sweet", and "edible" are related to only the *muffin*. They are *not* very closely related to what the sentence refers to **as a whole**, namely an act of stealing. Thus you would probably not want to tick those boxes.

This was followed by the sixteen sentences, each with twelve (or nine) features to choose from, together with a "None of the above" option, as follows:

She found that he had closed the door.

- refused
- unopened
- blocked
- saw
- looked
- locked
- grew
- slept
- lost
- wrote
- wiped
- realised
- None of the above

(The "None of the above" option was included so that if a participant did not pick any of the features, it would be possible to tell whether they had done so deliberately, or whether they had simply not attempted the question. In fact, no responses were excluded by this criterion.)[4]

At the end was a question asking if the participant had noticed any pattern in their responses, and if so, what it was.

2.3.3 Results

For each sentence, I recorded the number of PAV features that each participant chose as most descriptive of the overall sentence meaning, as well as the number of content-clause

[4] A few participants ticked "None of the above" *in addition to* one or more features; I chose to treat these responses as if "None of the above" had not been ticked.

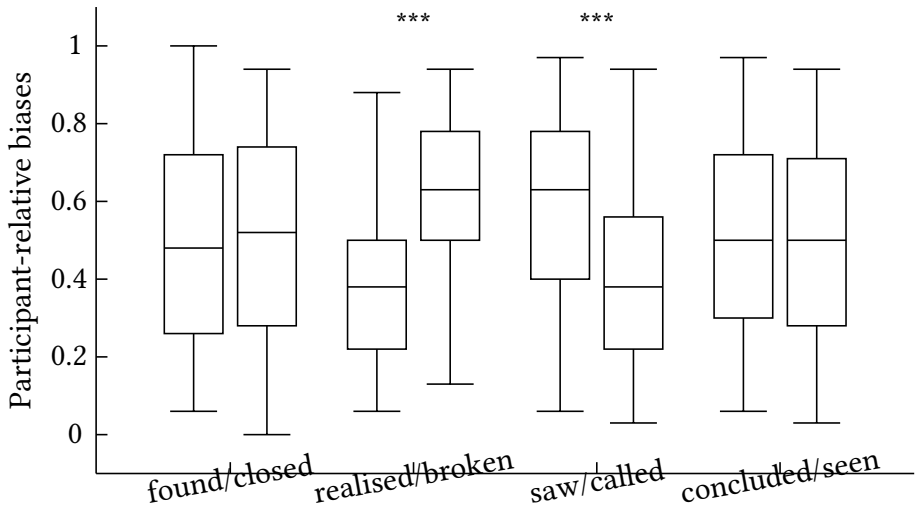


Figure 2.1: Results: Action verbs

verb features; these numbers ranged from 0 to 3 or 4. On the basis of these, a "PAV-biasedness" score was computed for each sentence, as the number of PAV features divided by the total number of features selected. ("Content-clause-biasedness" was defined analogously.)

There were huge individual differences in PAV- vs. content-clause-biasedness; participants ran the gamut from completely PAV-biased (four of them) to almost completely content-clause-biased. To factor out these individual differences, the biasedness scores were converted into "tied ranks" for each participant; that is, for each participant, the biasedness scores for all the sentences were given ranks from highest to lowest; and if there were two or more scores that were identical (i.e., whose relative ranking would be ambiguous), their ranking was defined as the average of all their possible ranks. This ensured, for example, that if a participant's biasedness score was exactly the same for every sentence, the tied ranks of all these scores would come out as 0.5.

Figures 2.1–2.4 show the distribution of participant-relative biases for each sentence, and whether each sentence shows a significant bias (as judged by a Mann–Whitney U-test). In each pair of box plots, the one on the left shows the distribution of PAV-biasedness scores, and the one on the right shows the distribution of content-clause-biasedness scores. In one sense, the second box plot does not add new information, since it is entirely determined by the first. However, seeing both box plots makes it easier to see how extreme the biases are.

As there were sixteen PAV/content-clause comparisons being made, the Bonferroni cor-

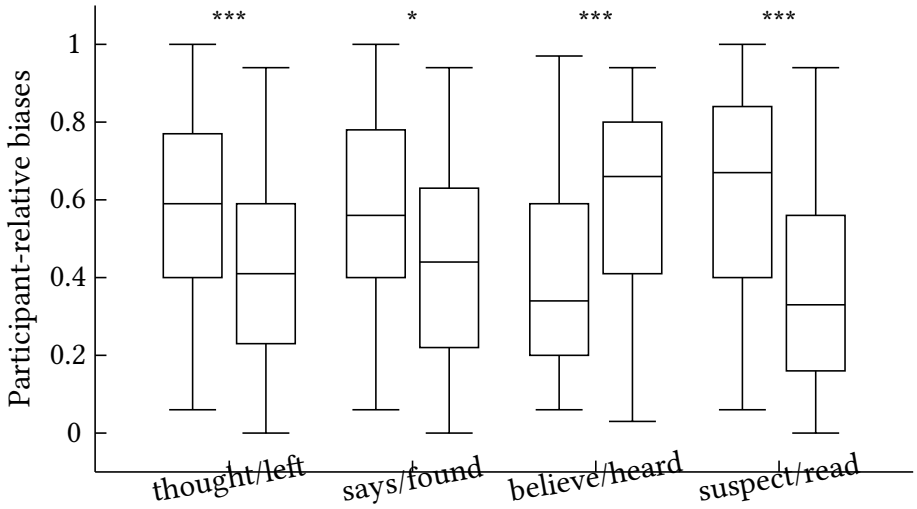


Figure 2.2: Results: Inclination verbs

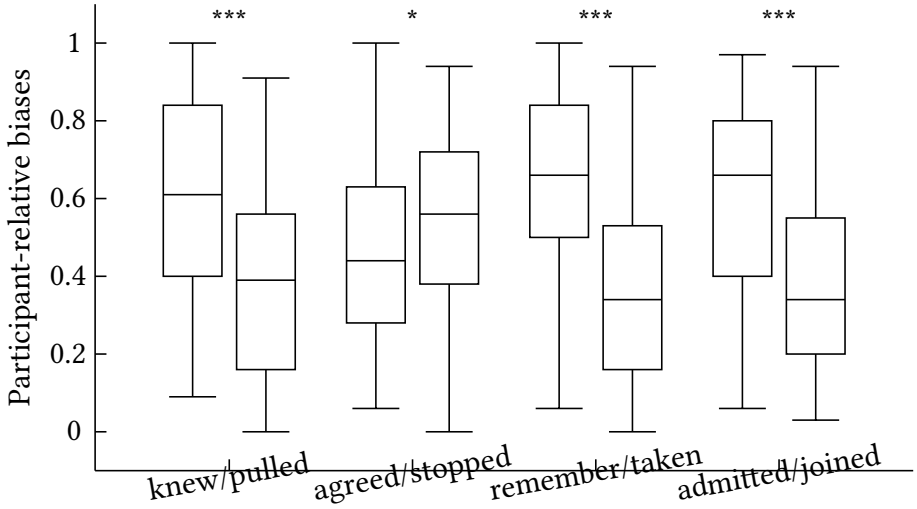


Figure 2.3: Results: Result verbs

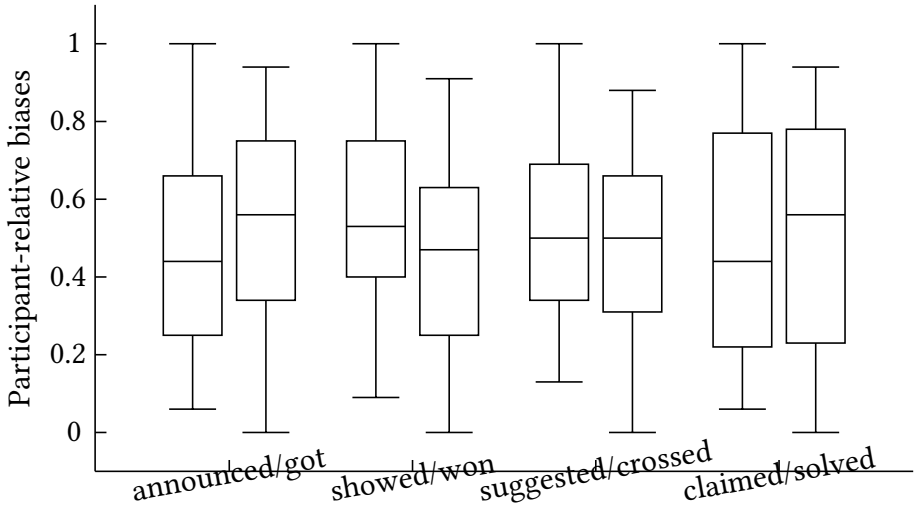


Figure 2.4: Results: Communication verbs

Table 2.3: Summary of PAV-biasedness results for Experiment 1. Significance thresholds: * $p < \frac{0.05}{16}$, ** $p < \frac{0.01}{16}$, *** $p < \frac{0.001}{16}$.

Verb	Z	r	significance
realised	−7.01	−0.68	***
believe	−5.24	−0.51	***
agreed	−2.96	−0.29	*
announced	−2.16	−0.21	
claimed	−0.96	−0.09	
found	−0.37	−0.04	
suggested	−0.01	0.00	
concluded	0.90	0.09	
showed	2.12	0.21	
says	3.30	0.32	*
thought	4.77	0.46	***
knew	5.82	0.57	***
saw	6.16	0.60	***
admitted	6.88	0.67	***
remember	7.19	0.70	***
suspect	7.21	0.70	***

rection was applied, and a significance threshold of $0.05 \div 16 = 0.003125$ was used. By this criterion, the sentences with *thought*, *knew*, *says*, *saw*, *remember*, *suspect* and *admitted* all had a significant PAV bias (*thought*: $p < \frac{0.001}{16}$, $Z = 4.77$, $r = 0.46$; *knew*: $p < \frac{0.001}{16}$, $Z = 5.82$, $r = 0.57$; *says*: $p < \frac{0.05}{16}$, $Z = 3.30$, $r = 0.32$; *saw*: $p < \frac{0.001}{16}$, $Z = 6.16$, $r = 0.60$; *remember*: $p < \frac{0.001}{16}$, $Z = 7.19$, $r = 0.70$; *suspect*: $p < \frac{0.001}{16}$, $Z = 7.21$, $r = 0.70$; *admitted*: $p < \frac{0.001}{16}$, $Z = 6.88$, $r = 0.67$), and the sentences with *realised*, *agreed* and *believe* had a significant content-clause bias (*realised*: $p < \frac{0.001}{16}$, $Z = 7.01$, $r = 0.68$; *agreed*: $p < \frac{0.01}{16}$, $Z = 2.96$, $r = 0.29$; *believe*: $p < \frac{0.001}{16}$, $Z = 5.24$, $r = 0.51$). The other sentences did not exhibit any bias that approached significance when multiple comparisons were corrected for. These results are summarised in Table 2.3, sorted by effect size (r).

Looking at the results by verb class, we find that the Inclination and Result classes show a statistically significant PAV bias (Inclination: $p < \frac{0.001}{4}$, $Z = 5.73$, $r = 0.56$; Result: $p < \frac{0.001}{4}$, $Z = 9.10$, $r = 0.88$). In each of these classes, however, there is one verb that exhibits the opposite tendency (*believe* and *agreed* are unexpectedly content-clause-biased).

The results can be summarised as follows:

(11) a. **PAV-biased verbs**: *thought*, *knew*, *says*, *saw*, *remember*, *suspect*, *admitted*

b. **Content-clause-biased verbs**: *realised*, *agreed*, *believe*

c. **Unbiased verbs**: *found*, *announced*, *showed*, *suggested*, *concluded*, *claimed*

Actually, while the above labels are convenient and compact, they are rather misleading, in that they suggest that we have discovered (semantic) properties of the verbs *thought*, *realised* (etc.) themselves. It would be more accurate to say that we are dealing with properties of the *constructions* [NP *thought that* S], [NP *realised that* S], etc. Thus, the three groups of verbs shown above would more accurately be labeled as follows:

(12) a. Verbs V such that [NP V *that* S] profiles the process designated by V to a greater extent than it profiles the process designated by S;

b. Verbs V such that [NP V *that* S] profiles the process designated by S to a greater extent than it profiles the process designated by V;

c. Verbs V such that [NP V *that* S] profiles the processes designated by V and S to roughly equal (or at least, not significantly different) degrees.

The next section considers possible explanations of these results; the following section then reports on an extension of this study that addresses some of the shortcomings that have been mentioned.

2.3.4 Discussion

The results of the current experiment hint at a semantic pattern underlying profile determinacy in finite-complementation constructions: namely, that constructions involving bridge verbs and factive verbs tend to have the PAV as the main verb, and the content clause as a subordinate clause. Constructions involving other types of complement-taking verbs do not have a clear pattern. (It should be borne in mind, though, that a sample of four verbs is not really adequate for making a generalisation about a verb class; but this was not the purpose of the study.)

The result for bridge verbs (which, the reader will recall, are NEG-raising) is surprising. According to Boye & Harder (2007: 578), if a verb is NEG-raising (i.e. if *I don't V that S* implies *I V that not-S*), then the content clause is the profile determinant. However, three of the four bridge verbs used in the study are actually PAV-biased.

The exception, as noted earlier, is the verb *believe*. It is possible that the content-clause bias here is due to the fact that this verb form had a first-person subject (which indicates that the content clause is part of what the speaker is asserting). However, this explanation fails to account for the fact that *suspect*, which also appeared with a first-person subject, shows a strong PAV bias.

The exceptional verb in the factive-verb class is *agreed*, which unexpectedly shows a content-clause bias; however, the effect size is smaller than for any of the other significantly-biased verbs ($r = 0.29$, just under the threshold of 0.3 for a "medium effect size"). It is possible, though, that this verb should not really be considered a factive verb (although it can certainly be used as such). One can think of contexts in which the truth of the content clause is not presupposed:

(13) He agrees (with her) that the water is too cold—{but no one else does/but I don't}.[5]

Indeed, there is probably a good case for classifying *agreed* as a communication verb, since one can only agree with a proposition that someone else has asserted (i.e., at least two conceptualisers need to be involved).

Finally, we may consider the two Action verbs that show a significant bias: *realised* (content-clause-biased) and *saw* (PAV-biased). A plausible explanation of the behaviour of *realised* does not come to mind; but notice that *saw* is a factive verb (if *she saw that he had called the police*, then it is necessarily true that *he had called the police*), and its behaviour is not surprising in this context.

Is there a larger pattern here? Perhaps; consider which of the verbs are capable of taking NP complements:

(14) a. [Until last week, she was unaware that he had broken the law. Then, suddenly,] *she realised that.

b. [Did he hear the sound?] *She believes that. [cf. She believes so.]

c. [They claimed that he had stopped the car.] *She agreed that. [cf. She agreed *with* that.]

d. [As soon as she found that he had got the job,] she announced it [to all her friends.]

[5] In certain languages, the content clause in this sentence would be in the subjunctive.

e. [Did he really solve that problem?] She claimed that, [but was later proven wrong.]

f. [Does she know that he had closed the door?—Yes,] *she found that.

g. [She thinks he crossed the border, doesn't she?—Yes,] she suggested that [at one point.]

h. [I'm not convinced that he saw the man, but] ?she concluded that.

i. [They didn't believe that he had won the battle, but] she showed that [beyond a shadow of doubt.]

j. [We're not sure that he found the body, although] ?she says that.

k. [Didn't she say he had left the room?] She thought that, [but now she isn't sure.]

l. [Did you tell her that he had pulled the trigger?] She knew that [already.]

m. [Does she know that he called the police?—Yes,] she saw that.

n. [They asked her point-blank whether he had joined the army.] She admitted that [readily.]

o. [She has forgotten that he had taken the money, but] I [still] remember that.

p. [Does she know that he read the book?—Yes, or at least] she suspects that.

(Here, the verbs have been sorted from least PAV-biased to most PAV-biased.) It seems as though the verbs that are least PAV-biased are those that do not readily take an NP complement. We will see how well this hypothesis fares in Experiment 2, reported in the next few sections.

2.4 Introduction to Experiment 2

There were two potential shortcomings with Experiment 1. The first is that the features of the PAVs and content-clause verbs had been generated freely; but, as noted earlier, the features of a word that come most easily to mind are not necessarily the ones that are most apt, and the most apt features do not always come easily to mind. To address this concern, a norming study was done in which participants were shown, for each verb, all of the features that had been generated for it in the earlier feature-elicitation study, and they had to select those features that best matched the verb. The features that were selected

by the most participants would be treated as the features that most accurately reflect the meaning of that verb.

Another shortcoming of the previous study was that each PAV was always paired with the same content clause; thus, one cannot shake off the suspicion that the content-clause verbs might be having an effect that is not being controlled for. To address this, the study was run with all possible pairings of PAVs and content clauses.

2.5 Norming study for Experiment 2

2.5.1 Participants

Forty-three participants (undergraduate students at Northumbria University) participated in the norming study. All self-identified as native speakers of English.

2.5.2 Materials and procedure

As in the earlier feature-elicitation study, there were two conditions: PAV and content-clause. In both cases, the following instructions were given:

> Below, you will find a list of sentences, each with one word in it italicised. Each sentence is followed by a list of features. Take a moment to look through the features, and then circle the ones which you think best describe the meaning of the italicised word *in the context of the sentence*. You may circle as many features as you think are appropriate.
>
> The following is an illustration of the sort of response you might give:
>
> She *invited* him to her house.
>
> - [make a request]
> - avalanche
> - skated
> - [come over]
> - [event]
> - Velcro
> - [joint activity]
> - chopped down
> - rectangular
> - [welcome]
> - fried

- polite action
- staircase

These instructions were followed by the sixteen finite-complementation sentences that were used in the previous study. Depending on the condition, either the PAVs or the content-clause verbs were italicised. Each sentence was followed by a list of between thirty and fifty features, which were drawn from the features that had been elicited in the earlier feature-elicitation task.

2.5.3 Results

The features of each verb that were ultimately chosen are shown in Table 2.4. (The numbers are the absolute number of participants that chose a given feature. As before, feature frequencies were roughly equalised across PAVs and content-clause verbs.)

2.6 Experiment 2

2.6.1 Participants

A hundred and sixty-three responses were collected by distributing the study by e-mail to undergraduates at Northumbria University. Out of these participants, five self-identified as native speakers of a language other than English. In addition, thirty-eight of the participants (including one of the non-native English speakers) reported that they were aware of a response strategy that they were using; these participants were excluded from the analysis, as the response strategy might have led to their consistently picking features of the PAV, or consistently picking features of the content-clause verb.[6]

In total, **121** responses were used.

2.6.2 Materials and procedure

Sixteen questionnaires were constructed, in such a way as to cover all possible combinations of the sixteen PAVs with the sixteen content clauses. The first questionnaire was identical to the one used in the initial version of the experiment, except that the answer choices

[6] I have not yet tested whether participants who indicated a response strategy actually behaved in this way.

Table 2.4: Results of norming study for Experiment 2.

found		realised		saw		concluded	
discovered	19	concluded	15	witnessed	15	ascertained	12
realised	18	discovered	15	observation	13	worked out	11
saw	14	revelation	10	realised	12	decided	10
notice	10	knew	9	discovered	8	revealed	9
observe	10	observed	8	visual confirmation	8	drew from facts/evidence	9
confirmed	7	found out	8	knew	7	summary	8
thought		**says**		**believe**		**suspect**	
assumed	16	suggests	11	strong feeling	11	thinks but can't prove	12
believed	15	told people	10	have faith	11	believe	11
guessed	13	might not be true	9	trust	10	perhaps	9
perceived	9	alleged	9	think	10	assume	9
suspect	8	rumour	9	conclude	9	guess	8
lack of certainty	5	stated	8	opinion	9	speculate	8
knew		**agreed**		**remember**		**admitted**	
was certain	16	confirmed	15	recall	17	confessed	17
definite	12	mutual decision	12	memory	15	revealed	15
100%	12	comply	11	recollected	12	confirmed	13
positive	11	same opinion	10	look back	11	opened up	11
fact	10	conceded	10	returning thought	8	announced	10
sure	10	consent	8	flashback	7	came clean	9
announced		**showed**		**suggested**		**claimed**	
revealed	18	demonstrated something	14	put forward	15	put forward	11
declared	15	boasted	12	indicated	13	said	9
told	13	displayed	12	proposal	12	suggested	9
said	11	presented	10	could have	11	announced	9
proclaimed	11	indicated	9	implied	10	perceived	8
broadcast	10	conveyed	8	hinted	10	believed	8

included eighteen features: six of the PAV, six of the content-clause verb, and six fillers (all randomly ordered). The second questionnaire differed from the first, in that content clause #1 was paired with PAV #2, content clause #2 with PAV #3, and so on. In the third questionnaire, content clause #1 was paired with PAV #3, content clause #2 with PAV #4, and so on; and so on for the rest of the questionnaires. Thus, every PAV was (as far as possible) paired with every content clause, reducing the possibility that the observed differences between PAVs might be driven by differences in the content-clause verbs.

There was one problem with the crossing of PAVs and content clauses: the verbs *find* and *see* appear both as PAVs (in *she found* and *she saw*) as well as in content clauses (in *that he had found the body* and *that he had seen the man*). It would be problematic to collect responses for the sentences *She found that he had found the body* and *She saw that he had seen the man*, because it would be nearly impossible to tell whether the participant was selecting features of the PAV or of the content-clause verb. Thus, these sentences were replaced with *She found that he had bought the book* and *She saw that he had broken the law* (in questionnaires 12 and 13, respectively).

Participants were assigned to questionnaires in the following manner: the e-mail invitation contained a link to `http://www.random.org/integers/?num=1&min=1&max=16&col=1&base=10&format=html&rnd=new`, which displays a single, random integer between 1 and 16 (inclusive). This link was followed by a numbered list of links to the 16 questionnaires, and participants were instructed to click on the link corresponding to the random number that they had been assigned.

2.6.3 Results

For each sentence that each participant saw, I coded the proportion of selected PAV and content-clause features relative to the total number of relevant features selected.

Generalising over all participants, and all sentences, there was no significant bias in the direction of either the PAV or the content clause; the average PAV bias was 0.51. In other words, on the whole, participants showed no preference for one verb over the other.

As in Experiment 1, there were huge between-participant differences: some participants were consistently PAV-biased, and others consistently content-clause-biased. This variation

was continuous; i.e. there were no discrete PAV-biased and content-clause-biased groups. To control for these individual differences, the bias scores for each participant were converted into tied ranks (as explained earlier), so that even if the bias scores for a participant were consistently high (or consistently low), the ranked scores would always have a mean of 0.5.

Tied ranks were computed for the PAV biases as well as the content-clause biases. Thus, for each participant, the distribution of tied ranks for the PAV bias and the content-clause bias of each verb were compared. The following verbs were found to have a significant PAV bias: (All of these verbs were found to be PAV-biased in the previous experiment as well.)

- *thought* ($p < \frac{0.001}{16}$, $Z = 4.50$, $r = 0.41$)
- *remembered* ($p < \frac{0.001}{16}$, $Z = 4.88$, $r = 0.44$)
- *suspect* ($p < \frac{0.001}{16}$, $Z = 6.01$, $r = 0.55$)
- *admitted* ($p < \frac{0.001}{16}$, $Z = 5.45$, $r = 0.50$)

In addition, the following verbs were found to have a significant content-clause bias:

- *found* ($p < \frac{0.01}{16}$, $Z = -3.53$, $r = -0.32$)
- *realised* ($p < \frac{0.001}{16}$, $Z = -4.21$, $r = -0.38$)
- *says* ($p < \frac{0.05}{16}$, $Z = -3.33$, $r = -0.30$)
- *agreed* ($p < \frac{0.01}{16}$, $Z = -3.45$, $r = -0.31$)
- *believe* ($p < \frac{0.01}{16}$, $Z = -3.87$, $r = -0.35$)

This leaves the following verbs that did not show a significant bias:

- *knew* ($p > 0.05$, $Z = -0.35$, $r = -0.03$)
- *announced* ($p > 0.05$, $Z = -0.02$, $r = 0.00$)
- *showed* ($0.05 > p > \frac{0.05}{16}$, $Z = -2.87$, $r = -0.26$)
- *saw* ($p > 0.05$, $Z = 1.43$, $r = 0.13$)

Table 2.5: Summary of PAV-biasedness results for Experiment 2. Significance thresholds: * $p < \frac{0.05}{16}$, ** $p < \frac{0.01}{16}$, *** $p < \frac{0.001}{16}$.

Verb	Z	r	significance
realised	−4.21	−0.38	*
believe	−3.87	−0.35	*
found	−3.53	−0.32	*
agreed	−3.45	−0.31	*
says	−3.33	−0.30	*
showed	−2.87	−0.26	
claimed	−1.21	−0.11	
knew	−0.35	−0.03	
concluded	−0.33	−0.03	
announced	−0.02	0.00	
saw	1.43	0.13	
suggested	2.05	0.19	
thought	4.50	0.41	*
remember	4.88	0.44	*
admitted	5.45	0.50	*
suspect	6.01	0.55	*

- *suggested* ($0.05 > p > \frac{0.05}{16}$, $Z = 2.05$, $r = 0.19$)
- *concluded* ($p > 0.05$, $Z = -0.33$, $r = -0.03$)
- *claimed* ($p > 0.05$, $Z = -1.21$, $r = -0.11$)

These results are summarised in Table 2.5, sorted by effect size (r). It is worth noting the relatively large effect size of *showed* (in the direction of content-clause bias), which approaches the 0.3 threshold for a "medium effect size". In Experiment 1, the effect size for *showed* was −0.21 (but so was the effect size for *announced*, which is now zero). It is unclear what, if anything, this means.

An analysis was also done by verb class. The results were as follows:

- **Action verbs** (verbs of realisation): content-clause-biased ($p < \frac{0.01}{16}$, $Z = -3.84$, $r = -0.35$)
- **Inclination verbs** (bridge/NEG-raising verbs): neutral ($p > 0.05$, $Z = 1.82$, $r = 0.17$)
- **Result verbs** (factive verbs): PAV-biased ($p < \frac{0.05}{16}$, $Z = 3.37$, $r = 0.31$)
- **Interaction verbs** (verbs of communication): neutral ($p > 0.05$, $Z = -1.04$, $r = -0.09$)

Notice, though, that the effect for action verbs is driven by only *found* and *realised*; but the effect for result verbs is driven by three of the four verbs (*agreed*, *remembered* and *admitted*; *knew* being the exception). The class of inclination verbs contains both PAV-biased verbs (*thought* and *suspect*) and content-clause-biased verbs (*says* and *believe*). None of the interaction verbs has a significant bias one way or the other.

2.6.4 Discussion

As before, we find hints of semantic explicability of profile determinacy in propositional-attitude constructions. Factive verbs seem to be PAV-biased (with the exception of *believe*, perplexing as before). We now find that bridge verbs no longer show an overall bias; but a closer look reveals that this is because *says* has "flipped" from being PAV-biased to being content-clause-biased. This is perhaps to be expected, as *say* is ambiguous between a bridge-verb reading (in which it is used to introduce an assertion with which the speaker agrees), and a purely communicative reading (in which the speaker makes no claim as to the truth of what is said). It is entirely possible that the sentence *She says that he had found the body* nudged participants towards the bridge-verb reading. (Note, too, that in both the previous experiment and the current one, the effect size for *says* was fairly close to the "medium" threshold.)

Another difference from the earlier result is in the behaviour of the Action verbs. *Realised* remains content-clause-biased; however, *saw* is now neutral, and *found* (which was previously neutral) is content-clause-biased.

2.7 Follow-up to Experiment 2

Let us now consider the hypothesis advanced earlier, that the PAV-biased propositional-attitude verbs are ones for which the content clause can be substituted with an NP, and that the content-clause-biased verbs are ones for which this substitution is not possible. This follow-up study verifies to what degree the 16 PAVs under study are capable of taking NP complements, and whether this indeed correlates with the effect sizes found in the main study.

2.7.1 Participants

Questionnaires were distributed to undergraduate students at Northumbria University. In this way, **20** responses were collected.

2.7.2 Materials and procedure

Participants were provided the following instructions:

> In each of the following question-answer pairs, please rate how natural-sounding B's answer is, on a scale from 1 ("I would never say this") to 5 ("this is something I would readily say").
>
> If you're unsure of your rating, feel free to explain as best you can why you're unsure (we will find this information useful).
>
> A: Did he close the door?
>
> B: Yes—she found that.
>
> 1 2 3 4 5

(and likewise for the other 15 PAVs).

2.7.3 Results and discussion

For each propositional-attitude verb, ratings were averaged across participants, and then converted into values between 0 and 1 (by subtracting 1 and dividing by 4); the results are shown in Table 2.6. These values were then correlated with the effect sizes (r) found in the main study described in the previous section. The correlation was 0.40 (t = 1.66, df = 14, p = 0.12). In other words, there was no significant correlation between the degree to which a PAV allows for an NP complement and the degree to which it is PAV-biased.

2.8 General discussion

Ultimately, we should not be overly concerned by the fact that the profile of a propositional-attitude sentence cannot be predicted using the factors considered in this chapter. In essence, there were two major hypotheses being tested:

Table 2.6: Results for the NP-complement acceptability study.

Verb	Acceptability of NP complement
found	0.19
showed	0.26
agreed	0.28
concluded	0.28
saw	0.45
knew	0.48
admitted	0.50
thought	0.50
realized	0.54
announced	0.59
believe	0.61
suggested	0.61
suspect	0.63
says	0.64
claimed	0.66
remember	0.80

(a) that the PAV is *always* the profile determinant (the traditional view);

(b) that the content clause is *always* the profile determinant (the extreme version of the discourse-based view);

and both of these extremes have clearly been shown to be false. Individual propositional-attitude verbs may be biased one way or the other, but there is no overall bias. This certainly makes the lack of consensus on how to analyse these verbs understandable.

In particular, we should not worry that profile determinacy seems to have nothing to do with which clause is more contentful or "prominent"; as mentioned earlier, what a sentence profiles (i.e. designates) can be (and usually is) distinct from what it makes prominent. In fact, I suspect that it is precisely this distinction that Boye & Harder 2007 are trying to capture by distinguishing "structure-level" vs. "usage-level" properties of a propositional-attitude verb. See also §5.2.6 below for further discussion of the relation between profile determinacy and prominence.

2.9 Conclusions

In this chapter I hope to have shown that in finite complementation constructions in English, neither the propositional-attitude verb nor the content clause can always be said to be the "head". The extent to which each constituent is the "head" appears to depend on the particular PAV that is being used, in a way that cannot obviously be predicted from semantic or distributional properties of the verb.

This may seem like a disappointing conclusion. However, under a usage-based model, there is no problem at all with saying that verb-specific constructions such as [NP *saw that* S], [NP *realised that* S], etc. (or perhaps constructions that are more schematic: [NP SEE *(that)* S], [NP REALISE *(that)* S], etc.; or more specific: [*We saw that* S], [*I realised that* S], etc.) are learned and represented separately in the speaker's mind, and that information about profile determinacy is stored separately with each of these.

Furthermore, there is a broader, methodological point being made here: that it is indeed possible, as Dąbrowska (2009) urges, to operationalise semantic analyses of grammatical phenomena of the sort proposed in Cognitive Grammar (as concretely illustrated here for the construct "profile determinant")—provided we are clear about our definitions. This is after all the unifying thread that runs through this work.

2.A Features of PAVs and content-clause verbs

Table 2.7: Action verb sentence verb-features.

found		realised		saw		concluded	
discover	64.71	**concluded**	23.53	**acknowledged**	11.76	**decided**	17.65
realised	35.29	**knew**	23.53	**eyes**	11.76	**final**	17.65
saw	23.53	**thought**	17.65	heard	11.76	**finished**	17.65
aggressive	11.76	confusion	11.76	**knew**	11.76	confirmed	11.76
look	11.76	crime	11.76	looked	11.76	finalised	11.76
lost	11.76	discovered	11.76	**observed**	11.76	**realised**	11.76
shut out	11.76	**found out**	11.76			resulted	11.76
		law	11.76			summarised	11.76
		remember	11.76			thought	11.76
closed		**broken**		**called**		**seen**	
shut	71.43	**illegal**	28.57	phone	42.86	**eyes**	28.57
locked	28.57	**bad**	14.29	ring	42.86	**looked**	21.43
blocked	21.43	**crime**	14.29	**shouted**	35.71	**noticed**	21.43
refused	21.43	damaged	14.29	**dialled**	21.43	belief	14.29
unopened	21.43	**guilty**	14.29	**spoke**	21.43	past tense	14.29
barred	14.29	infringed upon	14.29	asked for help	14.29	saw	14.29
denied	14.29	mended	14.29	contacted	14.29	sense	14.29
goodbye	14.29	opposed	14.29	emergency	14.29	**sight**	14.29
prevented	14.29	snapped	14.29	**help**	14.29		
rejected	14.29			informed	14.29		
sealed	14.29			telephoned	14.29		
slammed	14.29						
stopped	14.29						

Table 2.8: Inclination verb sentence verb-features.

thought		says		believe		suspect	
assumed	23.53	**told**	29.41	belief	17.65	think	35.29
think	23.53	**spoken**	23.53	**conclude**	17.65	**believe**	23.53
brain	17.65	communicate	11.76	**faith**	17.65	**suspicion**	23.53
ponder	17.65	**informed**	11.76	**agree**	11.76	**guess**	17.65
unsure	17.65	iterates	11.76	**certain**	11.76	**maybe**	17.65
believed	11.76	**report**	11.76	consider	11.76	assume	11.76
		talk	11.76	know	11.76	negative	11.76
		words	11.76			opinion	11.76
						uncertain	11.76
left		**found**		**heard**		**read**	
gone	42.86	**discovered**	42.86	listen	57.14	**information**	21.43
not there	35.71	looked	14.29	**noise**	42.86	**knowledge**	21.43
exit	21.43	**lost**	14.29	**ears**	35.71	**look**	21.43
movement	21.43	realised	14.29	**music**	14.29	**words**	21.43
abandoned	14.29	retrieved	14.29	sense	14.29	absorbed	14.29
departed	14.29	**searched**	14.29	**sound**	14.29	studied	14.29
direction	14.29	seen	14.29	speaking	14.29	writing	14.29
vacated	14.29	**shock**	14.29				
		stumbled upon	14.29				

Table 2.9: Result verb sentence verb-features.

knew		agreed		remember		admitted	
certain	41.18	**decision**	17.65	**memory**	35.29	**truth**	23.53
confident	17.65	**yes**	17.65	**recall**	29.41	**came clean**	17.65
definite	17.65	comply	11.76	**thought**	17.65	**confessed**	17.65
fear	17.65	**confirmed**	11.76	**witness**	17.65	**revealed**	17.65
knowledge	17.65			look back	11.76	accepted	11.76
fact	11.76			recollection	11.76	announced	11.76
positive	11.76			saw	11.76	ashamed	11.76
saw	11.76					conceded	11.76
sure	11.76					embarrassed	11.76
						let out	11.76
						owned up	11.76
						told	11.76
pulled		**stopped**		**taken**		**joined**	
shot	50.00	**halted**	57.14	**stolen**	78.57	**part of**	28.57
death	28.57	**braked**	35.71	**thief**	21.43	**connect**	21.43
fired	28.57	**(not moving)**		**borrowed**	14.29	**signed up**	21.43
force	21.43			**withdraw**	14.29	accepted	14.29
killed	21.43					merged	14.29
end	14.29					**recruitment**	14.29
murdered	14.29					united	14.29
pressure	14.29					voluntary	14.29
squeezed	14.29						

Table 2.10: Communication verb sentence verb-features.

announced		showed		suggested		claimed	
told	29.41	**presented**	23.53	**implied**	23.53	**believed**	17.65
shouted	23.53	**displayed**	17.65	**hinted**	17.65	**lie**	11.76
spoke	23.53	confirmed	11.76	**idea**	17.65	**statement**	11.76
celebration	17.65	demonstrated	11.76	advice	11.76		
declared	17.65	**pride**	11.76	guessed	11.76		
loud	17.65	**revealed**	11.76	**opinion**	11.76		
pleased	17.65	victory	11.76	proclaimed	11.76		
proud	17.65			put forward	11.76		
revealed	17.65			said	11.76		
bragged	11.76			thought	11.76		
excited	11.76						
inform	11.76						
news	11.76						
proclaim	11.76						
public	11.76						
said	11.76						

got		won		crossed		solved	
successful	28.57	victory	42.86	**escape**	28.57	answered	35.71
won	28.57	**success**	35.71	**travel**	28.57	**completed**	21.43
accepted	21.43	**achievement**	28.57	**immigrate**	21.43	**puzzle**	21.43
achieved	21.43	**celebration**	21.43	country	14.29	achieved	14.29
employment	21.43	beaten	14.29	**freedom**	14.29	**explained**	14.29
received	21.43	defeated	14.29	illegal	14.29	finished	14.29
acquired	14.29	first	14.29	moved	14.29	relieved	14.29
work	14.29	fought	14.29	went over	14.29	thought	14.29
		medal	14.29				
		violence	14.29				
		winner	14.29				

Chapter 3

Focal prominence in the dative and existential alternations

3.1 Introduction

The previous chapter started with a problem of linguistic description, where different authors have analysed the same construction in different ways. The alternative analyses were reformulated in terms of the descriptive constructs of Cognitive Grammar, and these formulations were then turned into hypotheses that were tested experimentally. The purpose was to show how Cognitive Grammar could be used as a tool for empirically deciding between competing analyses.

This chapter and the next focus more narrowly on descriptive constructs of Cognitive Grammar itself, in particular "trajector", "landmark", "sequential scanning" and "summary scanning". The purpose will be to identify what (if anything) these notions correspond to in terms of the observable dynamics of language processing, and to determine whether these notions have been correctly applied in the analysis of English grammar.

The present chapter will focus on the notions "trajector" and "landmark", which are used as semantic characterisations of "subject" and "(primary) object", respectively. As such, they figure in the analyses of the following two constructional alternations:

(15) Dative alternation:

a. The teacher gave the swimmer a banana. [ditransitive]

b. The teacher gave a banana to the swimmer. [dative]

(16) Existential alternation:

a. The book is on the shelf. [locative]

b. There is a book on the shelf. [existential]

The ditransitive and dative constructions differ in terms of whether the (first) object denotes the recipient of an event of transfer, or rather its theme (the transferred object). The locative and existential constructions differ in terms of whether the subject denotes the located object, or is an "expletive" (or "ambient"; cf. Bolinger 1973) pro-form.

Thus, if it is true that trajector and landmark correspond to subject and object, and if there is an experimental method for determining what the trajector or landmark is in a given sentence, then this method should reveal that in the ditransitive construction, the landmark is the recipient, whereas in the dative construction, it is the theme. Likewise, it should reveal that in the locative construction, the trajector is the located object, whereas in the existential construction, it is the "ambience" (this notion is elaborated further below).

These are the hypotheses that will be tested in this chapter. However, we will start by examining more closely the notions of trajector and landmark, and asking how these could be operationalised.

3.1.1 Trajector and landmark

According to Cognitive Grammar, an expression can designate either a "thing" or a "relation"; a relation consists of interconnections between entities (Langacker 1987: 215). The entities that are directly interconnected by a relation (in other words, the arguments of the relation) are called "focal participants" (Langacker 1991: 301), and are characterised as "figures" (in the Gestalt psychology sense of the term).

For relations which have two or more arguments (e.g. the relations profiled by divalent and trivalent verbs, adpositions, or adverbs), a distinction is drawn between the "primary" and "secondary" focal participants, or primary and secondary figures (Langacker 1991: 308). These are also called the "trajector" and "landmark", respectively (Langacker 1987: 231–236). For example, in a sentence such as *The lamp is above the table*, the lamp is the primary figure

or trajector, and the table is the secondary figure or landmark (Langacker 2008a: 71, 73).[1] Conversely, in *The table is below the lamp*, the table is the trajector and the lamp is the landmark.

One of the main uses of the trajector/landmark distinction is to characterise the distinction between subject and object. Langacker (1991: 305–313) argues that while subjects *prototypically* exhibit a number of properties such as animacy, (relative) agentivity, definiteness, topicality, and so on, the only property that they *necessarily* exhibit is that of being construed as the (primary) figure. This is particularly clear in clauses involving spatial relations (e.g. *The lamp is above the table*), or symmetric predicates (e.g. *Joshua resembles Jonathan*), where the two arguments need not differ at all in animacy, agentivity, definiteness or topicality.

In a clause with two arguments, the object, by virtue of being the only focal participant that is not primary, is by default the (unique) landmark (Langacker 1987: 270). For three-argument clauses, Langacker distinguishes between a "primary landmark" and a "secondary landmark" (Langacker 2008a: 393–394),[2] expressed in English as the "primary object" and "secondary object" in a ditransitive clause (Dryer 1986). While Langacker does not argue explicitly for this analysis (as he does for his analysis of subjects and objects), it accords well with work showing that the primary object in a ditransitive clause tends to have more prototypical "subject-like" properties than the secondary object (e.g. it is more likely to be animate, definite, topical, etc.; cf. Bresnan et al. 2007).

3.1.2 Experimental evidence

How might one go about operationalising notions such as trajector and landmark? A clear indication comes from Tomlin (1997) (building on Forrest 1992), who experimentally investigates the effect of visual attention on the choice of active or passive voice.

In Tomlin's experiments, participants were shown a series of short film clips; in each of them, two cartoon fish of different colours swim towards each other. Shortly before they meet, an arrow is flashed next to one of the fish. Then one of the fish (not always the one

[1] In the approach presented in Talmy (2000a), the table would be analysed as the "Ground". Langacker reserves "ground" for non-focal relational participants (e.g. Langacker 1991: 323).

[2] Logically, these terms should be equivalent to "secondary figure" and "tertiary figure"; however, Langacker tends to avoid the term "tertiary figure" (Langacker 1991: 326). In any case, little hinges on this.

that has been cued) swallows the other and continues swimming to the other side of the screen. Participants were instructed to describe this eating event as soon as they saw it.

Tomlin (1997: 178–179) found that English speakers virtually always used the active voice when the eating fish (the agent) was cued, and virtually always used the passive voice when the eaten fish (the patient) was cued. Thus, the visually-cued fish was always coded as the subject of the sentence used to describe the viewed event.

Tomlin's study has subsequently been criticised for using a blatantly overt attention cue (e.g. Gleitman et al. 2007). Further, Diderichsen (2001) found that the attention cue had been presented so early that the participant's attention could in principle have switched to a different target by the time they began to formulate their description. These issues were addressed by Myachykov (2007) and Gleitman et al. (2007), who were able to replicate and extend Tomlin's results, but with a less striking effect size.

Thus, "trajector" has been successfully and fruitfully operationalised as "the event participant which is (visually) attended to at the onset of the utterance". This not only matches the idea of trajector as primary figure (cf. Vecera, Flevaris & Filapek 2004, who find that attention influences figure/ground assignment in ambiguous visual scenes), but also Chafe's (1994: 83) characterisation of subjects as "starting points" (see also MacWhinney 1977).

This immediately suggests that "landmark" could be operationalised as "the event participant *besides* the trajector that is most saliently attended to at the onset of the utterance"; see Myachykov, D. Thompson et al. (2011: 104) for a suggestion along these lines.

3.1.3 Application to the questions at hand

We may now return to the dative and existential alternations; the examples at the beginning of this chapter are repeated below for convenience:

(17) Dative alternation:

a. The teacher gave the swimmer a banana. [ditransitive]

b. The teacher gave a banana to the swimmer. [dative]

(18) Existential alternation:

a. The book is on the shelf. [locative]

b. There is a book on the shelf. [existential]

In light of the discussion in the preceding subsection, how would the Cognitive Grammar analyses of these alternations be experimentally tested?

For the dative alternation, one could use a straightforward extension of Tomlin's paradigm (as suggested in Myachykov, D. Thompson et al. 2011: 104): show a picture of a transfer event (e.g. a teacher giving a banana to a swimmer), directing attention to either the recipient (the swimmer) or the theme (the banana). If the primary object is indeed the (primary) landmark, then directing attention to the recipient would cause participants to be more likely to use the ditransitive construction (i.e., make the recipient the primary object); likewise, directing attention to the theme would cause participants to be more likely to use the dative construction (i.e., make the theme the primary object).

For the existential alternation, things are not so straightforward. For the locative alternant, one can direct attention to the located object (the book). What would one direct attention to for the existential alternant (assuming that *there* is the subject/trajector: e.g. Hartmann 2010)? Conventional wisdom suggests that in this usage, *there* has no referent.

Here, inspiration may be taken from Langacker's (2010e) analysis of impersonal *it* in sentences such as *It's raining* or *It's fun when old friends get together*. He suggests that *it* refers to "the conceptualizer's scope of awareness for the issue at hand" (Langacker 2010e: 139)—basically, the scene as a whole rather than any particular element within it. While he does not address existential *there* in detail, he suggests that essentially the same analysis could be applied (Langacker 2010e: 147).

What this means, in practical terms, is that in order to direct attention to an entity that would be coded as the subject of an existential sentence, one would need to direct attention in a diffuse fashion, rather than to any particular location.

The next section describes an attempt to run an experiment along the lines just described.

3.2 Experiment

3.2.1 Participants

Thirty-seven undergraduate psychology students at the Australian National University participated in the experiment.[3] They received course credit for participation.

Among these, five were excluded from the analysis because they were not native speakers of English; and another four were excluded because they were able to work out what kind of hypothesis was being tested.

Thus, in total, there were **28** participants, 20 female and 8 male.

3.2.2 Materials

The stimuli consisted of 24 pictures of transfer events, 24 pictures of locative scenes, and 24 fillers.

The pictures of transfer events were selected from a set of stimuli kindly provided by Andriy Myachykov. These 24 pictures were arranged in six blocks; each block had a picture of "giving", a picture of "selling", a picture of "showing" and one of "throwing" (in that order). Within each block, the horizontal direction of transfer alternated. Odd-numbered blocks started with rightwards transfer, and even-numbered blocks with leftwards transfer.

To create the locative scenes, a selection of pictures from the BowPed Topological Relations Picture Series (Bowerman & Pederson 1992) was decomposed into figures and grounds, and these were recombined to create 24 distinct scenes. These 24 scenes were arranged in six blocks; each block contained an example of "on", one of "under", one of "in", and one of "right (of)" (in that order).

Twenty-four fillers were taken from among the pictures of intransitive events provided by Andriy Myachykov.

The transfer-event pictures, fillers, and locative scenes were interleaved (in that order). An additional four fillers were added to the beginning.

In total, participants were presented with 76 pictures to respond to.

[3] I am indebted to Evan Kidd for his guidance, and for providing access to lab space, equipment and participants.

3.2.3 Procedure

Participants were seated in front of a computer running PowerPoint, and saw the following instructions:

> In this experiment, you will be shown a series of pictures. You will be asked to describe each picture as soon as you see it, in one sentence.
>
> In the next few slides, however, you will be shown some of the people who will appear in the pictures. Just practice identifying each of them.
>
> Press the spacebar when you are ready to continue.

The next 16 slides each showed a picture of a person in occupational clothing, with a label underneath which the participant was to read aloud. The purpose of these identification-practice trials was to ensure that participants' responses to the transfer-event pictures would not be delayed because of difficulty in naming the actors. (The more a participant's response is delayed, the weaker the potential effect of the attention cue.)

After completing the identification trials, participants saw the following directions:

> On the following slides are some examples of pictures you will be asked to describe in this experiment. Just read out the descriptions that are provided.
>
> (Press the spacebar to continue.)

In the next nine slides, they saw four examples of transfer-event scenes (such as Figure 3.1), four examples of locative scenes (such as Figure 3.2), and one filler (such as Figure 3.3). Each of these had a description shown underneath, which the participant was to read aloud. For the transfer-event scenes, both ditransitive and dative frames were illustrated twice. For the locative scenes, both the existential and presentational constructions were illustrated twice.

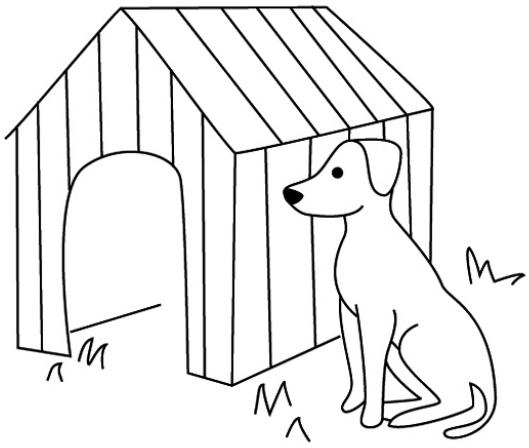
After the practice trials were over, the experiment began. Each trial began with a fixation cross.

For each of the experimental trials, there were four conditions:

1. Transfer events

The teacher is giving the swimmer a banana.

Figure 3.1: Example of a transfer-event picture.



The dog is to the right of the kennel.

Figure 3.2: Example of a locative scene.

The fireman is sneezing.

Figure 3.3: Example of a filler item.

(a) In the "theme-cueing" condition, before the picture was presented, a red dot was flashed in the eventual location of the theme, in order to draw attention to the theme once the picture appeared;

(b) In the "recipient-cueing" condition, the dot was flashed in the eventual location of the recipient;

(c) In the "agent-cueing" condition, the agent was cued (this served as a baseline condition);

(d) In the "no-cueing" condition, there was no cueing (this was another baseline).

2. Locative scenes

(a) In the "figure-cueing" condition, a white rectangle on a black background was flashed in the area eventually occupied by the figure, in order to draw attention to the figure once the picture appeared;

(b) In the "scene-cueing" condition, the entire scene (including both figure and ground) was cued with a white rectangle;

(c) In the "filler" condition, a filler was shown, and attention was cued to the entire scene (this condition is not of interest, and was included simply to balance out the number of conditions for each type of experimental stimulus);

(d) In the "no-cueing" condition, there was no attention-cueing (this served as a baseline condition).

The four conditions were cycled over the 76 stimuli (including the fillers), and four lists were created, each starting with a different condition.

Participants' oral responses were audio-recorded, and subsequently transcribed and coded for the construction used.

At the end of the experiment, participants were debriefed. They were first asked to guess the hypotheses being tested, and then the hypotheses were explained to them.

3.2.4 Results

Dative alternation

All responses that did not use either the ditransitive construction or the prepositional-object construction (in the active voice) were excluded. Among the remaining responses, when the recipient was cued, participants used the (expected) ditransitive construction 26% of the time, and the (unexpected) dative construction 74% of the time. When the theme was cued, participants used the (expected) dative construction 80% of the time, and the ditransitive construction 20% of the time. In the control conditions (agent-cueing and no-cueing), participants used the ditransitive construction 18% of the time, and the dative construction 82% of the time. There were no significant differences among any of these proportions (recipient-cueing vs. theme-cueing: $\chi^2 < 0.005$, $df = 1$, $p = 0.95$; recipient-cueing vs. controls: $\chi^2 = 0.11$, $df = 1$, $p = 0.74$; theme-cueing vs. controls: $\chi^2 = 0.01$, $df = 1$, $p = 0.90$).

Existential alternation

Responses that did not use either the locative or existential constructions were excluded. Among the remaining responses, regardless of condition (figure-cueing, scene-cueing, or no-cueing), participants used the locative construction 55% of the time, and the existential construction 45% of the time. Needless to say, there were no significant differences between conditions.

3.3 Discussion

There are several possible reasons why the experiment may have turned up null results. One is that there is genuinely no effect to be found, either because the analyses that were being tested are not valid, or because these analyses were improperly operationalised.

Even if there was an effect to be found, however, there are reasons why the present experiment may have failed to detect the effect. It is possible that the attention-cueing mechanism was too weak (there was a delay of 100msec between the cue and the stimulus, compared to 75msec in Tomlin's design). Additionally, it could be that there was a general constructional bias that was sufficiently strong to completely mask the effect of the perceptual priming. It is not possible to know, with the given data, whether these explanations are correct. However, Myachykov (pers. comm., forthcoming) finds that using a stronger attention-capture mechanism (verified with eye-tracking) still produces null results.

It is well worth considering the possibility that the underlying Cognitive Grammar analyses need to be revised. Indeed, a closer analysis of the linguistic data reveals that notions such as "trajector" and "landmark" are not really necessary for characterising grammatical relations, once one gives a proper account of information structure. An alternative analysis of grammatical relations in Cognitive Grammar will be suggested in §5.3.

Chapter 4

Modes of scanning in finite and non-finite subordinate clauses

4.1 Introduction

This chapter focuses on the distinction drawn in Cognitive Grammar between "sequential scanning" and "summary scanning", which is used to describe the distinction between finite and non-finite clauses in English, as in the following examples:

(19) a. She said he wiped the table. [finite]

b. She watched him wipe the table. [non-finite]

Intuitively speaking, a finite clause is something that can be used on its own as a main clause (Crystal 1997: 427, cited in Evans 2007: 366); in other words something that can be used as a "complete sentence". Clearly, *he wiped the table* can be a complete sentence on its own. By contrast, a non-finite clause must be subordinate; it cannot stand on its own as a complete sentence: **(him) wipe the table* is not a complete sentence on its own.

Langacker (1991: 439–442) describes the distinction between finite clauses and non-finite clauses partly in terms of how the described event is "scanned" or viewed mentally: whether it is viewed as unfolding from start to finish, like a motion picture ("sequential scanning"), or whether it is viewed in a single gestalt, like a multiple-exposure photograph ("summary scanning"). The following subsection explains these notions in greater detail.

4.1.1 Sequential and summary scanning

As mentioned before, in Cognitive Grammar an expression may designate either a thing (a region in a domain) or a relation (a set of interconnections among entities). Relations are further subdivided (Langacker 1987: 220–222) into "stative relations" (those that do not need to be characterised with reference to the passage of time) and "complex relations" (those that incorporate the conception of passing time). For example, in English, adjectives (e.g. *red*) and prepositional phrases (e.g. *under the tree*) profile stative relations, as they do not inherently refer to the passage of time.[1] By contrast, verbs (e.g. *walk*, *sleep*, *understand*), as well as constructions that are built from verbs, generally profile complex relations, as they do include the conception of passing time.[2]

Among complex relations, Langacker (1987: 249) distinguishes between "processes" and "complex atemporal relations", according to whether the time interval in the conceptual base is part of the profile or not. Equivalently, processes and complex atemporal relations are distinguished by whether the relation is "sequentially scanned" through time, or is "summarily scanned".

Langacker (1987: 250–253) explains this distinction as follows: Let

$$\left[\begin{smallmatrix} R/t \\ C \end{smallmatrix}\right]_T$$

represent the conceptualisation, at time T, of a relation R holding at time t, by conceptualiser C. Then the conceptualisation involved in sequential scanning takes the form of the following sequence:

$$\left[\begin{smallmatrix} R_0/t_0 \\ C \end{smallmatrix}\right]_{T_0} > \left[\begin{smallmatrix} R_1/t_1 \\ C \end{smallmatrix}\right]_{T_1} > \left[\begin{smallmatrix} R_2/t_2 \\ C \end{smallmatrix}\right]_{T_2} > \cdots > \left[\begin{smallmatrix} R_n/t_n \\ C \end{smallmatrix}\right]_{T_n}.$$

In other words, at successive moments of processing time ($T_0, T_1, T_2, \ldots, T_n$), the conceptualiser imagines the successive states of the process ($R_0, R_1, R_2, \ldots, R_n$) occurring at successive moments of conceived time ($t_0, t_1, t_2, \ldots, t_n$). In summary scanning, the sequence is of the

[1] If these expressions are used predicatively in a finite clause (e.g., *The ball is {red/under the tree}*), then the conception of passing time is introduced by the finite auxiliary (*is*), and the clause as a whole profiles a complex relation.

[2] This is true even of "imperfective verbs" such as *understand*, which denote a stable state, because this state is conceived as *enduring* over a certain time period.

form

$$[\begin{smallmatrix} R_0/t_0 \\ C \end{smallmatrix}]_{T_0} > [\begin{smallmatrix} R_0/t_0, R_1/t_1 \\ C \end{smallmatrix}]_{T_1} > [\begin{smallmatrix} R_0/t_0, R_1/t_1, R_2/t_2 \\ C \end{smallmatrix}]_{T_2} > \cdots > [\begin{smallmatrix} R_0/t_0, R_1/t_1, R_2/t_2, \ldots, R_n/t_n \\ C \end{smallmatrix}]_{T_n}.$$

In other words, at successive moments of processing time, the conceptualiser *adds* successive states of the process to their overall conceptualisation. That is, each stage of the conceptualisation is *inclusive* of all the previous stages.

How does this relate to finite and non-finite clauses? Langacker (1991: 439–442) claims that non-finite clauses are "ungrounded" (unmarked for tense and modality), and that there is thus no "viewing frame" within which the described event is "immediately accessible for focused observation". He argues that "this focal-point status is necessary for the state-by-state, sequential scanning characteristic of a process"; thus, it follows as a consequence that ungrounded clauses (which, by virtue of lacking tense and modality marking, cannot be main clauses and are hence non-finite) profile an event that is summarily scanned, not sequentially scanned.

Among all the descriptive constructs proposed in Cognitive Grammar, those of sequential and summary scanning have turned out to be the most controversial; Langacker (1987: 253) had already anticipated that the "hard-nosed linguist" would request justification for such constructs, while cautioning that such a request may "embody methodologically unreasonable expectations". Francis (2000: 100) (cited in Taylor 2002: 516) charges that sequential and summary scanning are "highly esoteric concepts for which there could be no counterexamples [*sic*[3]]". Most prominently, Broccias & Hollmann (2007) have questioned whether sequential and summary scanning are even a necessary part of the Cognitive Grammar framework (though see Langacker 2008b for a reply in the affirmative).

There have been few attempts to settle this controversy empirically. There is one unpublished experimental study from before 2007 by Catherine Harris, which attempted to check whether there is a difference in processing time between "verbs which might be scanned summarily or sequentially (under the hypothesis that summary scanning is faster than sequential scanning)" (Broccias & Hollmann 2007: 516). This study did not find any

[3]Strictly speaking, a concept cannot have a counterexample; only hypotheses formulated in terms of a concept can have counterexamples.

conclusive results; however, the exact experimental design has not been published, and it is possible that the study did not correctly operationalise scanning. Also worthy of mention is an unpublished (to my knowledge) study by Kawabata (2011). This was a production study, which found that speakers of Japanese are more likely to describe a still picture using a nominal than using a verb or a clause, whereas they are more likely to describe an animated scene using a verb or clause than using a nominal. On the surface, this seems to support the distinction between sequential scanning and summary scanning (since nouns are necessarily summarily scanned, if indeed they involve scanning at all). However, the distinction between nouns and verbs in Cognitive Grammar is also one of relationality; and further, the study does not address the possibility that when a subject describes a picture using a noun (e.g., *tsuri* 'fishing'), they may actually be producing an clause with an implied verb (e.g., *Tsuri desu* "[This] is fishing"), and thus be using sequential scanning.

Searching for a way to operationalise scanning was not straightforward; the concept of scanning is not used much in the psychology of visual perception. An exception is Kosslyn (1980: 36–52, etc.) (which is in fact cited in Langacker 1987: 5, 110, 136, though in other contexts); however, here it generally refers to the scanning of a static image, and so is not strictly relevant.

A more promising line of inquiry rested on the following observation: In sequential scanning, the conceptualisation at T_n contains only the end state of the event, R_n/t_n, and not any of the initial or medial states. In summary scanning, by contrast, the conceptualisation at T_n contains all states, initial, medial and final, superimposed on top of each other. Given that humans tend to attend to endpoints (Regier & Zheng 2007), this means that after a person has heard a non-finite clause (which involves summary scanning), they would attend to all of the component states of the event described, whereas if they had heard a finite clause (which involves sequential scanning), they would attend to only the final state. A way of checking this would be to measure how quickly the hearer can identify a picture of a medial state after hearing a non-finite versus a finite clause; the reaction time should be shorter in the first case. For final states, there should be no difference in reaction times.

As it happens, a strikingly similar study had already been run by Madden & Zwaan (2003: 666). Here, however, the structures being contrasted were not finite vs. non-finite

clauses, but rather finite clauses in the perfective or imperfective aspect (e.g. *The man made a fire* versus *The man was making a fire*).[4] Nonetheless, the pictorial stimuli were exactly of the kind needed, and these were used in the experiment described in the next section.

4.2 Experiment

4.2.1 Participants

Thirty-seven undergraduate psychology students from the Australian National University (the same ones as in the experiment in the previous chapter) were used as participants;[5] 12 were male and 25 were female. They received course credit for their participation.

4.2.2 Materials

The pictorial stimuli from Madden & Zwaan (2003) (kindly provided by Carol Madden) were used in this study. These consist of two pictures each of 28 different events: one picture of a medial state, and one picture of the final (or near-final) state (see Figures 4.1 and 4.2). There are also 27 fillers (such as Figure 4.3).

For each of the events depicted in the experimental pictures, two sentences were created: one describing the event using a finite subordinate clause, and one describing it using a non-finite subordinate clause. For example, one of the events was of a girl painting a picture; the corresponding sentences were *She said the girl painted a picture.* and *She saw the girl paint a picture.* The matrix clause for a finite subordinate clause was always *She said*, and the matrix clause for a non-finite subordinate clause was always *She saw*.

Each of the filler pictures was associated with a single sentence that had nothing to do with the event or object depicted by the picture. These sentences were again of the form [*She said* [finite clause]] or [*She saw* [non-finite clause]]. (The subordinate clauses here

[4] Madden & Zwaan (2003: 666–667, 668–671) found that subjects respond more quickly to pictures of medial states after reading imperfective clauses than after reading perfective ones; and there is no significant difference in reaction times for final states. While they do not refer to Cognitive Grammar, their results are perfectly consistent with the Cognitive Grammar analysis of perfective and imperfective (or "progressive") aspect (Langacker 1991: 25–26): the imperfectivising morpheme *-ing* "construes [the] states [of the process] at a level of abstraction that neutralizes their differences", thus making the medial states just as accessible as the final state at the end of the sequential scanning entailed by the clause.

[5] The author is indebted to Evan Kidd for his guidance, and for providing access to lab space, equipment (including software) and participants.

Figure 4.1: Picture of a medial state: “painting”.

Figure 4.2: Picture of a final state: “painted”.

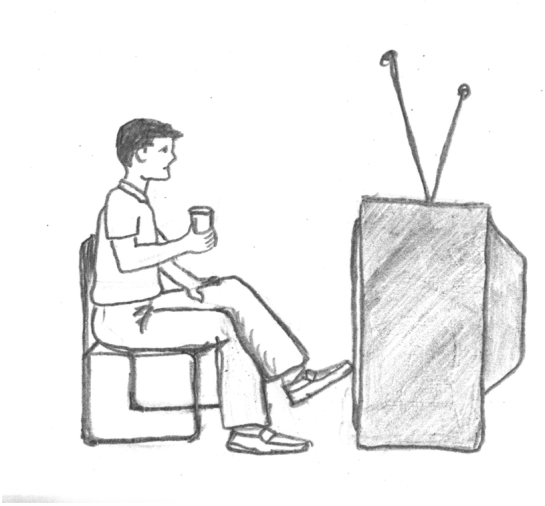


Figure 4.3: Filler: “watching TV”.

were based on the filler sentences in the experiments reported in Madden & Zwaan 2003.)

4.2.3 Procedure

Participants were tested individually, seated in front of a computer running E-Prime. The “D“ and “K“ keys on the keyboard had been labeled as “Yes“ and “No“, respectively, and participants were instructed to rest their index fingers on these keys, so that they could respond as quickly as possible. They saw the following instructions on the screen:

> In each of the following screens, you will see a sentence, part of which is underlined.
>
> Read the sentence, then press the spacebar. The sentence will disappear, and you will see a picture.
>
> You need to decide, as quickly as possible, whether the picture matches the *underlined portion* of the sentence.
>
> Use the marked “Yes” and “No” keys to indicate your response.
>
> When you are ready to begin, press the spacebar.

Participants were then orally reminded to respond as quickly as possible while being accurate; and they were requested to read the sentences out loud, to ensure that they were processing the sentences fully, and not simply glancing at the main verb of the subordinate clause.

This was followed by 28 blocks of 2 trials each. Each block contained one experimental trial, and one filler (in a random order). Each trial had the following structure:

1. The fixation cue ***READY*** was shown in the centre of the screen for 1 second;
2. The sentence (with the subordinate clause underlined) was shown until the participant pressed the spacebar, or until 10 seconds had passed (whichever was earlier);
3. The picture was shown until the participant pressed Yes or No (D or K) to indicate their response. Their reaction time was recorded.[6] The correct answer for experimental trials was always "Yes" (D), and the correct answer for fillers was always "No" (K).

For the experimental trials an event was chosen at random (without replacement) from amongst the 28, and the sentence-picture pair was chosen at random from four possibilities:

1. The sentence has a finite subordinate clause, and the picture depicts a final (or near-final) state;
2. The sentence has a finite subordinate clause, and the picture depicts a medial state;
3. The sentence has a non-finite subordinate clause, and the picture depicts a final state;
4. The sentence has a non-finite subordinate clause, and the picture depicts a medial state.

Recall that the prediction is that reaction times will be lower for Condition 1 (finite, final) than for Condition 2 (finite, medial), but there will not be any difference in reaction times between Conditions 3 and 4 (non-finite, final/medial). A secondary prediction is that the reaction times will be the same for Condition 1 (finite, final) as for Conditions 3 and 4 (non-finite).

For the filler trials, a filler was chosen at random (without replacement) from among the 28 (there were only 27 filler pictures, but one of them was duplicated in order to equalise the

[6]The reader may wonder why a computer keyboard was used, rather than a serial response box, which would allow for more accurate reaction-time measurements. Given that reaction times were being compared across conditions, and that the absolute reaction times were not of interest, it did not seem to matter if the computer keyboard introduced a uniform delay in the measurements. (Thanks to Evan Kidd for his advice regarding this.)

Table 4.1: Average reaction times.

	Finite	Non-finite
Final state	792.50	798.50
Medial state	835.04	675.65

numbers of experimental and filler trials). Each filler consisted of a unique sentence-picture pair. There were no predictions concerning reaction times for the fillers.

4.2.4 Results

Only "Yes" responses from the experimental trials were analysed. The averaged reaction times were as given in Table 4.1.

There was no significant difference in reaction times for finite clauses between final-state and medial-state pictures, owing to the huge standard deviations (237.617 for the final-state condition, and 414.815 for the medial-state condition). There was no significant difference in reaction times for non-finite clauses either (again owing to similarly huge standard deviations).

It is interesting to note that there is a (non-significant) trend in the predicted direction, in that the difference in reaction times is greater for finite clauses than for non-finite clauses, and that for finite clauses, it is the final-state pictures that lead to lower reaction times. Unfortunately, nothing can be securely concluded from this.

4.3 Discussion

There are a number of reasons why this experiment may have produced a null result. A closer look at the experimental result reveals that while overall, each of the four conditions was presented almost equally often, there were huge differences between participants. In other words, some participants saw hardly any trials in Condition 1, whereas others had most of their trials in Condition 1 (and likewise for the other conditions). This was due to the fact that conditions were assigned to trials in a random manner. It would have been better if conditions had been assigned in a cyclic fashion, so that each participant saw each of the four conditions roughly the same number of times.

It is possible that there were simply not enough participants in the study to obtain a significant effect. A power analysis was conducted to determine how many participants would be required to obtain a significant effect of the observed size. The result was that roughly 500 participants would have been required to get a significant effect of size 0.1351, which is what was observed. Given the tiny size of this effect, it seems unlikely that there is any effect of interest to be found.

4.4 Conclusions

Similarly to the previous chapter, we are forced to conclude that there is no clear support for the Cognitive Grammar analysis of finite and non-finite clauses in English. This suggests that we should seriously consider the possibility that sequential and summary scanning may in fact not be necessary in Cognitive Grammar.

Indeed, all of the relevant distinctions in English grammar can be captured using other available constructs; in particular, all that is needed to characterise a non-finite clause is the fact that it is not grounded (i.e., not "anchored" to the here-and-now by means of tense and modality).

While this chapter has only considered the use of modes of scanning to analyse the finite/non-finite distinction, the notion of scanning is also used in Cognitive Grammar to analyse fictive motion (e.g., *The roof slopes steeply upward*; Langacker 2002: 157), as well as certain quantifiers (e.g., *a few politicians* vs. *few politicians*; Langacker 2010d: 76). Any suggested alternative to scanning will also have to account for these phenomena.

Part II

An alternative construal of Cognitive Grammar

Chapter 5

Theoretical prerequisites

In the preceding chapters, I have considered three major descriptive constructs of Cognitive Grammar, namely profile determinacy, focal prominence, and mode of scanning. I have tried to test whether descriptions of grammatical phenomena using these constructs are indeed psychologically real. In every case, the results have been at best inconclusive.

Thus, the only conclusion that can safely be drawn from this research is that operationalising Cognitive Grammar is difficult—a point that has already been made repeatedly by Langacker (1991, 2008b), etc., as well as Langacker (p.c.). However, this research does raise the question of whether such hard-to-operationalise descriptive constructs are needed in Cognitive Grammar in the first place, and whether Cognitive Grammar itself could be simplified so that it only requires the use of descriptive constructs that are known to be straightforwardly operationalisable. In this chapter and the next, I propose such a simplification. As we shall see, it requires fundamental revisions to the framework.

Revising any theoretical framework is a daunting and risky business; but this is especially so in the case of Cognitive Grammar, which was initially developed over the span of a decade (1976 to 1987; see Langacker 2008a: vii), and has subsequently remained remarkably stable in comparison to other grammatical frameworks.[1] Any adjustment of the framework, then, would need to be able to convincingly describe four decades' worth of descriptive phenomena. Accordingly, what follows should be understood not as a challenge to the existing research tradition, but simply as an exploration of what a simpler, more

[1] Langacker (2002: x): "To paraphrase a bumper sticker, there was no need [for Cognitive Grammar] to be born again since it was born OK the first time."

easily-operationalisable Cognitive Grammar might look like.

This chapter presents the basic concepts of the proposed framework, motivating them using illustrative analyses. Along the way, it highlights major departures from (existing) Cognitive Grammar, giving special attention to finite complementation (which was treated in Chapter 2), the ditransitive/dative and locative/existential alternations (treated in Chapter 3), and the distinction between finite and non-finite complements of perception verbs (Chapter 4). The next chapter focuses on showing that the proposed framework achieves reasonable descriptive coverage, examining a wide variety of grammatical phenomena (mostly from English).

5.1 Preliminaries

Since the proposed framework departs radically in many ways from standard Cognitive Grammar, it is important to state clearly at the outset which aspects of the latter are retained—i.e., what makes the current proposal an "*alternate construal* of Cognitive Grammar", rather than an entirely separate framework. As noted in §1.2.1 (p. 9), the core tenet of Cognitive Grammar is the "Content Requirement", which is as follows (Langacker 1987: 53–54):

> [T]he only structures permitted in the grammar of a language…are
>
> 1. phonological, semantic, or symbolic structures that actually occur in linguistic expressions;
> 2. schemas for such structures;
> 3. categorizing relationships involving the elements in (1) and (2).

In Cognitive Grammar, every descriptive construct and grammatical analysis is evaluated against this standard; it is thus frequently and prominently invoked.[2] Accordingly, the Content Requirement forms the conceptual bedrock for the proposed revision.

Part 1 of the Content Requirement raises the question of what "semantic structure" consists of.[3] According to Langacker (2008a: 43), "meaning consists of both conceptual **content**

[2]Indeed, sometimes to humorous effect, e.g. Langacker (1991: 183): "This practice [of using contentless diacritics to represent the grammatical gender of nouns] is in any event illegal in cognitive grammar, even among consenting linguists, because the content requirement proscribes the use of artificial devices…".

[3]Phonological structure is less commonly discussed in the framework of Cognitive Grammar, but is comparat-

and a particular way of **construing** that content [emphasis in original]". I have introduced the terms "conceptual content" and "construal" in §1.2.2; the following reviews and elaborates on the discussion there.

The conceptual content of a linguistic expression is the set of entities that are called to mind by the use of that expression. Cognitive linguistics in general views meaning in terms of simulation or mental models (Barsalou 1999; Johnson-Laird 1983; Zwaan 2015); a hearer typically understands a piece of discourse by imagining the objects or situations described, going through the same mental operations that are involved in actually perceiving or experiencing those objects or situations (though with lower intensity). In these terms, the conceptual content of an expression is simply the set of (imagined) entities that are part of the simulation or mental model invoked by that expression. To give an example (from Croft & Cruse 2004: 14–15): the words *circle* and *radius* both invoke the mental model of a circle which necessarily has a constant radius, and thus these two words have the same conceptual content; equivalently, it is impossible to imagine a circle that doesn't have a radius, or a radius that isn't (at least potentially) part of a circle.

Here, let me note that this example is slightly more complicated than suggested by Croft & Cruse (2004: 14–15). In general, there are often multiple ways of imagining an entity, which differ in terms of which other entities are part of the simulation (and hence part of the conceptual content). There are usually some entities that are *obligatorily* part of the simulation, and others that *may* be part of it, but which the simulation must always "leave space for". Applying this to *circle* versus *radius*, we see that, while it's not possible to imagine a circle that doesn't have a radius, it is possible to imagine a circle without also imagining the radius (not imagining the radius doesn't imply that the radius doesn't exist); thus, *circle* may include a radius as part of its conceptual content, but does not have to (though one must always "leave space for" imagining a radius). On the other hand, it

ively easy to describe; see Taylor (2002: 143–163, 243–262), Nesset (2008), and Uehara & Kumashiro (2007) for examples of Cognitive Grammar approaches to phonology. The important point for what follows is that the phonological structures that are relevant for grammar—in particular, those that are capable of being associated with meaning—are the "phonologically free" levels of the prosodic hierarchy, i.e. constituents from the phonological word upwards. This is strongly suggested by the analysis of the plural suffix *-s* (in the context of *tables*) in Langacker (1987: 337–338): "The actual phonological structure of this morpheme includes more than just [z]: it consists of [z] embedded as an integral part of the syllabic organization of a schematic stem.... This morpheme is a natural phonological constituent...and this may be true in general". In other words, it is not the segment constituting the suffix that bears the meaning of plurality, but rather the word-pattern created by the suffix. With regard to symbolic structure, see Verhagen (2009) for some important refinements to the standard Cognitive Grammar treatment.

does seem impossible to imagine a radius without also imagining the circle that it serves to define (otherwise, one merely has a line segment); if so, then *radius* necessarily includes a circle as part of its conceptual content. Linguistically, this is reflected in the fact that the noun *radius* is obligatorily possessed with a circle as possessor (e.g., one can't say *# I drew a radius* without having previously mentioned a circle), whereas *circle* is not obligatorily possessed (*I drew a circle* is fine even if one hasn't mentioned the radius).

Conceptual content is by itself insufficient for an adequate characterisation of linguistic meaning; for example, it provides no way of distinguishing between the members of complementary pairs such as *parent/child* and *husband/wife*. These distinctions can only be captured by some notion of "construal"—i.e., by positing that some parts of a simulation or mental model are somehow more "salient" than other parts.

For example, the difference between the meanings of *husband* and *wife* lies in the choice of which part of the simulation (viz. a married couple) is "designated" by the expression, or equivalently, which part is "in profile". Likewise, the prepositions *above* and *below*, though they may have the same conceptual content (two vertically-aligned and separated objects) and profile (the spatial relation between them), differ in terms of which entity is selected as the "primary focal participant" or "trajector" (Langacker 2008a: 71).[4]

Profiling and focal prominence are only two of the many kinds of "construal" or "salience" that are appealed to in Cognitive Grammar; Croft & Cruse (2004: §3.2) list thirteen in total. But it is far from clear how these various types of construal are related: the relation between profile and trajector, discussed since Langacker (1987: 187–188), continues to be an active topic of research (Langacker p.c.). If every proposed type of construal is maintained to be conceptually distinct, then this poses a significant practical problem for operationalisation: one would not only have to find a different way of operationalising each type of construal, but also test that all of these operationalisations capture distinct phenomena. This is deeply problematic; although psychologists use a number of techniques for operationalising salience (including the ones illustrated in previous chapters), it is far from clear how many *independent concepts* of salience these are capable of operationalising.[5] Thus,

[4]Later in this chapter, it will become clear that in the present framework, the prepositions *above* and *below*—or more precisely, prepositional phrases of the form [*above* NP] and [*below* NP]—do not in fact profile the same entities; i.e. profiling is sufficient to account for the semantic difference.

[5]Schmidt (1991), for example, suggests four categories of "distinctiveness", whereas Pattabhiraman (1992) uses only two.

from the perspective of both theoretical elegance as well as practical testability, it is desirable to reduce as far as possible the number of different kinds of construal or salience that are used in Cognitive Grammar. (See Kalyan 2011 for an early—and highly flawed—attempt at doing this.)

The present proposal takes the reduction of types of salience to its logical extreme, positing just a *single* type of salience. This is the type of salience that is at issue when a discourse referent is said to be "active", "accessible", "given", or "evoked" at a certain point in a discourse (Ariel 1990; Chafe 1994; Givón 1984; Prince 1981). As will be seen below, profile and trajector may be defined in terms of the entities that are "textually evoked" (as opposed to "environmentally evoked"; Prince 1981: 236) by a particular expression, or which are presupposed as being evoked by the preceding discourse (including the current utterance). It may well turn out that this approach is impracticably minimalistic; but it is still worthwhile to see how much can be accomplished by it.

A major advantage to basing the description of semantic structure on evocation (the term that I will be using henceforth, in the tradition of Prince 1981) is that this notion can already be operationalised in a simple, intuitive way that does not require the use of sophisticated experimental techniques: namely, through the use of anaphoric or demonstrative nominals, or noun phrases with reduced stress. To check whether, at a given point in a discourse, a certain entity has been evoked or not, it suffices to test whether that entity can be felicitously referred to with *he*, *she* or *it*, *this* or *that*, [*the* N], [*that* N], or [N̆P] (or the equivalents in whatever language is under study).[6]

Intuitions about the felicity of anaphora or demonstratives seem to be fairly robust, in the sense that linguists' intuitions match naïve speakers' intuitions (even for examples involving "backwards anaphora"; see Kazanina et al. 2007; Phillips 2009). Moreover, psycholinguists have developed a number of techniques for investigating the activation of referents and the resolution of anaphora in real time, such as the visual-world paradigm (e.g. Pyykkönen 2009) and cross-modal priming (e.g. Shillcock 1982). It should thus be possible

[6] As the reader might expect, there are subtle differences in the conditions under which these various expressions can be used. In particular, phonologically-reduced (clitic) pronouns seem to be used when the antecedent expression is unstressed (i.e. when the antecedent referent has been mentioned at least twice before), whereas phonologically free expressions are used when the antecedent introduced its referent into the discourse for the first time. (See Lambrecht 1994: 204 for a similar analysis of the distinction between the German *er*-series and *der*-series of pronouns, though here the distinction is not explicitly drawn in phonological terms.)

to make analyses of grammatical phenomena in terms of activation/evocation psychologically testable without extensive methodological innovation.

Many linguistic expressions textually evoke more than one entity; and usually, some of these entities are characterised in terms of others (i.e., some contain others within their conceptual content). I will define the "outermost" evoked entities—those that are not contained within the conceptual content of any other textually-evoked entity—as constituting the "profile" of the expression.

In addition to conceptual content and construal, there is one further notion that is necessary for the description of semantic structure, namely the "grounding" of evoked entities. Any entity that a speaker evokes as a discourse referent has to be situated with respect to the common ground[7], so that the hearer knows whether the entity needs to be added to his or her knowledge of the world, or whether it suffices to search for the entity within his or her existing knowledge. In other words, any discourse referent has to be marked by the speaker as either "hearer-old" or "hearer-new"; see Prince (1992: 6). In addition, the speaker needs to specify whether the entity can be *uniquely* located in the common ground on the basis of the provided conceptual content; in other words, the entity must be marked as "identifiable" or "non-identifiable" (Chafe 1994: 93 ff.).

To summarise: in addition to the Content Requirement, the following constraint is proposed:

> The semantic structure of any linguistic expression consists of the following three components:[8]

[7] Actually, it has been claimed that Salishan languages such as St'át'imcets do not make any reference to the "common ground" in their grammars, and thus lack such things as definite pronouns (Matthewson 2008). However, closer examination of the data seems to reveal that there is simply a cultural assumption in these communities that the common ground is the same as the speaker's knowledge; in other words, in these languages, the speaker can presuppose anything they like, and the hearer will simply be expected to accommodate this presupposition.

[8] Note that not all linguistic expressions have a semantic structure. In particular:

1. Some expressions are merely "exponents" of a larger construction (in the sense of Booij 2005: 116); I would argue that this is the case for determiners (e.g. *some*, *these*), auxiliaries (e.g. *might*), and most verbs (e.g. *gave*).
2. Phatic utterances such as *Hello* or *Thank you* often do not textually evoke any entities. They may evoke the utterance itself (as in *Thank you!—Oh, you don't need to say <u>that</u>* [= the utterance *Thank you*])—but this obviously cannot be *part* of the semantic structure of the utterance. In other words, this entity is *environmentally* evoked. Occasionally, phatic utterances can indeed textually evoke an entity (as in *Thank you so much!—Yes, I know <u>that</u>* [= the fact that you're grateful to me]); but this requires some "extra effort" on the part of the speaker and/or hearer to construe the utterance as being intended to convey information—and thus, this is probably not the usual case.

1. Entities that are textually evoked by the expression (or presupposed as being textually or environmentally evoked in the discourse up to and including the current utterance)—the "outermost" such entities constitute the **profile**;
2. All entities that are entailed by (or obligatorily simulated with) the above, whether or not these entities are themselves evoked—i.e. the expression's **conceptual content**;
3. Situation of each evoked entity with respect to the speech-act participants' common ground, on the basis of the provided conceptual content—i.e. **grounding** of these evoked entities.

The above constraint in conjunction with the Content Requirement will henceforth be called the **Extended Content Requirement**.

The remainder of this chapter introduces some of the novel analyses that are necessitated by the adoption of the Extended Content Requirement; these analyses often differ considerably from the standard ones.[9] A more systematic overview of the grammatical structures of English is deferred until the next chapter; here, I begin with the analysis of profiling, and then consider other major topics such as focal prominence (trajector/landmark alignment), information structure (topic and focus), and sanctioning (judgments of well-formedness).

5.2 Profiling

This section explores the consequences of defining the profile of an expression as the "outermost" textually-evoked entity or entities. It examines in turn each of the major types of syntactic constituents in English, analysing in each case which entities are textually evoked,

3. Intonation units of the sort that are termed "regulatory" (as opposed to "substantive") by Chafe (1994: 63–64)—i.e. expressions such as *well*, *in fact*, *by the way*, etc. that aren't part of any utterance, but merely serve to rhetorically situate an adjacent utterance—often do not textually evoke any entities. A few may—e.g. *unfortunately*, *according to NP*, etc.—but these are probably in the minority.

Another caveat is that there is actually one further aspect of semantic structure, which just happens to be of limited relevance for English: namely, the *grammatical gender* of the expression (or more precisely, the "target gender", following the terminology in Corbett 1991: 45–47, 150–160). This will not be discussed further in this thesis.

[9] On the other hand, some of the analyses will be seen to be reminiscent of—and in some cases inspired by—HPSG, Role and Reference Grammar, Systemic-Functional Grammar, and other frameworks.

and which of the evoked entities are entailed by (i.e. contained in the conceptual content of) which others. Along the way, I revisit the phenomena considered in Chapters 2–4, and propose analyses that might be easier to operationalise.

It is important to note that at this stage, I will be using the traditional labels for various types of syntactic constituents ("noun phrase", "prepositional phrase", etc.) purely for convenience; I do not ascribe any theoretical status to these constructs (and do not claim that they can necessarily be given consistent definitions under the current framework). The next chapter will tackle the issue of defining syntactic constituents in a manner that is consistent with the Extended Content Requirement.

5.2.1 Noun phrases

Many noun phrases are used to designate entities in the real world, which can (in principle) be pointed at or otherwise identified; such nominals are called "referring expressions" (Lyons 1977: 23). In these cases, it is intuitively obvious that the real-world referent is textually evoked, becoming available as the target of anaphora.[10] This can be seen with the noun phrase "Walter Simpson" in the following example from Chafe (1994: 78; indexing added):

(20) a Well,
b then he talked to that … [Wàlter Símpson]$_i$ and,
c … he$_i$ knóws Càts [*i.e. "Caterpillar"-brand tractors*].
d .. He$_i$ used to hàve a Cát,
e right now he works on … Dètroit éngines.[11]

Many noun phrases, however, are non-referring: for example, the nonspecific indefinite noun phrase in a sentence like *Ollie hopes to marry a blonde* (Langacker 1991: 103), which does not designate any particular, identifiable person. This may seem to pose a problem for the idea that a meaningful unit always textually evokes one or more entities, as it looks as though the entity designated by the noun phrase is not available as the target of anaphora:

[10] Plural noun phrases will of course evoke multiple entities. This is left aside in what follows, but will be picked up again in the next chapter.

[11] Indications of stress in this example have been reproduced exactly from Chafe (1994); however, the indication of primary and secondary stress in lines d and e seems to be backwards. It is almost certainly *háve a Càt* and *Détroit èngines*.

the sentence cannot be followed by *She is rich* without forcing *a blonde* to be read as a *specific* indefinite ("a certain blonde").

However, this problem is only apparent, and disappears once we take into account the rôle of mental spaces (see Langacker 1991: 104–105). The predicate *hope* makes reference to a mental space consisting of the situation that the subject hopes to bring about, but which has not yet been realised; in this case, the situation of the subject (Ollie) marrying a blonde. Crucially, the referent of *a blonde* exists *only* in this mental space. Thus, only an anaphor in the same mental space can refer to it. For example, the sentence could be followed by *She* ***should*** *be rich, too*, where the modal *should* places the entire conceptual content of the clause in the mental space of unrealised ideals.

Another kind of "non-referring" noun phrase is a predicate nominal, which again does not seem to be capable of serving as the antecedent of an anaphor.

(21) I'm a linguist$_i$. *He$_i$ says strange things.

Again, the problem is only apparent: the predicate nominal does not refer to any particular linguist (as the grammaticality judgment above would presuppose), but rather evokes a *type of person* known as a "linguist". An anaphor can certainly refer to this type:[12]

(22) a. I'm a linguist$_i$. It$_i$'s someone who studies language scientifically.

b. I'm a policeman$_i$.—That$_i$'s the kind of person we need more of around here!

c. That's a lion$_i$. It$_i$'s one of the (kinds of) animals I'm afraid of.

Thus, to summarise the above: a noun phrase textually evokes the entity that it is intuitively understood to designate or refer to. Moreover, if this is the only entity that is evoked by the noun phrase, then this entity is by default the "outermost" one, and is hence the profile.

However, not all noun phrases evoke just the referent: some may evoke a type as well as an instance, and some may also evoke the set of all entities belonging to that type (i.e. the "reference mass" or "maximal extension of the type specification": Langacker 1991: 82). Consider the following examples:

(23) I just got a bread machine. [singular count noun]

[12]Note that the anaphor must be inanimate (*it* or *that*): in the first two examples, it would be unacceptable to use *he* or *she*. This is what we would expect given that the anaphor refers to a type, rather than a person.

a. Have you used it [= the bread machine] yet? [instance]

b. It [= a bread machine] is something I've been wanting to get for some time. [type]

c. Aren't they [= bread machines] a bit expensive? [reference mass]

(24) He gave her some floppy disks. [plural count noun]

a. They [= the floppy disks] were badly corrupted. [instance]

b. That [= some floppy disks] is apparently what she wanted for her birthday.[type]

c. Those [= floppy disks] are apparently still used at his company.[reference mass]

(25) Here's some milk. [mass noun]

a. It [= the milk] has been pasteurised. [instance]

b. That [= some milk] is what you usually have at this time, right? [type]

c. It [= milk] is good for you, you know. [reference mass]

A predicate nominal may also evoke a reference mass (in addition to a type):

(26) That's a kangaroo$_i$. They$_i$ [= kangaroos] are everywhere these days. [reference mass]

A noun phrase may also evoke other entities, if it has another constituent (e.g. a prepositional phrase) embedded inside it:

(27) The football [under the table]$_i$ is mine. In fact, EVERYTHING there$_i$ is mine.

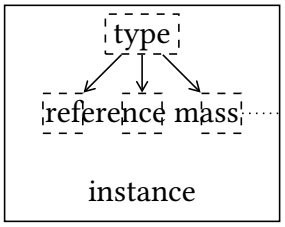
In general, it isn't possible to predict, based purely on formal properties, whether a noun phrase evokes a type or reference mass in addition to an instance. Rather, it is a matter of what the speaker wishes to draw attention to: whether the speaker wishes to present an entity as a representative of a category, or simply to talk about the entity without relating it to anything broader. Impressionistically, a type or reference mass is more likely to be evoked if the category they represent is somehow "unusual" (as with the category of floppy disks these days), or perhaps if the category is a subordinate-level category (e.g. *greyhound*), rather than basic-level (*dog*) or superordinate-level (*animal*; Mervis & Rosch 1981). Such claims can easily be tested experimentally.

A good heuristic, however, is to test whether the noun phrase can be paraphrased by one that includes a generic plural which explicitly profiles the reference mass, or includes a

generic indefinite that profiles a type. Thus, in the examples above, *a bread machine* could be paraphrased as *one of those "bread machines"* or *something known as a "bread machine"*, and *a kangaroo* could be paraphrased as *one of those "kangaroos"*.

A final point is that in these cases, the instance contains the type and reference mass in its conceptual content (since it is explicitly characterised as an instance of the type and a member of the reference mass), but the type and reference mass do not contain the instance in their conceptual content (since these are characterised independently of the instance); this is particularly obvious in the above paraphrases. For this reason, it is the instance that is the "outermost" evoked entity, and hence the profile.

To summarise this subsection: **a (simple) noun phrase profiles the entity that it intuitively refers to, and may additionally evoke a type and the set of entities belonging to this type (the "reference mass")**. This may be expressed diagrammatically as follows:[13]



Here, the arrows indicate that every member of the reference mass is an instance of the type, and the dotted line indicates that the profiled instance is a member of the reference mass.

5.2.2 Prepositional phrases

In Cognitive Grammar, a prepositional phrase[14] is taken to profile a stative relation between two things. Thus, the profile of *above the tree* is a particular spatial relation holding between a schematically-characterised thing and a tree (Langacker 1987: 467). In addition, the entities that are directly involved in the relation (the trajector and landmark) are considered to be part of the relational profile (Langacker 1987: 215).

[13] The diagram illustrates the case of a "count noun", where the reference mass consists of multiple, distinct entities (only three are shown, for simplicity). If the instance is a mass, then the reference mass will consist of just a single entity, namely the universal mass (e.g. the universal mass of "milk").

[14] For full typological generality, this subsection should be titled "adpositional phrases", to accommodate languages which have postpositions rather than prepositions. Here "prepositional" is used because it is a more familiar term, and because our examples come from English.

At a low level, a relation is defined in terms of an array of "comparison events" (Langacker 1987: 222–228, 237–242); however, it is still not entirely clear in Langacker's framework exactly what kind of discourse referent a relation constitutes, and how one would anaphorically refer to a relation (as opposed to some reification of it). This makes it problematic to empirically test whether a given linguistic expression profiles a relation in Langacker's sense.

We can observe that a prepositional phrase generally evokes a *location* (also known as a "search domain"; see Langacker 1987: 286, ultimately following G. A. Miller & Johnson-Laird 1976: 44 etc.):

(28) I just saw some mice [under the dining table]$_i$.—No wonder; it's quite messy there$_i$!

In some cases, the landmark (the object with respect to which the location or search domain is defined) may also be evoked:

(29) There's a bee [inside [my shirt]$_i$].—Take it$_i$ off, then!

However, this is not always the case:

(30) Today the children went [to school]$_i$.

a. They'll learn many useful things there$_i$. [location]

b. # <u>It</u> [= the school] has an indoor swimming pool.[15] [landmark]

Again, whether the landmark is evoked or not cannot be predicted from the form of the prepositional phrase, but is rather partly a matter of what the speaker wishes to draw attention to (or what the hearer infers that the speaker wishes to draw attention to). Contrary to what might be expected from Langacker's analysis, the trajector (the referent of *some mice*, *a bee*, or *the children* in the above examples) is not evoked by the prepositional phrase, as the conceptual content of the trajector is nowhere to be found within that of the prepositional phrase.

It seems clear that, when a prepositional phrase evokes both a location and a landmark, the location contains the landmark in its conceptual content (since it is explicitly defined with respect to the landmark), but the landmark does not contain the location in its conceptual content (since the landmark is independently defined). Thus, it is the location that is the

[15] But cf. *Today our children went to [the new junior high school]$_i$. It$_i$ has an indoor swimming pool.*

"outermost" evoked entity, and hence the profile (this can also be seen from the constituent structure of the prepositional phrase).

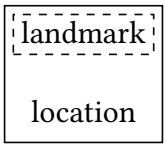
The above concerns spatial (and also temporal) prepositional phrases, which are usually taken as a model for analysing more abstract prepositional phrases such as those involving *to*, *of*, *for*, etc. Langacker (1991: 404), in particular, suggests that both abstract and spatial/temporal prepositional phrases can be analysed as profiling a relation between two things. However, this equivalence is less plausible in the present framework: if it were indeed the case that abstract prepositional phrases are to be analysed analogously to locational ones, then we would expect that a phrase such as *for his mother* would evoke some sort of "location" or "search domain", perhaps in addition to the referent of *his mother*. Yet it is very hard to imagine what such a "location" would be; and in fact the only entity that is made subsequently available as a discourse referent is the "landmark" ('his mother'). This strongly suggests that it is in fact the latter that is the profile of the "prepositional phrase", and consequently, that what we are dealing with is effectively a case-marked noun phrase.

This is not an unprecedented analysis: Van Eynde (2000), in the framework of HPSG, argues that so-called "case-marking prepositions" do not contribute any "content" to the prepositional phrases of which they are the (syntactic) head, and that their complement is in fact the "semantic head" of the prepositional phrase. In other words, what are conventionally thought of as "prepositional phrases" are not all alike; some have a semantic value over and above that of the preposition's complement, whereas others are simply case-marked NPs. (See Matlock 2004: ch. 3 for a very similar analysis in the framework of mainstream generative grammar.) This possibility has not so far been raised in the framework of Cognitive Grammar, but is strongly motivated by an analysis of profiling in terms of textual evocation.

An obvious question that remains is that of how to distinguish between different abstract/case-marking "prepositional phrases", or between a case-marking "PP" and an NP that isn't (overtly) case-marked. In other words, how is a speaker to know (e.g.) that *He baked a cake for her* means something different from *He baked a cake with her*, if *for her* and *with her* have the same profile? A full answer will have to wait until the next chapter; but in brief, the difference lies not in the semantics of the prepositional phrases themselves (much

less that of the syllables *for* and *with*), but rather in that of clause-level constructions of the form (e.g.) [Sbj [V Obj [for…]$_{Obj}$]$_{Pred}$]$_{S}$ vs. [Sbj [V Obj [with…]$_{Obj}$]$_{Pred}$]$_{S}$;[16] each of these constructions entails different sorts of semantic relations between the entity profiled by the prepositional phrase and the other entities evoked by the clause.

To summarise this subsection: **a spatial (or temporal) prepositional phrase profiles a location, and may also evoke the landmark**; **an abstract "prepositional phrase" profiles the "landmark", and is better thought of as a case-marked NP**. The first of these statements may be expressed diagrammatically as follows:



5.2.3 Finite clauses

In Cognitive Grammar, a finite clause is taken to profile a "process", which is defined as a relation with a "positive temporal profile", i.e. which is "sequentially scanned" (Langacker 1987: 244). I have already noted the difficulties with the notion of "relation", and in Chapter 4, have raised questions concerning the validity and necessity of the notion of "scanning". Thus, a different approach is required for defining the profile of a finite clause.

If we look at the entities evoked by a declarative finite clause, we find the following:

1. The actants and circumstants[17] of the clause (if any, as well as whatever evoked entities are conceptually contained within the actants and circumstants);

2. an eventuality-type, i.e. a type of state/activity/accomplishment/achievement/etc. (see e.g. Vendler 1957);

3. (optionally) a higher-order eventuality-type, or generalisation of the (lower-order) eventuality-type, with one of the arguments "blanked out";

4. a state of affairs or "fact", i.e. the (present) state of the world that corresponds to the specified instantiation of the lower-order eventuality-type.

[16] The notational conventions here will be given precise definitions later in this chapter and in the next.

[17] Following e.g. Lazard (2015: 114), and in the tradition of Tesnière (1959), I use "actant" and "circumstant" instead of "argument" and "adjunct", to make it clear that I am talking about entities within the semantic structure of the clause; the terms "argument" and "adjunct" will be reserved for those constituents of the clause which profile actants and circumstants, respectively.

In addition, a finite clause may *environmentally* evoke an "utterance" or "attitudinal object" (Moltmann 2014), in other words, the product (in the sense of Twardowski 1911) of the speech act that the speaker is performing. This may be a statement, question, command, etc.

The entities just mentioned may be illustrated as follows (based on Langacker 1991: 32):[18]

(31) Harvey taunted the bear last Tuesday.

a. Why did he do that?/Did it get angry? [actants]

b. That [= last Tuesday] wasn't a good day for trying such pranks! [circumstant]

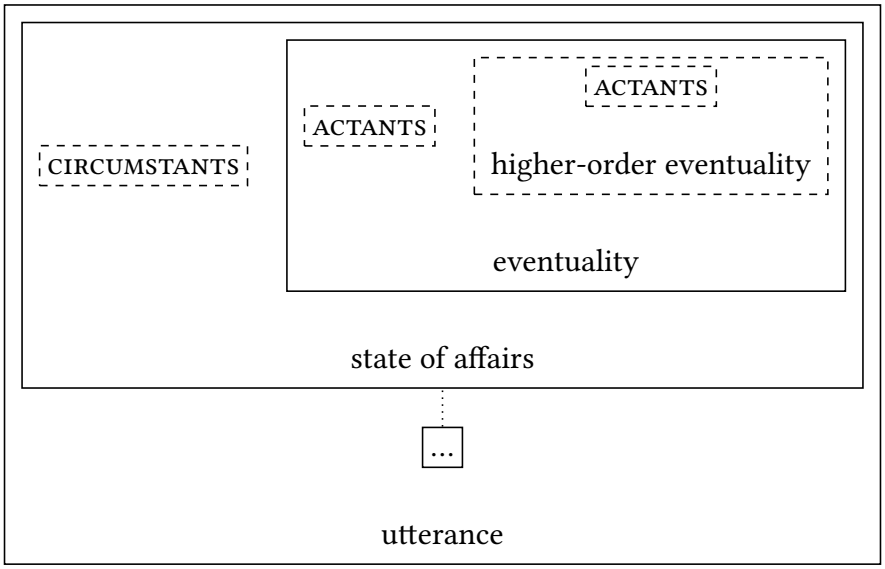
c. It [= him taunting the bear] doesn't happen very often. [eventuality-type]

d. I thought that [= taunting the bear] is strictly forbidden! [higher-order eventuality-type]

e. That [= (the fact) that he taunted the bear last Tuesday] surprises me. [state of affairs]

f. That [= the statement that he taunted the bear last Tuesday] is a bit misleading—he just provoked it slightly. [utterance]

From this, it is possible to see that the entities evoked by the clause are related as follows: (In later diagrams, the environmentally evoked entity—the utterance—will often be omitted for simplicity.)



[18]For examples of finite clauses that do not evoke a higher-order eventuality, see the §5.5.2 below on the thetic/categorical distinction.

(The small caps indicate the fact that "actant" and "circumstant" are not *types* of entities, in the way that eventualities and states of affairs are; rather, they are labels for *structural rôles* in the above semantic configuration. See Chomsky 1969: 69 ff. for similar comments.) Thus, the state of affairs is clearly what is profiled by the clause.

The various kinds of abstract entities that a finite clause might evoke can be (a) identified with different kinds of clause nominalisations (as shown by the glosses of *it* and *that* in square brackets above), and (b) distinguished from each other in terms of what sorts of predicates can apply to them. In particular:

- An eventuality usually corresponds to a "gerundive nominalisation" with or without a subject (Heyvaert 2008; Quirk et al. 1985: 1064 etc.)—e.g. [NP V-ing NP], [NP's V-ing NP],[19] or [V-ing NP]. In the case of a real (as opposed to hypothetical) eventuality, it may correspond to an "ing_{of}" nominalisation (e.g. [NP's V-ing of NP]). An eventuality has properties that depend on its aspectual class. For example:
  - An achievement (i.e. a punctual event, e.g. 'the furnace exploding') can *happen*.
  - An accomplishment (e.g. 'Mary taking a shower') can *take* a certain amount of time.
  - A process (activity or accomplishment, e.g. 'me driving a car') can be easy or difficult, or tiring, or fun, or in general have an effect upon some experiencer.
- A state of affairs or fact may correspond to a gerundive nominalisation with a genitive subject (e.g. [NP's V-ing NP]; Heyvaert 2008: 41–42, Lees 1960: 71–72), or to an "ing_{of}" nominalisation (e.g. [NP's V-ing of NP]; Zucchi 2013: 206) or to a *(the fact) that*-clause. It can
  - be (actually or potentially) surprising, or disturbing, or (un)important, or in general have some impact on the person conceptualising it;
  - imply (or be implied by) another state of affairs;
  - in the case of *actual* states of affairs (i.e., facts; Zucchi 2013: 207–208), be known, realised, noticed, observed, told, or in general be the object of any factive verb.

[19] The latter is used when the subject referent has already been evoked in the preceding discourse.

- An utterance may correspond to a *(the statement) that-* or *(the question) whether-*clause; furthermore,
  - it can be said, spoken, whispered, repeated, paraphrased, translated, written, encoded, or in general be the object of any manner-of-speech or mode-of-communication verb;
  - in the case of a statement (or "proposition"), it may be (actually or potentially) true or false, or informative, or misleading, etc.; or be believed, questioned, evaluated, refuted, etc.;
  - in general, it may be (un)important, or politically (in)correct, or (un)necessary, etc.

Taking the above into account, it is thus possible to provide semantic analyses of not only finite clauses, but also various types of non-finite and nominalised clauses.

Before leaving the topic of clauses, it would be desirable to say something about non-finite complements of perception verbs (e.g. *She saw him wipe the table*), which were discussed in Chapter 4. These can be seen to profile an eventuality, and also evoke a higher-order eventuality and one or more actants or circumstants; crucially, they do *not* evoke a state of affairs or an utterance:

(32) She saw him wipe the table.

a. It [= the table] hadn't been cleaned for weeks. [actant]

b. It [= his wiping (of) the table] had never happened before. [eventuality]

c. She was glad she wouldn't have to do it [= wiping the table] herself.[higher-order eventuality]

d. # Did you know that [= the fact that he wiped the table]? [state of affairs]

e. # That [= the statement that he wiped the table] is not true—he didn't! [utterance]

Thus, to summarise this subsection: **a declarative finite clause profiles a state of affairs, and textually evokes actants and circumstants, an eventuality, and possibly a higher-order eventuality; it also environmentally evokes an utterance**. Environmentally evoking an utterance is arguably what distinguishes finite from non-finite clauses (though it is

possible to draw the distinction elsewhere, e.g. defining a finite clause to be any expression that profiles a state of affairs).

5.2.4 Adjectival phrases

In Cognitive Grammar, adjectives are taken to profile a univalent relation, i.e., a relation that has a trajector but no landmark (*pace* Langacker 1987: 232–233, which is not followed in subsequent work). The reader is directed to the preceding comments regarding the notion of "relation".

If we examine the entities that are evoked by an adjective (or more precisely, an adjectival phrase), we find that it evokes (and profiles) a "property"—which is a particular kind of eventuality, namely a type of state:

(33) John is tall$_i$. It$_i$ [= tallness/being tall] runs in his family.

This is true for attributive adjectives as well:

(34) He married a tall$_i$ woman. It$_i$ [= tallness/being tall] is a quality that he finds attractive, for some reason.

Thus, to summarise: **an adjectival phrase profiles a property, in other words, a state-type**.

5.2.5 Adverbial phrases

Adverbs (or adverbial phrases) in Cognitive Grammar are again taken to profile a univalent relation, being distinguished from adjectives solely in that their trajector is a relation rather than a thing (Langacker 1991: 43).

Starting with manner adverbs, we find that they generally evoke (and profile) the manner in which the modified type of action is performed, and also evoke a property of this manner:

(35) She handled the situation admirably.

a. It [= the manner in which she handled the situation] *was* admirable. [manner]

b. That [= being admirable] is typical of the way she copes with adversity. [property]

(36) He told the story beautifully.

a. It [= the manner in which he told the story] *was* beautiful. [manner]

b. That [= being beautiful] is typical of the way he speaks. [property]

This is further supported by the fact that *admirably* and *beautifully* can be paraphrased as *in an admirable way* and *in a beautiful way*, respectively, which more transparently evoke these entities.

Some manner adverbs, however, seem to profile a property of the subject:

(37) She left angrily.

a. That [= being angry] is typical of her.

b. But why should she be ø [= angry]?

c. # It [= the manner in which she left] *was* angry.

(38) He approached her fearfully.

a. That [= being fearful] isn't typical of him.

b. He needn't have been ø [= fearful]!

c. # It [= the manner in which he approached her] *was* fearful.

This is further supported by the fact that *angrily* and *fearfully* can be paraphrased as *with/in anger* and *with fear*, respectively, which more transparently evoke these properties; and also by the fact that the sentences could be paraphrased using adjectives instead of adverbs, i.e. *She left, angry* and *He approached her, fearful.*

Sentential adverbs (*contra* Langacker 2010d: 288–289) do not profile any entity:

(39) Unfortunately, it looks like your application was rejected.

a. # That [= being unfortunate] is typical of the events in my life these days.

(40) Optimistically, we should be able to finish the project in two weeks.

a. # That [= being optimistic] is typical of you, isn't it?

(41) Hopefully, he'll be back sometime before noon.

a. # That [= being hopeful] isn't typical of you!

This is not surprising, given that sentential adverbs fall under the category of "regulatory intonation units" (Chafe 1994: 63–64)—ones that do not form part of an utterance—and these

do not necessarily have a semantic structure.

Likewise, intensifying adverbs do not have a profile:

(42) She's surprisingly modest about her accomplishments!

a. # That [= being surprising] is typical of her qualities.

(43) He is extremely wise.

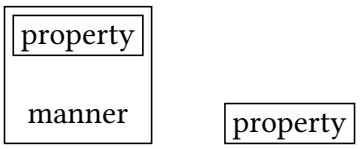
a. # That [= being extreme] is unusual for his qualities—mostly he's an average person.

These "adverbs" (along with *very*, *really*, *so*, and so on) are better thought of as "determiners" of adjectives, i.e. as mere exponents of adjective-phrase constructions, which don't have an associated semantic pole of their own.

Thus, to summarise, adverbial phrases are by no means homogeneous:

1. **a (prototypical) manner adverbial phrase profiles a manner, and also evokes a property of this manner**;
2. **some manner adverbs profile the same property as their corresponding adjectives**;
3. **all other "adverbs" have no identifiable profile on their own, and are merely exponents of larger constructions**.

The first two possibilities may be diagrammed as follows:

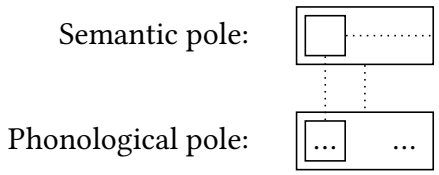


5.2.6 Profile determinacy and finite complementation

Before leaving the topic of profiling, it will be useful to consider how the present framework handles the concept of "profile determinacy", and in particular how this might be applied to the analysis of finite complementation in English (treated in Chapter 2).

In the present framework, the profile of an expression consists of those evoked entities which are not contained within the conceptual content of any other evoked entities—in

brief, the "outermost" entities. A profile determinant of a construction would thus be a subconstituent whose outermost evoked entities are the same as those of the larger expression, as follows (illustrated assuming that each profile consists of just one entity):



(Following standard conventions, a dotted line within the semantic pole stands for referential identity, whereas a dotted line between the phonological and semantic poles stands for symbolisation.)

Yet this would lead to a paradox: the entity profiled by the construction would simultaneously be the outermost evoked entity, and *not* the outermost evoked entity (since the entities represented by the inner and outer boxes are referentially identical). Thus, it is not possible to define the concept of profile determinacy in a coherent manner in the present framework.

Phenomena traditionally analysed in terms of profile determinacy will be considered in the section on grounding below, as well as in the next chapter;[20] here I will focus on finite complementation. Even though it is not possible to speak of the propositional-attitude verb or the content clause as the "profile determinant" of the sentence, it still makes sense to talk about the "prominence" of the content clause and the propositional-attitude clause, in the sense of whether their content is asserted by the speaker. This can be checked using well-known tests such as having the addressee agree with the speaker using *That's true*, and checking what *that* refers to:

(44) I think John knows about the exam.

a. That's true; he does.

b. # That's true; you do think so.

(45) He denies that the Earth is warming.

a. # That's true; it is.

b. That's true; he does.

[20] In general, what is conventionally analysed as the "profile determinant" in a construction is either an exponent—e.g. the preposition in a prepositional phrase—or a constituent that profiles a "type"—e.g. the noun stem in (some) noun phrases, or a verb phrase in a clause.

(46) For some reason, she claims that she's tone-deaf.

a. # That's true; she is.

b. That's true; she does.

In the first example, the content clause's content is what is asserted; in the second and third examples, the content clause is not asserted, but the content of the matrix clause is.

Thus, to summarise: under the proposed framework, **there is no "profile determinacy"**; however, in the case of finite complementation, **the prominence of a clause is usefully defined as whether its content is asserted by the speaker**; more concretely, whether it is "addressable" (Boye & Harder 2007: 578).

5.3 Focal prominence

In Cognitive Grammar, any relation that has two or more participants has a hierarchy of prominence among these participants, such that one of them is the "trajector" or "primary figure", and the others are "landmarks" or "secondary/tertiary/(etc.) figures". In the domain of clausal structure, the trajector is the subject, and the landmark(s) the object(s). Given that one aim of the present framework is to reduce as far as possible the number of different types of salience that are appealed to, it is worth asking whether the notions of trajector and landmark (at least as applied to clausal structure) are really necessary for the purposes of grammatical description.

The first question is whether grammatical relations are necessary in the first place. There are endless debates as to whether subjects can be characterised consistently across languages (see e.g. Donohue 2002; Lazard 2015 for insightful contributions and extensive references), and whether "subject" is even a useful notion in the description of individual languages (Croft 2001: 203–240). The reason for these debates is that the subject in a language is usually defined as the actant that tends to serve as the "pivot" (i.e. the shared actant) in multi-clausal constructions. Different languages may prefer different pivots: in English, the pivot is usually {S,A} (where S is conventionally used to denote the sole actant of an intransitive clause, and A is used to denote the actant of a transitive clause that has more agent-like coding), whereas in so-called "(syntactically) ergative" languages such as

Dyirbal (Pama-Nyungan), the pivot is often {S,P} (where P is used to denote the actant of a transitive clause that has more patient-like coding):

(47) ŋuma yabu-ŋgu bura-n banaga-n^{ɣ}u
father-ABS mother-ERG see-NFUT return-NFUT
mother(A) saw father(O) and he(S) returned.

(Dixon 1994: 12; Dixon uses O rather than P. The point is that the zero-coded S of 'returned' (*banagan^{ɣ}u*) is necessarily coreferential with the P of 'saw' (*buran*), whereas in English *Mother saw father and returned*, the S of 'returned' is necessarily coreferential with the A of 'saw'; i.e. the only interpretation is *Mother saw father and she returned*.)

Furthermore, even within a language there may be no global preference for any particular pivot, as in Jakaltek (Mayan; see Van Valin & LaPolla 1997: 284–285 for details). For these reasons, Van Valin & LaPolla (1997) and others argue that pivots are construction-specific, and that it is often not useful to generalise over pivots within a single language, let alone generalise across languages.

At the same time, there are certain phenomena that seem to universally pick out an {S,A} grouping of actants, even in languages that are otherwise syntactically ergative: this includes the addressee of imperatives ($ø_S$ *Jump!*, $ø_A$ *Seize him$_P$!*), the pivot of control constructions (e.g. *She wants $ø_S$ to sleep*, *She wants $ø_A$ to meet him$_P$*, **She wants him to meet $ø_P$ [= her]*), and the controller of reflexives (*He$_A$ saw himself$_P$*, **Himself$_A$ saw him$_P$*; Dixon 1994: 131–139). Thus, Dixon (1994: 124–125) defines {S,A} as a universal notion of "subject" (similar to "logical subject" in Sweet 1900: 16–17, 19, as opposed to "grammatical subject"; cf. also the notion of "reference subject" in Lazard 2015: 123, and "a-subject" in Andrews 2007: 197–221), and this is presumably the notion that ought to be captured by a language-independent notion such as "trajector".

The next question is whether the ("logical", "reference", or "a-") subject of a clause can indeed be characterised as a trajector or a primary figure. As was discussed in detail in Chapter 3, this idea seems to find support in Tomlin (1997), which found that the actant that the speaker is paying attention to (and hence perceives as the figure) at the moment of utterance formulation is virtually guaranteed to be coded as the subject by English speakers. However, later studies (such as Griffin & Bock 2000, Myachykov 2007, and Gleitman et al.

2007) find weaker support for this hypothesis.

In addition, a limitation of all the above studies (which to my knowledge has not been addressed so far) is that the responses to the stimuli tend to be instances of what Lambrecht (1994: 223) calls "predicate-focus" structures, where the subject is also a sentence topic. Thus, it is entirely possible that what has been shown is that the actant that is attended to at the moment of utterance formulation tends to be coded as a *topic*, rather than necessarily as the *subject*. Indeed, this is further supported by the results of Myachykov & Tomlin (2008), who find that in spoken Russian, where left-dislocation is a far more common strategy for topicalising the P argument than is the use of passive voice, it is left-dislocation that speakers tend to use when they are made to attend to the patient at the moment of utterance formulation. To be really sure that attention determines the subject, and not just the topic, one would have to elicit not only predicate-focus structures, but also sentence-focus/argument-focus structures, where the subject is not a topic. For example, if the speaker sees a clip of a red fish eating a cued blue fish, one would have to show not only that *The blue fish was eaten by the* RED FISH is more likely than *The red fish ate the* BLUE FISH; but also that *The* BLUE FISH *was eaten by the red fish* is more likely than *The* RED FISH *ate the blue fish*. It would be extremely hard to construct a pragmatic context in which the latter two sentences would be natural, without biasing the responses in some other way. Asking a leading question such as *Which fish was eaten by the red fish?* or *Which fish ate the blue fish?* would of course pre-determine the syntactic structure of the response.

Given these difficulties, it is necessary to look for another characterisation of subject, which is easier to operationalise, and in particular, which can be clearly distinguished from the notion of "topic".[21] It so happens that just such a characterisation is made available by the above-mentioned notion of "higher-order eventuality". Notice that in a sentence such as *Harvey taunted the bear*, the evoked higher-order eventuality, viz. 'taunting the bear', does not involve the referent of *Harvey* in any way. On the other hand, the higher-order

[21]The reader might wonder why I have not simply used {S,A} as the definition of "subject", following Dixon (1994: 124–125). The reason is that notions such as S, A and P, though extremely useful for typological comparison, do not strictly adhere to the (Extended) Content Requirement, as they are not defined purely in terms of semantic and phonological structure. More specifically, A and P are actants that are *coded the same way as* the agent and patient actants in a clause describing a prototypical transitive event (with a verb such as 'kill' or 'break'; see e.g. Haspelmath 2011a: 545–551, Lazard 2015: 119); this definition explicitly makes reference to morphosyntactic form, and requires some arbitrary judgment of what counts as the "same coding" in any given language. The definition of subject that I will be proposing here is purely in terms of semantic structure.

eventuality *does* involve the referent of *the bear*. Thus, I would propose to define the subject of a clause as "**the entity that is included in the conceptual content of the lower-order eventuality but excluded from that of the higher-order eventuality**".[22] This definition makes no reference to the notion of "trajector" or "figure", and instead makes reference only to the notion of textual evocation; thus it is consistent with the Extended Content Requirement.

We can check that a subject, so defined, is distinct from an agent, by noting that a passive clause evokes a higher-order eventuality that excludes the "underlying" P but may include the "underlying" A:

(48) The poor bear was taunted by Harvey.

a. I know how unpleasant that [= being taunted by Harvey] is!

Likewise, we can check that a subject is distinct from a topic, by noting that a clause evokes the same eventuality regardless of whether its subject is a topic or a focus:

(49) I heard Bill taunted the bear.—No, HARVEY taunted the bear.

a. Really? Why did HE do that [= taunting the bear]?

The proposed definition of "subject" is highly reminiscent of the way the subject-relation was defined in early versions of generative grammar, namely as "the relation holding between the NP of a sentence of the form NP⁀Aux⁀VP and the whole sentence" (Chomsky 1969: 69; see also Van Valin & LaPolla 1997: 243–244, Taverniers 2005: 654–655); note that a higher-order eventuality is in fact often profiled by a constituent that we could call a VP (see next chapter for details). However, a disadvantage of defining subjects in terms of VPs is that this definition cannot be used in languages that lack a (surface) VP, e.g. Celtic or Semitic languages, which are VSO—unless one assumes an "underlying" SVO or SOV order, from which the "surface" word order is derived by obligatory transformations (as argued in Kayne 1994). The present definition of subjects does not have this disadvantage, as even in languages that lack a (surface) VP constituent, clauses may still evoke higher-order eventualities. This is evidenced by the fact that such languages do have "VP anaphora"; see the following example from St'át'imcets (Salishan; Davis 2005: 41–42):

[22] See Taverniers (2005) for a similar analysis (following Davidse 1997) which draws on notions from Systemic-Functional Grammar. In a similar manner, it is natural to define the objects of a clause as the entities that are included within the higher-order eventuality.

(50) t'elkw-ílc kw=s=Tmícus lhel=ta=ts'qáxa7-s=a xíl-em t'it
dismount-AUT DET=NMLZ=Tmícus from=DET=horse-3POSS-EXIS *do*-MID also
kw=s=Pikáola
DET=NMLZ=Pikáola
'Tmícus got off his horse. Pikáola did so too.'

Here the antecedent of *xílem* 'do (so)' is the higher-order eventuality 'getting off one's horse', even though this is not profiled by any constituent in the sentence (*t'elkwílc…lhel-tats'qáxa7sa* cannot be a constituent, as it is phonologically discontinuous).

As an additional piece of cross-linguistic evidence for the proposed definition of "subject", there are indications that this definition corresponds to an {S,A} grouping of arguments (as expected) even in languages that are syntactically ergative, or show mixed-pivot behaviour. In particular, in Balinese (Artawa & Blake 1997), the unmarked transitive construction is ergative, as shown by its behaviour in a number of syntactic environments:

(51) Nyoman lempag tiang
Nyoman hit I
'I hit Nyoman.'

(Artawa & Blake 1997: 484)

(52) tiang ane [] gugut cicing
I REL bite dog
'I am the one the dog bit.' [pivot of relative clause = P]

(Artawa & Blake 1997: 493)

(53) ia opak tiang lantas [] ngeling
3SG scold I then cry
'I scolded him/her, then he/she cried.' [pivot of coordination = P]

(Artawa & Blake 1997: 495)

Thus, the pivot for most purposes is {S,P}. However, VP anaphora points to {S,A} (as do the phenomena discussed in Dixon 1994: 131–139):

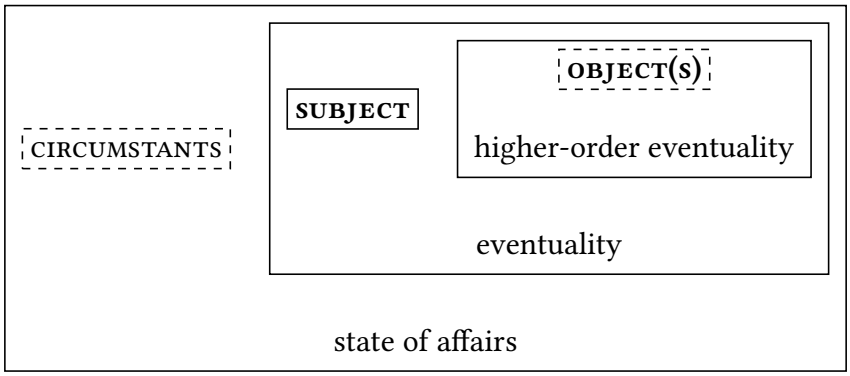
(54) surat tulis tiang tur belin tiang-e masih keto
letter write I and brother I-POSS also that
'I wrote a letter and so did my elder brother.' (Artawa & Blake 1997: 504)

Here, the antecedent of *keto* 'that' is the higher-order eventuality 'writing a letter', even though there is no constituent profiling this entity (*surat tulis*, though contiguous, is known to not be a constituent, whereas *tulis tiang* is in fact a constituent). I have not been able to

locate any other discussions of VP anaphora in syntactically ergative languages, but this is already highly suggestive.

Thus, to summarise: **the ("logical", "reference", or "a-") subject of a clause**—which turns out, cross-linguistically, to be {S,A}—**is the entity that is contained in the lower-order eventuality but not in the higher-order eventuality**. It is not clear that a notion of "grammatical subject" (or "predication subject"—see Lazard 2015: 123—or "p-subject"—see Andrews 2007: 198) can be given such a consistent definition; as argued by LaPolla (2006), it is probably more fruitful to describe syntactic pivots in terms of the semantic composition rules for individual multiclausal constructions.

The proposed definition of "subject" (and "object") can be expressed diagrammatically by amending the above diagram of the entities evoked by a finite clause:



5.3.1 Impersonal subjects

While on the topic of "subjects", an issue to be considered (raised in Chapter 3) is the analysis of impersonal subjects, such as *there* in *There is a book on the table*, or *it* in *It's raining*. In Cognitive Grammar, these are analysed as subjects, i.e., as trajectors, which refer to the "ambience", "field" or "scope of attention" (e.g. Langacker 2010e: 147, following Bolinger 1973; Bolinger 1977: ch. 4). Chapter 3 reported on an attempt to test this analysis for sentences of the type *There is a book on the table* by cueing attention either diffusely (to the locative scene as a whole) or narrowly (to the located object), and seeing whether this would affect whether the speaker uses the existential construction (*There is a book on the table*) or the locative construction (*A book is on the table*). This attention manipulation had no measurable effect.

Under the present framework, there is no requirement that impersonal *there* or *it* have

independent meaning; they may simply be exponents of certain clausal constructions. Furthermore, if we examine the entities evoked by these constructions, we find that these constructions behave very differently from the canonical finite clauses considered above. In particular, there is no evidence that either the existential construction or the "weather" construction evokes a higher-order eventuality (and indeed, it is hard to imagine what such a higher-order eventuality would look like). Only one eventuality is evoked:

(55) There's a cup of coffee on the table.

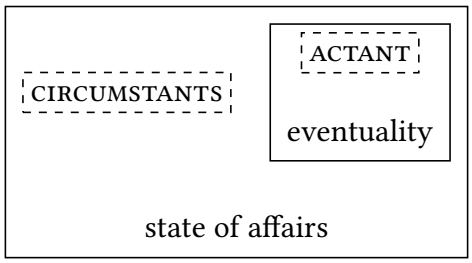
a. That [= there being a cup of coffee on the table] is unusual!

(56) Oh no, it's raining!

a. Don't worry; that [= (the state of) it(s) raining] usually only lasts a few minutes.

The implication of this is that these constructions have neither subject nor object—and indeed, the weather construction has no actants whatsoever. Some cross-linguistic support for this lies in the fact that the actant of an existential clause is treated in some languages like a subject, and in others like an object (and no doubt in still others like neither). For example, in English the actant of an existential behaves like a subject in that it triggers agreement on the verb (*There is a book* vs. *There are books*), whereas in German the actant of an existential behaves like an object in that it must be coded using the Accusative case (*Es gibt einen Mann* 'There is a man').

Thus, to summarise: **there are no impersonal subjects**; **"impersonal-subject" constructions do not evoke a higher-order eventuality, and so do not have subjects or objects**. This can be expressed diagrammatically as follows:



5.3.2 Double-object constructions

We have just seen some cases of clauses which do not have a subject or object, and indeed may not even have any actants. There are also clauses that have more than one object (i.e.

more than one evoked entity immediately contained within the higher-order eventuality).[23] This is the case with clauses that have an "oblique object" in addition to a "core" object, as well as clauses that have two "core" objects:

(57) She ate the soup with a spoon.

a. That [= eating the soup with a spoon] is just what you'd have expected a Westerner to do. [higher-order eventuality]

b. Apparently it [= the soup] was too hot to sip. [core object]

c. It [= the spoon] was a clay one that she had made herself. [oblique object]

(58) She gave the children flowers.

a. No one else had thought of doing that [= giving the children flowers]. [higher-order eventuality]

b. They [= the children] were delighted. [1st core object]

c. They [= the flowers] were freshly cut ones. [2nd core object]

(The distinction between core and oblique arguments will be re-examined in the next chapter, and somewhat refined.)

Given this, we may now reconsider the dative alternation (discussed in Chapter 3). In Cognitive Grammar, the first and second objects in the ditransitive construction are analysed as the primary and secondary landmark, i.e., as secondary and tertiary figures. In principle, this distinction could be operationalised in a similar way to that between trajector and (primary) landmark; however, as we saw in Chapter 3, adapting the experimental paradigm of Tomlin (1997) and Myachykov (2007) does not support this analysis.

The question remains as to how the present framework would capture the differences in usage between the alternants in the dative alternation. Here we may refer to the valuable quantitative work done by Bresnan et al. (2007), who show (building on numerous earlier proposals in the functionalist tradition) that in either construction, the first object is likely to be given, animate, or definite, whereas the second object is likely to not have these attributes. Given that givenness, animacy and definiteness are commonly invoked as properties

[23] It appears to be impossible for a clause to have more than one subject. While this is consistent with all grammatical frameworks as far as I am aware, it is unclear why this should, *a priori*, be the case.

of topics, this seems to suggest that the first object tends to be a topic, and the second tends not to be.[24] It will be possible to specify this proposal more precisely after the discussion of topics and foci below; the crucial point here is that the functional difference between the ditransitive and dative constructions can be adequately described without appealing to the notion of primary vs. secondary landmark, and indeed, without appealing to the notion of grammatical relations at all.

5.4 Grounding

In Cognitive Grammar, it is proposed that certain types of entities (namely, things and processes) may be "grounded", i.e., that the speaker and hearer may jointly establish "mental contact" with these entities (Langacker 1991: 91). In the conventional terminology of grammatical description, a grounded thing is what is profiled by a full noun phrase, and a grounded process is what is profiled by a finite verb or clause. All other expressions profile "ungrounded" entities: for example, bare nouns, non-finite verb phrases, and prepositional phrases.

There is some inconsistency (*pace* Langacker 2010b) between the way the notion of "grounding" is applied to nominals and to verbs/clauses. In the case of nominals, grounding is essentially a matter of definiteness; i.e., a grounded nominal is one that is specified as either definite or indefinite (or more precisely, as profiling an entity that either is or is not uniquely identifiable on the basis of the nominal's conceptual content; see Chafe 1994: 93 ff.). With verbs and clauses, on the other hand, grounding is a matter of finiteness, i.e., whether the profiled process is situated with respect to the here-and-now.

Langacker (2010b) argues in detail that nominal and clausal grounding are essentially of the same kind, on the basis of analogies between demonstratives and tense marking (which both indicate "distance" from the deictic centre), and between modality and definiteness (which both make reference to the "Control Cycle", though in different ways). However, the consensus among linguists in general appears to be that the clausal equival-

[24] Of course, there are also other factors that account for the difference between the alternants. For example, the ditransitive construction can only be used when the recipient is somehow affected by receiving the transferred object: thus, **He sent the library a book* is odd, but *He sent the library his vast collection of philosophy journals* is fine.

ent of definiteness is not finiteness, but rather presupposition vs. assertion (e.g. Lambrecht 1994: 77–79). Presupposition and assertion, like definiteness and indefiniteness, are a matter of whether an entity (in this case, a state of affairs) is uniquely identifiable as part of the common ground on the basis of the provided conceptual content. Being situated with respect to the here-and-now is logically independent of whether an entity is specified for identifiability: a noun phrase such as *a cat* is specified as having a referent that is non-identifiable, but it is unclear in what way this referent might be situated with respect to the here-and-now (independently of the clause which the noun phrase appears in).

The above explains why I have chosen to define "grounding" as "the situation of an entity with respect to the common ground, on the basis of the provided conceptual content". And yet, given this definition, one wonders if it is possible for any evoked entity to *not* be grounded. Intuitively, it seems hard, if not impossible, to perceive or imagine any entity without either recognising it or not recognising it. It thus seems more natural to assume that the textual evocation of an entity necessarily entails its grounding.

This poses problems for the idea that there might be expressions that profile an "ungrounded" entity. In fact, upon closer inspection, such (putative) expressions—insofar as they profile any entities at all—*do* turn out to ground these entities:

(59) John was showing us his new [bread machine]$_i$. Apparently that$_i$ [= (the kind of thing known as) a bread machine] is what everyone uses these days. [type]

(60) We might [go for a drink]$_i$. You do that$_i$ [= (the activity of) going for a drink] every Friday! [higher-order eventuality]

(61) I just saw some mice [under the dining table]$_i$.—No wonder; it's quite messy there$_i$ [= (in the space) under the dining table]! [location]

In every case, the profiled entities are *identifiable* (and in particular, the expressions are specified as being "definite", as can be seen from the glosses using the definite article). More specifically: Noun stems (insofar as they evoke anything on their own) profile a type, which is specified as being part of the common ground (e.g. the speaker and hearer already know that there exists a type of thing known as a bread machine); and moreover, this type is (by its very nature) specified as being uniquely identifiable (e.g. the speaker and hearer both know that this expression, in this context, can pick out only this one type of thing).

A non-finite (or at least non-TAM-marked) verb phrase profiles a higher-order eventuality, which is specified as being part of the common ground (e.g. the speaker and hearer already know that there is a kind of activity known as "going for a drink"). Moreover, this eventuality is uniquely identifiable (e.g. the speaker and hearer both know that this expression, in this context, can pick out only this one type of activity).

Finally (as we saw earlier), a spatial prepositional phrase evokes a location, which may or may not be part of the common ground depending on whether the landmark is part of the common ground (e.g. given that the dining table is already known to the speaker and hearer, the region under the dining table is also known to them). Further, the location may or may not be uniquely identifiable, depending on whether the landmark is uniquely identifiable (e.g. given that the dining table is uniquely identifiable for the speaker and hearer, the region under it is also uniquely identifiable).

To summarise this section: **grounding corresponds to definiteness for nominals, and presupposition/assertion (*not* finiteness) for clauses**. Finiteness, as discussed earlier, could be defined as profiling a state of affairs (which is necessarily situated with respect to the present), as opposed to an eventuality (which has no temporal location). Moreover, **every evoked entity is necessarily grounded**; there are no "ungrounded" entities.

5.5 Topic and focus

Information structure (or information packaging) is an important part of how speakers use grammar to convey conceptual content; yet the questions that are dealt with in studies of information structure have received little attention so far in Cognitive Grammar research (see Langacker 1991: 313–317 for an exception, in addition to recent work such as Langacker 2010a, 2014).

So far, among the topics usually considered to be part of information structure, we have already dealt with activation (Lambrecht 1994: §3.3), identifiability (*ibid.*, §3.2), and presupposition/assertion (§2.3). This section deals with the notions of "topic" (*ibid.*, ch. 4) and "focus" (ch. 5).

5.5.1 Focus types

By way of introduction, let us consider the three basic information-structure patterns or "focus structures" proposed by Lambrecht (1994: 222), and see how they might be described in accordance with the Extended Content Requirement. These focus structures are *predicate focus* (or "topic-comment articulation"), *argument focus* (or "identificational articulation"), and *sentence focus* ("event-reporting" or "presentational" articulation). These three focus types are illustrated as follows (based on Lambrecht 1994: 223):

(62) Predicate-focus structure:

A: What happened to your car?

B: My car broke DOWN.

(63) Argument-focus structure:

A: I heard your motorcycle broke down?

B: My CAR broke down.

(64) Sentence-focus structure:

A: What happened?

B: My CAR broke down.

As suggested by the labels, Lambrecht argues that the essential difference between these three types of sentences resides in which part of the sentence constitutes the focus; whether it is the predicate (*broke down*), an argument (*my car*), or the entire sentence.

Let us consider in a bit more detail what it means for a particular part of a sentence to be in "focus". Lambrecht (1994: 207) defines the focus of a sentence as "the element of information whereby the presupposition and the assertion DIFFER from each other [emphasis in original]".[25] The idea is that, for example, in the argument-focus sentence *My CAR broke down*, the presupposition is of the form 'speaker's *x* broke down', and the assertion is of the form '*x* = car' (Lambrecht 1994: 228); what differentiates the assertion from the presupposition is the noun *car*, which is thus the focus.

Lambrecht (1994) does not provide explicit criteria for determining the form of the presupposition and the assertion of a sentence; I would thus propose a slightly different for-

[25] This definition presupposes that every sentence has one, and only one, focus. This is different from the approach taken here.

mulation. Every declarative utterance profiles a state of affairs that is new to the hearer (i.e. an assertion); but in many cases (though not all), the conceptual content of that state of affairs specifies not only what *is* the case, but also what *isn't* the case. Thus, when saying *My* CAR *broke down*, the state of affairs that the speaker is introducing into the common ground is not merely 'the fact that my car broke down', but rather 'the fact that my car broke down AND all other things of mine didn't break down'. (This can be seen from the fact that if one were to say *My* CAR *broke down, not anything* ELSE *of mine*, one would not be "adding any new information".)

In such cases, I propose to define a focused entity as "an evoked entity by which what is affirmed differs from what is denied". In the argument-focus example, the profile of *my car* is obviously a focus by this definition; so is the eventuality evoked by the sentence ('my car breaking down'). Applying this definition to sentence focus, we see that the state of affairs profiled by the sentence-focus example is 'the fact that my car broke down AND all other things that might have happened didn't happen'; thus, the evoked eventuality ('my car breaking down') is in focus, but not the profile of *my car* (which does not correspond to any entity in what is denied).

The proposed definition of focus does not work as expected for the above example of "predicate focus". Here, the profiled state of affairs is 'the fact that my car broke down AND all other things that might have happened to my car didn't happen to my car'; however, it is not the case that the higher-order eventuality 'breaking down' is in focus, because this eventuality is not evoked by the sentence in the first place:

(65) My car [broke DOWN]$_i$.—#That$_i$ happened to my motorcycle last week!

Here, the only entity that can be said to be in focus is the lower-order eventuality ('my car breaking down'). Thus, this is not truly an example of "predicate focus"; nonetheless, it is easy to think of true examples of predicate focus, where a higher-order eventuality *is* evoked and focused:

(66) My car [got a FLAT TYRE]$_i$.—That$_i$ happened to my motorcycle last week!

So far, I have proposed a definition of "focus" in terms of a comparison between what is affirmed and what is denied by an utterance. The notion of "topic" can be defined in similar terms: specifically, as an evoked entity that is *shared* between what is affirmed and what

is denied.[26] Applying this definition to the above examples of Lambrecht's focus types, we find the following (the reader may wish to refer back to the above descriptions of what is affirmed and denied by each example sentence):

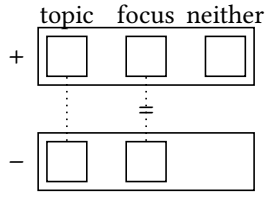
1. In the "predicate focus" example, the subject is a topic (this is the case with "true" examples of predicate focus as well).

2. In the argument focus example, the subject is *not* a topic. If the sentence evoked a higher-order eventuality (e.g. *I heard your motorcycle had a flat tyre? My* CAR *had a flat tyre*), then this would be a topic.

3. In the sentence focus example, again, the subject is not a topic. Here, though, if the sentence were to evoke a higher-order eventuality (as in *What happened?—My* CAR *had a* FLAT TYRE), this would not be a topic either (as it would have no counterpart in what is denied).

In the above, I have attempted to reduce Lambrecht's three focus types to various configurations of topical and focal evoked entities—much as Lambrecht (1994: 221–238) does, but defining the notions of topic and focus in terms of the more basic notion of a comparison between what is affirmed by an utterance and what is denied. In general, it will be more convenient to work with the notions of topic and focus than with focus types, as this will allow for greater flexibility in discussing the information-structure properties of grammatical constructions.

The definitions of topic and focus proposed in this subsection may be summarised in the following diagram:[27]



[26] This definition is more precise than the standard definition of a topic (e.g. Lambrecht 1994: 118) as "the thing which the proposition expressed by the sentence is ABOUT [emphasis in original]". It thus addresses the comment by Polinsky (1999: 572) in her review of Lambrecht (1994) that "[l]inguists have essentially given up on a rigorous definition of topics—almost everyone…mentions the aboutness condition and then moves on to more mundane matters of topichood or topicalization". It is worth noting, however, that the proposed definitions of topic and focus are highly reminiscent of the proposal in Deane (1991: 40–41) and Deane (1992: 36–37) to define topic and focus in terms of "convergent activation" and "divergent activation", respectively.

[27] It is interesting to compare this three-way typology with the distinction drawn in Markman & Gentner (1996: 236) between "commonalities", "alignable differences", and "nonalignable differences" (respectively) in the context of similarity judgment.

In other words:

1. **only "contrastive" utterances that simultaneously affirm one state of affairs and deny another can have topics and foci;**
2. **a topic is an evoked entity that is shared between what is affirmed and what is denied;**
3. **a focus is an evoked entity by which what is affirmed contrasts with what is denied;**
4. **an entity that is present in what is affirmed but not in what is denied is neither a topic nor a focus.**

5.5.2 The thetic/categorical distinction

An important application of the concepts of information structure is to the prediction of stress placement in sentences (Lambrecht 1994: 257–286, 322–333; see also Ladd 2008: ch. 6, among others). Lambrecht (1994: 113) proposes that a constituent is given primary stress (in English, at least) whenever its referent is either *new* (i.e. not previously evoked) or *focused*. (Thus, a distinction is made between an "activation accent" and a "focus accent". It is entirely possible for an utterance to have *no* primary stress, only secondary stress: e.g. *Ìs it cléan?—Ìt's clèan/#Ìt's cléan.*)

An often-discussed problem in the intonational phonology of English is that of how to predict when an intransitive clause has primary stress on both subject and predicate, and when it has primary stress on just the subject—in other words, to explain the difference in usage between "thetic" and "categorical" sentences. Sasse (1987) notes that, even if context is held relatively constant, there are certain intransitive sentences that strongly favour a thetic reading (indicated with accentuation only on the subject), and others that favour a categorical reading (Sasse 1987: 521):

(67) Thetic:

a. What's new?—Harry's coming./*Harry's coming.

b. How's the weather?—The sun's shining/*The sun's shining.

(68) Categorical:

a. What's going on outside?—HARRY's SINGing./*HARRY's singing.

b. What has happened?—The PRINCess SNEEZED./*The PRINCess sneezed.

For Lambrecht (1994: e.g. 236), the thetic/categorical distinction reduces to the distinction between sentence focus and predicate focus. Yet the differences illustrated in the above examples cannot be in terms of focus structure (see also Sasse 1987: 520), since in all of the above discourse contexts, the eventuality evoked by the sentence is what is intended to be in focus—nothing else. Thus, since the differences in accentuation cannot be due to the placement of focus accents, they must be due to the placement of activation accents; in other words, the distinction must be in terms of which entities are (newly) evoked by each sentence type.

I propose that in those sentences where only the subject has primary stress (i.e. thetic sentences), the sentence does not evoke any higher-order eventuality, and thus there is really no predicate that might be eligible for an accent (whether a focus accent or an activation accent). This can be seen from the following examples:

(69) HARRY's coming.—#John's doing that, too.

(70) The SUN's shining.—#The moon's doing that, too.[28]

This proposal is consistent with existing accounts of the thetic/categorical distinction. For example, Allerton & Cruttenden (1979) observe that thetic sentences tend to involve verbs that are either "semantically empty"/"predictable", or verbs of appearance and disappearance, or verbs denoting a misfortune. It is hardly surprising that "semantically empty" or "predictable" verbs do not evoke a higher-order eventuality; as for verbs of appearance or disappearance, we saw above that existential sentences do not evoke a higher-order eventuality—and appearance or disappearance is not far removed semantically from existence. The claim regarding verbs denoting a misfortune is disputed by Sasse (1987: 526).

More generally, all accounts of the thetic/categorical distinction state in one way or another that in thetic sentences, the predicate doesn't "add much information" on top of the identity of the subject. For example, Bolinger (1954: 152) states that the predicate conveys information only "of a hackneyed sort" about the subject referent; likewise, Sasse

[28]Note that one *can* say, *Harry's coming—So is John!*, or *The sun's shining—So is the moon!*. However, as we will see in the next chapter, the [*So* AUX NP] construction does *not* refer anaphorically to a higher-order eventuality, but only to a lower-order one (in fancier terms, it is not a case of VP anaphora).

(1987: 522–526) proposes that categorical statements are used when the hearer is expecting information about the subject referent, with thetic sentences used otherwise. Sax (2012) refines these accounts using the framework of Relevance Theory (Sperber & Wilson 1986), and proposes that the deaccentuation of the predicate in thetic sentences results from the fact that the predicate's content is "weakly predictable" by the time the hearer has finished processing the accented subject. All of the above accounts can be seen to be consistent with the fact that in thetic sentences, the "predicate" does not evoke any entity, and thus has no reason to bear primary stress (since the subject already does, on behalf of itself as well as the whole clause).

Thus, to summarise: following Lambrecht (1994: 113), **a constituent receives primary stress whenever its referent is either new or focused**. In accordance with this, **the reason why thetic sentences have an unaccented predicate is that there is no "predicate"**.

5.6 Sanctioning

What are the aims of a grammatical description? Many linguists would agree with the following (due to Chomsky 1964: 28–29):[29]

1. A grammatical description must have **observational adequacy**: it must "present the observed primary data correctly", in other words, correctly discriminate between well-formed and ill-formed structures;

2. it must have **descriptive adequacy**: it must "give a correct account of the linguistic intuition of the native speaker, and specify the observed data…in terms of significant generalizations that express underlying regularities in the language": in other words, it must provide a "structural description" (p. 34) of each well-formed usage event, and thereby account for the speaker's ability to discriminate well-formed and ill-formed structures;

3. it must have **explanatory adequacy**: "the associated linguistic theory [must] provide a general basis for selecting a [descriptively adequate] grammar over other [observa-

[29] I thank Arie Verhagen for correcting my understanding of Chomsky's views.

> tionally adequate] grammars that [are not descriptively adequate]".[30]

Thus far, I have addressed only (certain aspects of) descriptive adequacy: I have tried to illustrate (and will continue to illustrate in the next chapter) how the proposed framework is capable of providing descriptions of various grammatical structures. This section looks at observational adequacy (and the remaining aspects of descriptive adequacy): how well-formedness and ill-formedness are captured—or in the terminology of Cognitive Grammar, how usage events are "sanctioned" by the grammar. (Explanatory adequacy has not specifically been treated, but is implicit in any attempt to build a general descriptive framework.)

In keeping with the Cognitive Grammar account of sanctioning (Langacker 1987: 409–447), as well as that in many versions of Construction Grammar (e.g. Fillmore 1998), I assume that the sanctioning of a usage event proceeds by comparing the usage event with a number of "schemas" or stored units, and ensuring that none of the relevant comparisons results in a mismatch. The main question, then, is what constitute "schemas", and what constitutes a "relevant comparison".

With regard to schemas, a useful starting point is Croft's (1995: 872) "IU (= intonation unit) storage hypothesis":

> *The IU storage hypothesis*
>
> > The constructions [= schemas] that are stored or precompiled are the GUs [grammatical units] that (normally) occur in a single IU.

An intonation unit (or IU; a term adopted from Chafe 1994: 53 ff.) is a stretch of speech that is defined by a continuous intonation contour, typically characterised by a decline in pitch, loudness and/or speech rate, and often (but not necessarily) bounded by pauses (Chafe 1994: 57–60). Chafe (1994: 108–119) argues that intonation units are units of speech planning, and that an intonation unit typically does not contain more than one new piece of information (the "one new idea constraint"; see also the "one-clause-at-a-time hypothesis" of Pawley & Syder 2000). Croft (1995) further shows, on the basis of an analysis of the Pear Stories narratives, that more than 97% of IUs consist of a full grammatical unit (the "full

[30] The "associated linguistic theory" here is what came to be known as Universal Grammar; but the principle can be understood in a theory-independent way.

GU condition"), and that an IU almost never consists of a complex grammatical structure that isn't already conventionalised (or even grammaticalised); this is the basis on which he proposes the IU storage hypothesis. These results have been replicated for Japanese (Matsumoto 2000), Mandarin (Tao 1996), Korean (Park 2002), and the Australian languages Wardaman (Croft 2007a) and Dalabon (B. Ross, Fletcher & Nordlinger 2016).

The IU storage hypothesis as formulated by Croft defines constructions (or schemas) in terms of GUs, and only secondarily in terms of IUs. GUs are taken in this context as a pretheoretical notion; but it would be desirable (from the point of view of the Extended Content Requirement) to do away with such notions as far as possible. I would thus propose the following, simpler formulation (*pace* Croft 2007a: 9, 30–31):

The strong IU storage hypothesis

> The schemas that are stored or precompiled are IUs.

This still leaves unanswered the question of the level of generality at which schemas are stored. Cognitive Grammar does not *a priori* place any constraints on this, and would thus allow for highly specific IU schemas (e.g. *[[John] [saw [Mary]]]*), highly general ones (e.g. [Sbj [V Obj]]), and anything in between (e.g. [Sbj [*saw* Obj]]). Each schema is however given a weightage or "salience" that is determined by the interplay between its frequency (more frequently-instantiated schemas have higher salience) and its concreteness (more concrete schemas have higher salience); see Langacker (1987: e.g. 414) for details.

Unfortunately, there is no general, widely-agreed methodology for measuring the salience of a schema. This represents a significant problem for operationalising the Cognitive Grammar account of sanctioning; it would thus be desirable to have a more constrained theoretical account of which schemas are stored. Such an account is suggested by psycholinguistic evidence that, below the level of intonation units, the units of speech planning are phonological words (Wheeldon & Lahiri 1997, 2002)—more specifically, that the amount of time required to plan an IU is directly proportional to the number of phonological words it contains. In particular, this suggests the following hypothesis:

The strong IU storage hypothesis (final version)

> The schemas that are stored or precompiled are IUs. Each IU schema specifies one phonological word, and leaves the rest schematic.

The idea that schemas of the above kind are the *only* ones necessary for describing language can of course only be supported by attempting to describe a language using only such schemas; this will be attempted in the next chapter. For now, let us preview a few consequences of the strong IU storage hypothesis. It is clear that the hypothesis permits "verb-frame" schemas such as [SBJ [*saw* OBJ]$_{Pred}$]$_S$,[31] since this sequence does occur as a full IU (e.g. *John saw Mary*), and it specifies only one phonological word (/ˌsɒ/). However, there cannot be a "lemma-level" schema [SBJ [SEE OBJ]$_{Pred}$]$_S$, since no part of this is phonologically specific. (The generalisations that are normally captured by the notion of a "lemma" are instead dealt with using "second-order schemas"; see below.)

What about noun phrases? Noun phrases do sometimes occur on their own as IUs (e.g. *Canberra // is a small city*); in these cases we might have schemas such as [*Canberra*], assuming that this occurs frequently enough as a full IU.[32] However, noun phrases most commonly occur inside clausal IUs (e.g. *John found my key*; *I just saw John*); this would lead to schemas such as [[*John*]$_{Sbj}$ [V OBJ]$_{Pred}$]$_S$ and [SBJ [V [*John*]$_{Obj}$]$_{Pred}$]$_S$. It may seem that this approach makes overly fine distinctions, effectively forcing us to distinguish between "nominative" and "accusative" NPs in English, even when these are homophonous. But this is not necessarily a bad thing, if we accept that linguistic knowledge is item-based; moreover, the task of describing the emergence of case-marking in a language is made simpler if we assume that the relevant distinctions are already available to speakers to begin with (rather than speakers having to suddenly introduce a wholly new distinction into their mental grammars).

The above gives some idea of what schemas would look like under the strong IU storage hypothesis. Turning back to the question of how to describe sanctioning, it would seem obvious that sanctioning proceeds by searching for a set of schemas that provide a "complete

[31] Here SBJ and OBJ are as defined earlier; *Pred*(icate) is shorthand for a constituent that profiles a higher-order eventuality (a "verb phrase"); and S(entence) is shorthand for a constituent that environmentally evokes an utterance.

[32] We would, however, need a way of capturing the syntactic rôle of this unit, i.e. how the IU relates to the utterance as a whole, as well as to the adjacent IU(s) (if any). Specifically, we would need to specify that the IU is followed by a Predicate IU, and that these combine as subject and predicate to form a complete utterance. This would be captured by a schema of the form { [*Canberra*]$_{Sbj}$ {PRED} }$_S$, where curly braces are used to enclose structures that lie outside the IU being defined.

phonological covering" of the usage event; if no complete phonological covering can be found using the available schemas, then the usage event is judged as ill-formed.

This would be a viable account of sanctioning for a language that had no morphology. However, once we allow for productive morphology, it immediately becomes clear that it will often be impossible to find a complete phonological covering in the manner described: for example, if a speaker hears the plural noun *octopi*[33] for the first time, they will be unable to locate a schema with precisely this phonological content. Yet speakers are perfectly capable of accepting and understanding such novel morphological forms; the question is how to account for this in the present model.

The typical approach to the description of morphology—the "Item-and-Arrangement" approach—is to say that the speaker represents a morphologically-complex word as a combination of a stem and affixes. In this case, the claim would be that the speaker represents *octopi* as consisting of a stem *octop-* 'octopus (unspecified for number)' and an affix *-i* 'PL'; there would then be a "plural noun" schema of the form $[\mathrm{N}_{stem}\text{-}i]_{N_{pl}}$, and the speaker would be able to recognise *octopi* as instantiating this schema, having already extracted the stem *octop-* from the singular form *octopus*. (See Booij 2010 for a detailed exposition of such an approach to morphology.) However, this approach is incompatible with the present framework, as the "stem" does not constitute a full phonological word,[34] and thus cannot have a semantic pole. Furthermore, in languages which exhibit "non-concatenative" morphology, it is often impossible to separate stem from affixes in the speech stream (see Rubba 1993 for a careful treatment of non-concatenative morphology in a dialect of modern Aramaic using Cognitive Grammar).

A different approach to morphological description—a "Word-and-Paradigm" approach—would be to make use of the notion of a "second-order schema" (Nesset 2008: 18–21), or a pattern of relatedness between two types of (first-order) schemas. In this case, "Latinate second-declension pluralisation" (as exemplified by *an octopus* ⟶ *octopi*) would be captured by second-order schemas such as $[\,[\textsc{Sbj}\,[\mathrm{V}\,[/\text{ən}\mathrm{V}\ldots\text{əs}/]_{Obj}]_{Pred}]_{S} \longrightarrow [\textsc{Sbj}\,[\mathrm{V}\,[/\mathrm{V}\ldots\text{aɪ}/]_{Obj}]_{Pred}]_{S}]$. This schema summarises the observed regularity (which occurs with moderately high type frequency) that whenever one finds an generic plural noun phrase in object position begin-

[33] This is an innovative plural form; the standard form is *octopuses*, and the correct Greek plural is *octopodes* (/ɒkˈtəʊpədiːz/).

[34] I am assuming here that phonological words cannot be nested; this is not uncontroversial.

ning in a vowel and ending in /aɪ/, one often also finds an existing first-order schema with a corresponding singular indefinite noun phrase in object position, which has /əs/ at the end instead of /aɪ/, and which has /ən/ added on at the beginning. This model of morphology is consistent with the present framework, as it does not require assigning meaning to phonological units below the level of a word.

Turning back to the description of sanctioning, I would propose that the process runs as follows: the speaker, upon hearing *octopi* (in a particular sentential context), compares it with all stored (first-order) schemas. For every such pair (e.g. (*an octopus*, *octopi*)), the speaker searches for a high-type-frequency second-order schema that matches along the semantic pole (e.g. (indefinite singular, generic plural)); and if any such second-order schemas are found, the speaker checks whether any of them also matches along the phonological pole (e.g. (/ənV…əs/, /V…aɪ/)). The usage event is judged as well-formed only if, for every pairing of a phonological word with a stored first-order schema, if there is at least one high-type-frequency second-order schema that matches this pairing semantically, then at least one of those second-order schemas also matches phonologically.

To make this clearer, let us consider an example of a (novel) usage event that is judged to be ill-formed, e.g. **I drinked it all* (Langacker 1987: 432). Here, the speaker compares *drinked* (in the context of this usage event) with a schema such as [Sbj [*is drinking* Obj]$_{Pred}$]$_S$. There is indeed at least one high-type-frequency second-order schema that semantically matches the pairing of this first-order schema with *drinked*, namely the present-progressive–to–past-tense schema [[Sbj [/ɪz…ɪŋ/ Obj]$_{Pred}$]$_S$ ⟶ [Sbj [/…d/ Obj]$_{Pred}$]$_S$]—and this schema also matches phonologically. However, the speaker *also* compares *drinked* to the schema [Sbj [*drank* Obj]$_{Pred}$]$_S$. There is a high-type-frequency second-order schema that semantically matches this pair as well, namely the "semantically null" [[Sbj [/…/ Obj]$_{Pred}$]$_S$ ⟶ [Sbj [/…/ Obj]$_{Pred}$]$_S$]. But this second-order schema is also *phonologically* null—and this *mismatches* the *drank*/*drinked* pairing. Thus, the usage event *I drinked it all* is ruled to be ill-formed.

(An important point raised by this analysis is that in practice, a large amount of the work of sanctioning is done by semantically and phonologically "null" second-order schemas, which merely check whether the usage event matches up with a stored first-order schema. Thus, the model of sanctioning adopted here is a generalisation of the "naïve" model which

does not make use of second-order schemas.)

Thus, to summarise:

1. **(First-order) schemas in the grammar**
   (a) **are IU-sized, and**
   (b) **specify exactly one phonological word.**
2. **An IU is sanctioned one phonological word at a time, by**
   (a) **comparing that word (in its context) with all stored first-order schemas;**
   (b) **for each pairing, searching for high-type-frequency second-order schemas that match semantically;**
   (c) **if any are found, checking whether any of the second-order schemas also matches phonologically.**

Chapter 6

Descriptive application

This chapter builds on the theoretical proposals presented in the last chapter, and attempts to show how a number of grammatical phenomena in English (at least) can be adequately described without violating the Extended Content Requirement or the strong IU storage hypothesis.

The chapter starts by defining some relevant units of discourse, in particular the "sentence". It then focuses on (declarative) finite clauses and their constituents: verbs (or verb complexes), arguments, and adjuncts. Finally, we consider clause structures that are traditionally analysed as being "derived" from a basic clause structure using movement or deletion operations (which are of course forbidden by the Content Requirement); this includes *wh*-questions, relative clauses, topicalisation, and various kinds of ellipsis.

In this chapter, to a much greater extent than in the previous chapter, diagrams will be used (for their succinctness) as the primary way of expressing the proposed analyses, with the surrounding text serving mainly to justify and gloss the diagrams, and to highlight important aspects of them. Accordingly, precise notational conventions will be developed over the course of this chapter, which the reader is encouraged to become familiar with.

6.1 Units of discourse

The largest unit of discourse that will be considered within this framework is the (conversational) *turn*, or the interval between when a speaker starts speaking and when he or she "hands off" to the next speaker. Every turn is composed of one or more "Turn Construction

Units" (TCUs), a term first introduced by Sacks, Schegloff & Jefferson (1974: 701, 720–723) in the framework of Conversation Analysis (CA). A TCU can be understood as a unit that could *potentially* stand on its own as a full turn; more precisely, a TCU is a stretch of speech at the end of which the next speaker may take the floor if they so wish (but may also allow the first speaker to continue speaking). In the terminology of Conversation Analysis, a TCU is defined as a stretch of speech that ends in a "Transition Relevance Place" (TRP; Sacks, Schegloff & Jefferson 1974: 703). To put it another way, a TCU is over when the speaker has "made a point"; in written language, a TCU would correspond roughly to a "paragraph" (and a turn to a "text").

Each TCU, in turn, consists of one or more "sentences". "Sentence" is a term that enjoys little favour in CA and related approaches, since units that are "grammatically complete" are often not pragmatically complete (Ford & S. A. Thompson 1996: 153 ff.)—in other words, speakers often speak in "run-on sentences". Thus, CA and related approaches do not make use of a construct that corresponds to the notion of a "sentence" (though see Chafe 1994: 139–144 on "centers of interest"). However, I believe there is one way of defining a sentence-like notion that not only is relevant to discourse, but also corresponds fairly well to the notion of a syntactically complete unit. Specifically, I propose to define a sentence as **a stretch of speech that environmentally evokes an utterance** (or "attitudinal object" in the sense of Moltmann 2014)—intuitively, a stretch of speech which "does something" interactionally, or which *contributes* towards making a point. A sentence can be followed by a change of speaker; but unless the sentence occurs at the end of a TCU, the next speaker can only respond with a minimal "back-channel" response (a "continuer", in the terminology of Schegloff 1982: 81) such as *uh-huh* or *yes?*, and must immediately yield the floor back to the original speaker until she has finished making her point.

The type of sentence most commonly described in descriptive grammars (and arguably most frequent in discourse) is a finite clause (which profiles a state of affairs and evokes eventualities, etc., as we saw in §5.2.3); accordingly, this chapter will primarily focus on finite clauses and their constituents. However, there are also many other types of sentences, some of which Langacker (2008a: 475–477) discusses under the heading of "expressives". Some expressives have a profile, though the profile may not be identical to that of the

nearest clausal paraphrase:

(71) Fire! [≈ There's a fire!]

a. Where is it [= the fire]? [actant]

b. # That [= there being a fire] hasn't happened for a while. [eventuality]

c. # That [= the fact that there's a fire] doesn't surprise me. [state of affairs]

(72) A snake! [≈ There's a snake!]

a. Get it [= the snake] off me! [actant]

b. # That [= there being a snake] is unusual at this time of day. [eventuality]

c. # That [= the fact that there's a snake] makes it likely that there are others.[state of affairs]

Other expressives may not have a profile at all:

(73) Hello! [≈ 'I greet you'?]

a. # That [= you(r) greeting me] is unusual. [eventuality]

b. # That [= the fact that you're greeting me] makes me wonder if we've met before. [state of affairs]

(74) Thank you! [≈ 'I thank you'?]

a. # That [= you(r) thanking me] hasn't happened for a while. [eventuality]

b. # That [= the fact that you're thanking me] surprises me. [state of affairs]

All expressives, however, environmentally evoke an utterance (and hence qualify as sentences by the definition proposed above):

(75) Fire!

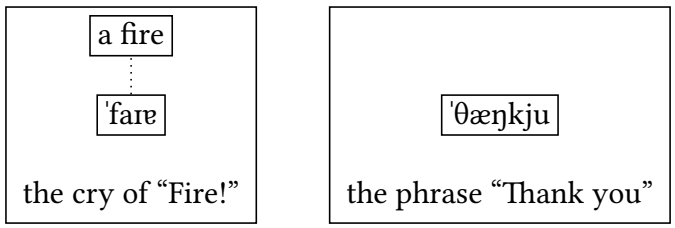
a. That [= the cry of "Fire!"] is a stupid thing to yell in a crowded room like this!

(76) Thank you!

a. And thank *you* for saying that [= the politeness expression "Thank you"]!

The above observations can be summarised diagrammatically as follows:

(77)



Fire! *Thank you!*

Here, the outermost boxes denote the environmentally-evoked utterances, which conceptually contain both the phonological and (if applicable) semantic poles of the sentence.

The rest of this chapter will focus exclusively on sentences that are finite clauses (i.e. which profile a state of affairs).

6.2 Verbs

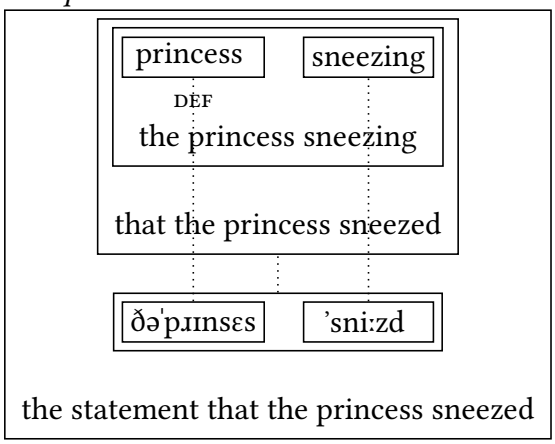
We will begin our discussion of finite-clause sentences with sentences that occupy a single IU. We will extract first- and second-order schemas for finite verbs and verb-complexes. The next section will consider schemas for arguments and adjuncts, and introduce finite clauses that are split across multiple IUs.

6.2.1 Valency

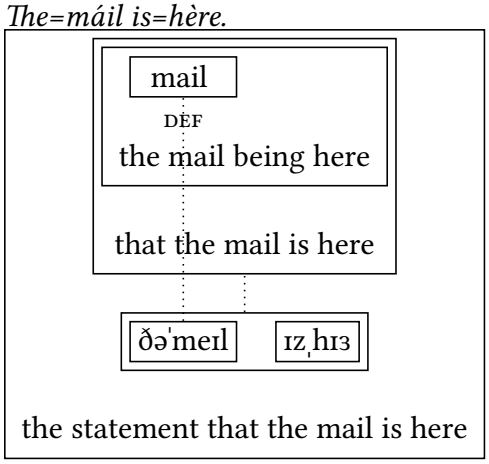
As we saw in the last chapter, finite-clause sentences fall into two main types: those that are organised into subject and predicate, and those that lack subject-predicate organisation. Another way of stating this is that some sentences (such as *The=príncess snéezed*[1]) evoke a higher-order eventuality (e.g. ‘sneezing’) and thus have a subject (defined as the entity that lies outside the conceptual content of the higher-order eventuality but within that of the lower-order one: in this case ‘the princess’), whereas others (such as *The=máil is=hère*, or *It’s=ráining*) do not evoke a higher-order eventuality, and thus cannot have a subject as such; in some cases (such as *It’s ráining*), they may not even have any actants. The following are representations of the sentences *The=príncess snéezed*, *The=máil is=hère*, and *It’s=ráining*:

[1]In this chapter, following Chafe (1994), acute and grave accents will be systematically used to indicate primary and secondary stress in sentences. Every phonological word will carry exactly one accent mark. The equals sign (=) will be used to join orthographic words that belong to the same phonological word. In diagrams, the phonological poles will be given in IPA transcription, following standard British English phonology (though my own dialect is closer to standard American English). Here, too, primary and secondary stress will be indicated, using the IPA symbols /ˈ/ and /ˌ/, respectively.

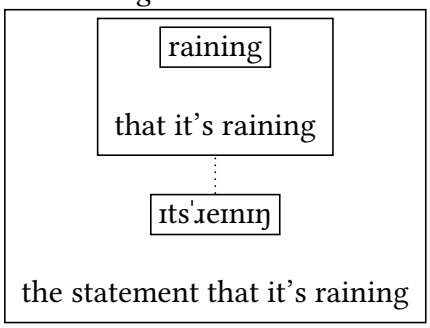
(78) a. *The=príncess snéezed.*



b. *The=máil is=hère.*



c. *It's=ráining.*



(In these representations, the specification "DEF" is given *outside* the boxes that it applies to, to make it clear that it is an aspect of grounding, i.e. a property of the *descriptions* of certain entities, rather than a property of those entities themselves. Grounding specifications will often be omitted to keep diagrams uncluttered; strictly speaking, every box representing an evoked entity needs to have one.)

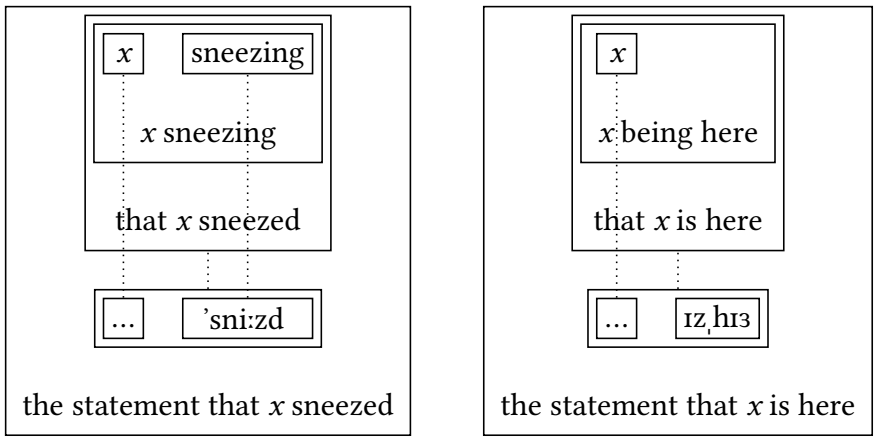
In the above diagrams, each box that represents a (textually or environmentally) evoked entity is provided with an informal gloss; the correspondences between the glosses and the types of abstract entities that I claim are evoked by a finite clause (as discussed in §5.2.3)

are given in the following table:

Higher-order eventuality	sneezing	–	–
Lower-order eventuality	the princess sneezing	the mail being here	raining
State of affairs	that the princess sneezed	that the mail is here	that it's raining
Utterance	the statement that [...]		

On the basis of the first two diagrams above (and those of other sentences involving *snéezed* and *is=hère* that the speaker may have come across), it is possible to extract the following first-order schemas:

(79)



$[\textsc{Sbj}\ [\textit{snéezed}]_{Pred}]_S$ $[\textsc{Arg}\ \textit{is=hère}]_S$

(Note that, since *is=hère* is not a predicate, its argument is not, strictly speaking, a subject—hence I have abbreviated it as Arg(ument) instead.)

At this stage it will be useful to explicitly state a (hypothetical) procedure for how schemas are extracted from usage events; the following proposal is consistent with the formulation of the strong IU storage hypothesis in the previous chapter:

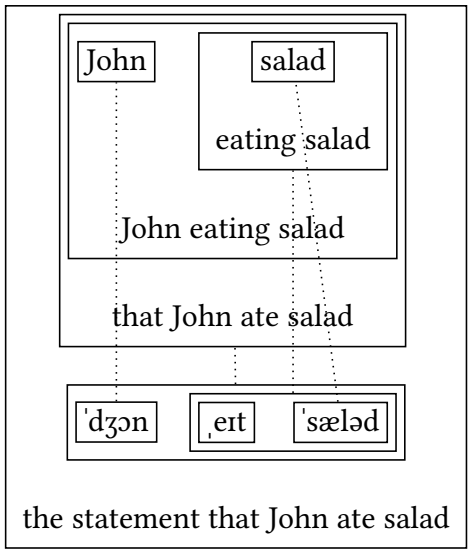
> A schema can only be extracted from a set of IUs that
>
> 1. have the same "constituent structure" (i.e. the same meronomic configuration of semantic and symbolic structures, regardless of their actual content), and
> 2. share one phonological word, and the semantic pole that this word (at least partially) symbolises; these must be in the same position with respect to the shared constituent structure of all the IUs.
>
> In addition to the shared constituent structure and the shared phonological word and semantic pole, the schema will also preserve any abstract semantic

structure (e.g. grounding of evoked entities, relations among entities, etc., but not evoked entities themselves) that is constant throughout the set of IUs.

This constraint is sufficiently restrictive to provide a clear procedure for (1) selecting a set of IUs to generalise over, and (2) extracting a precise schema from them. This procedure—which I will call for convenience the **Schema Extraction Procedure** (SEP)—will be followed rigorously in the remainder of this chapter. The reader can verify that the above schemas for *snéezed* and *is=hère* are exactly the ones we would obtain by following the SEP (*is=hère* only partially symbolises 'that *x* is here'; only the whole clausal IU fully symbolises it).

So far we have considered only intransitive clauses—clauses which do not have an object, i.e. any constituent within the predicate. It is not hard, though, to see what the representation of a transitive clause would look like, e.g. for *Ɉóhn àte sálad*:

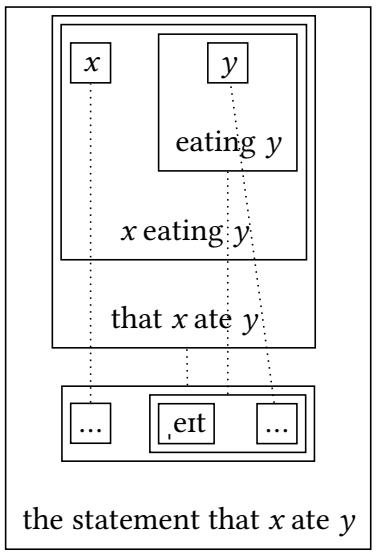
(80)



Ɉóhn àte sálad

Applying the SEP, we can see that it is possible to extract the following schema for *àte*:

(81)



$[_{\text{SBJ}}\ [\textit{àte}\ _{\text{OBJ}}]_{Pred}]_S$

The above schema accounts for sentences where the subject, verb and object are all phonologically separate. However, it fails to account for a sentence such as *Ɉóhn àte=a sándwich*, where the indefinite article encliticises to the verb, thus forming a phonological word with it, and is separated from the head noun. Under most approaches, we would say that there is a "mismatch" between syntax and phonology (see e.g. Lahiri & Plank 2010, among many others): although *a sándwich* constitutes a syntactic constituent (and is thus capable of bearing meaning), it does not constitute a phonological constituent in this sentence. Such an approach is analytically convenient, in that it allows us to use the same syntactic analysis for both *[[Ɉóhn] [àte [sálad]]]* and *[[Ɉóhn] [àte [a sándwich]]]*. However, it requires a level of structure (syntactic constituency as distinct from phonological constituency) that is neither properly phonological nor properly semantic (and not reducible to a combination of the two)—and which thus cannot be detected "on the surface" of a usage event.[2] It would thus be desirable to work only with phonological constituency (as this is directly observable), and assume that all meaning-bearing units (i.e. what syntactic constituents are supposed to be) are phonological constituents[3] (see e.g. Steedman 2000 for similar arguments—and see the "phonological syntax" of Trager & Henry Lee Smith 1957

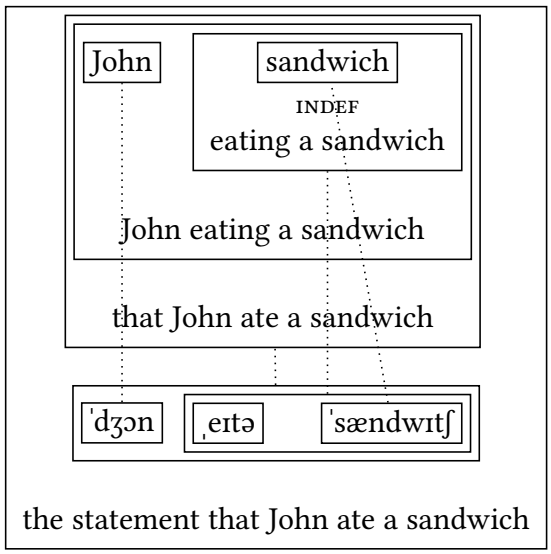
[2]It is important to note that most standard diagnostics of syntactic constituency—e.g. whether a particular portion of a sentence can be displaced or interrupted—depend on *distributional* tests, and thus do not refer exclusively to properties that are observable in the usage event itself. Also, experimental tests of syntactic constituency (e.g. Gee & F. Grosjean 1983; F. Grosjean, L. Grosjean & Lane 1979; Levelt 1970a,b, *pace* Garrett, Bever & Fodor 1966) invariably find a kind of structure that corresponds more closely to phonological constituency than to syntactic constituency as traditionally understood (see also Bybee & Scheibman 1999: esp. 589–593).

[3]The converse is not true: it is quite possible for a phonological constituent to not be a meaning-bearing unit, as is the case with the verbs (as opposed to the verb phrases) in the above schemas.

for an intriguing precedent to this approach from the late Bloomfieldian era).

Thus, given the phonological constituency of *Ʃóhn àte=a sándwich*, it would be preferable to posit *sándwich* (rather than *a sándwich*, which is not a phonological constituent here) as the meaning-bearing unit that profiles the sandwich, as shown in the following representation:

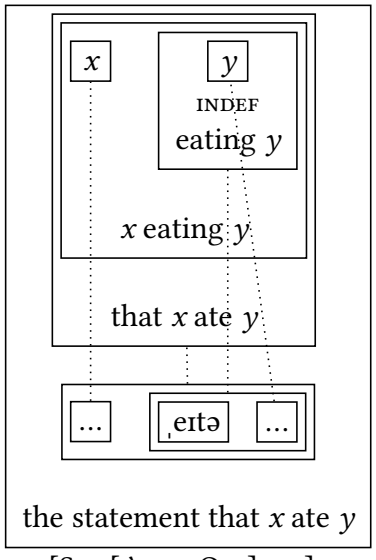
(82)



Ʃóhn àte=a sándwich

(The encliticisation of *=a* is accounted for by the relevant second-order schema on page 129.) Applying the SEP, we get the following schema for *àte=a*:

(83)



[SBJ [*àte=a* OBJ]$_{Pred}$]$_{S}$

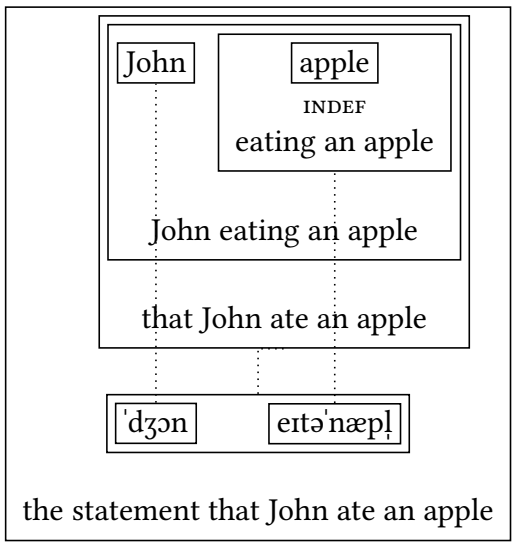
Note that the indefiniteness specification on the object is preserved in the schema, as it is present without exception in all the usage events covered by the schema.

At this point, two questions naturally arise. Firstly, doesn't it need to be specified in the schema that the object noun needs to start with a consonant (**Ʃóhn àte=a ápple*)? And secondly (following on from the first question), how would the present framework describe

the encliticisation of *an* to a preceding verb, while imposing the correct constraints on the use of *a* versus *an*?

Let us start with the second question. It appears that in English, while *a* is often phonologically separated from the following noun when it is encliticised to a preceding verb, *an* never is; thus we have *Jóhn ate=an=ápple* rather than **Jóhn àte=an ápple*. This means that in this sentence, *ápple* is not a phonological constituent, and thus cannot bear meaning on its own—which suggests the following analysis:

(84)



Jóhn ate=an=ápple

Note, too, that *a* remains joined to the following noun (even when encliticised) when the noun begins with an unstressed syllable: thus we have *Jóhn ate=a=banána* rather than **Jóhn àte=a banána*; this would be analysed analogously to the above case.

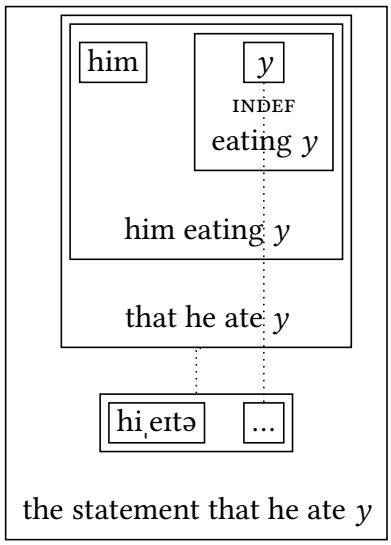
In these cases, what we are dealing with is effectively a special "inflected form" of the noun, which would thus be captured using a second-order schema such as [Sbj [V *the=•*]$_{Pred}$]$_S$ [Sbj [*ate=an=•*]$_{Pred}$]$_S$. The constraint that *an* requires a noun beginning in a vowel, or that *a* requires a noun beginning in a consonant, would be captured by making the appropriate specifications on the "•" in the second-order schema (e.g., [Sbj [V *the=/V•/*]$_{Pred}$]$_S$ > [Sbj [*ate=an=/V•/*]$_{Pred}$]$_S$).

For *a* followed by a noun starting with a stressed syllable (as in *…àte=a sálad*), the fact that the noun must begin with a consonant would be captured by more general phonotactic constraints of English. For example, one might argue that in English, a phonological word can never begin with a vowel; even when it appears at the beginning of an IU, a vowel

automatically acquires a glottal stop onset (e.g. [ʔ]*Apples are delicious*).[4] To answer the original first question: no, the schema for *àte=a* doesn't need to specify that the following noun must start with a consonant. (The importance of all this argumentation is that it suggests that schemas do not contain phonological specifications for anything other than the phonological word on the basis of which they were extracted. This keeps the SEP simple.)

So far, we have considered only clauses where the arguments are full noun phrases. However, in natural discourse, the arguments of a clause (and especially the subject) are very often pronominal, and in particular bound pronouns. This may result in another kind of claimed "mismatch" between syntax and phonology: even in transitive clauses, where the verb and object supposedly form a syntactic unit (a "verb phrase") that is separate from the subject, the subject and verb may form a phonological constituent that excludes the object. As before, it is desirable to avoid positing two types of constituency, and preferable to assume that only phonological constituents may be meaningful units. This suggests schemas such as [*he=àte=a* OBJ]$_S$:

(85)



[*he=àte=a* OBJ]$_S$

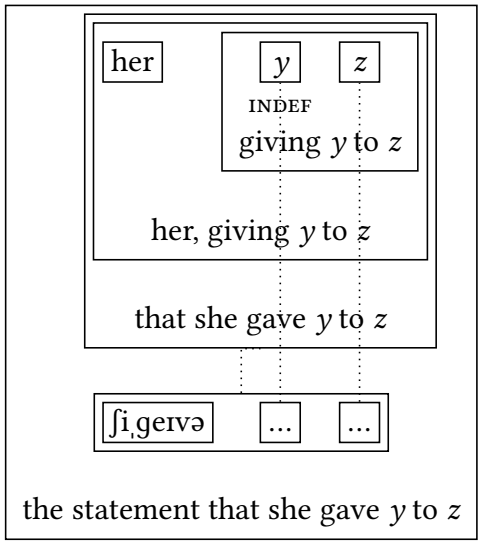
Note that here, "*àte=a* OBJ" is not treated as a meaningful unit, since it is not a phonological constituent.

Let us now briefly consider clauses with more than one object, such as those involving verbs of transfer. The following is a schema for *gave* in a dative frame, [*she=gàve=a* THM

[4]This raises the point that the framework being developed must have a systematic way of stating these kinds of phonotactic constraints. This issue will not be discussed here, for lack of space; but suffice it to say that the most natural approach would be along the lines of Radical Templatic Phonology as proposed by Vihman & Croft (2007).

Rec]$_S$:[5]

(86)



[*she=gàve=a* Thm Rec]$_S$

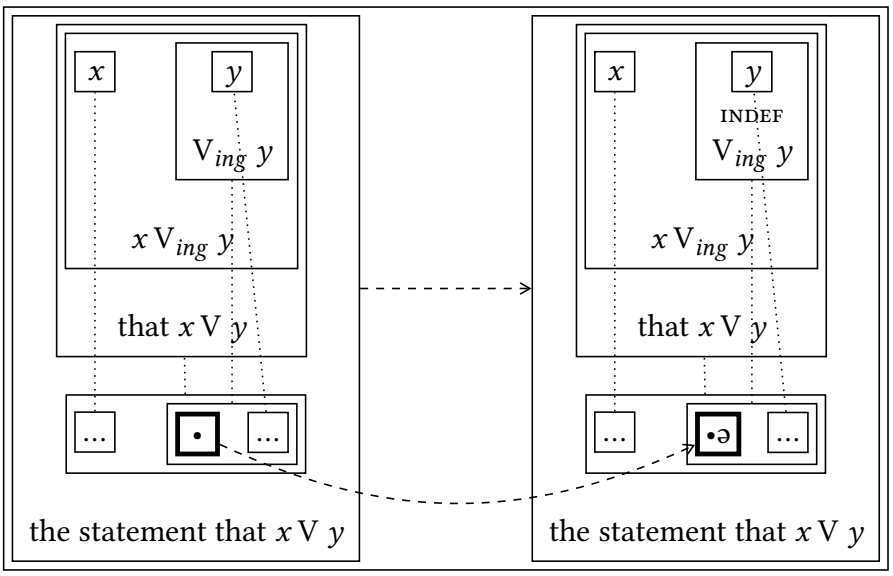
(Note that this schema only covers cases where the constituent profiling the theme begins with a consonant-initial stressed syllable, e.g. *She=gàve=a bóok…*. For other cases, such as *She=gave=an=ápple…*, or *She=gave=a=banána…*, different schemas will be needed.) The reader should be able to work out corresponding schemas for *gave* in a ditransitive frame (e.g. [*she=gàve* Rec Thm]$_S$ or [*she=gàve=him* Thm]$_S$).

So far, we have considered only first-order schemas; we are thus not yet able to properly account for the sanctioning of novel usage events, and in particular, productivity in argument structure (i.e. the ability to take a verb that has been witnessed in one argument-structure configuration, and use it in another argument-structure configuration, as described and analysed extensively in e.g. Goldberg 1995). This is fairly straightforward, however. Let us introduce the use of second-order schemas with the simple example of taking a verb without an encliticised indefinite article (e.g. *àte*), and using it in a context where it does have an encliticised indefinite article (i.e. *àte=a*). This could be described as follows:[6]

[5]Note that it is not specified that Rec must begin with the preposition *to*, since only one phonological word can be specified by a schema. This information would instead be captured by the appropriate noun-phrase schema for the oblique object in the dative frame. See the discussion of oblique objects below.

[6]In second-order schemas, thick lines will be used to indicate the phonological word that changes between the source and the target—the "focus" of the second-order schema, as it were. This is of course the phonological word that is specified by the first-order schemas that instantiate the source and target. Since a second-order schema generalises over a number of pairings of first-order schemas, e.g. *àte*/*àte=a*, *sàw*/*sàw=a*, *wànted*/*wànted=a*, etc., the focus is typically at least partly schematic. This is not a violation of the SEP, as the requirement for a schema to specify exactly one phonological word only applies to first-order schemas. The dashed arrows indicate a relationship of "extension" or "partial schematicity" between the source and the target, and between corresponding structures within the source and target; see Nesset (2008: 18–19).

(87)

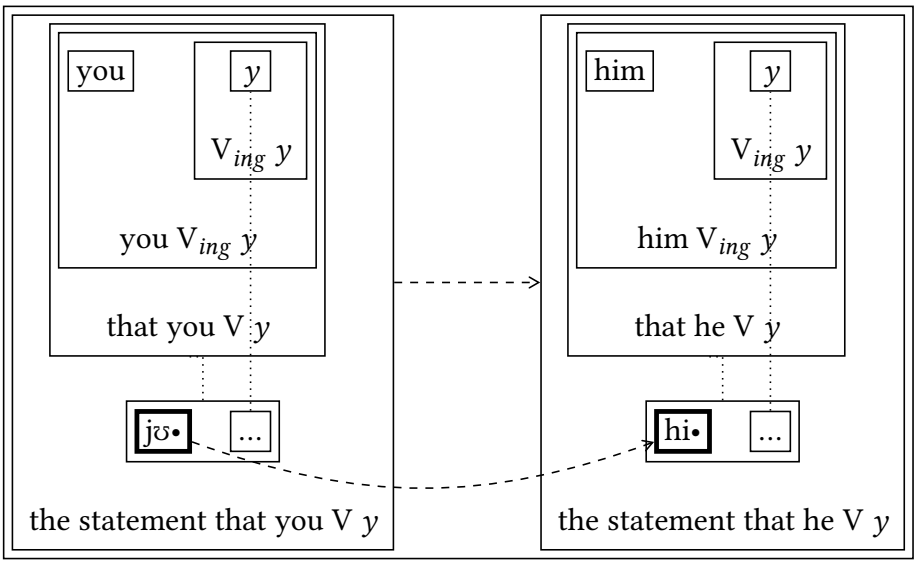


Encliticisation of indefinite article to a transitive verb

The above second-order schema would be able to sanction a comparison between a novel usage event such as *Jóhn àte=a sálad* and the schema [Sbj [*àte* Obj]$_{Pred}$]$_S$, in accordance with the sanctioning procedure laid out in the last section of the previous chapter.

To take another simple example, the following is a schema for deriving a transitive clause with the bound subject pronoun *you* from one with the bound subject pronoun *he*:

(88)



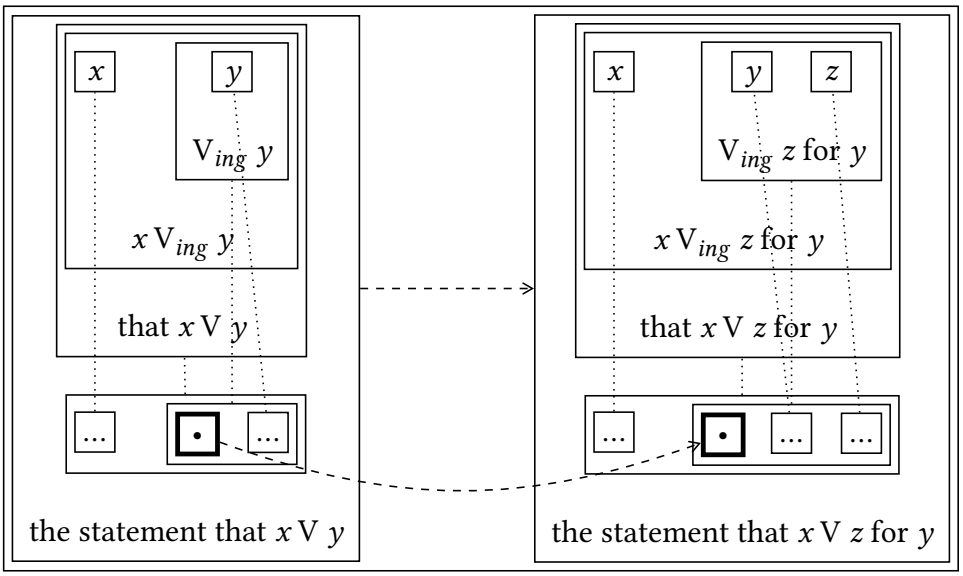
Replacement of bound subject pronoun *you* with *he*

This schema is of course just one of a number of second-order schemas (involving different pairings of bound subject pronouns), which together constitute a "paradigm" of pronominal subject marking on English transitive verbs. (See Bybee 1985: ch. 3, 5 for the model of paradigms adopted here.)

Turning now to cases of productivity in argument structure (or to put it another way, valence-changing operations), here is a second-order schema for deriving a ditransitive use

of a verb from its transitive use (i.e., [Sbj [[•]$_V$ Obj]$_{Pred}$]$_S$ > [Sbj [[•]$_V$ Rec Thm]$_{Pred}$]$_S$):

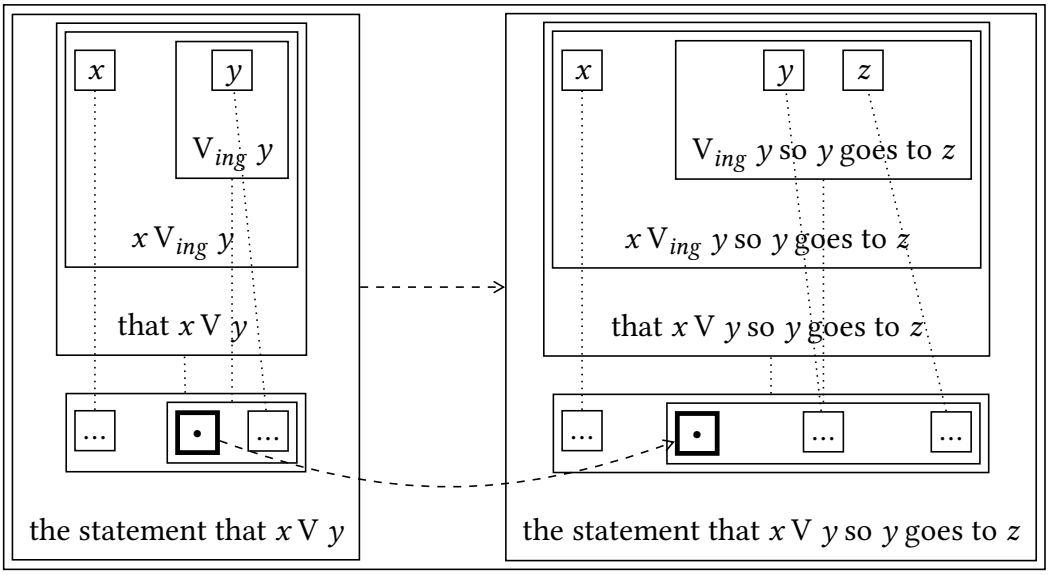
(89)



Coercion of a transitive verb into the ditransitive construction

Likewise for extending a transitive verb using the caused-motion construction (i.e., [Sbj [[•]$_V$ Obj]$_{Pred}$]$_S$ > [Sbj [[•]$_V$ Obj PP]$_{Pred}$]$_S$):

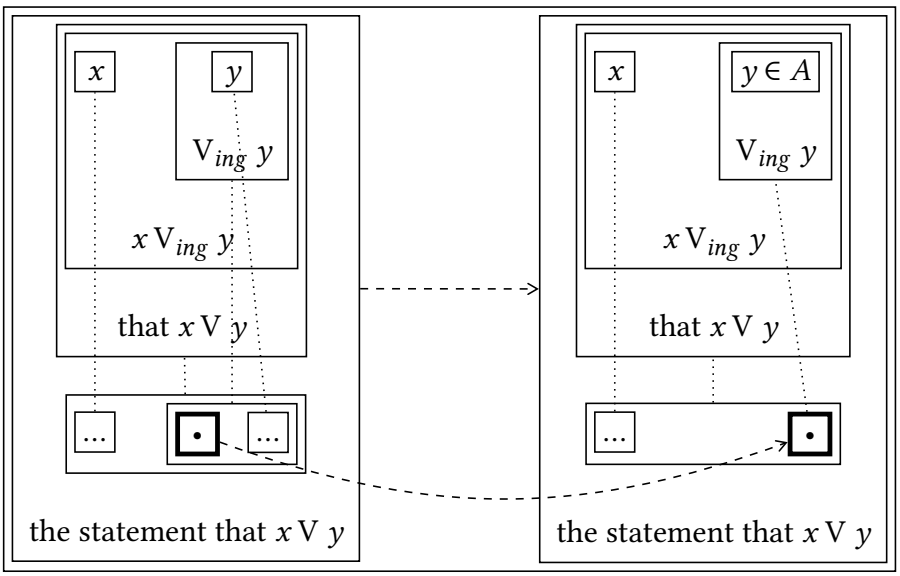
(90)



Coercion of a transitive verb into the caused-motion construction

To conclude, let us move from valence-*increasing* operations to valence-*decreasing* operations, in particular the family of phenomena called *null instantiation* by Fillmore (1986). Let us start with Definite Null Instantiation (DNI), where a verb appears with one fewer complement than it would normally take, but the identity of the referent of the missing complement is recoverable from the context due to being highly salient. For example (Fillmore 1986: 98), *Why did you marry her?—Because Mother insisted ø [= on it].* The pattern whereby the object of a transitive verb could be subjected to DNI may be notated as follows:

(91)

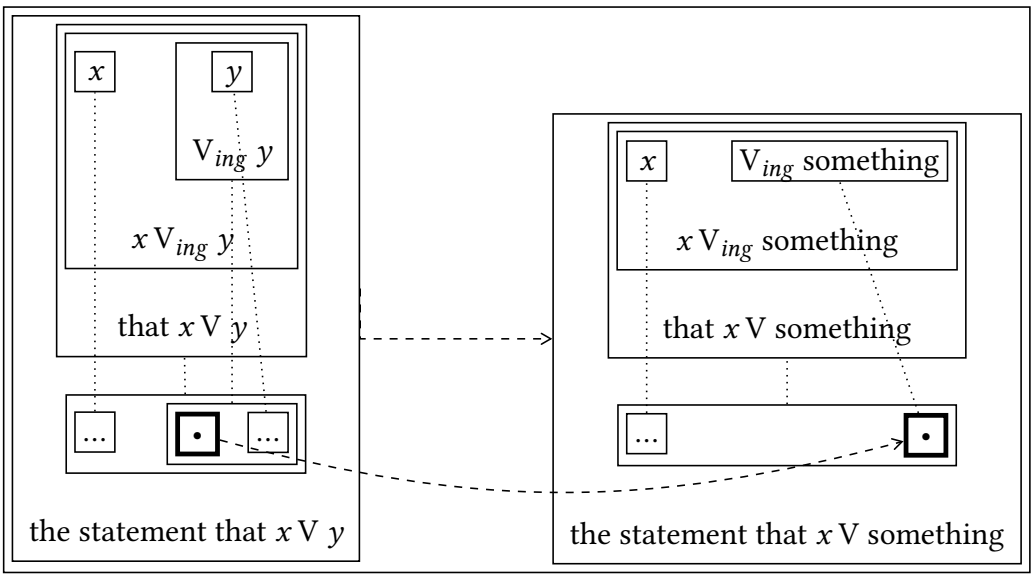


Definite Null Instantiation

(Here A refers to the set of all entities that are active in the discourse; $y \in A$ is thus used as shorthand for "some entity y which is currently active". We could just as well have used *it/him/her*.) It so happens that in English, DNI is unproductive, and completely lexically determined (Fillmore 1986: 98–102); however, in so-called "pro-drop" languages, it is easy to see that DNI is massively productive.

The second type of null instantiation mentioned by Fillmore (1986) is Indefinite Null Instantiation (INI); this is where a verb appears without a complement that it would normally be expected to have, and the referent of this missing complement is filled in with a conventional, generic entity rather than an entity that is currently active in the discourse. For example (Fillmore 1986: 96), *We've already eaten ø [= a meal]*; *I've tried to stop drinking ø [= alcohol]*. The pattern whereby the object of a transitive verb could be subjected to INI may be notated as follows:

(92)



Indefinite Null Instantiation

Unlike DNI, INI is at least partially productive in modern English; a possible example of a relatively recent novel instance of INI is the expression *holding ø* to mean "having drugs to sell" (*Urban Dictionary* 2016: s.v. *holding*).

The third type of null instantiation introduced by Fillmore (though not discussed in Fillmore 1986) is Free Null Instantiation (FNI), whereby some actant of the clause is left unexpressed, and may be filled in with either a contextually salient entity or a conventional, generic entity. FNI is usually used to describe non-core arguments, e.g. Croft (2001: 276):

(93) a. She took some blue stationery out of the cupboard and wrote a letter ø [= on it].

b. She wrote a letter ø [= on something].

One way of analysing this would be to say that these usages of the verb *write* are productively derived from a schema such as [Sbj [*wròte=a* Obj Loc]$_{Pred}$]$_S$, by way of second-order schemas that are exactly analogous to the ones above for DNI and INI. Details are omitted for reasons of space.

6.2.2 TAM marking

Thus far we have mainly been considering verb schemas that differ according to how many arguments are present; in other words, that differ by argument structure. In this subsection, we consider schemas that differ by the tense/aspect/mood (TAM) of the verb. In doing so, we will need to begin with a precise understanding of the range of semantic values of each TAM category.

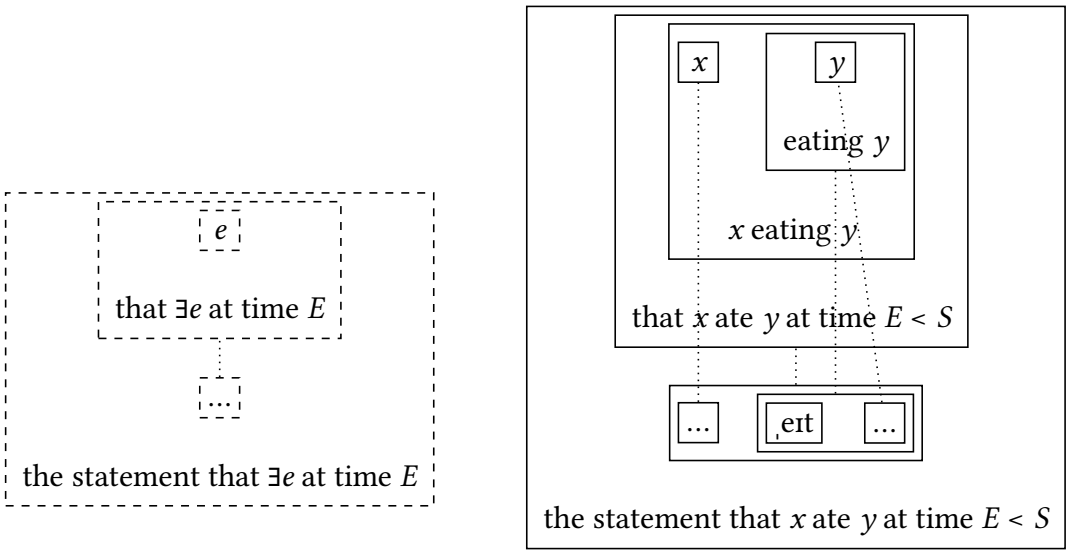
Let us begin by considering the past tense, as this is the only TAM category that is expressed in English by straightforward inflection. In the classic analysis by Reichenbach (1947: 290), the past tense is the tense where the event time is prior to the speech time, and equal to the reference time ($E = R < S$). The terms "event time" and "speech time" are self-explanatory; the "reference time" (also sometimes called the "topic time") will be understood here as the event time associated with a state of affairs evoked in the preceding discourse.

Typically, the event time of a past-tense clause is identified with the event time of the preceding clause (which thus serves as the reference time):

(94) Last night I had dinner at home. I ate bread (last night).

This could be captured by a schema such as the following (for the verb *eat*):

(95)



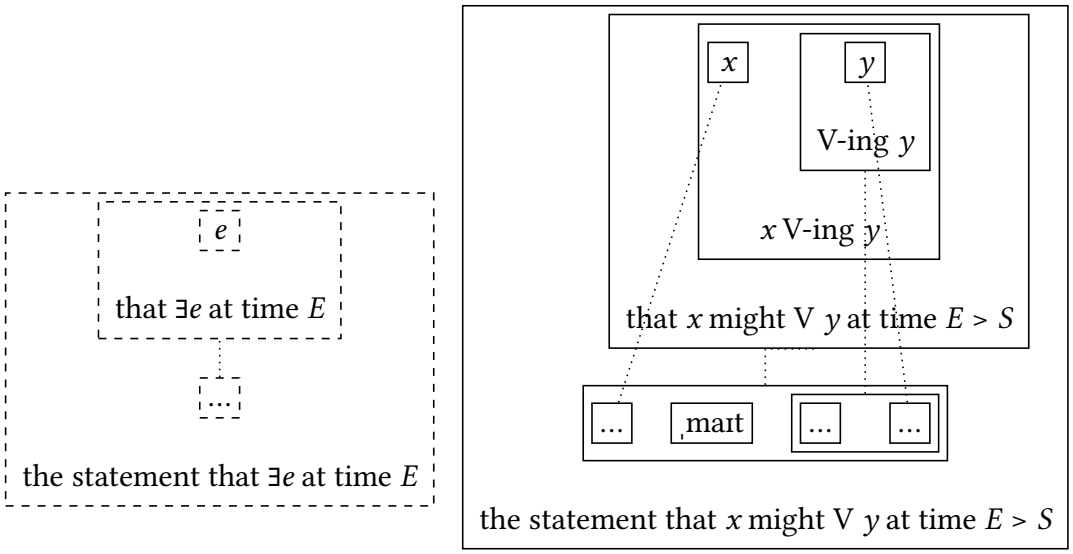
[Sbj [*àte* Obj]$_{Pred}$]$_S$

This schema specifies that the event time E is in the past ($< S$), but also specifies that the preceding discourse includes a clause that has the same event time (i.e., which also evokes a state of affairs situating some eventuality *e* at time E).

However, not all uses of the English past tense make use of a reference time: for example, a sentence like *My=cát (just=)dìed* can be used discourse-initially (with the implication that the event time is just prior to the speech time). Likewise, if an event time is stated explicitly (as in *I=àte bréad last=nìght*), there is no need to "carry over" the event time from a previous clause. These cases are thus better described as simply $E < S$, without R figuring anywhere.

Other TAM categories (e.g. future tense, or various modal categories) are analogous to the above, but may of course presuppose a reference/event time in the future rather than the past. The following is a schema for the modal auxiliary *might*, or more precisely, [Sbj *mìght* [V Obj]$_{Pred}$]$_S$, in the usage where the event time is carried over from a previous clause:

(96)



[Sbj *mìght* [V Obj]$_{Pred}$]$_S$

The above thus corresponds to $S < E = R$. As with the past tense, futures and modals can be used in a way that does not make use of a reference time (either by specifying the event time explicitly, or by implying that the event time is immediately after the speech time).

Contra Reichenbach (1947: 290), the present tense does not make use of a reference time—it only needs to specify that the event time is equal to the speech time, regardless of whether the speech time was also the event time of a previous clause (hence, $E = S$, rather than $E = R = S$). (The *habitual* present, however, may use a reference time: e.g. *I see John every week. We play cards (every week).*)

We have briefly covered categories of tense; let us now consider categories of aspect, starting with the English "perfect" aspect (also called "perfectal"; cf. Sasse 2002: 210), expressed by the auxiliary *have* together with a past participle. In Reichenbach (1947: 290), this corresponds to situations where the event time precedes the reference time (i.e. $E < R = S$ for present perfect, $E < R < S$ for past perfect, and $S < E < R$ for future perfect). This analysis clearly holds good for the past and future perfects; these require (in the absence of an explicitly-specified event time) that the event time be carried over from a previous clause:[7]

[7]Things are a little more complicated with modal auxiliaries other than *will* (e.g. *might have*, *would have*, etc.).

(97) a. John came home at eight. He had made a stop at the grocery store.

b. # John had made a stop at the grocery store. [discourse-initial]

(98) a. Let's meet next week. I'll have finished writing my chapter.

b. # I'll have finished writing my chapter. [discourse-initial]

However, this analysis breaks down for the present perfect, for two reasons. Firstly, even when the event time is not explicitly specified, the present perfect does not require a reference time; it can, for example, be used discourse-initially (e.g. *I've sent you an e-mail; take a look when you can*). Secondly, it is not the case that the event time precedes the speech time ($E < S$), as illustrated in the following examples (Michaelis 1994: 113):

(99) a. * Harry has joined the navy in 1960.

b. [It was 1972.] Harry had joined the navy in 1960.

Here, the event time (specified by the adjunct) is "1960". We can see that unlike in the past perfect, in the present perfect the event time must include the speech time at its right end; thus, compare the starred sentence to the following:

(100) Harry has joined the navy this year.

Here, the event time is "this year (so far)", which clearly includes the speech time. See Michaelis (1994); Richards (1982) and works cited therein for further arguments for this kind of analysis. (Note that Langacker 1991: 211–225 essentially follows the Reichenbachian analysis.)

It must be noted that the present perfect also has a "resultative" reading, where the clause evokes not only the expected higher-order eventuality, but also a derived higher-order eventuality that represents the *result* of that action; and the evoked lower-order eventuality is an instance of the latter, not the former. This can be seen in the following example:

(101) I've finished my lunch!

a. That [= finishing one's lunch] isn't such a hard task! ["root" higher-order eventuality]

These are not necessarily perfects; rather, they may be pasts, allowing for a reference time that is *prior* to the speech time. This can be demonstrated by examples such as *What did she eat last night?—She must have eaten that bowl of chili*, where E is clearly in the past.

b. That [= having finished one's lunch] isn't generally a sufficient excuse for leaving the dining table. [derived higher-order eventuality]

c. That [= you having finished your lunch] usually means you're about to burp loudly. [lower-order eventuality]

See Michaelis (1994), Depraetere (1998), and Croft (2012: 162–164) among others for further discussion of this and other readings of the English present perfect.

Let us move to the progressive aspect, expressed in English by the auxiliary *be* together with a present participle. In terms of Reichenbachian primitives, the progressive tenses can be characterised in the same way as the unmarked tenses (*pace* Reichenbach 1947: 290); what distinguishes them is that the event time covers only a *portion* of the event (a medial state), rather than the entire event from beginning to end. Langacker (1991: 207–211) further claims that it is this medial state (and not the event as a whole) that is profiled by the clause; but while this proposal is theoretically well-motivated within Cognitive Grammar (from the idea that the profile of an expression is curtailed to fit the "immediate scope of predication"), the understanding of profiling and textual evocation in the current framework does not give any reason to believe that a progressive clause evokes a proper subset of the event, as opposed to the full event. (Indeed, it is hard to see how such a claim would even be tested.)

A major strength of the analysis of progressives in Langacker (1991: 207–211) is that it provides an elegant explanation of why it is not possible to use a stative verb in the progressive aspect (e.g. **I am knowing it*): since a stative verb profiles a process that is completely homogeneous, a proper subset of the process would look exactly the same as the full process, and thus the profile of a progressive would look exactly the same as that of the unmarked aspect. In the present framework, the corresponding analysis would be that the present progressive specifies that the event time coincides with an identifiably medial state of the eventuality, i.e. one that is distinguishable from the beginning and end states; in the case of a stative verb, the evoked eventuality does not have any medial state that could be distinguished from the beginning and end states, and so using the present progressive would be semantically incoherent.

Having considered the perfect(al) and progressive aspects, we need to consider the perfect progressive aspect, expressed by the auxiliary sequence *have been* followed by a present participle. The present perfect progressive (*has been*) is fairly straightforward: the event time includes the speech time at its right end ($E \supset S$ and $\max(E) = \max(S)$), and the event time covers only a medial state of the event. However, the past perfect progressive (*had been*) and future perfect progressive (*will have been*) seem to deviate from the normal values of the perfectal aspect in non-present tenses, in that the event time necessarily includes the reference time at its right end ($E \supset R$ and $\max(E) = \max(R)$), whereas normally the event time and reference time are disjoint. This is illustrated in the following examples:

(102) a. John came home at midnight. He had been drinking. [R = midnight, E = the hours before midnight]

b. I promise I'll submit my paper next Monday.—Do you realise we'll have been waiting for it for over two months? [R = next Monday, E = the two months leading up to next Monday]

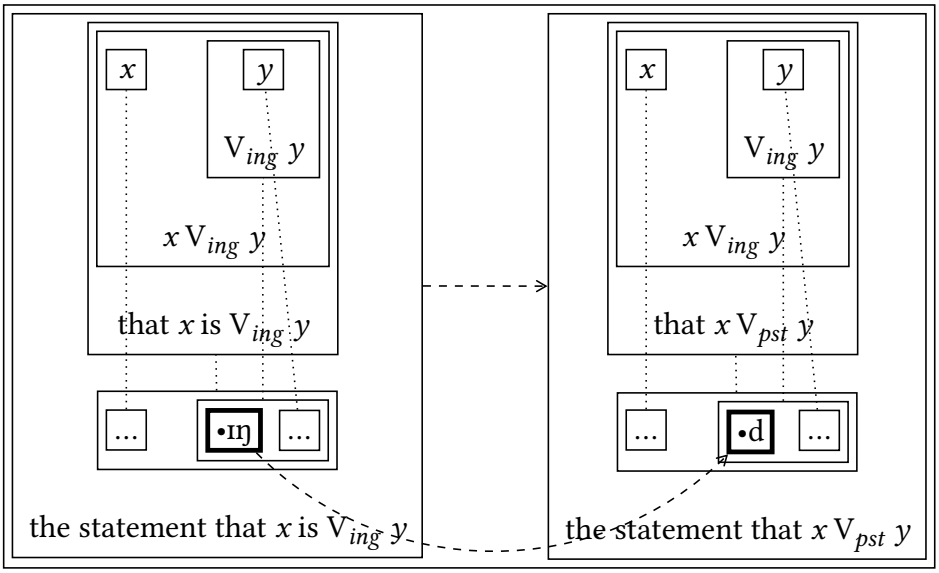
Having seen the semantic values of various TAM categories in English, let us consider the (first-order) schemas that are needed to account for their expression in clauses. In English, (marked) aspectual and (irrealis) modal categories are expressed using "auxiliaries", which may either be phonologically free (*Jóhn mìght cóme*), be encliticised to the subject (*Jóhn='s sléeping*), or be procliticised to the verb (*Jóhn // is=enjóying=himself*). Here, for simplicity, we focus on phonologically free auxiliaries.

We saw above a schema for *mìght*, [Sbj *mìght* [V Obj]$_{Pred}$]$_S$; schemas for other modal auxiliaries look just the same. (Note that under "modal auxiliaries", we need to include such expressions as *might=evèntually* or *would=sòmeday*.) Aspectual auxiliaries typically either procliticise to the verb (if the subject is in a separate IU, e.g. *The=Éagle // has=lánded*) or encliticise to the subject (otherwise, e.g. *Jóhn='s sléeping*); however, in some cases they may be phonologically free (*Your=váse has=jùst arríved*; *The=shíp is=nòw sínking*; *Máry mùst=have=been surprísed*); in these cases, the schemas are analogous to those for free modal auxiliaries.

There would also need to be schemas for the present and past participles of verbs, as well as second-order schemas for productively deriving these forms from the finite forms of

the verb (and vice versa). Let us finish by considering some of these second-order schemas. The following is a second-order schema for deriving the past-tense form of a transitive verb from the present participle. This is of course just one of many past-tense schemas:

(103)

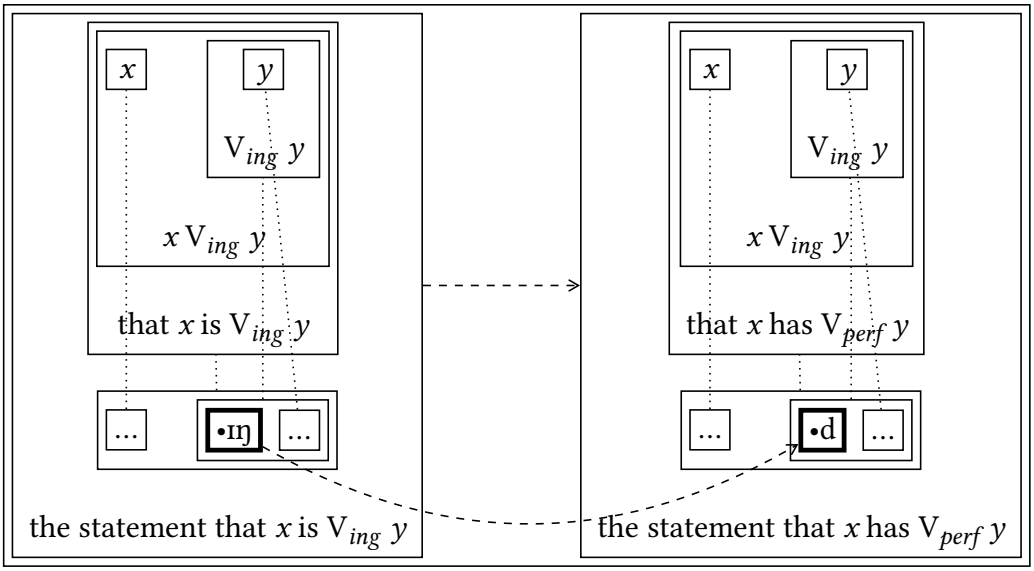


Derivation of past tense from progressive form of a transitive verb

(Note that the progressive auxiliary is not represented in the source schema, since it normally encliticises to the subject. There will of course need to be second-order schemas for sanctioning subjects with encliticised auxiliaries.)

For the perfect participle, we have schemas like the following:

(104)

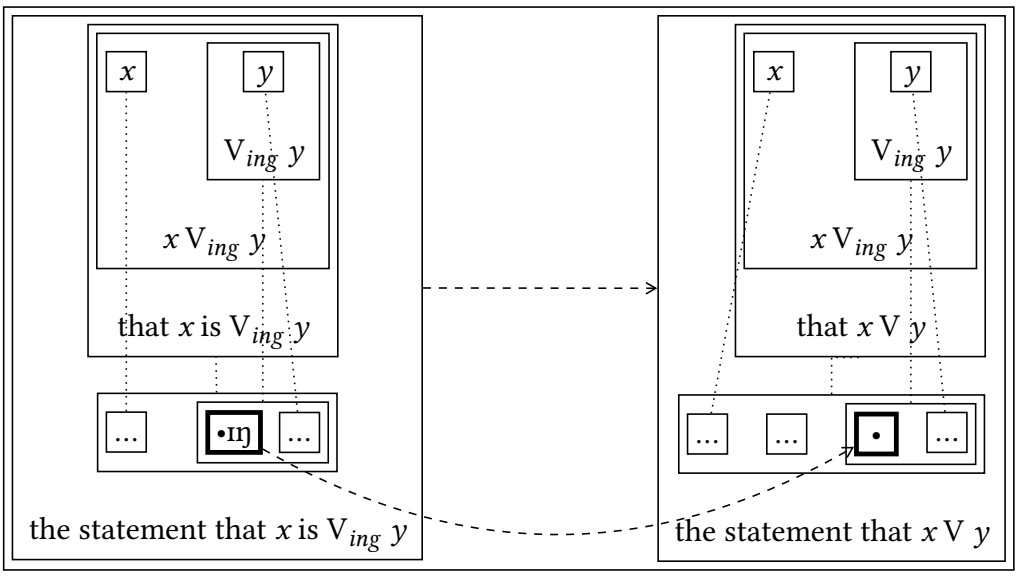


Derivation of perfect participle from progressive form of a transitive verb

(Note, likewise, that the perfect auxiliary is not represented in the target schema.)

Finally, for the bare (infinitival) form of a verb (such as would be used following a modal auxiliary), we have schemas like the following:

(105)



Derivation of bare form of a transitive verb from progressive form

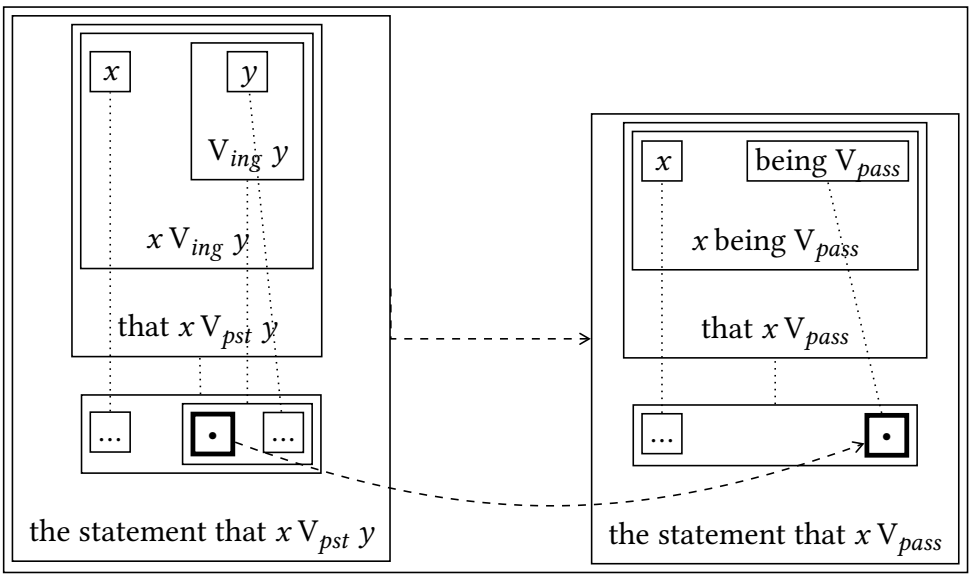
(The target of the schema is neutral with regard to modality, and specifies only that the profiled state of affairs constitutes some actual or potential occurrence of the evoked eventualities.)

6.2.3 Voice

Another category that determines the form of a verb complex in English is voice, and in particular, the passive voice, formed in English with the auxiliary verb *be* and a passive participle that is formally identical to the perfect participle.

To put it simply, the function of the passive voice is to take a clause with a higher-order eventuality of the form 'V-ing *y*', and turn it into a clause with a higher-order eventuality of the form 'getting V-ed', or else 'getting V-ed by *z*', depending on whether an agent is overtly specified. This function is easily captured by passive-participle second-order schemas such as the following (for the case where the perfect/passive participle is identical to the past-tense form):

(106)



Derivation of passive participle from past-tense form of a transitive verb

(It is worth noting that the lower-order eventuality '*x* being V_{pass}' is semantically identical to the higher-order eventuality 'V_{ing} *x*'; this will become important further below in the discussion of VP anaphora.)

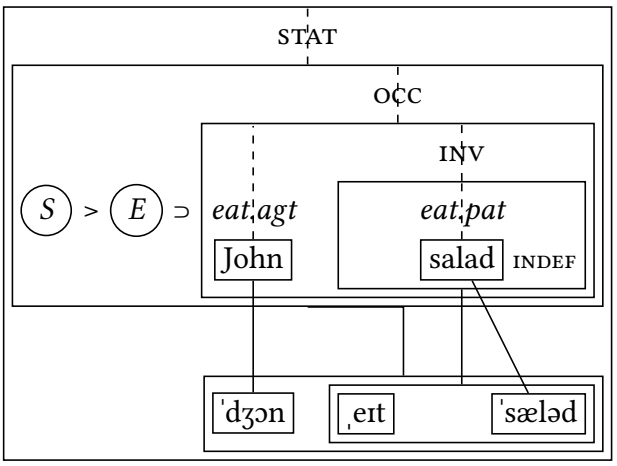
The passive voice can of course be combined with various TAM categories; this would call for auxiliary schemas such as [SBJ *mìght=have=been* $[V_{pass}]_{Pred}]_S$, etc.

6.2.4 A word about notation

So far in this chapter, the notational conventions in the diagrams have been fairly informal; in particular, the boxes denoting evoked entities are labeled in a mix of natural language and algebraic notation. Through the rest of this chapter, the diagrams will increase in complexity, and for this reason it will be useful at this stage to introduce some more precise notational conventions.

To start with an illustration, a sentence such as *Ɉóhn àte sálad* would henceforth be diagrammed as follows:

(107)



Jóhn àte sálad

The following changes need to be noted:

1. Whenever an entity can be described as a function of entities that it conceptually contains, then this is indicated by dashed lines connecting the outer entity with the inner ones, with labels indicating the nature of the semantic relationships involved. For example:

   (a) The evoked eventuality "John eating salad" can be completely characterised as "an eventuality that involves 'eating salad', and has 'John' in the role of 'eater'". This is indicated with a dashed line connecting the lower-order and higher-order eventualities, labeled INV(olves), and with a dashed line connecting the lower-order eventuality with the subject, labeled *eat.agt* ("agent of eating"). Relations such as *eat.agt* and *eat.pat* are specific to each predicate. Not too much should be read into the suffixes *.agt* and *.pat*; the relations could just as easily have been called eat_1 and eat_2.

   (b) The state of affairs "that John ate salad" can be completely characterised as "a state of affairs that constitutes the actual occurrence of the eventuality 'John eating salad' at some point (*E*) prior to the moment of speaking (*S*)". This is indicated with a dashed line connecting the state of affairs with the eventuality, labeled OCC(urrence), and with the symbols > and ⊃ indicating that the event time *E* is prior to the speech time *S*, and contains the eventuality.

   (c) The utterance "the statement that John ate salad" can be completely characterised as "the product (in the sense of Twardowski 1911) of a speech act conveying the state of affairs 'that John ate salad' using such-and-such phonological con-

tent". This is indicated with a dashed line connecting the utterance with the state of affairs, labeled STAT(ement), and with the appropriate symbolisation lines connecting the phonological content with the semantic content.

2. Entities that are part of the conceptual content of an evoked entity, but which are not themselves evoked, are denoted by circles rather than rectangles; in the above example, this includes the speech time (*S*) and event time (*E*). Such entities will often be omitted from diagrams for simplicity.

3. For clarity, the relationship of symbolisation between a phonological unit and an entity in the semantic pole is denoted by a solid line rather than a dotted line (following the convention in Langacker 2008a rather than that in Langacker 1987).

Other diagrammatic conventions will also be found necessary, but these will be introduced as needed.

6.3 Arguments

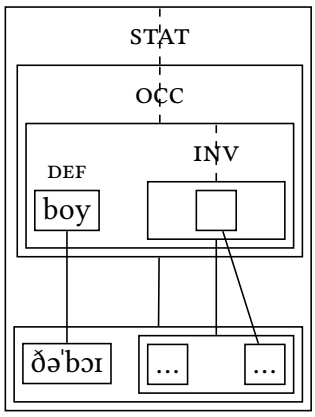
So far we have considered schemas for the parts of a sentence that are traditionally analysed as verbs or verb complexes.[8] In this and the following section, we will consider the non-verbal constituents of a sentence, namely those typically classified as "arguments" and "adjuncts". This section focuses on schemas for arguments, i.e. constituents whose profile resides within the (lower-order) eventuality evoked by a finite clause.

6.3.1 External structure

Let us consider a noun phrase such as *the=bóy*. A speaker of English is likely to have encountered this phrase at least some of the time in the subject position of a transitive clause occupying a single IU (e.g. *The=bóy àte chócolate*). Applying the SEP to such contexts, one is likely to arrive at a schema such as the following:

[8] We can define a "verb" or "verb complex" as "any phonological word that is immediately contained within a constituent that profiles a state of affairs or an eventuality". This is a somewhat ungainly definition; but it corresponds reasonably well to the standard use of these terms.

(108)

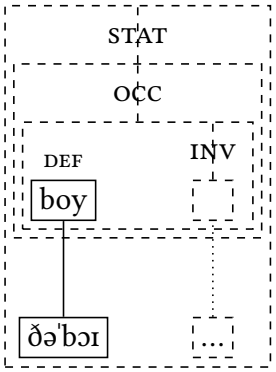


The=bóy in subject position

(Note that there would be a different schema for *the=bóy* in the subject position of an intransitive clause, and likewise for various argument-structure configurations.)

As noted by Croft (1995: 856–857), subject NPs are sometimes split off intonationally from the predicate (with the likelihood going up as the complexity of the NP increases), so we also need to posit schemas for subject NPs that occur in their own IUs. (Object NPs rarely occur in their own IUs.) This is what such a schema would look like for *the=bóy* (though this is arguably not a very likely lone-NP IU due to its shortness):

(109)



The=bóy as a subject IU

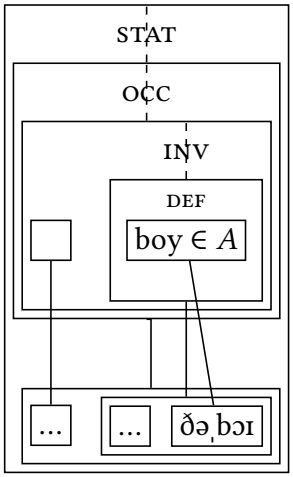
This schema introduces some new notational conventions, which it is worth commenting on before proceeding further. As noted briefly in the last section of the previous chapter, a schema contains information about the relationship between its phonological and semantic poles and those of the adjacent IUs (if any). So far in this chapter, we were dealing with IUs that are complete sentences, i.e., which do not bear any grammatical relation to adjacent IUs; thus, this aspect of schema organisation could be conveniently ignored. From here onwards, however, we will often be considering IUs that are smaller than a sentence, and will thus often need to notate the relations between an IU and its neighbours.

These relations will be notated, as above, by drawing with dashed lines the boxes representing the neighbouring IUs (in this case, the phonological and semantic poles of the pre-

dicate), as well as any other structures lying outside the IU being described by the schema (in this case, the lower-order eventuality, the state of affairs, and the utterance evoked by the sentence, all of which are built from the material in the current IU as well as in the next one). It is important to note that the *internal structure* of the neighbouring IUs must be left unspecified; this can be seen as a version of the principle of "locality of selection" in early versions of generative grammar (Chomsky 1969: ch. 2) as well as modern frameworks such as HPSG (Sag 2007), namely that one constituent may not "peek inside" its sister constituents.

Let us now consider the noun phrase *the=bòy* as used in the object position of a transitive-clause IU (e.g. *Máry sáw the=bòy*).[9] After repeatedly seeing this phrase in this particular syntactic context and applying the SEP, the speaker would arrive at a schema like the following:

(110)



The=bòy in object position

(The fact that the boy has already been evoked in the preceding discourse is captured by the notation "boy ∈ *A*"; *A* stands for the set of entities currently active in the discourse.)

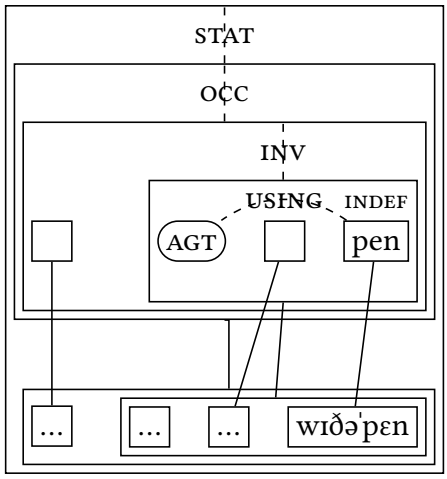
We have considered subjects and (direct) objects. A distinction is usually drawn between "direct" and "oblique" objects (e.g. Van Valin & LaPolla 1997: 29), where direct objects are identified (cross-linguistically) as those that appear without an adposition, or in a "direct" case such as nominative, accusative, ergative or absolutive, and oblique objects are identified as those that appear with an adposition or in an "oblique" case such as dative, instrumental, or locative (Van Valin 2005: 1). These definitions are framed in terms

[9] The reason for taking the de-stressed form of the noun phrase (which would be used only when the profiled entity has already been evoked) is that if *bóy* were stressed, the article would automatically encliticise to the verb (*Máry sàw=the bóy*), and so *the=bóy* could not be a constituent; this would be less convenient for expository purposes.

of purely formal syntactic notions; we need to ask whether there is a way of defining the direct/oblique distinction in a way that is consistent with the Extended Content Requirement.

I would like to suggest that there is such a way: an oblique object (or more generally, an oblique argument) is one whose schema explicitly specifies a relation between the object's profile and some other entity in the conceptual content of the clause. Let us illustrate this with the phrase *with=a=pén* (assuming for the moment that this phrase occurs frequently enough to give rise to a schema). In many attested uses of this phrase, it will occur within the predicate of a transitive clause, appearing after the direct object (e.g. *[Ɉóhn [wròte=the lètter with=a=pén]$_{Pred}$]$_{S}$*). Importantly, in virtually all of these uses, there will be a relation between the profile of the phrase (i.e. the pen) and the schematic agent that figures in the evoked higher-order eventuality (which in turn corresponds to the subject). This is expressed as follows:

(111)



An oblique object: *with=a=pén*

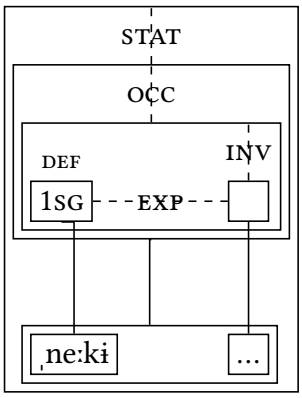
Given this definition of oblique arguments, we can note that there are not only oblique objects, but also cases of "oblique subjects" (though they are not usually called such). These are what are usually called "non-canonical" subjects, i.e. subjects in a case other than nominative or ergative. These are often found in constructions expressing bodily or psychological states, as in the following examples (see Hagège 2006 for a cross-linguistic survey):

(112) a. nē-kku paci-kkiṟ-atu
1SG-DAT be.hungry-PRS-3SG.N
I'm hungry. (Tamil)

b. boku=ni=wa kuruma=ga ar-u
1SG=DAT=TOP car=NOM exist-NPST
I own a car. (Japanese)

In these cases, the schema for the oblique form of the subject (*nēkku* or *boku=ni=wa*) specifies a particular relation between the subject and the higher-order eventuality, namely that the subject *experiences the state* specified by the higher-order eventuality. This may expressed as follows (for the Tamil example):

(113)



An "oblique subject": Tamil *nēkku* '1SG:DAT'

So far we have considered only arguments that might be analysed as "noun phrases" (bearing in mind the view taken here that "prepositional phrases" with an abstract preposition such as *with* are actually case-marked noun phrases). It is equally possible, however, for arguments to be (true) prepositional phrases, or adjectival phrases; this is particularly the case in copular constructions. Rather than starting with English copular constructions, I will analyse the postverbal arguments of copular constructions in Spanish, since Spanish distinguishes formally between different copular constructions that are outwardly identical in English.

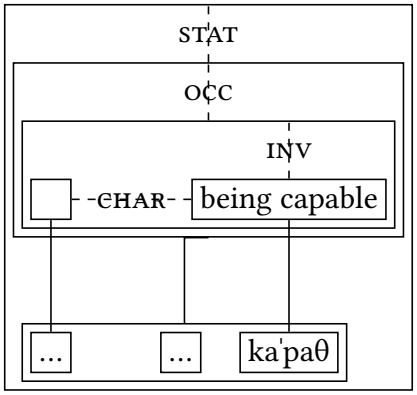
Spanish has two copulas, with infinitives *ser* and *estar* (deriving from Latin *sedere* 'sit' and *stāre* 'stand'), which may be used with nominal, adjectival, or prepositional complements. The semantic distinction between these two copulas has been the subject of much discussion (see Leonetti Jungl 1994 for a review); here we will consider only a subset of the relevant facts.

With noun-phrase complements, only *ser* is used; this will not be analysed here, as it is quite analogous to any other transitive verb. With adjective-phrase complements, the choice between *ser* and *estar* is determined by the kind of state denoted by the complement. In general, an adjective denoting an "inherent, essential, [or] permanent" state selects for

ser, whereas an adjective denoting an "accidental, transient [or] accessory" state selects for *estar* (Leonetti Jungl 1994: 182); thus, *ser capaz* 'to be capable', *ser mortal* 'to be mortal', but *estar descalzo* 'to be barefoot', *estar angustiado* 'to be anxious'. The "same" adjective can often appear with both copulas, but with a corresponding difference in meaning: *ser feliz* 'to have a happy disposition', *estar feliz* 'to be happy (at the moment)'.

The distinction between these two types of adjectives can easily be characterised as a difference in the relation between the higher-order eventuality (the predicate) and the subject of the clause. With adjectives that select for *ser*, the subject is described as being *characterised by* the state profiled by the adjective, as follows:[10]

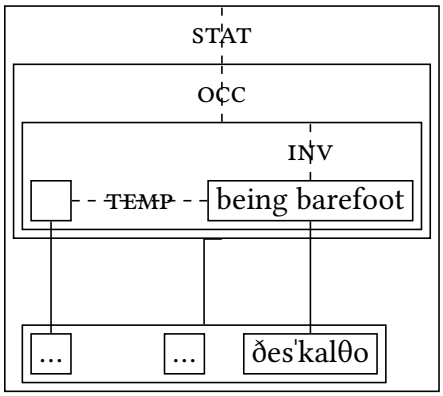
(114)



A predicate adjective denoting an inherent property: Spanish *capaz* 'capable'

By contrast, with adjectives that select for *estar*, the subject is described as being *temporarily in* the state profiled by the adjective:

(115)



A predicate adjective denoting a temporary property: Spanish *descalzo* 'barefoot'

There is, however, one major class of exceptions, namely perfect participles (or perhaps "resultative participles") of verbs: even when these denote stable states, they invariably take *estar*, e.g.:

(116) La carta ya est-á escrit-a
DEF.F letter already be-3SG.PRS write:PFV.PTCP-F

[10]Phonological transcriptions follow Peninsular Spanish phonology, even though my L2 Spanish is closer to Colombian.

The letter is already written. (Leonetti Jungl 1994: 194)

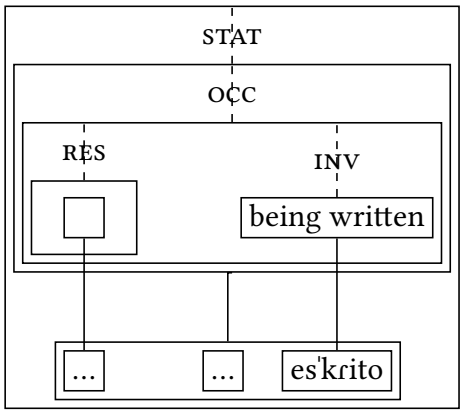
This can be accounted for by noting that the configuration of evoked entities in this clause is different from what has been seen so far: in particular, the clause evokes not only the state of the letter *having* been written, but also the event of the letter *being* written, which results in this state:

(117) The letter is written.

a. Really? When did that [= someone writing the letter] happen?

This consideration results in the following schema for *escrito*:[11]

(118)



A predicative perfect participle: Spanish *escrito* 'written'

Here the box around the subject referent represents the event that results in ("RES") the state of the subject referent having been written.

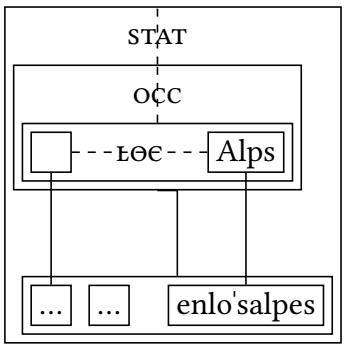
Finally, with prepositional-phrase (locative) complements, *estar* is always used (even when the location is a permanent one), e.g.:

(119) El lago de Como est-á en los Alpes
DEF.M lake of C. be-3SG.PRS in DEF.M.PL Alps
The lake of Como is in the Alps. (Leonetti Jungl 1994: 196)

Here, the schema for the complement could be diagrammed as follows:

[11]For convenience, I am ignoring grammatical gender; a proper discussion of how grammatical gender is implemented in the current framework would take us too far astray.

(120)



A predicate prepositional phrase: Spanish *en los Alpes* 'in the Alps'

where "LOC" stands for a locative relationship between the referents of the subject and complement.

English schemas for adjectival and locative complements of copulas are (I would argue) perfectly analogous to the ones above for Spanish; it is simply that the formal distinctions made in Spanish provide a more obvious motivation for the semantic distinctions highlighted above.

6.3.2 Internal structure

We have so far considered schemas for arguments insofar as they differ amongst each other by the relation between the profiled entity and the other entities in the conceptual content of the clause. In this subsection, we consider how schemas for arguments differ amongst each other with respect to their internal semantic structure. In particular, we will be considering the internal structure of noun phrases.

Let us start by examining the use of the definite and indefinite articles (*the* and *a(n)*). As mentioned in the last chapter, definiteness (or more precisely, identifiability) is a property of a *description*, not of an entity; this is why definiteness is indicated in the diagrams by putting DEF and INDEF *outside* the box corresponding to the profiled entity, not inside. The definite article *the* is used to indicate that the profiled entity is *uniquely* identifiable within the common ground (e.g. Birner & Ward 1994). Prototypically, uniqueness derives from the fact that the profiled entity has already been evoked; this is illustrated in the following example from Chafe (1994: 93–94):

(121) (...)

d(B) well Í hèard of an élephant,

e(B) .. that sát dówn on a ÙẂ one time.

(…)

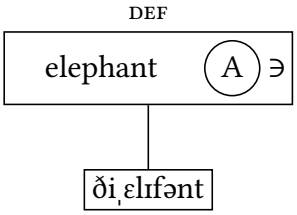
q(B) … and the .. élephant was in fróntof em,

r(B) so he jùst procèeded to sìt dòwn on the V̀Ẃ.

Here both the elephant and the VW are introduced into the discourse using indefinite noun phrases; but once they have been textually evoked, they are mentioned later in the discourse using definite noun phrases, as they can be uniquely identified by virtue of having been evoked.

The above suggests a schema such as the following for *the=èlephant* (ignoring for simplicity the syntagmatic context of the noun phrase):

(122)



Anaphoric use of the definite article

As before, *A* stands for "the set of entities that are currently active, i.e. have already been evoked". In previous diagrams, the content of the semantic pole would have been written as "elephant ∈ *A*"; here the A is enclosed in a circle to make it clear that it is an entity that is part of the conceptual content of the noun phrase, but is not evoked by it. Also, the set-membership sign has the outer box as its source, rather than the word "elephant", to make it clear that it is the profiled entity (and not some subset thereof) that belongs to the set of active entities.

(Demonstratives—such as *this* and *that*—are analogous to the above use of *the*, except that the profiled entity may be discourse-new, and is uniquely identifiable by virtue of its location with respect to the deictic centre.)

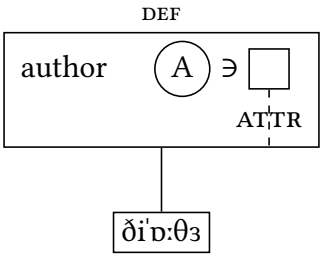
Of course, not all instances of the definite article are in noun phrases that refer to previously-evoked entities. Consider an example such as the following (Birner & Ward 1994: 94):

(123) I hated that book. *The author* is an idiot.

Here, the entity profiled by *the author* has not been evoked in the previous discourse—but a related entity (the book) has been. Here, the use of the definite article indicates that

the profiled entity is an attribute of some entity which has already been evoked; this is shown in the following schema for *the=áuthor* (again omitting the syntagmatic context for convenience):

(124)



Associative use of the definite article

This usage of the definite article is sometimes called "associative anaphora" (*anaphore associative* in French: Kleiber 1999); Chafe (1994: 96) uses the term "indirect sharing" to refer to the kind of identifiability involved.

Turning now to indefinite articles, we note that it is necessary to distinguish between "specific" and "nonspecific" indefinites, as in the two interpretations of *Óllie hopes=to=màrry=a blónde* discussed in the previous chapter (see Langacker 1991: 103). Traditionally, specificity is said to be about whether the speaker "has in mind" a particular referent for the profiled entity (in this case, whether the speaker has in mind a particular blonde). More specifically, a specific indefinite is said to refer to an entity that the speaker has in mind but the hearer doesn't, whereas a nonspecific indefinite is said to refer to an entity that neither the speaker nor the hearer have in mind. Specific and nonspecific indefinites are often seen in a paradigmatic relationship with definites, which supposedly refer to an entity that both speaker and hearer have in mind; this is convenient, as it allows specificity and definiteness to be defined in terms of the same underlying constructs (this approach is taken in Langacker 2010b).

However, there are various problems with the formulation of specificity in terms of "what the speaker has in mind". As noted by Higginbotham (1987: 64) (cited in von Heusinger 2002: §4.4):

> In typical cases specific uses are said to involve a referent that the speaker 'has in mind.' But this condition seems much too strong. Suppose my friend George says to me, 'I met with a certain student of mine today.' Then I can report the encounter to a third party by saying, 'George said that he met with

> a certain student of his today,' and the 'specificity' effect is felt, although I am in no position to say which student George met with.

Indeed, the sentence *Óllie hòpes=to màrry=a blónde* can be used with the specific-indefinite reading as long as Ollie knows which blonde he hopes to marry, even if the speaker has no idea.

Moreover, definites can be either specific—the more common case—or nonspecific, as in von Heusinger (2002: 253): *They'll never find the man that will please them.*

A more fruitful approach would probably be one stated in terms of mental spaces, e.g. the analysis in Fauconnier (1985) of the following example (cf. Langacker 1991: 104–105, which follows exactly this approach):

(125) John Paul hopes that *a former quarterback* will adopt needy children.

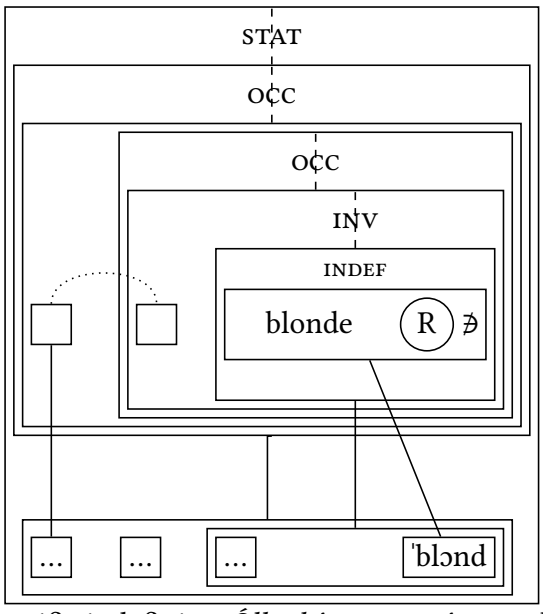
According to Fauconnier (1985: 23), "the space-builder is *John Paul hopes*, there are two spaces M, M', and the connector F maps "reality" onto "hopes." If the noun phrase *a former quarterback* sets up w directly in M', then w has no counterpart in M; that is, no "real" quarterback is set up (the so-called nonspecific reading). If the noun phrase sets up a trigger w in M and a target w' in M', then a "real" quarterback, w, is set up, with a counterpart in M' (the specific reading)". In other words, in the mental spaces framework, the difference between a specific and a nonspecific indefinite is a matter of whether the profiled entity exists in "reality", or only exists in a non-real mental space (such as that set up by a predicate of wanting or hoping).

Drawing on these insights, I would propose the following schema for the nonspecific indefinite reading of *blónde* in contexts such as *Óllie hòpes=to màrry=a blónde*:[12]

[12]Note that in this type of sentence, the main evoked eventuality contains within it a state of affairs (e.g. that which is hoped for), which in turn contains other evoked entities. This can be seen from evidence such as the following:

(1) Ollie hopes to marry a blonde.
   a. That [= Ollie's marrying a blonde] would surprise me. [state of affairs]
   b. That [= Ollie marrying a blonde] is not likely to happen. [eventuality]
   c. That [= marrying a blonde] isn't as easy as it seems. [higher-order eventuality]

(126)

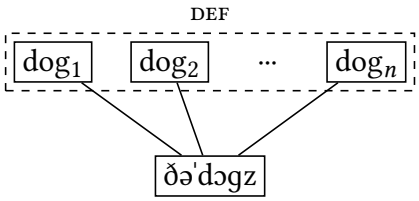


Nonspecific indefinite: *Óllie hòpes=to màrry=a blónde*

Here, *R* stands for the "reality" mental space.

Thus far, I have not discussed plural noun phrases, and have been diagramming only examples involving singular reference; this has made possible the convenient (though implicit) assumption that every meaningful expression profiles just a *single* entity. However, it should be intuitively clear that any plural noun phrase textually evokes *multiple* entities—and that, since these entities are the "outermost" ones in terms of conceptual content, the profile consists of multiple entities. This is diagrammed as follows for the noun phrase *the=dógs*:

(127)

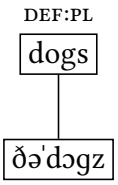


A plural noun phrase: *the=dógs*

As indicated by the dashed box, definiteness (i.e. unique identifiability) is a property of the *whole set* of profiled entities, not of each individual profiled entity.

Number, thus characterised, is something that can vary continuously from 1 to ∞—or be indeterminate. However, we need to capture the fact that most languages divide up the space of "number" into discrete categories: for example, in English, all quantities greater than 1 are treated as somehow "the same" for the purposes of grammatical agreement (i.e., as belonging to the category "plural"). I would propose to notate this using "outside-the-box" annotations in the same vein as DEF/INDEF: grammatical number, like definiteness, is

a property of the *description* of a set of entities, rather than of the entities themselves. Thus, a plural noun phrase such as *the=dógs* will henceforth be diagrammed as follows:



where it must be understood that the profile consists of multiple entities, not just one.

Having considered plurals, it is now possible to discuss quantifiers—and in particular, numerals. (Other quantifiers will not be discussed here, for lack of space.) When quantifying a noun, numerals do not have a profile of their own; in this respect, they behave just like articles or demonstratives:[13]

(128) Thrèe cáts èntered the=ròom.

a. # That [= the number 3] is a prime number.

b. They [= the cats] were all black.

Large numerals, however, often turn the noun phrase into a phrase that evokes a numeral and a quantity in addition to profiling a multiplicity of entities:

(129) The=petítion=was sìgned by=a=thóusand twò=hundred=and=forty stúdents.

a. That [= 1240] is a suspiciously round number. [numeral]

b. That [= 1240 students] is a lot of students! [quantity]

c. They [= the students] were protesting against an increase in tuition fees. [entities]

(Note that the quantity '1240 students' is treated as *singular*, not plural.) Such numerically-quantified noun phrases are thus quite similar to measure phrases of the following kind:

(130) We=bòught thrée kìlos=of grápes.

[13]Before proceeding, it is worth saying something about *pluralia tantum*, such as *trousers* or *scissors*, which are formally plural yet cannot be quantified by numerals (**five trousers*, **three scissors*—leaving aside the fact that in some dialects, these expressions could be pressed into service to mean 'five *pairs of* trousers' or 'three *pairs of* scissors'). I would propose that *pluralia tantum* are like regular plurals in that they profile multiple entities (e.g. individual trouser legs or scissor arms); however, unlike with regular plurals, these entities are not all conceived as identical (since they come in complementary, matching pairs, e.g. left and right trouser legs). Numeral quantifiers presuppose that the entities profiled by the noun phrase are conceived of as being identical, and so they cannot apply to *pluralia tantum*.

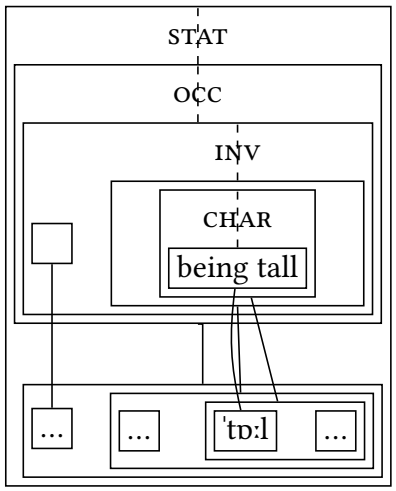
a. Isn't that [= three kilos] too much weight for someone your age to carry?[measure]

b. That [= three kilos of grapes] is a lot for three people to eat! [quantity]

c. They [= the grapes] are in the bag. [entities]

We will now consider constituents of the noun phrase which, unlike articles, demonstratives and (small) numerals, have their own profile—starting with adjectives. As mentioned in the previous chapter, adjectives (whether attributive or predicative) profile a (higher-order) state; see §5.2.4 for examples. The following is a schema for the attributive adjective *táll* used to modify a noun in object position:

(131)



An attributive adjective (*tall*) modifying an object

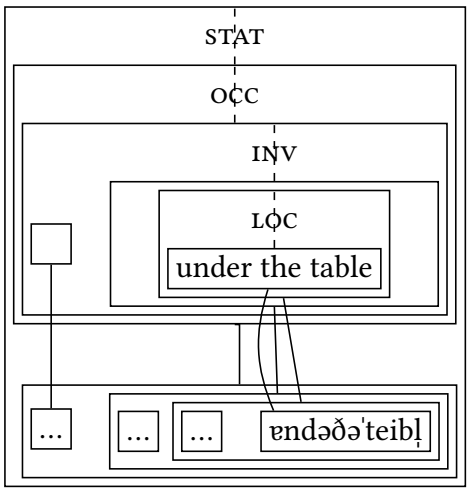
Some apparent "adjectives", however, do not have a profile of their own, and are basically (parts of) determiners: e.g. *old* (or *ol'*), *nice*, *little* (or *li'l*), *great*, etc.:

(132) I=had=a=nìce shówer.

a. # That [= being nice] is typical of your showers.

Prepositional phrases that modify a noun (as in *the football under the table*) can be analysed in a manner that is exactly analogous to the analysis of adjectives above. Here is a schema for *under=the=táble*, where the prepositional phrase modifies a noun in object position (as in *Jóhn caught=sìght=of=the fóotball under=the=táble*):

(133)



A prepositional phrase (*under=the=táble*) modifying an object

Finally, let us consider the marking of possession. Pronominal possessive pronouns (*my*, *your*, etc.) are just like other determiners in that they do not have their own profile (since they are phonologically bound). One detail needs to be mentioned, namely the distinction between *its* and the "associative anaphora" usage of *the*, which also arguably involves a kind of possessive relationship. The possessive pronoun seems to imply a relationship of "characterisation" between the possessum and the possessor, which is absent with the definite article:

(134) I examined the sword.

a. Its hilt was rusty.

b. The hilt was rusty.

(135) I went to the door.

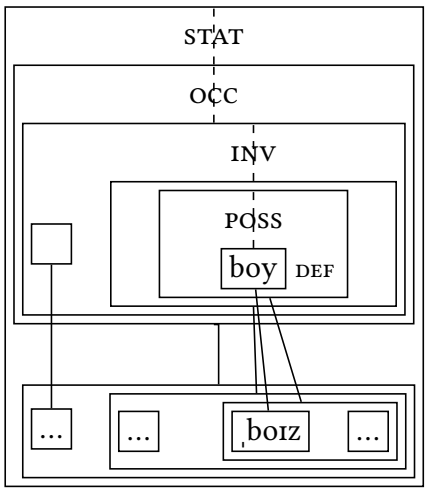
a. # Its knob had some engravings on it.

b. The knob had some engravings on it.

The hilt of a sword is capable of being a distinctive, characteristic part of it, to a greater extent than the knob of a door.

When a possessor is expressed by a noun phrase, rather than by a bound pronoun, it takes a special possessive form that is marked by the clitic *='s*. The following is a schema for *bòy's* when it modifies a noun in object position (as in *J̀óhn lòoked=at=the bòy's shóes*):

(136)

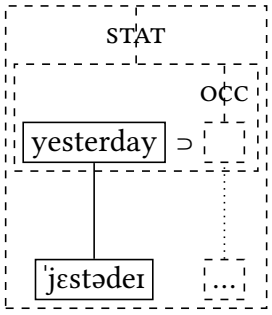


A possessive noun (*bòy's*) modifying an object

6.4 Adjuncts

So far, the sentence constituents we have been considering all profile entities within the (lower-order) eventuality—in other words, they are arguments. This section considers adjuncts, which profile an entity that is outside the eventuality. Many adjuncts specify the time or location of some occurrence of the eventuality (e.g. *Yesterday, I stayed home*; *Under the table, there was a cat*). The following is a schema for *yésterday*, used on its own as a full IU that precedes an IU that profiles an eventuality:

(137)

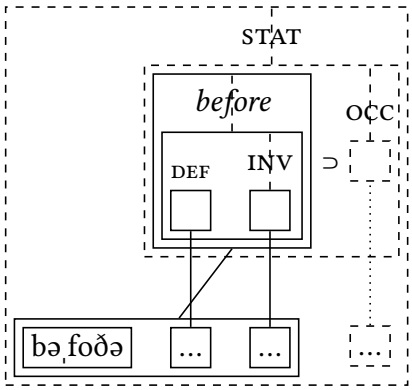


Yésterday,…

Note that, following the principle of locality of selection, nothing is specified about the internal structure of the following IU; all that is specified is that the two IUs together textually evoke a state of affairs that is built out of the temporal location profiled by *yésterday* and the eventuality profiled by the following IU, and environmentally evoke an utterance of the appropriate kind.

Aside from lexical time adverbials such as *yésterday*, another way of specifying a time is to use an adverbial clause, as in *Befòre=the Ròmans inváded,…*. The following is a schema for an (intransitive) adverbial clause with *befòre=the*:

(138)



[*Befòre=the* SBJ PRED],…

Note that an adverbial clause, unlike a (main) finite clause, does not evoke a state of affairs; it does evoke an eventuality, and its profile is a time before the occurrence of that eventuality:

(139) Befòre=the Ròmans inváded…

a. # I didn't know that [= the fact that the Romans invaded] until last year, you know. [state of affairs]

b. That [= the Romans invading] happened in 43 AD, I think. [eventuality]

c. That [= the time before the Romans invaded] must have been a relatively uneventful period! [time]

Also, as indicated in the diagram above, there isn't any constituent within the adverbial clause that profiles the eventuality; one might think that *Ròmans inváded* profiles it in the example above, but there is no obvious reason for treating this as a constituent phonologically.

Conditionals (e.g. *If they leave,…*) are formally parallel to adverbial clauses, but differ in that instead of profiling a time, they profile a (potential) state of affairs.

(140) If=théy léave, wé'll lèave as=wèll.

a. In fact, that [= their leaving] is the *only* circumstance under which we'll leave.

6.5 Movement and deletion

Given the central importance of the (Extended) Content Requirement in the current framework, it is important to address syntactic phenomena that have traditionally been analysed in terms of "movement" or "deletion", i.e. as requiring a distinction between "deep structure" and "surface structure" (as first proposed in Chomsky 1965). The problem of describing such

phenomena in a monostratal framework (i.e. one that eschews derivations) is hardly a new one; HPSG, for example, makes use of a "SLASH" feature (possibly inspired by the notation of Categorial Grammar, e.g. Lambek 1958) to indicate that a constituent is "missing a piece inside" that needs to be supplied at a higher level of syntactic structure (Pollard & Sag 1994: 159). In Cognitive Grammar (and construction grammar more generally), however, such issues have received relatively little attention (though see e.g. Langacker 1991: 465–466 on *wh*-movement, and Langacker 2008a: 211–214 on relative-clause extraposition).

In this section, we start with the analysis of *wh*-questions and the attendant island constraints, before moving to relative clauses, topicalisation, clefts, and ellipsis.

6.5.1 *Wh*-questions and island constraints

Wh-questions differ from declarative sentences primarily in terms of the utterance that they environmentally evoke. In particular, rather than evoking the product of an act of "saying", they evoke the product of an act of "asking": a question, rather than a statement. Apart from this, *wh*-questions evoke the same sorts of entities as declarative sentences do. This is illustrated as follows:

(141) Whó=was Jòhn tálking=to?

a. I think she [= the person he was talking to] already left. [actant]

b. …and does he think I would enjoy that [= talking to that person] as well? [higher-order eventuality]

c. It [= him talking to that person] seems to have kept him quite amused. [lower-order eventuality]

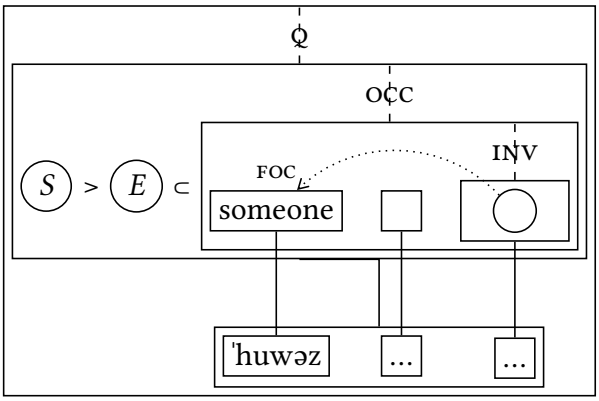
d. It [= the fact that he was talking to that person] worries me slightly. [state of affairs]

e. You know why I'm asking that [= the question of who he was talking to], right? [question]

Note that the state of affairs profiled by the above question contrasts John's talking to the person who he actually talked to with the (counterfactual) possibility of John's talking to someone else instead; in other words, it could be glossed as "the fact that John was talking

to *that* person rather than to anyone else". By the definitions laid out in §5.5, this means that the profile of the *wh*-phrase (*who*, or rather *whó=was*) is a *focus*. Here, then, is a schema for the *wh*-phrase *whó=was* (it is typical for a *wh*-phrase to have an encliticised auxiliary, and possibly also an encliticised bound subject pronoun, as in *Whó=were=you tálking=to?*):[14]

(142)



[*Whó=was* SBJ PRED?]

(Obviously, not every combination of a *wh*-word with an encliticised auxiliary needs to have its own first-order schema; some less-frequent combinations may be derived from more-frequent ones by means of the appropriate second-order schemas. Cf. the discussion of "paradigms" on p. 129.) The important thing to notice in this schema is how the "movement" of the *wh*-phrase out of the verb phrase (e.g. "[*tálking=to* _]") is represented. The point is that the verb (e.g. *tálking=to*) profiles a higher-order eventuality (e.g. "talking to a particular person") even though one of the entities within its conceptual content (e.g. the person who is being talked to) has its conceptual content supplied by a separate constituent (the *wh*-phrase). This is indicated in the diagram by representing the entity profiled by the *wh*-phrase twice: once outside the higher-order eventuality but inside the lower-order one, where its conceptual content is directly specified and it is evoked; and once inside the higher-order eventuality, where it is not evoked, and its conceptual content is specified by a correspondence with the entity as it appears outside the higher-order eventuality. In a sense, the second representation of the entity, which is conceptually dependent on the first, is analogous to a "gap", "trace", or SLASH feature.

A topic that is nearly always discussed in the context of *wh*-questions is that of "island constraints"—the observation (since at least J. R. Ross 1967) that the *wh*-phrase may be extracted from some constituents but not others. For example, the following (Ambridge &

[14]Note that since the clause is necessarily in the past progressive, the event time needs to be specified as being prior to the speech time (*S* > *E*), and as *being contained in* the eventuality (*E* ⊂), rather than containing it (as is usual).

Goldberg 2008: 358) is a violation of a supposed island constraint against extracting from noun phrases:

(143) * Who did he just read the report that was about _?

Over the years, many explanations of island constraints have been proposed: in terms of innate constraints (Chomsky 1964), processing (Kluender & Kutas 1993), attention (Deane 1991), information structure (Erteschik-Shir 1973; Goldberg 2006), and "expectation" (Chaves 2013), to name a few. Space does not permit a fuller consideration of these approaches here; moreover, the approach proposed below is not intended as a response to any particular existing approach, but rather as the simplest account that makes use of only the descriptive constructs permitted in the current framework.

I would propose that a *wh*-phrase can only be extracted from a constituent in the same IU; or, to put it in a way that is more consistent with the Content Requirement, the profile of a *wh*-phrase can only correspond to an entity in the conceptual content of its own IU.[15] To see this, consider the following contrast (based on Deane 1991: 9):

(144) a. Who did you read a book about?

b. * Who did you lose a book about?

In both cases, the profile of the *wh*-phrase is made to correspond to an entity in the conceptual content of the noun phrase profiling the book; and this noun phrase is clearly in the same IU as the *wh*-phrase. However, if we look at the corresponding declarative structures, we see a different picture (again based on the examples in Deane 1991: 9):

(145) a. I=rèad=a bòok=about Jòhn Ír ving.

b. I=lòst a=bòok=about Jòhn Ír ving.

The first sentence has an essentially continuous intonation contour, whereas the second features a sharp discontinuity—more specifically, a "downstep" or resetting of the pitch to a lower level—between *I=lòst* and *a=bòok=about*. This, combined with other factors such as the lack of a boundary tone on *I=lòst*, the possibility of a faster speech rate on *a=bòok=about Jòhn Írving*, and indeed the failure of *a* to encliticise to the preceding verb, suggests that *a=bòok=about Jòhn Írving* is actually a full IU that is *embedded* within the larger IU that

[15] There may of course be variation in how an utterance can be split up into IUs (e.g. Cruttenden 1997: 37), and so this proposal should be taken with the appropriate qualifications.

comprises the whole sentence. The idea that one IU may be embedded in another is not accommodated in the framework of Chafe (1994) or in Conversation Analysis—and in fairness, it may not be necessary for describing most natural speech, as can be seen from Croft (1995)—but it is standard in many formal approaches to intonational phonology (e.g. Astruc-Aguilera & Nolan 2007), and is obviously useful for describing "parentheticals", among many other constructions.

To return to the example, certain verbs seem to favour an object consisting of an embedded IU, whereas others allow for an object that is in the same IU as the verb. This is true in questions as well as statements:

(146) a. Whén=did=$_{\text{you}}$ rèad=$_{\text{a}}$ bòok=$_{\text{about}}$ Jòhn Ír$_{\text{ving?}}$

b. Whén=did=$_{\text{you}}$ lòse $_{\text{a=bòok=about}}$ Jòhn Ír$_{\text{ving?}}$

(Note again the discontinuity between *lòse* and *a=bòok=about* in the second sentence.) Thus, the reason why **Who did you lose a book about?* is unacceptable would be that there is no way of sanctioning a *wh*-question usage of *lose* where the object is in the same IU as the verb (as would be required by the proposed constraint), given that virtually all other relevant usages of *lose* have the object in an embedded IU.

6.5.2 Relative clauses

Relative clauses come in three varieties: restrictive, nonrestrictive, and adjoined. The terms "restrictive" and "nonrestrictive" are familiar from traditional grammar; Langacker (1991: 419) illustrates this distinction with the following examples:

(147) a. She told a funny story which greatly amused me. [restrictive]

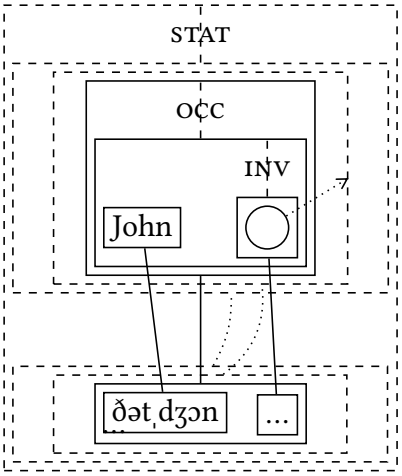
b. She told a funny story, which greatly amused me. [nonrestrictive]

The main difference lies in whether the relative clause (*which greatly amused me*) lies inside or outside the noun phrase profiling the funny story; apart from this, in terms of conceptual content the two sentences are equivalent. Langacker (1991: 419) notes that "[the nonrestrictive example] has another interpretation, whereby *which* does not refer to the story but rather to the fact that she told it. This latter construction defies traditional classification". Accordingly, the term "adjoined relative clause" has been adopted, following Croft

(1995: 843–844), from descriptions of similar phenomena in Australian languages. (The term "sentential relative clause" is also used—e.g. Brinton 2000: 215—but I was unaware of this at the time of writing.)

Common to all three types of relative clause is the fact that they all occupy an IU of their own. Let us consider each in turn. Restrictive relative clauses are prosodically embedded within the noun phrase that they modify. The following is a schema for *that=Ɉòhn* in a context such as *The=bóok that=Ɉòhn wróte is=quìte pópular* (note that *that=Ɉòhn wróte* is spoken at a lower pitch than the surrounding material):

(148)



Subject of a restrictive relative clause: ...[*that=Ɉòhn*$_{Sbj}$ PRED]$_{RC}$...

Note that, following locality of selection, the internal structure of the IU in which the relative clause is embedded is not specified, except for one entity that corresponds to an entity in the conceptual content of the relative clause—namely, the profile of the noun phrase that is being modified. The reader may doubt that a relative clause profiles a state of affairs, based on data such as the following:

(149) The book that John wrote is quite popular.—#His adviser actually doubts that [= the fact that John wrote that book].

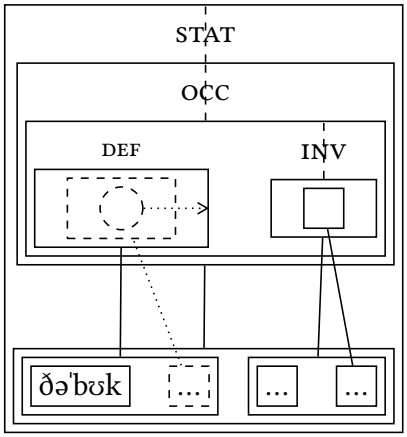
However, the reason that the above does not work is that the sentence containing the anaphor does not immediately follow the IU that comprises the relative clause. Adjusting the example accordingly improves acceptability:

(150) The book that John wrote—his adviser actually doubts that (fact), for some reason—is quite popular.

In addition to schemas for restrictive relative clauses themselves, it is also necessary to have schemas for noun phrases that contain a restrictive relative clause (since one cannot

occur without the other). The following is a schema for *the=bóok* followed by a restrictive relative clause, the whole serving as the subject in a transitive clause:

(151)

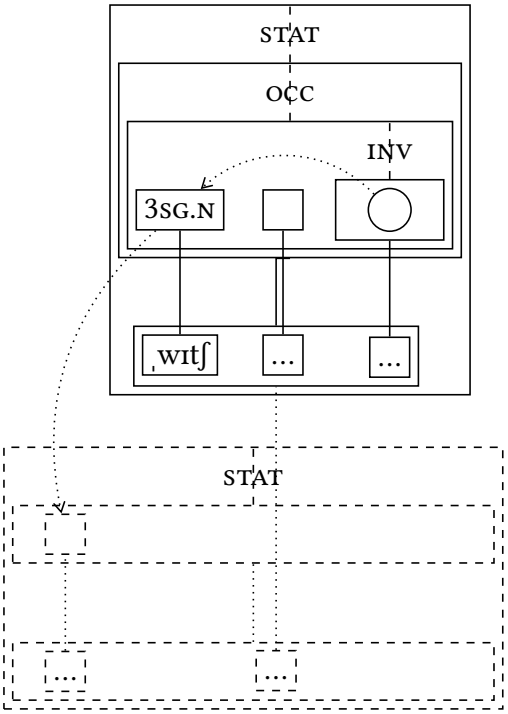


Head of a restrictive relative clause (*the=bóok*), in subject position

Note that, again by locality of selection, there is no specification of the internal structure of the relative clause, except that there is some (unevoked) entity within its conceptual content that corresponds to the profile of the noun phrase headed by *the=bóok*.

Nonrestrictive relative clauses are "parenthetically embedded" within a clause. This means that the clause within which the relative clause is phonologically embedded does not feature the conceptual content of the relative clause in any way; in other words, a nonrestrictive relative clause is an "aside" which can be removed with no effect whatsoever on the semantic pole of the main clause. Here, then, is a schema for *whìch* in a nonrestrictive relative transitive clause with the gap in object position:

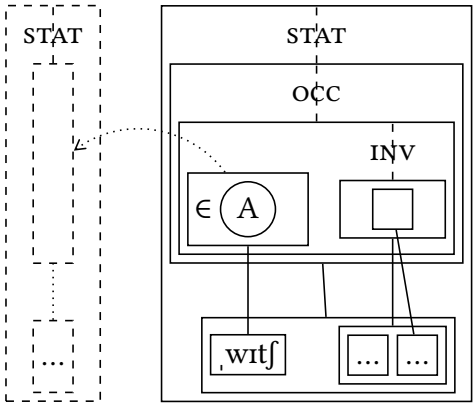
(152) Subject of a nonrestrictive relative clause (*whìch*)



Note that the only specification of the "matrix" IU is the constituent that corresponds semantically to the relative pronoun, i.e. the noun phrase that the relative clause modifies (which must immediately precede the relative clause).

Adjoined relative clauses can be analysed in a very similar way:

(153)



Subject of an adjoined relative clause (*whìch*)

(In the sample of discourse used by Croft 1995, all adjoined relative clauses have the relative pronoun in subject position; accordingly, this is the configuration that is diagrammed here.) In other words, the relative pronoun *whìch*, when used in an adjoined relative clause, is an anaphor that is constrained to be coreferent with the state of affairs profiled by the preceding statement.

Before leaving the topic of relative clauses, let us consider relative clause extraposition (see Kuno & Takami 2004 and Francis & Michaelis 2014 for some recent approaches; the present approach is quite different, however). It is necessary to distinguish between two types of relative clause extraposition, depending on whether the noun phrase modified by the relative clause is definite or indefinite:

(154) a. The=pízza=is hère that=you=órdered.

b. A=mán=is hère, who=would=lìke=to sée=you.

Definite relative clause extraposition requires that the modified noun phrase be the *last* complete constituent (i.e. meaning-bearing unit) that precedes the relative clause; indefinite relative clause extraposition has no such restriction:

(155) a. * The=pízza=is búrnt that=you=órdered.

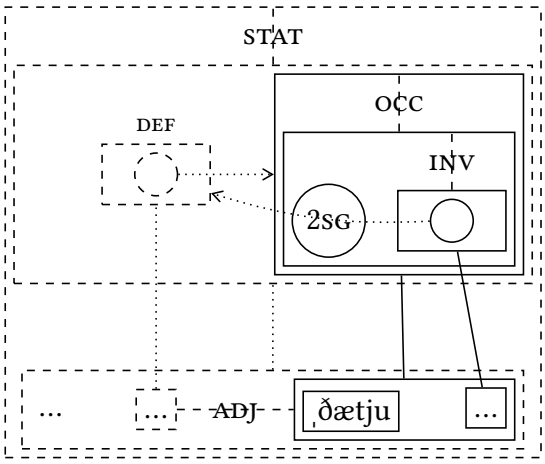
b. A=mán was=just=admìring=the gárden, who=would=lìke=to sée=you.

Note that (154a) is a thetic sentence, and thus does not evoke a higher-order eventuality;

thus the only complete meaning-bearing unit that precedes *that=you=órdered* is *the=pízza*, which is the noun phrase modified by the relative clause. On the other hand, (155a) is a categorical sentence; *is=búrnt* profiles a higher-order eventuality, and is the last complete meaning-bearing unit before the relative clause. Since this is not the modified noun phrase, relative clause extraposition fails.

In accordance with the above analysis, here is a schema for the complementiser in a relative clause extraposed from a definite noun phrase:

(156)

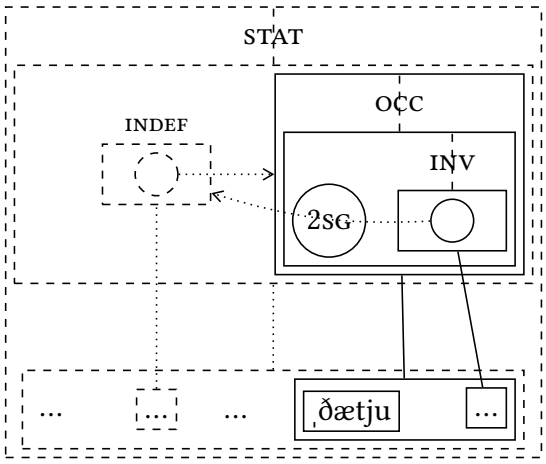


Extraposition of a relative clause from a definite noun phrase: [*thàt=you* PRED]$_{RC}$

Here the phonological pole of the noun phrase is specified as being "adjacent" to the phonological pole of the relative clause, in the sense defined above. Note that there are *two* "gaps", one in the semantic pole of the noun phrase, which is filled by the state of affairs profiled by the relative clause, and one in the semantic pole of the relative clause, which is filled by the entity profiled by the noun phrase. Note also that even though the complementiser is procliticised to the subject pronoun, the resulting word does not profile the second-person singular referent. (The reader's intuition may differ on this last point; but it would not affect the analysis in any fundamental way.)

Likewise, here is a schema for the complementiser in a relative clause extraposed from an indefinite noun phrase:

(157)



Extraposition of a relative clause from an indefinite noun phrase

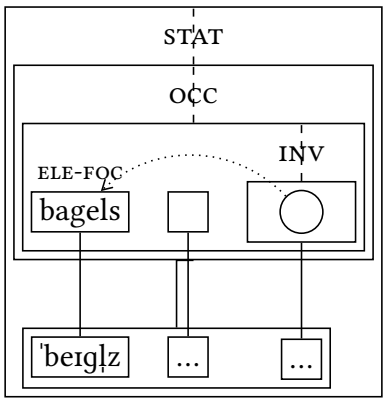
The only difference between this schema and the previous one (apart from the definiteness of the modified noun phrase) is that there is no longer any specified relation (besides simple anteriority) between the phonological poles of the noun phrase and relative clause.

6.5.3 Topicalisation

"Topicalisation" in English is prototypically exemplified by sentences such as *Bágels, I=líke* (see the discussion of this example in Chafe 1994: 84). Yet the "topic" in this sentence (*bágels*) does not fit the definition of "topic" used in the current framework; as noted by Chafe (1994: 84), "the *bagels* [are] 'preposed' to heighten their contrastiveness, presumably with other foods that I don't like"—i.e., the preposed constituent is actually a *focus*.

It is worth examining this contrastiveness more closely, in terms of what is affirmed and what is denied. The clause *Bágels I=líke* might occur in a context such as *Ì=don't génerally lìke Jèwish=food—but=bágels I=líke*. Here, the referent of *bágels* in the affirmed state of affairs is contrasted with Jewish food as a whole in the denied state of affairs. In general, in this construction the entity profiled by the focus is contrasted with a set that contains it; I thus propose to call this "element focus". Accordingly, a schema for *bágels* in such an element-focus construction might look as follows (where "ELE-FOC" is shorthand for "element focus"):

(158)



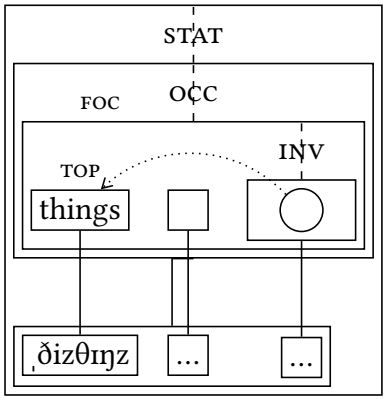
Left-dislocation: “element focus”

A “true” case of topicalisation would be an example such as the following:

(159) Thèse=things you=hàve=to stúdy (…no one learns them without effort).

Here, the profiled state of affairs contrasts something that is true (that you have to study these things) with something that is false (that people can learn these things without effort); importantly, the profile of *thèse=things* is shared between the two, and is hence a topic. A schema for *thèse=things* as a topicalised object in a transitive clause would thus be as follows:

(160)



A topicalised noun phrase: *thèse=things*

6.5.4 Clefts

Clefts may be exemplified by *It’s=bágels that=I=líke.* Clefts are usually considered to be canonical argument-focus constructions (see discussion in Lambrecht 1994); thus, the above example would be equivalent to (one reading of) *I=lìke bágels.* However, these two constructions are not exactly equivalent, as can be seen from the following examples:

(161) What do you usually like for breakfast?

a. # It’s=bágels that=I=líke.

b. I=lìke bágels.

(162) You usually like pancakes for breakfast, right?

a. # Nò, it's=bágels that=I=líke.

b. Nò, I=lìke bágels.

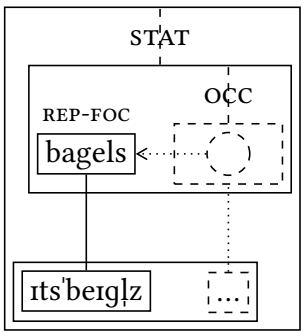
(163) You usually like pancakes rather than bagels, right?

a. Nò, it's=bágels that=I=líke.

b. Nò, I=lìke bágels.

Clearly, a cleft requires that the focused constituent profile an entity that has already been evoked, and moreover, that this entity be contrasted with another entity that has already been evoked. I will refer to this type of focus as "replacive focus". A schema for the focus *it's=bágels* would thus be as follows:

(164)



A clefted noun phrase: *It's=bágels that=I=líke*

Note that the portion after the focus is an embedded IU; this can be seen from the sharp intonational discontinuity in the example sentence:

(165) It's=bágels
that=I=líke.

6.5.5 Ellipsis

A final topic that is traditionally analysed in terms of transformations is "ellipsis", or more generally, "surface anaphora" (a term introduced by Hankamer & Sag 1976). The most widely-studied type of surface anaphora is "VP ellipsis" (also called "Post-Auxiliary Ellipsis" in Sag 1976: 53), illustrated by examples such as *Did you remember to get the milk?—Yes I did* _ (P. Miller & Pullum 2013: ex. 2d). Like other kinds of surface anaphora, VP ellipsis is generally believed to constrain not only the meaning of the antecedent (as is the case with pronouns and other "deep" anaphora) but also the syntactic form of the antecedent (in this

case, as a VP). A consequence of this is that the antecedent must be expressed linguistically, and not merely be inferable from context (examples from Hankamer & Sag 1976: 392):

(166) a. [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop]
Sag: #It's not clear that you'll be able to.

b. Hankamer: I'm going to stuff this ball through this hoop.
Sag: It's not clear that you'll be able to.

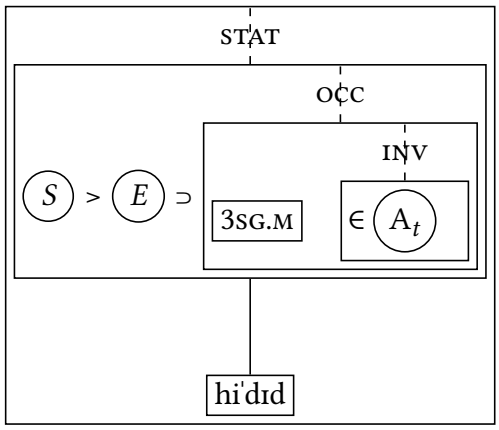
While it is clear that VP ellipsis generally requires that the antecedent be linguistic (though see P. Miller & Pullum 2013 for an important class of exceptions), there are many attested cases where the antecedent does not take the form of a VP, e.g. the following examples (P. Miller & Pullum 2013: ex. 8):

(167) a. Actually I have implemented it [= a computer system] with a manager, but it doesn't have to be [~~implemented with a manager~~]. (Kehler 2000: 549, (24))

b. Mubarak's survival is impossible to predict and, even if he does [~~survive~~], his plan to make his son his heir apparent is now in serious jeopardy. [COCA: CBS Evening News]

This leads one to suspect that the constraints on the antecedent of VP ellipsis are in fact semantic rather than syntactic. Indeed, in the present framework, it makes sense to say that the antecedent of VP ellipsis is required to be a *textually-evoked higher-order eventuality*. Accordingly, here is a schema for the sentence *He=díd*:

(168)



VP ellipsis: *He=díd* _

This does not, however, address the question of how to analyse cases where there is no linguistic VP antecedent, since it still needs to be shown that there is *something* in the previous discourse that evokes the appropriate higher-order eventuality. Let us consider, in

particular, cases of "voice mismatch", where (for example) the clause exhibiting VP ellipsis is active, whereas the clause containing the antecedent is passive. Kertz (2008) notes that only some such cases are acceptable (exx. 3, 1):[16]

(169) a. A lot of this material can be skipped, and often I do.

b. # The material was skipped by the instructors, and the TAs did too.

To explain this pattern of acceptability, let us note that in the first example, the antecedent would have to be the higher-order eventuality "skipping a lot of this material". It may at first appear that there is nothing in the antecedent clause which evokes this entity—but note that the clause evokes a *lower*-order eventuality of the form "a lot of this material being skipped". A moment's reflection reveals that the two are absolutely indistinguishable semantically; thus, the correct antecedent for the VP ellipsis is in fact provided by the semantic structure of the previous clause.

For the second (unacceptable) example, the antecedent would have to be the higher-order eventuality "skipping the material". This is indeed not evoked by the clause *The material was skipped by the instructors*; the only eventualities that it evokes are "the material being skipped by the instructors" and "being skipped by the instructors".

To the above analysis it needs to be added that the subject in the clause exhibiting VP ellipsis must be understood as being an agent—otherwise, there would be no unambiguous way of integrating it with the higher-order eventuality from the previous clause.

It is necessary at this point to say something about the analysis of *do it* and *do so*, which are considered to be cases of "deep anaphora", which do *not* require an antecedent with a particular syntactic structure. Since the proposed analysis of VP ellipsis has dispensed with the deep/surface anaphor distinction, it remains to account for the differences in usage between *do it* and *do so* on the one hand, and *do* _ on the other. As noted by P. Miller & Pullum (2013: ex. 10), all examples of VP ellipsis fall into either the category of "Auxiliary-Choice" or the category of "Subject-Choice", depending on whether the auxiliary or the subject is stressed. In contexts which do not call for either of these types of focus, VP ellipsis is unacceptable, and a "deep anaphor" must be used (P. Miller & Pullum 2013: exx.

[16]While Kertz (2008) shows experimentally that sentences such as (169a) are preferred over sentences such as (169b), this does not necessarily mean that the former are fully acceptable in an absolute sense. This partial (or variable) acceptability will ultimately have to be accounted for.

12, 14):

(170) A. He shops in women's.

B. No, he doesn't. [COCA] [Auxiliary-Choice]

#No, he doesn't do it /this /that.

(171) A. He shops in women's.

B. He never does it alone. / He does it all the time. / He does it because that's the only place he can find things his size. [≠ Auxiliary- or Subject-Choice]

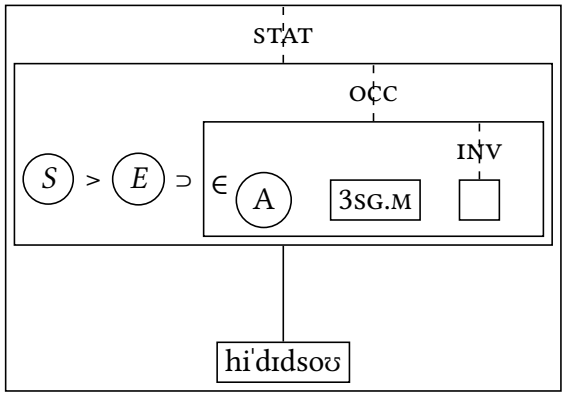
#He never does alone. / #He does all the time. / #He does because that's the only place he can find things his size.

In addition it must be noted that *do so* differs from *do it* in that it requires that the antecedent be textually (rather than environmentally) evoked (Houser 2010), and that the evoked (lower-order) eventuality be identical to the one evoked by the clause containing the antecedent (P. Miller 2011: 91):

(172) [He$_i$ recently retired as vice president of technology standards at Sony Electronics]$_j$. [He$_i$ did so]$_j$ because the Stooges need him again.

Indeed, it appears that the antecedent of *do so* is not in fact a higher-order eventuality, but rather a lower-order one. Accordingly, here is a schema for *he=díd=so*:

(173)



Overt VP anaphora: *He=díd=so*

Another type of ellipsis is what is known as NP anaphora, instantiated in English by (among other possibilities) "anaphoric *one*" (example from Goldberg & Michaelis 2016: 2):

(174) Chris found a job and Pat found one, too.

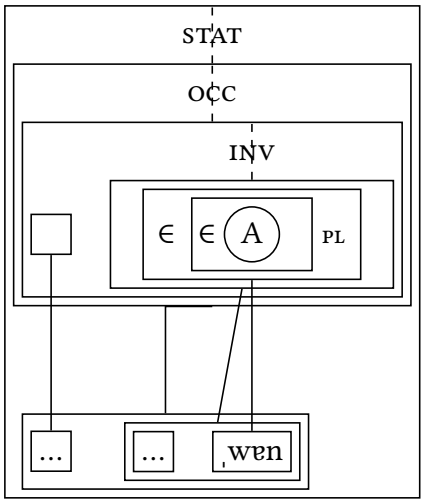
It is often assumed that anaphoric *one* is a surface anaphor whose antecedent is required to be an N′ constituent (i.e. a noun phrase minus its determiner). However, as has been

pointed out by a number of researchers (see Goldberg & Michaelis 2016: 4–5 for a review and examples), it can just as easily represent a bare nominal, a noun phrase minus a complement, a discontinuous phrase, a subpart of a compound word, or an environmentally evoked entity. I would propose (see Goldberg & Michaelis 2016 for a similar proposal) that the antecedent of anaphoric *one* is a set of entities, usually a type-mass (i.e. the set of all entities conforming to a particular description).[17] This can be seen for the above example as follows:

(175) Chris found a job—they [= jobs] are rather hard to find these days—and Pat found one, too.

Accordingly, the following is a schema for anaphoric *òne*:

(176)



Anaphoric *one* in object position

Finally, let us consider ellipsis in responses to *wh*-questions, as in *Whát=did=you búy?—A=bóx*. These structures have so far received little attention in Cognitive Grammar; but Langacker (p.c., 1 October 2010) writes,

> I doubt that a simple answer suffices for the question of what an elliptic expression profiles. The essence of ellipsis is that an expression is not apprehended independently, though locally it appears alone. Possibly, then, what it profiles depends on whether one considers its full apprehension or focuses on its local value.

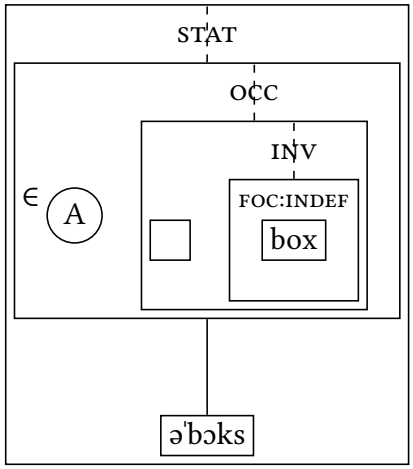
It is possible to give an answer to the question of what an elliptic expression profiles using the notion of profiling defined in the current framework. It is easy to see that *A=bóx* in

[17] This analysis is only claimed to be valid for the phonologically free anaphoric *one*; phonologically bound uses (e.g. *thís=one*, *the=òne=that* [Relative Clause]) may need to be analysed differently.

the above example evokes not only the box itself, but also all of the entities that would be evoked (textually or environmentally) by the sentence *I=bòught=a bóx* (and no others). Thus it follows that *A=bóx* in this context profiles a state of affairs of the form "the fact that I bought a box", and environmentally evokes "the statement that I bought a box".

More generally, a noun phrase used elliptically as the answer to a *wh*-question profiles the same state of affairs as the question, but specifies the focus more precisely as the entity that would ordinarily be profiled by the noun phrase in the context of a clause. Thus, here is a schema for the elliptic noun phrase *a=bóx*, used in response to an object *wh*-question:

(177)



A=bóx as an elliptic answer to a *wh*-question

6.6 Conclusion

In order to keep the size and complexity of this chapter within reasonable limits, a number of topics that the framework is capable of handling have been left out: most significantly, coordination and subordination; comparatives, gapping, and other staples of transformational grammar; cataphora; and also less widely-discussed but nonetheless important topics such as compositional idioms (Nunberg, Sag & Wasow 1994) and grammatical constraints on code-mixing (Di Sciullo, Muysken & Singh 1986).

In this chapter I hope to have shown that it is possible to develop a grammatical framework in accordance with the minimalistic and empirically-grounded ontology laid out in the previous chapter (with the Extended Content Requirement and the strong IU storage hypothesis), and that such a grammatical framework achieves a level of descriptive coverage and cognitive plausibility that is arguably no worse than that of current versions of Cognitive Grammar. Some broader implications are laid out in the next chapter.

Chapter 7

Conclusions

This thesis has been of a rather heterogeneous nature: what started as a series of attempts to operationalise grammatical analyses in Cognitive Grammar had to be abandoned, and instead it was found necessary to revise the descriptive framework from the ground up, in a way that avoids reference to any construct that is not already known to be operationalisable. The basic guiding principles of Cognitive Grammar—in particular, the Content Requirement—are still there; but the elaboration of these principles has led in a very different direction from that taken in Langacker (1987, 1991, 2008a). The previous chapter attempted to show that this new approach is capable of handling a reasonably wide range of descriptive phenomena (though a proper demonstration of its adequacy would take considerably more space). This chapter focuses on broader issues: operationalising the framework, application to some recurrent theoretical debates, and its relation to other subdisciplines of linguistics.

7.1 Operationalisation

While in the preceding chapters it was asserted in general terms that the framework *ought* to be operationalisable because of the constraints imposed on the kinds of descriptive constructs that are allowed, it has not yet been explicitly argued that this operationalisation is possible. To do so, let us begin by examining the kinds of descriptive constructs that are used in the framework, and then consider how each of these might be operationalised. We may classify the descriptive constructs as follows:

1. **Prosodic structure**: in particular, the division of speech into intonation units and phonological words (as well as the embedding of intonation units).

2. **Semantic structure**, in particular:

   (a) Which entities are (textually or environmentally) evoked by an expression (or presupposed as already having been evoked in the preceding discourse).

   (b) Which of the evoked entities are conceptually contained in which others; and thus, which entities constitute the profile of an expression.

   (c) Properties of a *description*, rather than of a conceived entity or entities, including

      i. Identifiability of the profiled entity or entities (i.e. their uniqueness within the common ground) on the basis of the provided conceptual content.

      ii. Agreement features such as person, (grammatical) number and gender.

3. **Schema availability**: Which of the first-order schemas that could be extracted from a particular array of usage events are in fact stored in the speaker's mind; and likewise, which pairings of first-order schemas gives rise to second-order schemas.

There is already considerable evidence for the psychological reality of prosodic constituency, particularly at the level of intonation units and phonological words, and accordingly there are well-established empirical methods for identifying these phonological constituents. For example, Schuetze-Coburn, Shapley & Weber (1991) show that intonation units can reliably be identified acoustically in terms of pitch declination (though this is only a sufficient and not a necessary criterion); and Wheeldon & Lahiri (1997, 2002) show in a series of ingenious experiments that phonological words are the smallest units of speech planning, using them to predict latencies in speech production. (Remember, too, the comments in the previous chapter to the effect that studies purporting to find experimental evidence of syntactic constituency—e.g. Gee & F. Grosjean 1983; F. Grosjean, L. Grosjean & Lane 1979; Levelt 1970a,b, *pace* Garrett, Bever & Fodor 1966—actually seem to be operationalising phonological constituency.)

The question of which entities are evoked by an expression has been addressed in the preceding chapters by following the expression with a sentence in which the entity that is hypothesised to be evoked is referred to with an anaphoric pronoun, and judging whether

this sentence is acceptable. So far, these judgments of acceptability have been mine alone (following a venerable tradition in theoretical linguistics); but it is not hard to see that the arguments of the previous two chapters could be tested more rigorously by collecting acceptability judgments from a large number of linguistically naïve English speakers. In this case, the methodologies discussed in experimental syntax textbooks such as Schütze (1996) and Cowart (1997) could be applied without modification.

(In principle it should be possible to apply on-line experimental methodologies such as the visual world paradigm or cross-modal priming, which have already been used extensively in the study of anaphora resolution; e.g. Hemforth, Konieczny & Scheepers 2000; Pyykkönen 2009; Shillcock 1982. However, many of the entities that are hypothesised to be evoked are highly abstract—e.g. eventualities, states of affairs, and utterances or attitudinal objects—and thus do not lend themselves to visual depiction, as would be needed in eye-tracking studies. Likewise, semantic associations of the sort used in priming studies would likely be too coarse-grained to differentiate between these kinds of abstract entities.)

The remaining aspects of semantic structure (conceptual containment of entities, identifiability, agreement features) are increasingly hard to operationalise without appeal to meta-linguistic intuitions; indeed, in the case of agreement features, this is almost definitionally impossible. However, it is possible to frame at least some of these intuitions in a way that does not presuppose linguistic training. For example, an important type of evidence for whether evoked entity *A* is conceptually contained in evoked entity *B* is whether the expression in question can be paraphrased in such a way that a constituent that profiles *A* is *phonologically* contained in a constituent that profiles *B*. This kind of reasoning was used in Chapter 5, e.g. when discussing adverbs: the adverb *loudly* evokes a manner and a property of that manner, and we can see that the property is conceptually contained in the manner because the adverb can be paraphrased as *in a loud manner*, where the constituency at the phonological pole mirrors that at the semantic pole. Likewise, for identifiability, questions of the form "Do you know which X she's talking about (based on what she told you about it)?" are highly accessible to intuition, and indeed are discussed as a matter of course in many everyday interactions.

Finally, operationalising the availability of schemas is a simple matter of measuring the

frequency with which a schema is instantiated in usage. This may come as a surprise, given the emphasis placed by Langacker (1987: e.g. 414) on the idea that the strength of a schema is a function of both its frequency as well as its "elaborative distance" from the usage event to be sanctioned—i.e., its concreteness or schematicity (see also Nesset 2008: 15, who uses the term "conceptual overlap" instead of "elaborative distance"). However, in the present framework, the SEP fixes the level of schematicity of each schema in a very specific way, meaning that the only axis of variation among schemas is precisely the frequency of their instantiation. We have not encountered any problems with this approach, and it eliminates a potentially large amount of arbitrariness in terms of determining the levels of generality at which schemas should be stated (see Kalyan 2012c: esp. 551 for further discussion). Also note that, by virtue of the way in which second-order schemas are extracted—by generalising over pairs of first-order schemas, rather than directly over usage events—their salience is necessarily determined by their type frequency rather than their token frequency, which is exactly what we would expect (Bybee 1985, 2001, *inter alia*).

7.2 Further theoretical issues

This section deals with the consequences of the proposed framework for some long-standing debates in grammatical theory.

7.2.1 Parts of speech

In most grammatical descriptions, words are classified into parts of speech such as noun, adjective and verb, and the part-of-speech affiliation of each word is taken to predict the range of constructions in which it may appear. However, Croft (2001) and others have argued that this approach, taken to its logical conclusion, would result in an unmanageably large number of part-of-speech categories, potentially as many as there are slots in constructions (see also Culicover 1999: ch. 2; Gross 1979); and that since each language has its own unique inventory of constructions, the part-of-speech categories of different languages may be mutually incomparable. Croft thus suggests that rather than assigning words to parts of speech, it would be more fruitful to approach the description of a language by starting with the constructions, and specifying for each construction the range of

words that can appear in each of its slots. For the purpose of cross-linguistic comparison, he proposes to define nouns, adjectives and verbs as prototypes involving the conjunction of a semantic class with a pragmatic function: thus, a (unmarked) noun is a word used for reference to a (physical) object; an (unmarked) adjective is a word used for modification by a property; and a (unmarked) verb is a word used for predication of an action. The pragmatic functions of "reference", "modification" and "predication" are held to be universal, in that every language has constructions that serve these functions.

At first glance, it may seem that Croft's Radical Construction Grammar is at odds with Cognitive Grammar, in that the latter claims that notions such as noun, adjective and verb can be given universal definitions that are purely semantic: a noun profiles a thing (a region in a domain); a verb profiles an uninstantiated (and possibly ungrounded) process; and an adjective profiles an atemporal relation with a thing as its trajector. However, it is important to remember that in Cognitive Grammar, "semantics", by virtue of encompassing construal as well as conceptual content, covers some of the territory traditionally reserved for "pragmatics". Indeed, a closer examination of the uses to which Langacker puts his definitions of parts of speech reveals that what is being characterised is neither semantic categories (as traditionally understood) nor distributional classes, but rather the pragmatic functions of reference, modification, and predication (Croft 2001: 104). This can be seen from the fact that, e.g., when a verb is used productively in the function of "reference" (as in *the cook* or *have a drink*), the word in question is analysed as profiling a thing (and as being zero-derived from an identical-looking word that profiles a process); when an adjective is used in the function of "predication" (as in *John is tall*), it is analysed as profiling a process (though it is zero-derived from an identical-looking word that profiles an atemporal relation); and so on. For Langacker, a word is a noun precisely in those contexts where it is used to profile a thing (i.e., in the function of reference); and nounhood is an inherent property of the word only to the extent that such a usage is conventionalised. Thus, even in so-called "pre-categorial" languages where (seemingly) any content word can be used in any of the three pragmatic functions, it is possible to identify nouns, adjectives and verbs on the basis of how frequently they are used for reference, modification and predication (Langacker 2005: esp. 113–121; see e.g. Mosel 2011 for a very similar view).

The present framework bears important similarities to the above approaches, but differs in that words are not stored as isolated units in the grammar (and thus cannot be said to fall into classes). Rather, what is stored is the use of a word in a particular IU pattern. This means that there is no need to refer to the classification of a word in order to predict which constructions it may appear in; this information is already captured by the first-order schemas that show the constructions in which the word has already been attested, and the second-order schemas that show how its attested range of usage might be extended to new constructional contexts. This shows that (as argued by Croft 2001) part-of-speech categories are not necessary for language description; and moreover, it does so in a way that directly addresses the question of how constructions are to be identified if not in terms of parts of speech (the "most frequently asked question about Radical Construction Grammar", according to Croft 2001: 51).

As for the typological prototypes of noun, verb and adjective: the pragmatic functions of reference, modification and predication can be given very precise definitions in the present framework. In particular:

1. "Reference" is the function served by a word whose corresponding schema does not specify any semantic relation between the profile of the word and any of the other entities evoked by the IU (cf. the diagrams for *the=bóy*—both in subject and object position—in the previous chapter, and compare these with any of the diagrams for oblique arguments, verbs, etc.).

2. "Modification" is the function served by a word in whose schema the word's profile is immediately contained in an entity serving the "reference" function.

3. "Predication" is the function served by a word (or other constituent) whose schema specifies a relationship of instantiation between the higher-order eventuality profiled by the word/constituent and an eventuality that involves it. Cf. any of the schemas for verb phrases in the previous chapter, and compare with schemas for other types of constituents.

See further below for more on defining cross-linguistic comparative concepts.

7.2.2 Lemmas

A concept that is frequently used not only in mainstream grammatical frameworks but also in most varieties of construction grammar is that of a "lemma": an abstraction over the different inflected forms of a noun, adjective or verb, which can serve as a term in a construction schema. E.g., Croft (2001: 26), when illustrating a taxonomic hierarchy of clause types, includes items such as [Sbj *sleep*], [Sbj *kiss* Obj], and [Sbj *kick the bucket*], which all involve verb lemmas; such examples could be multiplied indefinitely from publications on construction grammar and idiomatic language. (The notion of lemma does not seem to play a prominent rôle in Cognitive Grammar, even notationally; thus I have not cited any examples from Cognitive Grammar.)

On the surface, the notion of lemma seems perfectly compatible with the Content Requirement; it is simply a schema that abstracts over the semantic and phonological variation among a set of inflected forms. However, a closer look reveals that things are not so simple (see Edwards 2016 for a thorough discussion). In particular, how does one draw the boundaries of a lemma, including all forms that are inflectionally related to a given word, but excluding forms that are related by derivation, or forms that are not morphologically related at all, but merely happen to be phonologically and semantically similar? One way of answering this is to eliminate the problem by pointing out that inflection and derivation lie along a gradient (Bybee 1985), and defining morphological relatedness as nothing more than the conjunction of phonological and semantic similarity (Bybee 2001). Yet this solution is not entirely satisfactory, as it fails to capture the intuition that (e.g.) *go* and *went* are incontrovertibly members of the same lemma, despite being highly unprototypical in terms of their phonological (dis)similarity. Moreover, appealing to "similarity" is problematic to begin with, as the notion of similarity is notoriously pliable (Bybee 2010; Kalyan 2012c; Medin, Goldstone & Gentner 1993); it is of little use to say that two things are similar without specifying the *respects* in which they are similar.

In the present framework, it is possible to give a precise definition of "lemma" for verbs and nouns—or more precisely, verb phrases and noun phrases. Two verb-phrase forms may be said to belong to the same lemma if they both profile the same higher-order eventuality. This, then, is what unites *go* and *went*: the fact that [*go* PP] and [*went* PP] both profile the

higher-order eventuality "going to [the location profiled by PP]":

(178) a. We might go to Scotland. We've never done that [= going to Scotland] before!

b. Last summer, John went to Scotland. He had never done that before.

More generally, changing the tense and mood marking on a verb doesn't change the profiled eventuality, and so doesn't change the lemma; thus we may say that tense and mood are "inflectional" categories. Changing the aspect, on the other hand, may change the profiled eventuality (but not always): as we saw in the last chapter, the resultative reading of the present perfect (as in *I've (already) eaten my lunch*) changes the profile of the verb phrase to the resultant state of the action. Thus we can say that aspect is sometimes (but not always) a "derivational" category.

Two noun-phrase forms may be said to belong to the same lemma if they both profile entities with identical conceptual content. This means that case marking and definiteness marking are inflectional, as they leave conceptual content unchanged. However, number marking must be analysed as derivational, because the set of entities profiled by a plural noun phrase is clearly different from that profiled by the corresponding singular. This analysis may seem counterintuitive; but note that Langacker (1991: 78–81) analyses plural noun phrases as having a different type specification from the corresponding singular; and that cross-linguistically, plural nouns often show a different system of gender classification from singular nouns (Corbett 1991: ch. 7).

7.2.3 Lexical rules vs. constructions

A long-standing debate in construction grammar (and between proponents of construction grammar and its critics) is the extent to which the meaning of a sentence may be attributed to the main verb as opposed to the construction (i.e. the argument-structure pattern). In particular, when using a verb in a novel argument-structure pattern, in an example such as *She baked him a cake*, does the meaning of "transfer" arise from the verb undergoing a change of meaning (via a "lexical rule"), which then determines the argument structure? Or does the meaning arise from the argument-structure pattern itself, which is then integrated with the basic meaning of the verb? As noted by Croft (2003: 63), "this question is not decidable by purely linguistic evidence"; and indeed, arguments one way or the other often

rely on judgments of theoretical elegance, or (more convincingly) psychological plausibility. Langacker (2005: 147–155) proposes that both views on the question are partly right: while the meaning of "transfer" certainly does derive from the ditransitive construction, it also derives from the verb *to the extent* that the use of that verb in that construction is conventional. Goldberg (2006: 107–113) takes the same idea further by empirically measuring the "cue validity" of verbs and argument-structure patterns for particular meanings (though see Croft 2009: 158 for some reservations about this procedure).

In the present framework, verbs do not carry meaning on their own, unless they are intransitive (and thus constitute a full verb phrase); and in any case, they are always represented in the context of a particular IU pattern (i.e. a particular argument-structure configuration). Moreover, there are no fully-schematic argument-structure constructions, since all first-order schemas are required to have one specific phonological word and corresponding semantic pole. This all suggests an approach whereby sentence meaning is derived not from a (context-independent) verb, and not from a (fully-schematic) argument-structure pattern, but rather from a verb-specific construction (or an extension thereof, sanctioned by a second-order schema). This approach most closely resembles that of Croft (2003).

7.3 Looking outwards

This section suggests some consequences of the present framework for other subfields of linguistics. The proposals in this section will necessarily be programmatic, and quite possibly ill-thought-out.

7.3.1 Processing

An issue which has not been addressed so far in this framework (but which has increasingly been receiving attention in Cognitive Grammar: e.g. Langacker 2010a, 2014) is how language is produced and comprehended in real time. It is somewhat dangerous to speculate on this without being able to cite experimental evidence (though see Croft 2007b: 346–348); but some guesses can be made as to what a model of comprehension and production might look like.

Let us start with production (cf. Chafe 2005; Croft 2007b for related models). We might

suppose that the speaker starts with an idea of the speech act she wishes to perform; if there is already a fully phonologically-specified IU schema that can be used to perform this speech act (e.g. *Hello!*), then nothing more needs to be done, besides selecting this unit and producing it. However, in many cases there is no available schema that is fully phonologically specified; this is especially often the case when the speech act involves conveying conceptual content (i.e. verbalising experience, in the terminology of Croft 2007b). In this case, the speaker would need to decide on the conceptual content to be conveyed, and then pick some entities within this conceptual content to be textually evoked (since the only way of conveying conceptual content to an addressee is to evoke some of the entities therein). (The procedure thus far corresponds roughly to the "subchunking" and "propositionalising" stages in the model of Croft 2007b.) The speaker could then take one of the entities to be evoked, and search for IU-sized (first- or second-order) schemas that (a) contain a constituent that profiles an entity that is schematic for the one to be evoked, and (b) are otherwise compatible with the conceptual content to be conveyed. (This corresponds to the "categorisation" stage.) Repeating this for each of the entities to be evoked would result in a pool of schemas, of which some subset is likely to be capable of being integrated into a complete, phonologically-specific IU. Once the speaker has finished assembling one IU, she then plans the next IU, following the same procedure. Obviously, the steps laid out above are not strictly sequential; they may occur independently, and at different rates, for different parts of each IU.

Comprehension is somewhat simpler to describe: The hearer takes the first phonological word he hears, and matches it with stored (first- or second-order) IU schemas. This (in conjunction with contextual information of various kinds) determines the semantic pole that corresponds to the phonological word, and provides hypotheses about the structure of the remainder of the IU. This then makes it easier to process (and assign a semantic pole to) the next phonological word, and so on. As with production, comprehension proceeds one IU at a time.

7.3.2 Typology

In a number of recent publications, Haspelmath (2010a,b, 2011a) has emphasised the need to separate "descriptive categories", or categories that figure in the grammars of particular languages, from "comparative concepts", or concepts that are used for the purpose of arriving at typological generalisations. (Similar ideas have been expressed in, e.g., Bybee & Dahl 1989.) The arguments for this separation are familiar from Croft (2001): each language has its own inventory of constructions, and we cannot expect that the distributional classes defined by constructions in different languages will necessarily correspond.

Haspelmath (2010a: 665) states that comparative concepts "are defined on the basis of… universal conceptual-semantic concepts, general formal concepts, and other comparative concepts"; by "formal concepts" are meant concepts such as 'precede', 'identical', and 'overt' (which are not specific to linguistics) and also concepts from phonology (Haspelmath 2010a: 670). This is highly reminiscent of the Content Requirement, and suggests that Cognitive Grammar (and developments thereof) could be fruitfully used to arrive at definitions of comparative concepts.

Comparative concepts for "noun phrase", "adjective phrase" and "verb phrase"—or equivalently, reference, modification and predication—were presented in the section on parts of speech. Here I take a couple of examples of comparative concepts from Haspelmath (2010a,b), and attempt to reformulate them in the present framework.

Haspelmath (2010a: 672) proposes the following definition for the comparative concept 'question word' (or '*wh*-word'):[1]

> Definition: A question word is a word that can be used as a question pronoun (or adverb), that is, to represent the questioned content in a content question.

In the present framework, a "content question" may be defined as an IU (or sequence of IUs) that profiles a contrastive state of affairs, and environmentally evokes the utterance produced by the act of obliging the addressee to specify that state of affairs more concretely. The "questioned content" may be defined as a *focus* of the utterance, as discussed in the

[1] In light of the reservations expressed by Haspelmath (2011b) about the notion 'word', it would probably be more accurate to speak of 'question phrases' or '*wh*-phrases'.

previous chapter. Yet this would necessarily also include the profiled state of affairs itself, though we would not normally want to call the entire question a '*wh*-phrase'. Thus, it might be better to define the "questioned content" as a focus that is profiled by a proper subconstituent of the question. This leads to the following definition of the comparative concept (which could still be refined further, though this will not be done here for reasons of space):

> A question phrase is a proper subconstituent of a content question (defined above) which profiles a focused entity.

Haspelmath (2010b: 697) suggests a definition of 'clause' as "an expression that contains one predicate and potentially at least some of its arguments and that can be independently negated". As we have seen in the preceding chapters, if we understand a 'predicate' as a constituent that profiles a higher-order eventuality, then we have to recognise that not all clauses have predicates: in particular, thetic sentences (of the *My* CAR *broke down* type) lack a predicate. A definition in terms of the possibility of negation would also be problematic in the present framework, since in general, definitions in terms of potential behaviour (as opposed to behaviour observed in the usage event itself) are not allowed by the (Extended) Content Requirement.

I would propose to define a clause as "an expression that profiles a state of affairs". This is general enough to include both finite clauses as well as non-finite clauses such as *Harvey's taunting the bear*, while excluding e.g. non-finite verb phrases such as *taunting the bear*. On the other hand, this would be inconsistent with the idea that "from a crosslinguistic point of view, the possibility of negation corresponds best to our intuition about what should count as a clause" (Haspelmath 2010b: 697), since non-finite verb phrases can also be negated (*not taunting the bear*). Thus it might be better to define a clause as "an expression that profiles a state of affairs, or an". This definition, though, would also encompass adjectives (which profile a property, i.e. a higher-order state); and moreover, it is now a heterogeneous, disjunctive definition, which is less than desirable.

We see that defining comparative concepts rigorously (and in accordance with widespread intuitions) can be difficult. However, a grammatical framework that strictly adheres to the Content Requirement provides a metalanguage for formulating definitions that are

independent of language-particular categories, and that use only universally-definable notions. According to Haspelmath (2010a: 665), comparative concepts "are not psychologically real [*pace* Bybee & Dahl 1989], and they cannot be right or wrong. They can only be more or less well suited to the task of permitting crosslinguistic comparison"; thus, the test of the present framework as such a metalanguage will be in whether the definitions it provides ultimately prove useful in typological research.

7.4 Conclusions

In this chapter, I have attempted to show that the framework developed in this latter part of the thesis is not only adequate for the purpose of describing the grammars of languages in a consistent, non-arbitrary and psychologically plausible manner, but also provides clear answers to long-standing problems in grammatical theory, and provides some useful tools for thinking about language processing and linguistic typology.

The framework of Langacker (1987, 1991) introduced many important insights into linguistics which, at the time, were firmly against the mainstream (cf. Langacker 1986: 1: "What follows is a minority report"). Surely the most significant of these was the Content Requirement; while it has proven necessary to readjust almost every other aspect of Cognitive Grammar in some way, these readjustments themselves have arisen from an unwavering adherence to this fundamental principle.

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