

**Lexical semantics and syntax: commercial transactions
reanalyzed¹**

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¹ This paper arose out of an attempt to revise an earlier paper on the same list of verbs, Hudson 2008a. In preparing it I have benefited greatly from comments on earlier versions from a number of colleagues, in particular Nik Gisborne.

Abstract

The paper addresses the general theoretical question of how arbitrary syntax is, and more specifically, to what extent a word's syntactic valency may be predicted from its meaning. It argues that syntax is at least largely predictable given an analysis of meaning which pays due attention to the full cognitive structure which 'frames' each word's meaning. The theoretical background includes Fillmore's 'frame semantics', but the argument is based on a new analysis of the so-called 'commercial transaction' verbs BUY, SELL, PAY, CHARGE, SPEND and COST. In 1976, Fillmore claimed that these six verbs shares a single frame, in spite of the considerable syntactic differences among them such as their choice of prepositions and the options for passivization and omission. After re-analysis, it turns out that all of these syntactic differences can be explained as the regular syntactic pattern of a semantically coherent group of verbs to which the verb in question belongs. The methodological point of the paper is that semantic analysis should be guided by syntactic details as well as by careful structural analysis of the meaning. The main theoretical point is that the analysis requires a very flexible network analysis in which relations, both semantic and syntactic, can be created freely, rather than one which assumes a small and fixed universal set of relations; a subsidiary point is the benefit of being able to assume multiple default inheritance.

1 Introduction

One of the most discussed issues in recent grammatical theory is the relation between the semantic and syntactic structures associated with particular lexical items, and in particular, the question whether the syntactic structure can be predicted from the semantic. For example, if a verb's meaning includes two arguments, can we predict which will be realized by the subject and how the other will be realized (e.g. by the direct object or in some other way)? There seems to be general agreement that meaning gives some clues to syntax (and vice versa), but how strong and influential are these clues? At one extreme, there are those who argue that syntax is so clearly predictable that universal

(and innate) linking rules make ‘semantic bootstrapping’ an important aid to a language learner ({Pinker, 1996 2199 /id}). At the other extreme, it can be argued that predictability is so limited that a child must be able to learn syntactic details from experience with very little help from semantic bootstrapping ({Tomasello, 2003 1906 /id}). Evidence from synonyms does indeed seem to suggest that syntactic differences between words cannot always be predicted from their meanings ({Hudson, 1996 740 /id}); for example, although *nearly* and *almost* have the same meaning, they have rather different syntax:

- (1) I nearly/almost forgot my appointment.
- (2) I very nearly/*almost forgot my appointment.

On the other hand, it is important to know whether there is any tendency one way or the other.

The aim of this paper is to argue that syntax is much more predictable than might be thought from examples like these. However it is important to be clear from the outset that the evidence presented will not support a universal theory of linking rules. On the contrary, the patterns revealed will be very detailed and parochial, involving often tiny clusters of verbs in one language (English), comparable with the 300 word-classes listed in {Levin, 1993 2300 /id}. These general patterns may not help a child to learn syntax because the syntactic facts are easily observed; but they may allow ‘syntactic bootstrapping’, in which the child uses the word’s syntax as a clue to its meaning. I assume that the generalisations emerged historically through countless attempts by adult speakers to improve the correlations between semantic and syntactic patterns, so what they tell us about the human mind is how we strive to relate and to understand, rather than how we are guided by genetics.

The focus of the paper is a detailed consideration of six English verbs, the ‘commercial transaction’ (henceforth **CT**) verbs: BUY, SELL, PAY, CHARGE, SPEND and COST. These verbs are a good place from which to consider the linkage question because their syntax appears at first sight to include a great deal of unpredictable irregularity, so they offer a serious challenge. More importantly, however, earlier discussions of the CT verbs suggest the need for a ‘deep’ semantic analysis in which meanings are embedded in complex structures that provide their definitions; for example,

the meaning of BUY will be called 'buying', but this is just the beginning of an analysis which relates buying to a range of other concepts such as getting, trading, reward and money. Commercial transactions have been famous in lexical semantics since Fillmore's early discussions of Frame Semantics, where he uses the verbs to illustrate the following general claim:

'A word's meaning can be understood only with reference to a structured background of experience, beliefs, or practices, constituting a kind of conceptual prerequisite for understanding the meaning' (Fillmore and Atkins 1992).

The idea that lexical meanings are embedded in this way in cognitive structures, and defined by them, has rightly played a fundamental part in Fillmore's own work (Fillmore 1976; Fillmore 1982; Fillmore 1985; Fillmore 1986; Fillmore and Atkins 1992), and has been influential in other 'cognitive' theories (Evans and Green 2006:222-30); for example, it is reflected in Langacker's idea of 'cognitive domains' (Langacker 1990:3) and in the lexical semantics of linguists such as Jackendoff and Hudson (Jackendoff 2002:375-6, Hudson 1985; Hudson 2007).

The analysis of the CT verbs assumes, and justifies, two general principles. The first is a matter of methodology: that the analysis of meaning should be guided by evidence from syntax. This is not to say that meaning and syntax are necessarily in lock-step, but that syntax has evolved as a way of expressing meaning, so every syntactic fact should be considered a potential clue to meaning. This principle is important in general because the more evidence we have for semantic structures the better; but in the debate about predictability the principle is especially important because we need a method which is likely to maximize predictability. The logic is familiar from work by Levin and colleagues (e.g. Levin 1993): if the CT verbs all shared the same framing concept, the syntactic differences between them would be arbitrary and inexplicable, but if they are in fact dispersed among different frames in the way I suggest, all the details of syntactic valency can be explained.

The second principle is about theory. Any analysis presupposes some general theory about possible structures and relationships, and the more detailed the analysis is, the more important are the details of theory. Unlike earlier discussions of Frame Semantics and CT verbs, I make strong theoretical assumptions about structures in

both semantics and syntax, and about the ways in which they generalise and relate to one another. For example, Fillmore's brainchild 'FrameNet'² offers an analysis of BUY and SELL containing prose statements like the following definition of 'goods': 'The FE Goods is anything (including labor or time, for example) which is exchanged for Money in a transaction.' This is a useful step towards a detailed formal analysis, but it leaves all the structures and relations implicit in the prose. Discussions of Frame Semantics itself tend to invoke a version of Construction Grammar in the syntax (e.g. Goldberg 2006:39), but this is only one possible theory of syntax, and may not in fact be the most appropriate one. A promising alternative is the theory I adopt here, Word Grammar, which includes basic assumptions which are fundamentally different from those of Construction Grammar (Holmes and Hudson 2005; Hudson 2008b) as well as from other cognitive theories (Hudson, 2007 2316 /id}).

One particularly interesting and important theoretical issue concerns relational categories, whether syntactic (subject, adjunct and so on) or semantic (actor, patient and so on). Standard practice in syntax is to assume that syntactic relations come from a very small pool of possibly universal relations, and much the same is true in conceptual analysis, though the relation pool has names such as 'abstract cases', 'thematic roles', 'semantic roles' and 'force-dynamic relations'. It is easy to see the attraction of parsimony in the relational system, not least for the analyst in search of a ready-made analytical framework; but it turns out that the most revealing analyzes in fact break out of any parsimonious system of relations. Fillmore has the same concern with parsimonious systems in lexical semantic; for example, after suggesting a list of relations such as 'motivation', 'valued object' and 'risky situation' for analyzing the concept of Risk, he writes as follows:

² <http://framenet.icsi.berkeley.edu/>. The internet analysis includes a frame (dated 2001) called 'Commercial_transaction' which mentions PAY as well as BUY and SELL, and defines the goods as 'anything (including labor or time, for example) which is exchanged for Money in a transaction', so it still spans the frames that I distinguish in section 2 as 'trading' and 'paying'. However, COST and CHARGE are now assigned to different frames, called 'expensiveness' and 'commerce_collect'. SPEND does not appear in the list of lexical units.

There is a brute force character to this list, to be sure; but we can at least be sure that the roster of categories needed ... go far beyond anything envisioned by current theories of thematic roles or deep cases. (Fillmore and Atkins 1992:84)

In a footnote this is expanded as follows:

The point is that in a careful description of the semantic roles associated with predicates of most verbs we need 'frame-specific' semantic role categories, thus going far beyond the familiar repertoires of Agent, Patient, Experiencer, etc. found in much recent discussion of the the semantics and grammar of verbs. (ibid, note 15)

The same point has been made by others (Charniak 1981, Lawler 1989, Goldberg 2006:39, Fillmore and Atkins 1992, Gisborne 1996); in Lawler's terms, 'local cases' co-exist with 'universalist cases', and in Goldberg's, verb-specific 'participant roles' co-exist with construction-specific 'argument roles'.

What is new in what I offer below is the theoretical underpinning for this informal insight. One of the distinctive characteristics of Word Grammar is a formal theory of relations which allows them to be related to one another, for example in a hierarchy of more or less general relations. In this theory, a large – indeed, vast – and open-ended pool of relations is to be expected in any area of cognition. This theory of relations is introduced in section 3, together with the notation that Word Grammar offers for displaying relations.

Once this theoretical scene has been set, the remaining sections present an analysis for each of the six CT verbs in turn, showing in detail how the semantic classification and analysis explains the syntax.

2 Why CT verbs may not in fact share the same frame

In Fillmore's early analysis of CT verbs (Fillmore 1982:116-7, Fillmore and Atkins 1992), six verbs are all framed by the same concept and are collectively called 'commercial transaction verbs'. They are: BUY, SELL, CHARGE, SPEND, PAY and COST. (I follow the usual practice of completely capitalising the names of lexemes when they subsume a number of inflected forms.) The main evidence for the purported shared

frame is that each of the following sentences contains a different CT verb and is a possible description of a typical commercial transaction in which Bert (the buyer) gives Sam (the seller) a pound (the money) in exchange for some apples (the goods).

- (3) Bert **bought** the apples from Sam for a pound.
- (4) Sam **sold** Bert the apples for a pound.
- (5) Sam **charged** Bert a pound for the apples.
- (6) Bert **spent** a pound on the apples.
- (7) Bert **paid** Sam a pound for the apples.
- (8) The apples **cost** Bert a pound.

According to Fillmore, the frame can be analyzed in terms of the participant roles Buyer, Seller, Goods and Money, so each verb defines a different mapping of these roles onto syntactic dependents, as illustrated in the above examples and presented more systematically in Table 1. In this table, C1-C3 are the verb’s complements without commitment (at this point) on their syntactic status as direct objects and so on.

<i>Lexeme</i>	<i>Subject</i>	<i>verb</i>	<i>C1</i>	<i>C2</i>	<i>C3</i>
BUY	Buyer	<i>buys</i>	Goods	<i>from Seller</i>	<i>for Money</i>
SELL	Seller	<i>sells</i>	Goods	<i>to Buyer</i>	<i>for Money</i>
or:	Seller	<i>sells</i>	Buyer	Goods	<i>for Money</i>
CHARGE	Seller	<i>charges</i>	Buyer	Money	<i>for Goods</i>
SPEND	Buyer	<i>spends</i>	Money	<i>on Goods</i>	
PAY	Buyer	<i>pays</i>	Money	<i>to Seller</i>	<i>for Goods</i>
or:	Buyer	<i>pays</i>	Seller	Money	<i>for Goods</i>
COST	Goods	<i>cost</i>	Buyer	Money	

Table 1: Fillmore’s six commercial-transaction verbs

According to this analysis, then, these verbs all share the same meaning, and differ only in how they map this meaning, via the four roles, onto syntactic dependents. Jackendoff makes a similar claim about three of the verbs – BUY, PAY and SELL – though his analysis distinguishes them slightly in terms of the internal organisation of the

shared semantic structure (Jackendoff 1990:189-91). Given how easily the verbs all apply to the same scene, it may seem reasonable to lump them together in the analysis, but the evidence presented below and in later sections suggests that it is actually wrong; in short, they are not all CT verbs after all. The evidence consists of two related sets of observations, semantic and syntactic. Semantically, the verbs do not all apply to the same range of situations; and syntactically, they have different valencies which cannot be explained if they share the same meaning. The semantic facts are sufficiently simple and straightforward to handle in this section, but the syntactic discussion extends over the remaining sections, with a brief introduction below.

If the six CT verbs did share the same defining frame, then they should all have the same range of possible applications and should entail one another. Some of them do have this relation; for example, if Bert buys something from Sam we can be sure that Sam sold it to Bert, and vice versa, so BUY and SELL are mutually entailing and apply to the same total range of scenes. Similarly, if Bert pays Sam a pound it automatically follows that Sam charged Bert a pound, so PAY and CHARGE are mutually entailing; and if Bert spends a pound on the apples it follows that the apples cost Bert a pound. In short, we can recognise three pairs of CT verbs each of which defines a single shared frame:

- BUY, SELL share Frame 1
- PAY, CHARGE share Frame 2
- SPEND, COST share Frame 3.

But when we compare the pairs with each other, we find that their frames are different. Frame 1 (buying/selling) defines what we might call ‘verbs of trading’, where ‘goods’ change owner; so if Bert buys some apples from Sam, Sam becomes the permanent owner of the apples. Frame 2 (‘verbs of paying’) includes all cases where money changes hands in exchange for some benefit to the payer, so it covers selling; but it covers a wide range of other activities as well, such as hiring and services. Thus if Bert gets Sam to paint his house, he pays for the work but he does not buy it. Similarly, Frame 3 goes beyond mere shopping but in a different direction, to cover the use of resources other than money. For instance, Bert may spend time as well as money on a project, but without buying anything and indeed without any of the mutual exchange implied by

either of the other two frames. A suitable name for Frame-3 verbs is ‘resource management’. This new analysis is summarised in Table 2.

Verbs	Shared frame	Rough definition
BUY, SELL	trading	Ownership of Goods passes from Seller to Buyer in exchange for Money
PAY, CHARGE	paying	Ownership of Money passes from Payer to Charger in exchange for Benefit provided by Charger
SPEND, COST	resource management	Spender uses Resource to get Benefit, and the Cost is the Resource

Table 2: Three frames for CT verbs

Moreover, three of these verbs fit into a different classification scheme which applies well beyond any idea of commercial transactions, and which cuts directly across this three-way classification: a distinction between ‘verbs of giving’ and ‘verbs of getting’. (I prefer the term ‘getting’ to the more obvious candidate ‘receiving’ because buying is more active than merely receiving.) As Table 3 shows, selling and paying something are ways of giving it to someone else, comparable with lending, handing and so on, whereas buying something is a way of getting it – i.e. becoming its owner – like stealing, inheriting and so on. The verbs CHARGE, SPEND and COST do not fit into this classification (though informally charging looks like a way of ‘getting’ money). In short, far from sharing a single semantic frame, the CT verbs are distributed among at least five different frames.

Verbs	Shared frame	Definition
SELL, PAY	giving	Recipient becomes owner of something that previously belonged to Giver.
BUY	getting	Getter becomes owner of something

Table 3: Two more frames for CT verbs

One possible defence of the original analysis in terms of a shared ‘commercial transaction’ frame is that the various extensions may be metaphorical rather than part of the literal meaning. According to this analysis, paying for a haircut would be a metaphorical extension of paying for goods such as apples, and spending an hour would treat time metaphorically like money. But if these extensions are possible, why is it so much harder to extend buying and selling into these domains? The fact is that paying for a haircut is commonplace whereas ‘buying’ a haircut feels innovative and metaphorical, and requires a special interpretive effort because it is not immediately obvious why a speaker would say it. Similarly, spending an hour on something is commonplace, whereas it would be distinctly odd to talk about ‘selling’ something for an hour. Of course, metaphorical extensions are always possible, and no doubt the modern usage rests on a host of earlier metaphors, but diachrony is irrelevant to the synchronic analysis. In principle, at least, the examples considered here are all thoroughly conventionalised so we are dealing strictly in synchronically literal meanings.

The syntactic evidence supports the conclusion that these six verbs do not, in fact, share the same semantics. It is based on a number of apparently arbitrary syntactic facts about the six verbs and (as mentioned in section 1) it applies the same logic as has been used against lumping CLEAN and WIPE together as ‘verbs of removing’, even though they can both be used to describe the same scene of someone removing dirt from a table (Levin and Rappaport Hovav 1991). Levin and Rappoport show that by reorganising the semantic categories we can make the syntactic mapping less arbitrary without losing any semantic insights; and in particular, by distinguishing resultative verbs such as CLEAN from manner-of-action verbs such as WIPE they can explain why *wipe it clear* is possible but **clean it clear* is not. Similarly, by assigning the CT verbs to different semantic types (each associated with a different frame and, crucially, with different syntax), we can explain the syntactic differences between them. For example, if we distinguish verbs of trading (BUY, SELL) from verbs of paying (PAY, CHARGE) we immediately have an explanation for the differences in their complement patterns:

- (9) X *buys/sells* Goods *for* Money.
- (10) X *pays/charges* Money *for* Goods.

Resource management is different again, so SPEND takes the preposition *on* instead of *for*:

(11) X *spends* Money *on* Goods.

In each case, the choice of syntactic expression – with or without a preposition, and which preposition – follows from the semantic classification.

The following sections develop more detailed explanations for the syntactic differences among the CT verbs. Of course, the analysis does not remove arbitrariness altogether, but simply shifts it onto a higher level of generality; so an idiosyncratic choice of preposition by a single verb turns into a possibly idiosyncratic choice by a cluster of semantically similar verbs. Even so, the analysis which makes the generalisation is preferable to the one which does not. This principle will be the basis for all the analyzes in sections 4 to 9. In preparation for these analyzes we must first set the theoretical scene.

3 The theory of relations in Word Grammar

3.1 The network idea

The main idea behind Word Grammar is that grammar, like the rest of language and indeed like the whole of conceptual structure, is a network (Hudson 1994:1; Hudson 2007:1). It is not a network of other objects with their own internal structure, such as frames or constructions or lexical items, but simply a network of atomic nodes – a network ‘all the way down’, at least until it meets up with perceptual representations such as visual images, and with emotions. Each node in the network defines a concept, and every concept is represented in this way as a node in the network; thus the entire ‘content’ of a concept is defined by its links to other nodes in the network. The network idea is widely accepted in cognitive psychology (Reisberg 1997:257-303) and is common ground in cognitive linguistics (Barlow and Kemmer 2000; Bybee 1998; Croft and Cruse 2004; Goldberg 1995; Lamb 1998; Langacker 2000).

When applied to lexical semantics, the network view confirms the basic claim of Frame Semantics that one concept (the meaning of a particular word) can only be defined by its relations to other concepts (its ‘frame’). But since at least some of these framing concepts are themselves the meanings of words, this principle implies that the meaning of

one word may be used (or ‘recycled’ in the terminology of Hudson and Holmes 2000) as part of the frame for another. In short, we should not imagine that word meanings belong to a different area of cognition from their framing concepts; rather, we must think of them as forming a single integrated network in which a concept may simultaneously be the sense of one word and also part of the frame for the senses of other words (or indeed for concepts which are not assigned to any words). To take the stock example of ‘hypotenuse’, this is framed by ‘right-angled triangle’ but this in turn is framed by ‘triangle’, ‘line’, ‘angle’ and so on – all of which double up as the meanings of words. This view is diametrically opposed to the idea of a fixed universal semantic vocabulary to be used in defining every concept (Wierzbicka 1996). On the other hand, the network view is very close to traditional structural semantics (Geeraerts 1994), except that the items which are related are not words but concepts.

3.2 The classification of relations

One of the crucial questions in any network model is what kinds of relations are allowed between nodes in the network. One view is that all the links are mere ‘associations’ in an ‘associative network’, which means that all links are of the same type; but this kind of model has few attractions for linguists. We are used to distinguishing many kinds of relations; for example, a word’s meaning is obviously different from its pronunciation and its word-class, and syntax is all about the distinct relations to be found between co-occurring words. It is almost inconceivable to a linguist that all relations could be reduced to a single type. This leaves the question of how many relations, and which relations, do need to be distinguished – a fundamental question that any general theory must address. One of the basic questions is: where do relations ‘come from?’ Are they an innate part of cognition, or are they learned from experience? The answer is not obvious. On the one hand, there are good examples of very general and abstract relations which more or less have to be innate; perhaps the clearest example of this is the ‘isa’ relation used in all classification (as in ‘He is a linguist’). On the other hand, there are very specific relations which must be learned from experience, such as the relation between a person and their email address. A theory of language needs a more general theory of cognition which accommodates both these extremes.

The following is the theory of relations in Word Grammar (Hudson 2007:12-18). In this theory, relations are classified into two types:

- five **primitive relations**: ‘isa’, ‘identity’, ‘quantity’, ‘argument’ and ‘value’.
- an open-ended set of **relational concepts**: ‘subject’, ‘meaning’, ‘name’, ‘father’, and so on (and on).

The primitive relations are the basis for the logic of the system. They are almost certainly innate and may be ‘hard-wired’ in the sense that they may be implemented by distinct types of neuron or in distinct areas of the brain (though this is mere speculation). In contrast, relational concepts are learned from experience so they constitute an open-ended vocabulary of relations very much like the open-ended vocabulary of non-relational concepts such as ‘book’, ‘three’ and ‘run’. Moreover, like other concepts, relational concepts are organised hierarchically in an ‘isa hierarchy’ of increasingly general concepts each of which ‘isa’ one (or more) higher-level concepts.

To make the discussion more concrete, consider an area of cognition which has nothing to do with commercial transactions. What kinds of cognitive structures do we have for kinship relations such as ‘grandfather’? One thing that is very clear is that these relations form a network in which some relations help to define others; for example, ‘grandfather’ is defined in terms of ‘father’ and ‘parent’, and ‘parent’ in terms of ‘mother’ and ‘father’. These are all examples of learned relational concepts, but some of the relationships between them are primitive; for example, between the relations ‘mother’ and ‘parent’ we find the primitive ‘isa’ relation (in other words, ‘mother’ isa ‘parent’). Here is a verbal description of the parts of the network that are relevant to ‘grandfather’, all defined relative to a hypothetical person X:

- X’s grandfather is the father of X’s parent.
- X’s mother and father both ‘isa’ X’s parent.

However, verbal descriptions are very inefficient when applied to networks, so Word Grammar offers a visual notation in which the network structure is shown in the obvious way as a collection of nodes and lines. Each relation is represented by a separate line, and the non-primitive ones have a label enclosed in an ellipse. Each non-relational concept is represented by some kind of label (which in some cases is nothing but a dot). The primitive relations that are relevant here are:

- ‘Value’, an arrow pointing from a relational concept to its value.
- ‘Argument’, a simple arc without an arrowhead which links a relational concept to its argument. The value and argument are combined into a single pointed arc split in the middle by its label.
- ‘Isa’, a line with a little triangle that sits on the super-category.

These conventions are illustrated in Figure 1, which contains two definitions:

- The relation ‘parent’ between X and C is a generalisation of the relations ‘mother’ and ‘father’ (between X and A and B respectively, whose ‘isa’ relation to C is omitted for simplicity).
- The relation ‘grandfather’ between X and D is defined in terms of the relations ‘parent’ and ‘father1’ (a particular example of the ‘father’ relation). Thus, X’s grandfather is defined as X’s parent’s father.

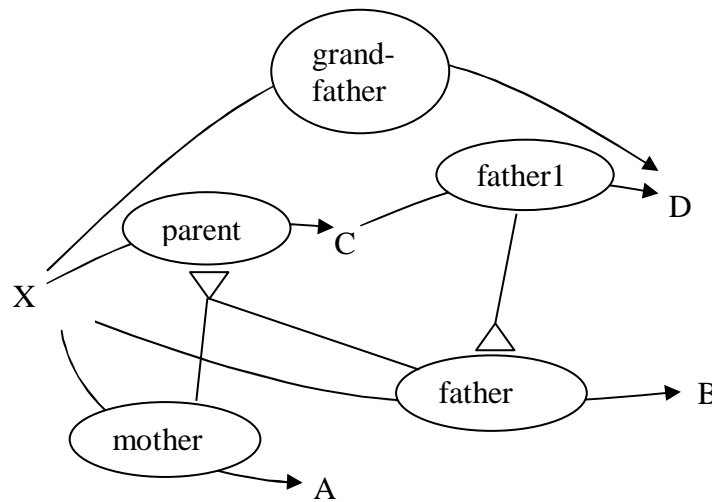


Figure 1: A network analysis of Grandfather, Mother, Father and Parent

3.3 The content of relations

The important point to note about this little example is how it defines one relation in terms of others. Most obviously, it defines ‘grandfather’ in terms of two simpler relations, ‘father’ and ‘parent’, and ‘parent’ in terms of ‘father’ and ‘mother’. This is not to say that

the concepts concerned are exhausted by these relations; both ‘father’ and ‘mother’ have a rich set of prototypical properties (Lakoff 1987:74-5) and even ‘grandfather’ may have some properties which cannot be derived from its defining relations. Moreover, it is clear that the defining concepts are ordinary word-meanings, rather than some independent conceptual system; for example, the relation ‘mother’ in Figure 1 must be the same concept as the one that is involved in the sense of the word MOTHER, because it shares all the complexities and uncertainties of the latter – so, to the extent that it is unclear whether Mary is ‘really’ John’s mother (e.g. because she adopted him), it is also uncertain whether Mary is ‘really’ the grandmother of John’s children.

If concepts (including relations) really are defined by their relations to other concepts, it follows that labels are strictly redundant (Lamb 1966; Lamb 1998). Obviously we analysts need labels for parts of networks for just the same reason that we need them to keep track of other parts of experience, but strictly speaking the labels are not part of the analysis. For example, the analysis in Figure 1 would be precisely the same without the label ‘father1’ because the lines show that the relation concerned ‘isa’ the one labelled ‘father’. It is true that labels are crucial to small networks like this, but the richer the network, the fewer labels are needed, and a hypothetical complete analysis which linked concepts to percepts and feelings would not need any labels at all. This is just as well in a theory of cognition, where labels are deeply problematic because they threaten an infinite regress: if words are represented mentally by means of labels, and labels are themselves words, how are labels represented mentally? In the practical world of semantic analysis, however, labels are indispensable not only because semantic analysts have limited brains, but also because diagrams rapidly fill up with lines if we insert ‘isa’ links between relations such as the one between ‘father’ and ‘father1’ in Figure 1. Consequently, the choice of labels is a practical matter of convenience without any theoretical consequences.

3.4 The logic of multiple default inheritance

Another relevant tenet of Word Grammar is that the basic logic of thought is **multiple default inheritance**; the same idea is found in Construction Grammar (Goldberg 2006:18), and is very similar to the idea that examples ‘instantiate’ schemas in Cognitive

Grammar (Langacker 2000); but in Word Grammar the logic is developed in much greater detail than in other theories (Hudson 2007:21-31). Inheritance is the logic of generalisation across the 'isa' link (which will now lose its 'scare quotes'): if A isa B, and B has some property P, then A 'inherits' P in the sense that we can assume A to have P even if we don't already know this as an independent fact. The more specific type of inheritance called 'multiple inheritance' allows A to inherit from more than one higher concept; so if A isa both B and C, then A inherits the properties of both B and C – a pattern which looms large in the analysis of CT verbs. As for 'default inheritance', this allows exceptions: if A has some property Q which conflicts with P, Q simply overrides P. It is because of this default logic that we find 'prototype effects': birds such as penguins which don't fly, things such as ashtrays which are unclear examples of furniture, and people such as foster-mothers who are unclear examples of mothers. Default logic is so obviously the basis for normal reasoning that the well-known problems of formalisation deserve a solution (which Word Grammar offers: Hudson 2007:21-31). It is also needed in the analysis of CT verbs, as we see below.

Inheritance is also one of the relations recognised between frames in the FrameNet project (Ruppenhofer et al 2006:104), but it appears not to allow defaults to be overridden or inheritance from multiple sources so the analyzes offered below may be hard to duplicate in this theoretical framework.

3.5 Participant roles

One of the attractions of Word Grammar for lexical semantics is the theoretical underpinning it provides for the analysis of participant roles. As noted in section 1, the problem in this area has often been noted. How should we reconcile the need for very specific roles such as Goods and Buyer with the attractions of a parsimonious system of semantic roles (so-called thematic or theta roles)? In order to get the best of both worlds, we need a general theory of relations such as the one in Word Grammar. When applied to CT verbs, a great many specific roles are needed, but the earlier analysis of 'grandfather' provides a model for integrating them with each other and with more general roles.

The following sections apply these theoretical tools in a re-analysis of the CT verbs. Each section deals with a different verb, but the analysis integrates them all into a

single virtual network. (This network is far too complicated to present *in toto*, of course, but it underlies the sub-networks that are presented.) In each case the aim is to relate the CT verb to other verbs with similar meanings and syntax, and thereby to explain the syntax. In some cases the CT verb turns out to inherit from more than one model, and in other cases it overrides crucial properties of the model, so the analysis requires the full power of multiple default inheritance as well as the range of relationships offered by WG. The analysis will stay close to the specific concepts which are most directly relevant to the CT verbs, but it will also explain (mostly in prose) ‘where the relations come from’.

4 BUY

4.1 Syntax

The syntax of BUY is conveniently summarised by the formula: ‘Buyer *buys* Goods (*from* Seller) (*for* Money)’, where ‘*from* Seller’ and ‘*for* Money’ are optional whereas ‘Goods’ is obligatory. The range of possibilities is illustrated by the following examples.

- (12) Bert bought some apples from Sam for a pound.
- (13) Bert bought some apples from Sam.
- (14) Bert bought some apples for a pound.
- (15) Bert bought some apples.
- (16) *Bert bought (from Sam) (for a pound).

Regarding my star against (16), it is true that this example is in fact possible, but only with the rather more specialised meaning of ‘professional trading’ in which professional buyers ‘buy’ for a living; in that case, a generic Goods (‘something’ or ‘things’) is understood, rather than the specific anaphoric referent found when the genuinely optional dependents are omitted. For example, (17) would normally be understood as saying that the pears as well as the apples were bought from Sam.

- (17) Bert bought some apples from Sam and Betty bought some pears.

In contrast, (18) need not mean that Betty bought apples.

- (18) Bert bought some apples and Betty bought too.

These observations suggest that the direct object is obligatory when BUY has its ordinary meaning.

It is very easy to find precedents for this syntactic pattern. The verb GET has precisely the same valency when it means ‘become the owner of’, and indeed it can be substituted for BUY in all the above sentences:

- (19) Bert got some apples from Sam for a pound.
- (20) Bert got some apples from Sam.
- (21) Bert got some apples for a pound.
- (22) Bert got some apples.
- (23) *Bert got (from Sam) (for a pound).

If this meaning of GET is called ‘getting’, we can explain the valency of BUY by saying that ‘buying’ isa ‘getting’. In the rather crude terminology of traditional structural semantics, we might describe BUY as a hyponym of GET; but this would overlook the fact that both lexemes are polysemous, so it is actually only one sense of BUY that ‘is a hyponym of’ (i.e. isa) one sense of GET.

However, although BUY and GET are interchangeable there is a crucial semantic difference between them with regard to the *for* phrase which defines the money paid. If Bert buys something, he necessarily pays some money for it, so the money is always part of the semantic frame, even though it need not be expressed syntactically; but if he merely gets something, there is no assumption about money changing hands. Consequently the isa link to ‘getting’ does not explain why ‘buying’ needs a money element. This needs a separate explanation which is provided in section 4.4 below.

4.2 Buying is getting: diagramming conventions

What we can do immediately is to explain why the verb BUY has an obligatory subject and object and an optional *from* phrase, and why these map as they do onto the semantic roles of ‘buying’. All these properties of BUY follow immediately if ‘buying’, the meaning of BUY, isa ‘getting’, one of the meanings of GET. This explanation for the syntax of BUY can be presented diagrammatically as the network fragment in Figure 2, which gives the semantic structure for ‘getting’, the corresponding syntactic structure for the verb GET, and the isa link from ‘buying’ to ‘getting’. The interpretation is as follows:

- As usual, the small triangle signals the isa relation (with its broad base sitting on the super-category and its apex pointing to the subcategories).
- The label ‘rn’ is short for ‘realization’; for instance, the top of the diagram shows that the word which is the actor’s realization is also the subject of the verb that realizes ‘getting’. Notice that the realization of ‘getting’ is not the verb GET itself but merely an example of it; this extra complexity is needed to avoid implying that GET always realizes this particular meaning; and similarly for the prepositions *from* and *for*.
- The numbers ‘1’ and ‘0/1’ are a convenient abbreviation for a separate ‘quantity’ link which specifies how many tokens of the category concerned are expected (Hudson 2007:19-20); thus, ‘1’ means ‘an obligatory item’ and ‘0/1’ means ‘an optional item’.
- Inheritable properties are not shown, so although ‘buying’ inherits all the structure attached to ‘getting’, this structure is left implicit in the diagram. Inheritable properties may in fact be stored, but the diagram shows the minimum of structure rather than the maximum.

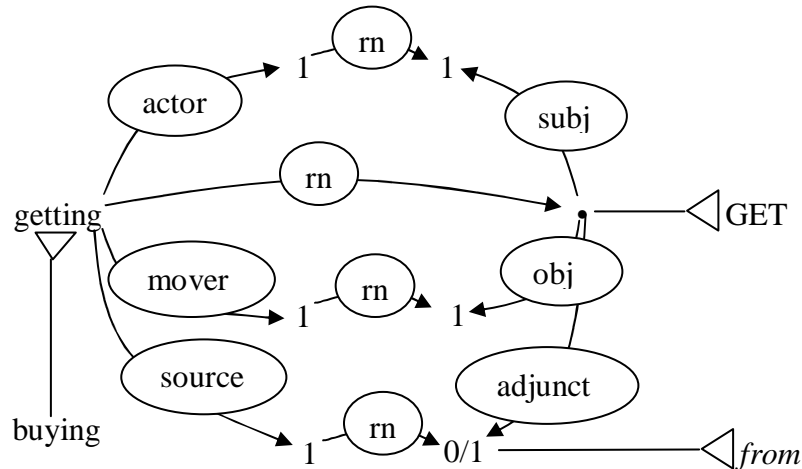


Figure 2: Explaining the semantics and syntax of ‘buying’ as an example of ‘getting’

The Word-Grammar diagram in Figure 2 is partially equivalent to the diagram in Figure 3, which is in the spirit of Construction Grammar (Goldberg 1995). The vertical

arrows in Figure 3 correspond to the realization relations in Figure 2, and the syntactic and semantic dependencies of the Word-Grammar diagram are implied by the left-right layout and the arrow-brackets in the Construction-Grammar one.

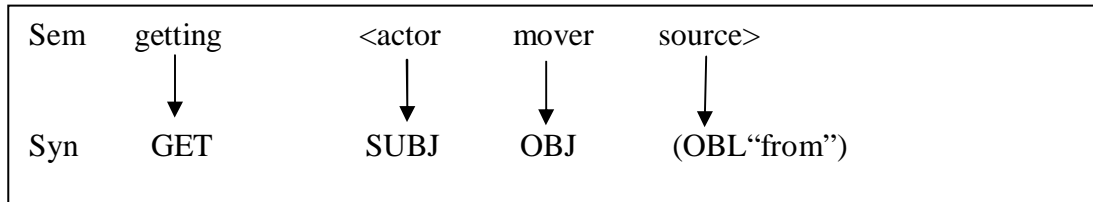


Figure 3: The syntax and semantics of ‘getting’ in the style of Construction Grammar

Seen as notational conventions, the choice between these two diagrams is merely a matter of taste, and no doubt the simple two-tier structure in Figure 3 has a great deal to commend it in comparison with the much more complex network in Figure 2. However, the former hides a lot of complexity; for example, ‘OBL“from”’ (based on ‘OBL“at”’ in Goldberg 1995:64) stands for ‘a phrase whose head is *from*’, a phrase-structure notion which is much more complex than the dependency structure in which the source is realized directly by the preposition *from*. Similarly, ‘GET’ stands for ‘one use of GET’, whose isa relation to GET are left implicit. But however helpful these short-cuts may be in a first sketch of an analysis, they are incompatible with a more comprehensive analysis, whereas the Word-Grammar analysis is fully extendable. In particular, it allows the explanatory analysis of semantic relations which I promised in section 3.

Construction Grammar offers just two kinds of relations: general argument roles such as ‘actor’ and ‘patient’ and verb-specific participant roles such as ‘robber’, ‘victim’ and ‘goods’ (Goldberg 1995:43-48; Goldberg 2006:20-21). This framework is too rigid to accommodate the complexities that are in fact needed to explain the relations concerned; the explanations offered below require the full flexibility of Word-Grammar networks .

4.3 Where do semantic relations come from?

According to the above analysis, ‘getting’ has relations called ‘actor’, ‘mover’ and ‘source’, so if ‘buying’ isa ‘getting’, it must inherit these relations. But what should we call them when applied to buying? The common-sense answer is that the actor is the buyer, the mover is the goods and the source is the seller, but in the network model there are no labels so the only possible answer is that each relation isa its super-category as shown in Figure 4 below: ‘buying’ inherits one relation which isa ‘actor’, another which isa ‘mover’ and a third which isa ‘source’. Notions like ‘buyer’ play no part in the analysis, even if we use them when translating the analysis into ordinary prose.

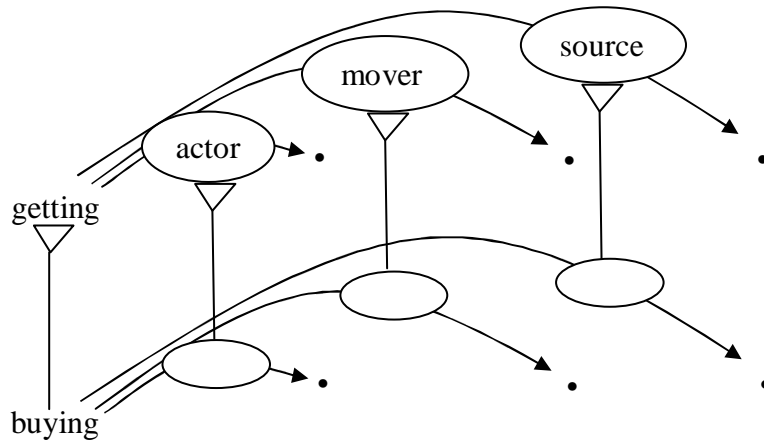


Figure 4: ‘Buying’ inherits its semantic roles from ‘getting’

But if ‘buyer’ and ‘seller’ play no part in the analysis, what about ‘actor’, ‘mover’ and ‘source’? Does the same apply to them or do they have a privileged status as primitives? Once again, the network model only allows one answer: these labels are not part of the analysis either, even if we use them when we translate into prose. Just as ‘grandfather’ is defined in terms of ‘parent’ and ‘father’ (section 3.2), these relations can be analysed further.

The role of ‘actor’ is clearly not peculiar to ‘getting’, but applies much more generally to all actions, which we can call ‘doing’. By definition, doing involves a purposeful and energetic participant who is in control, so dancing and eating are good examples whereas breaking one’s leg or dying are less so.

(24) What she did next was to dance.

(25) ?What she did next was to die.

In short, the actor of doing has the characteristics of the ‘proto-actor’ (Dowty 1991); but there is no need to treat it as a primitive because ‘doing’ (in this very general sense) provides a definition: the actor is the only participant of ‘doing’. The label ‘actor’ is simply shorthand for an isa link to this relation, as shown in Figure 5. This diagram gives a simple definition of the relation that we call ‘actor’, but of course it also allows the definition to be enriched further down the hierarchy; for example, the buyer has properties such as providing the money that go beyond the basic properties inherited from doing. These extra properties are specified in a more complete analysis but are left implicit here for simplicity.

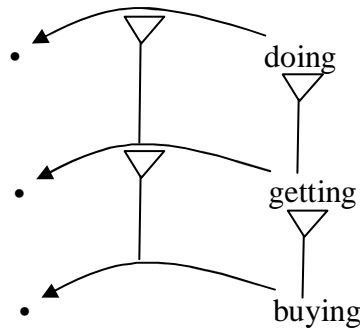


Figure 5: An actor is the one participant of ‘doing’ (or its descendant)

A more complex kind of definition is needed for the ‘mover’ of getting, which is the ‘goods’ of buying. In this case we invoke the semantics of causation, where an action causes a change in some person or thing (the ‘patient’) as in:

(26) I made him work.

(27) I heated the water.

In each case I did something which had a result that impacted on the patient, causing a change in the patient. If we call this general type of action ‘making’, the semantic structure concerned is as shown in Figure 6. This time the relation ‘patient’ is defined (like ‘grandfather’) as the point of convergence of two other more general relations (‘result’ and some unspecified relation); and as before, the definition is inherited simply through the isa links between relations without the help of labels such as ‘patient’. Once

again we find that an apparently ‘primitive’ relation can be analyzed and reduced to something simpler. Once ‘patient’ is defined in this way, we may choose to rename it ‘mover’ when it is inherited by movements such as getting; but of course this is merely a matter of mnemonic convenience.

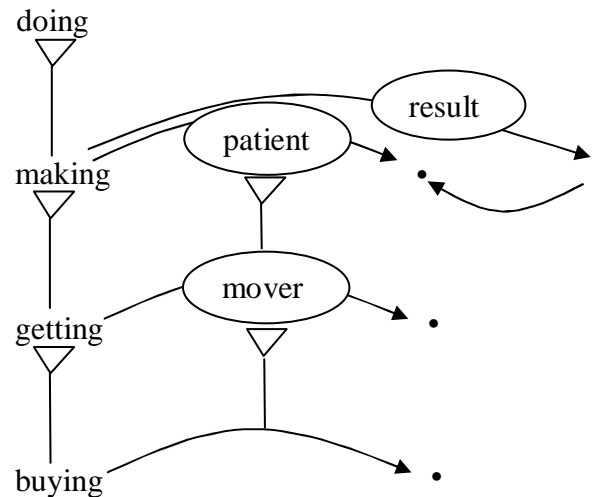


Figure 6: A patient is shared by ‘making’ and its result

The third participant of getting is ‘source’, which is no more peculiar to getting than the other two, and which like the other two can be decomposed into simpler relations. In this case the same relation is found in intransitives such as (28):

(28) He came from Edinburgh.

The source is the position of some entity before, but not after, some movement, so it presupposes an analysis of ‘moving’ (the concept of movement; I use gerunds to name events), which in turn requires an analysis of the more general event-type, ‘changing’. It is this changing that is the result of the making in Figure 6 and that provides the extra link to the mover. However, changing is a different kind of event from the ones considered so far, so I need to digress briefly to look at the semantics of changing.

In a change, one state (‘s1’) is followed by a different state, called ‘s2’; obvious examples are dying, getting tired, freezing and so on. The two states are not, of course, randomly selected – as, for example, if s1 was a state where John is reading and s2 is one where Mary is looking out of the window. It is important that the states are related to

each other by a ‘constant’, the entity that changes, and which by definition is involved in both states – e.g. if John dies, then he is the constant and in s1 he is not dead whereas in s2 he is. What is special about moving is that each of the states is an example of being located, which for simplicity we can call simply ‘being’; consequently, each state has what we can call a ‘trajector’ and a ‘landmark’ (Langacker 1990:6), abbreviated to ‘tr’ and ‘lm’. Thus if he came from Edinburgh, he is the trajector in both s1 and s2, but Edinburgh is landmark only in s1. This gives us a definition of ‘source’ in terms of the simpler relations ‘s1’ and ‘lm’, as shown in Figure 7, and this diagram gives a similar definition for ‘goal’ as the landmark of s2. This diagram also shows that the source and goal are realized (optionally) by the prepositions *from* and *to*, so any verb which inherits either of these relations will also inherit these prepositions as their realization.

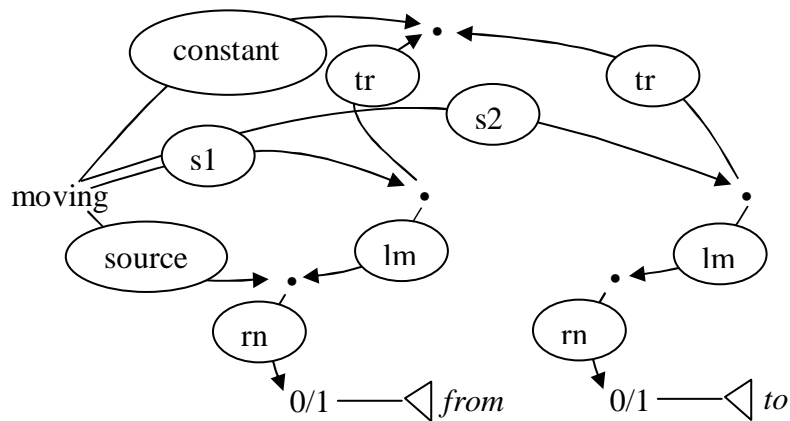


Figure 7: Source and goal are defined, and realized by *to* and *from*.

This ‘locative’ analysis is relevant to buying because it may be extended to more abstract domains which do not involve purely physical location (Gruber 1965, Jackendoff 2002:356). The domain of most relevance to buying and selling is possession, in which a thing is located in the possession of a person, as in (29).

(29) Sam has an apple.

The analysis proposed here assumes that the landmark is the possessor and the trajector is the thing possessed, so the latter may ‘move’ from one person to another in just the same way (linguistically speaking) as it may move from one place to another; and in both cases the movement has the same semantic structure, with a constant (the thing), a source (the first owner) and a goal (the second owner).

Returning to the analysis of getting, therefore, we can now include the source in the analysis so far. Getting has a source because its result has one. Strictly speaking, what we are calling the source of getting (and, by inheritance, of buying) is only indirectly related to the getting, via the moving which is its result. For instance, if he gets a car from me, he does something which moves the car from me to him, but I am not part of what he does. Nevertheless, we regularly ‘merge’ actions and their results linguistically in a ‘raising’ structure, which allows us in this case to treat the source of an action X’s result as though it were the source of X itself. The same is presumably true for the area of cognition close to speaking (‘thinking for speaking’ – Slobin 1987), where we can recognise a general action-type called ‘making-move’ (the sense of transitive MOVE, as in *He moved the ball*). Like other examples of making-move, getting has a derived ‘source’ element, which is defined as the source of its result. This ‘merger’ is shown in Figure 8. Notice how relations can be defined recursively in terms of other relations:

- getting: its source is also the source of its result, which isa moving.
- moving: its source is also the landmark of its initial state (s1), which isa being.

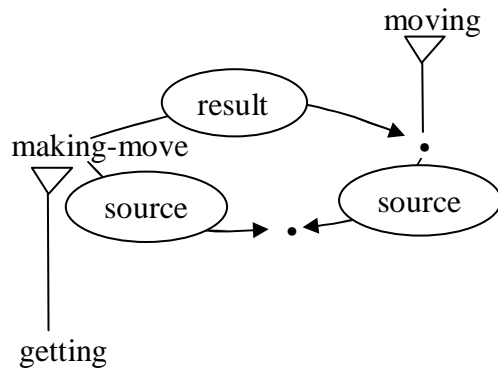


Figure 8: Getting inherits a derived source from making-move.

The analysis so far explains the *from* used with BUY. The explanation goes as follows:

- Buying isa getting, which isa making-move, which has a source, so buying also has a source.
- By inheritance from making-move, the source of buying is also the source of its result, which isa moving.
- By inheritance from moving, the source of buying is realized by the preposition *from* (by virtue of its relation to moving)
- By inheritance from very general patterns, the source of buying is realized by a dependent of BUY, so *by* depends on BUY.

Thus, the syntax of the source is straightforwardly explained, though it is noteworthy that the choice of preposition and its dependency relations are determined by different parts of the network.

The goal of the movement of goods in buying is less straightforward, because in this case the default *to* is overridden. The point of buying is that the buyer, who performs the action, is also the goal of the movement; that is, if I buy a car, I do something that makes the car move into my possession. This exceptional mapping can be stipulated at the appropriate level of generality (presumably for getting) and the logic of default inheritance will automatically block the default. As with the source, the goal of buying is

‘raised’ out of the movement that results from the buying, so the buyer is also the goal not only of the buying but also of the latter’s result.

The analysis of buying is summarised in Figure 9. This figure uses a simplified notation in which the shaded squares stand for the realization relations presented in earlier diagrams. Thus, the verb BUY inherits its subject from ‘doing’ and its object from ‘making’, while its optional dependent *from* comes from ‘moving’ (via ‘making-move’).

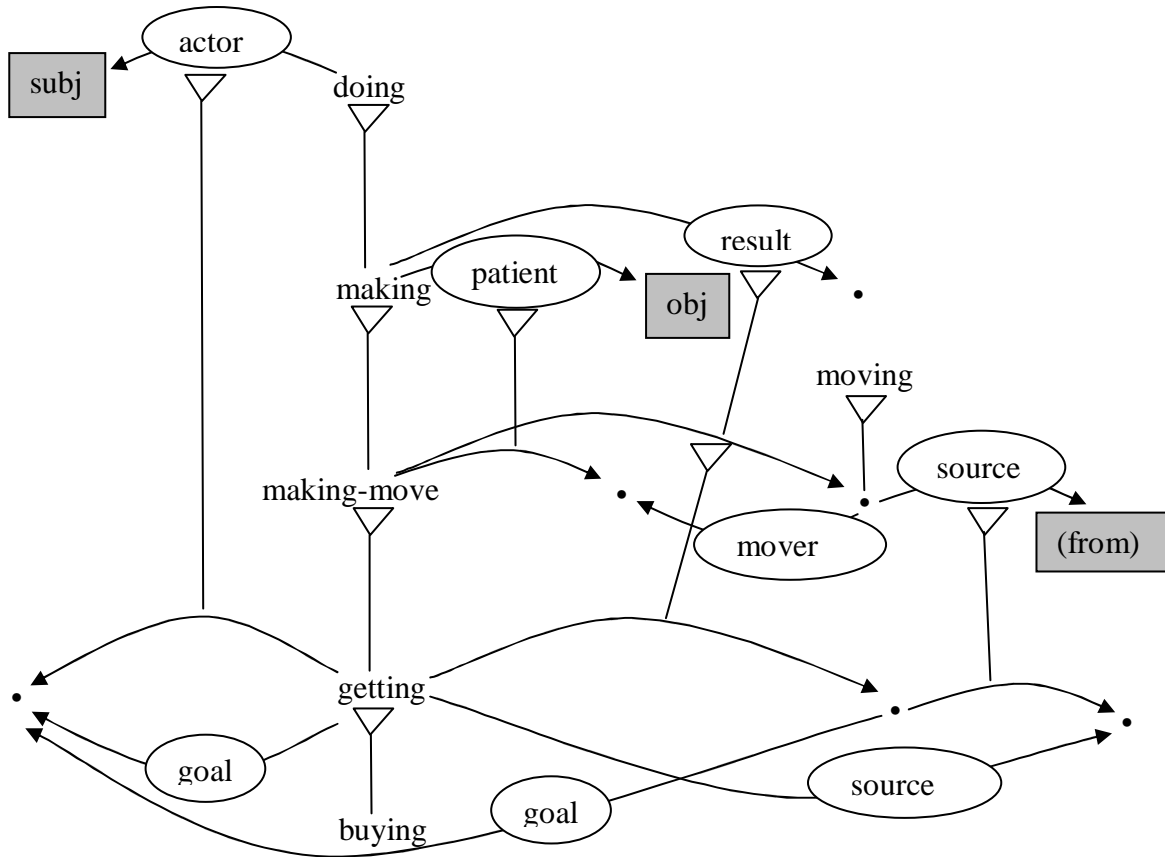


Figure 9: Buying inherits from ‘getting’, ‘making-move’, ‘making’ and ‘doing’

4.4 Compensating and *for*

The analysis so far explains the semantic and syntactic similarities between BUY and GET, but it does not distinguish buying from other kinds of getting, nor does it explain why money must be involved (and why it is realized by *for*). For this we must turn to a different area of semantics, compensation. Consider first the use of *for* in (30):

(30) Bert did it for a pound.

The pound is in some sense a compensation for the main action. The notion of compensation involves a kind of folk economics in which losses can be balanced by gains which compensate for them; so whatever Bert did in (30) incurs a loss (of energy, time and so on) which is compensated by someone else giving him the pound. The notion of compensating plays an important part in the analysis of paying (section 6.2), where I provide an analysis which defines the relation ‘compensation’ which is taken for granted here.

Now consider the very similar use of *for* with BUY in (31):

(31) Bert bought some apples for a pound.

Here too, the pound is a compensation, but the two cases are different in an interesting way: in (30), the pound goes to the actor but in (31) it does not go to Bert, the actor, but to the source of the apples, the seller. To anticipate the discussion of SELL in section 5, SELL is like DO rather than BUY in that the compensation goes to the actor:

(32) Sam sold Bert some apples for a pound.

This difference between BUY and the other verbs demands an explanation.

The relation ‘compensation’ links a loss to the gain that is intended to make up for it. Thus in all the examples above, the transfer of a pound is the compensation for the loss defined by the main verb. The later analysis of compensating defines a new relation ‘reward’ in terms of ‘compensation’ and ‘mover’, which Figure 9 has already defined in relation to ‘making-move’; so the compensation is an optional moving of a reward (the pound), realized by *for*, to some goal (the person who receives it). Figure 10 shows the semantic structure that underlies the general relation between an action (‘doing’) and its compensation.

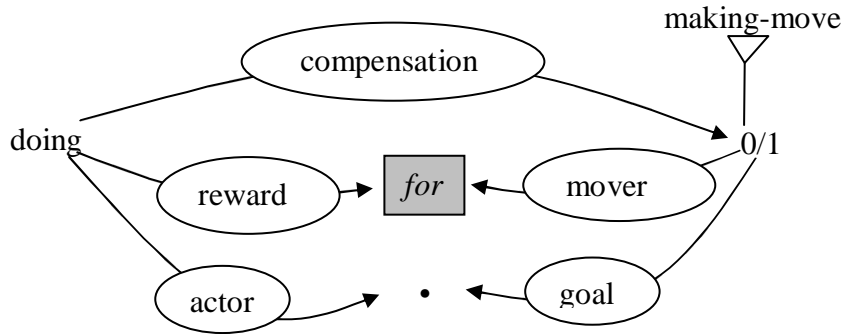


Figure 10: The compensation for an action moves a reward to the actor

One special kind of compensated action plays an important part in commerce, namely exchanging (Fillmore and Atkins 1992). This too uses the preposition *for*:

(33) He exchanged his apple for her banana.

The choice of preposition construes the banana as a compensation for the loss of the apple, so the basis of exchanging is not mere compensation, but mutual giving in which A's gift to B compensates for B's gift to A. This rather complex structure is shown in Figure 11.

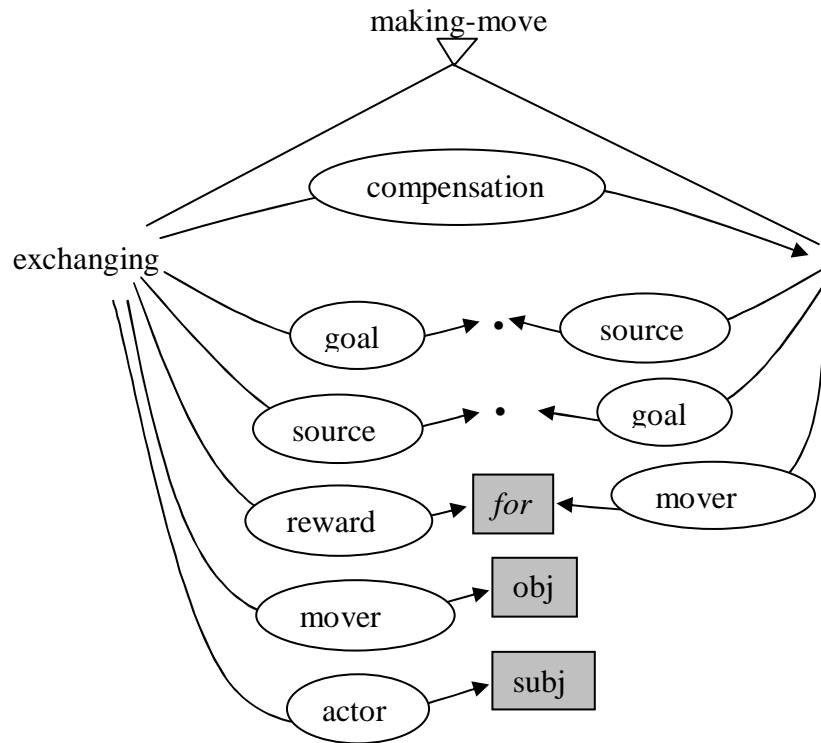


Figure 11: Exchanging is two reciprocal making-moves

Buying, like selling, is an example of exchanging in which the goods (the constant) are exchanged for the money (the reward). But unlike selling, the actor of buying is also the goal rather than the source of the exchange. This is because, as we saw in section 4.2, buying is an example of getting, where the actor is also the goal. Figure 12 shows how buying inherits both from exchanging and also from getting; for simplicity, it uses the vertical dimension rather than isa lines to show how the individual participants are related. In prose, the diagram shows that buying inherits as follows:

- from getting:
 - an actor which is also a goal and is realized by the subject.
 - a source which is realized by *from*.
 - a mover which is realized by the object.
- from exchanging:
 - a goal.

- a source.
- a mover.
- an actor.
- a reward which is realized by *for*.

The two goals are merged, as are the two sources and the movers. Thus the only extra participant which is inherited from exchanging is the reward, but the additional structure from exchanging greatly enriches the semantic frame.

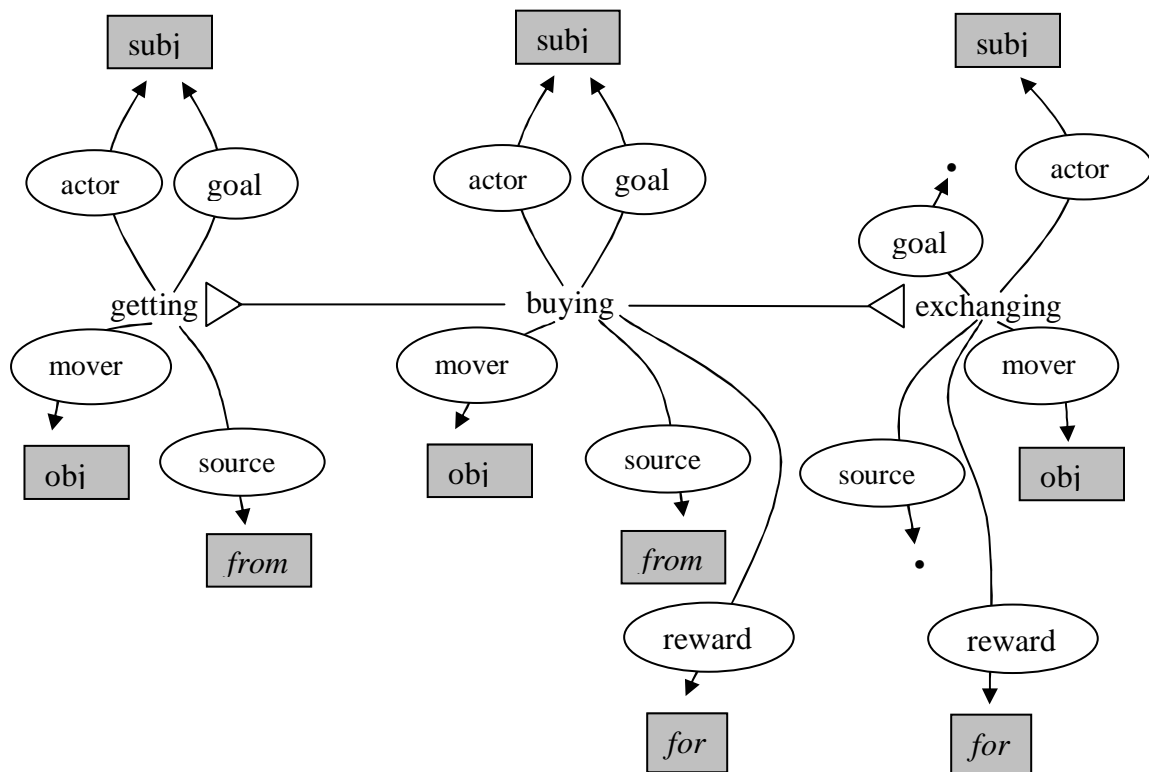


Figure 12: Buying inherits from both getting and exchanging

This analysis explains why the buyer gives the reward, whereas in most actions the actor receives it; this difference was illustrated earlier by sentences (30) and (31), repeated here:

(34) Bert did it for a pound.

(35) Bert bought the apples for a pound.

By default, as defined in Figure 10, the reward passes to the actor; but exchanging requires that the reward and the mover change places, which means that if the mover passes to the actor – as it does in getting – then the reward must pass from the actor. Thanks to the logic of default inheritance, this exceptional requirement overrides the default and the difference between (34) and (35) is explained.

4.5 Trading

Having explained why *for* is used to realize the ‘reward’ of any action which compensates someone for a loss, we can turn to the specifics of buying which distinguish it from other kinds of getting and exchanging. As we have seen, buying and selling entail each other, which shows that they share the same peculiarities; so in order to generalise across them we can call this kind of activity ‘trading’.

Trading is a special kind of exchanging where the compensation is money, so goods pass to one participant, and money to the other. In contrast with paying (see section 6), trading profiles the goods rather than the money, so the money compensates for the loss of goods rather than the other way round. I assume that trading is the prototypical scene for commercial transactions, so another element of the definition is the location: in a shop, which is in turn defined as a place where trading takes place. Thus, ‘shop’ and ‘trading’ are part of each other’s semantic frames. The structure is shown in Figure 13.

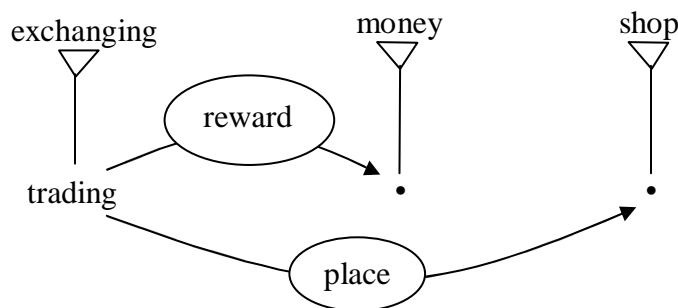


Figure 13: Trading is a kind of exchanging with monetary compensation

4.6 Synthesis

Finally, we bring together the various strands of this analysis of buying, the meaning of the verb BUY. In section 4.2 I argued that buying is getting, and that this explains most of its syntax; but section 4.4 suggested an explanation for the use of *for* in terms of the general notion of compensation and more specifically exchanging, with trading as a particular kind of exchanging (section 4.5). In short, buying inherits from two models: getting and trading (which in turn inherits from exchanging). Between them, these models explain all the syntax of BUY as a regular realization of semantic relations as follows:

- From getting and trading: its actor (the buyer) is realized by the subject.
- From getting: its goal is also realized by the subject.
- From getting and trading: its mover (the goods) is realized by the object.
- From getting: its source (the seller) is realized by *from*.
- From trading: its reward (the money) is realized by *for*.
- From trading: its reward is money.

5 SELL

5.1 Syntax

The syntactic options for SELL are as shown in (36) to (41).

- (36) Sam sold some apples to Bert.
- (37) Sam sold Bert some apples.
- (38) Sam sold some apples.
- (39) *Sam sold Bert.
- (40) *Sam sold to Bert.
- (41) *Sam sold.

As with BUY, the verb SELL can be used without a direct object as in (40) and (41), but only if Sam is a professional ‘seller’. Another similarity to BUY is the possibility of ‘*for Money*’, as in (42).

(42) Sam sold some apples to Bert for a pound.

The obvious model for this valency pattern is the verb GIVE, which is as interchangeable with SELL as GET was with BUY:

(43) Sam gave some apples to Bert.

(44) Sam gave Bert some apples.

(45) Sam gave some apples.

(46) *Sam gave Bert.

(47) *Sam gave to Bert.

(48) *Sam gave.

(49) Sam gave some apples to Bert for a pound.

Another important syntactic difference between SELL and BUY is that SELL has a ‘middle voice’ use which is not possible with BUY:

(50) The apples sold well.

(51) *The apples bought well.

This discrepancy is well known and much discussed (for example, Fagan 1988; Lakoff 1977; Rosta 1995; Yoshimura and Taylor 2004), and the general consensus is that this use presents the mover as ‘primarily responsible’ for the event. The quality of apples is relevant to selling them but not to buying them. I have nothing to add to this insight, nor can I offer a more formal analysis as yet.

Alongside these differences between selling and buying we must also recognise the similarities noted in section 4.5, where I classified them both as examples of trading (and therefore also of exchanging). This is why selling necessarily involves a monetary ‘reward’, in contrast with mere giving. However, most of the syntax of SELL is what it inherits via giving, so we can leave the ‘trading’ aspects till later.

5.2 Giving and double objects

The next step, then, is to provide an analysis of giving which can then be applied to selling. This analysis should reveal the similarities between giving and getting as well as their differences, so we start with this comparison. One problem is, of course, the polysemy of both GIVE and GET, but I assume that they each have one sense which entails the corresponding sense of the other, as in (52) and (53):

(52) Sam gave an apple to Bert.

(53) Bert got an apple from Sam.

These are the meanings that I call ‘giving’ and ‘getting’. Both meanings are examples of ‘making-move’, as defined in section 4.3, in which someone (the actor) makes a constant (in this case, the apple) move metaphorically from one person’s possession (the source) to another’s (the goal). The difference is that the actor is also the goal in getting, but the source in giving. Syntactically, the actor is always realized by the subject, so this merger overrides the default realization of the goal by *to* and of the source by *from*. This very simple difference is shown in Figure 14.

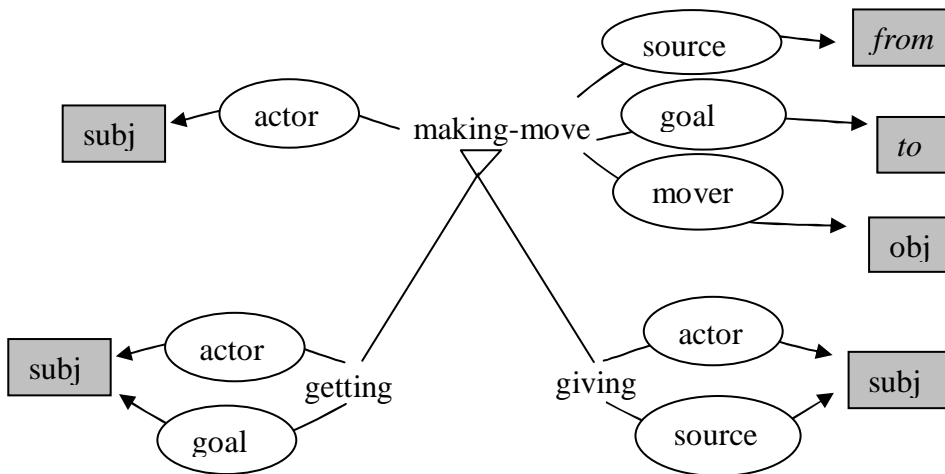


Figure 14: Giving and getting both isa ‘making-move’

If selling is a kind of giving, then we have an immediate explanation for the pattern ‘Seller *sells* Goods (to Buyer)’ in (36) and (38). However, the double-object pattern ‘Seller *sells* Buyer Goods’ raises further questions. Why is it that the goal has an alternative realization by the indirect object? This requires a deeper analysis which relates the ‘*to* ditransitives’ to their syntactic cousins, the ‘*for* ditransitives’, in order to explain why semantically and syntactically different examples like (54) and (55) have syntactically similar paraphrases (56) and (57).

(54) Sam made a cake for Mary.

- (55) Sam gave a cake to Mary.
(56) Sam made Mary a cake.
(57) Sam gave Mary a cake.

It is generally agreed that the last two examples have identical syntactic structures (Goldberg 2006:26-7) in which an indirect object precedes the direct object, even though the indirect object realizes the beneficiary in one case and the goal (i.e. the ‘recipient’) in the other. This could be simply a coincidence, but the semantic structures realized by *for* and by *to* are sufficiently similar to invite a unified analysis.

Let us consider first the semantics of beneficiary *for*. Unlike the ditransitive pattern, this is not tied to the occurrence of a concrete direct object but can occur freely in intransitives or in transitives with abstract objects:

- (58) He danced for her.
(59) He did it for her.

In both these sentences, *for her* identifies his purpose as benefitting her. The idea of benefitting fits into the folk economics discussed in section 4.4 where people can gain or lose as the result of events, so his intention in dancing or ‘doing it’ is that she should gain. We explore the concept of gaining in more detail in section 6.2, but it is enough here to assume that it allows us to define the relation ‘beneficiary’, realized by *for* (a very different use of *for* from the *for* of compensation as in *for a pound*). The beneficiary of an action is the person who is intended to gain from it.

Moving on to transitive sentences, one specific way of gaining is to become the owner of something such as a cake, so *for her* in (60) means that she is the intended owner of the cake.

- (60) Sam made a cake for her.

This is where ditransitive syntax becomes relevant as an optional alternative to *for*:

- (61) Sam made her a cake.

The syntax of the indirect object (which I take for granted here - Hudson 1992) requires it to occur with a direct object, so it is natural for it only to occur with transitive verbs; but more specifically, the beneficiary must become the owner (in some sense) of the direct object’s referent. For example, (62) has no ditransitive counterpart (63) because she does not benefit from his washing by ‘having’ his face.

(62) Sam washed his face for her.

(63) * Sam washed her his face.

This is why the verbs that allow ditransitives have to be ‘either verbs of obtaining or verbs of creation’ (Levin 1993:49). For lack of a better term, we can call this kind of action ‘finding/making’. The semantics for this action-type and its syntactic realization are shown in Figure 15 (where ‘d.obj’ and ‘i.obj’ stand for ‘direct object’ and ‘indirect object’ and brackets show optionality; as suggested in section 4.3, I assume that the possession and owner are the trajector (‘tr’) and landmark (‘lm’) in any example of ‘having’).

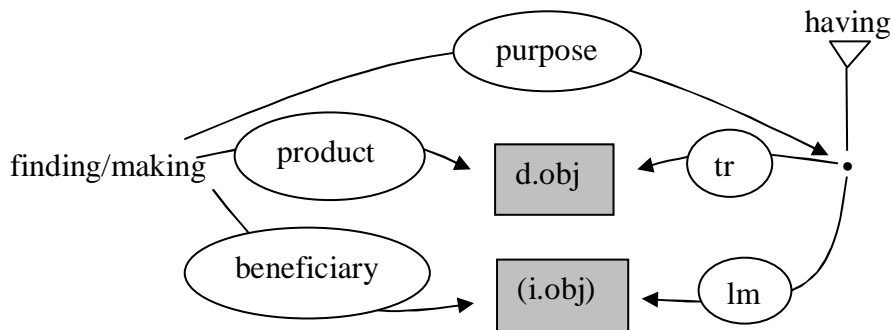


Figure 15: Indirect objects realize beneficiaries

However, this pattern only applies directly to beneficiary uses of the indirect object. Why is it that we find the same syntax with the apparently different semantics of giving? In a unitary analysis, one of them should be inherited from the other, but which is the basic one? The evidence suggests that for-ditransitives are basic and to-ditransitives inherit from them, rather than vice versa, because the meaning of for-ditransitives is more general and subsumes that of to-ditransitives. Consider (56) and (57), repeated here:

(64) Sam made Mary a cake. (beneficiary, alternates with *for*)

(65) Sam gave Mary a cake. (recipient, alternates with *to*)

In both cases, Mary becomes the owner of the cake, but the beneficiary pattern says nothing about the previous state, except that Mary did not own it. In contrast, the recipient pattern entails that she ‘receives’ it from Sam, i.e. Sam was the previous owner. Thus the recipient pattern is more specific than the beneficiary, which must therefore be the default. In other words, giving is a special kind of ‘finding/making’ in which the giver

already owns the product (the gift), and the goal participant inherits its syntax (realization by the indirect object) from the beneficiary. On the other hand, we have already seen (Figure 14) that giving is a kind of ‘making-move’ which allows the goal to be realized by *to*. Consequently, there are two possible inheritable realizations for the goal participant: *to*, by virtue of being the goal, and indirect object by virtue of being the beneficiary. Since neither option will override the other they must both be stipulated as possible, but they are both motivated by more general models. The proposed analysis is shown in Figure 16.

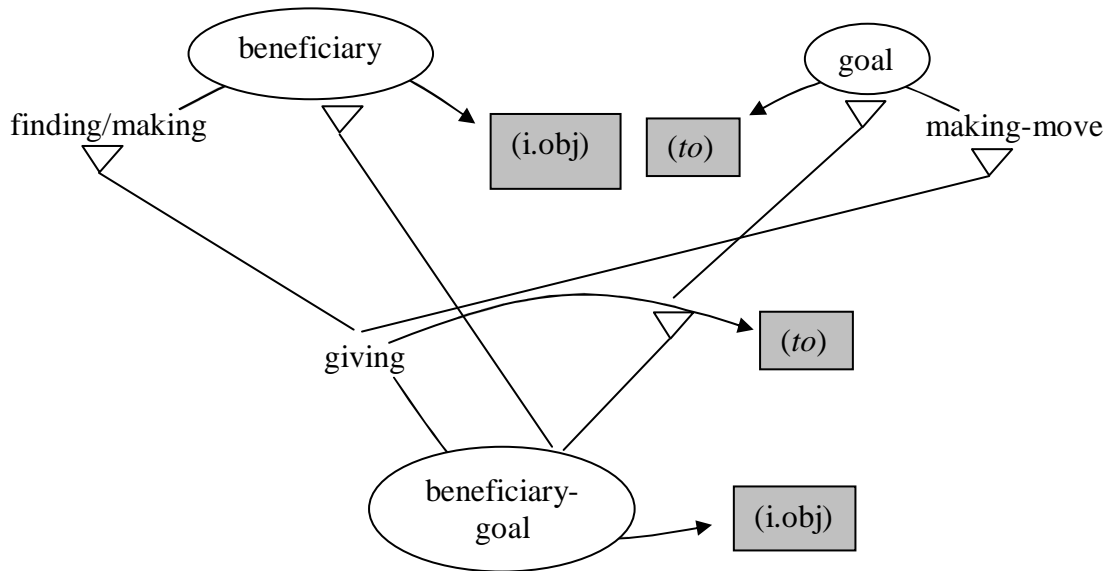


Figure 16: ‘Giving’ inherits the indirect object from ‘finding/making’

This analysis explains why verbs of giving allow the indirect object syntax which is primarily associated with verbs of ‘obtaining and creating’ (our ‘finding/making’), and why they allow it as an alternative to the *to* which they inherit from ‘making-move’. We can now apply this analysis immediately to selling, but this framework for verbs of giving is also relevant to other CT verbs, as we see below.

5.3 Synthesis

As noted in section 4.5, selling isa trading, which is why it necessarily involves money as a reward (and the syntactic possibility of *for*). This analysis can now be integrated with

the analysis of selling as giving in the same way that we recognised two models, trading and getting, for buying. The analysis is summarised in Figure 17.

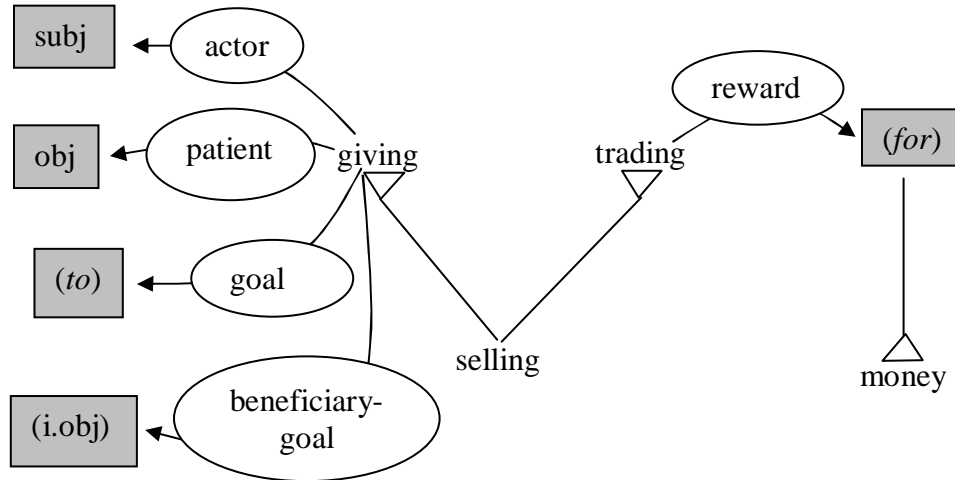


Figure 17: Explaining the syntax of SELL

6 PAY

6.1 Syntax

The syntax of PAY is very similar to that of SELL, but there are important points of difference.

- (66) Bert paid a pound to Sam (for some apples).
- (67) Bert paid Sam a pound (for some apples).
- (68) Bert paid a pound (for some apples).
- (69) Bert paid Sam (for some apples).
- (70) *Bert paid to Sam (for some apples).
- (71) Bert paid (for some apples).

As (71) shows, the direct object of PAY, *a pound*, is optional – though not if the goal is realized by *to*, as in (70) – whereas that of SELL is obligatory (except when referring to a professional seller). Moreover, what appears to be the indirect object (*Sam*) can occur on

its own without *a pound*, contrary to the generally rigid requirement that indirect objects only occur in the presence of a direct object.

Most of the syntactic facts can be explained in the same way as with SELL, by treating paying as an example of giving. This explains examples (66) to (68). But the remaining examples cannot be ignored and indeed, when we look for an explanation it turns out to be revealing. It turns out that paying is an example not only of giving but also of two other action-types, compensating and accepting.

6.2 Compensating again

We have already discussed the notion of compensation in connection with the preposition *for* (section 4.4) but this time we need to consider it as the meaning of the verb COMPENSATE. This is relevant because its syntax provides a model for one of the unexpected syntactic patterns found with PAY. Compensating a person for their loss provides an additional model for paying:

(72) Bert compensated Sam (for his loss).

(73) (= (69)) Bert paid Sam (for some apples).

When Sam gives Bert his apples this is a loss to him, so paying him is one way of compensating him for the loss. What is important about the syntax of these examples is that the person compensated (the ‘loser’) is realized by the direct object, which means that the loser rather than the money is profiled. If this analysis is right, then we have an explanation for the apparently exceptional pattern in (69) where what looks like an indirect object is used without a direct object. The explanation is that *Sam* is not in fact the indirect object here (although it is in (67)). This is even clearer with two related verbs, UNDERPAY and OVERPAY, where the money cannot be realized at all because it is built into the verb’s meaning (‘too little’ or ‘too much’).

(74) Bert underpaid Sam (for some apples).

(75) *Bert underpaid Sam a pound.

It is true that (75) is possible, but not in the relevant meaning (‘Bert paid Sam a pound, which was too little’); instead, *a pound* specifies the amount by which his payment is too little.

Figure 18 shows the semantic and syntactic structure of compensating, as in ‘A compensated B for the loss of C’. In this analysis, compensating involves five elements:

- the actor A (the compensator) realized by the subject
- the loser B, realized by the object
- the loss C, realized by *for*
- the reward D, which has the same value as C
- an act of compensation D, which is a making-move with A as its actor, B as its goal and D as its mover.

The reward and the act of compensation can be realized using the general-purpose machinery for instruments (e.g. *with a cheque*) or means (e.g. *by giving him a cheque*). Notice that this diagram also provides a definition for the relations ‘compensation’ and ‘reward’ that were invoked in section 4.4.

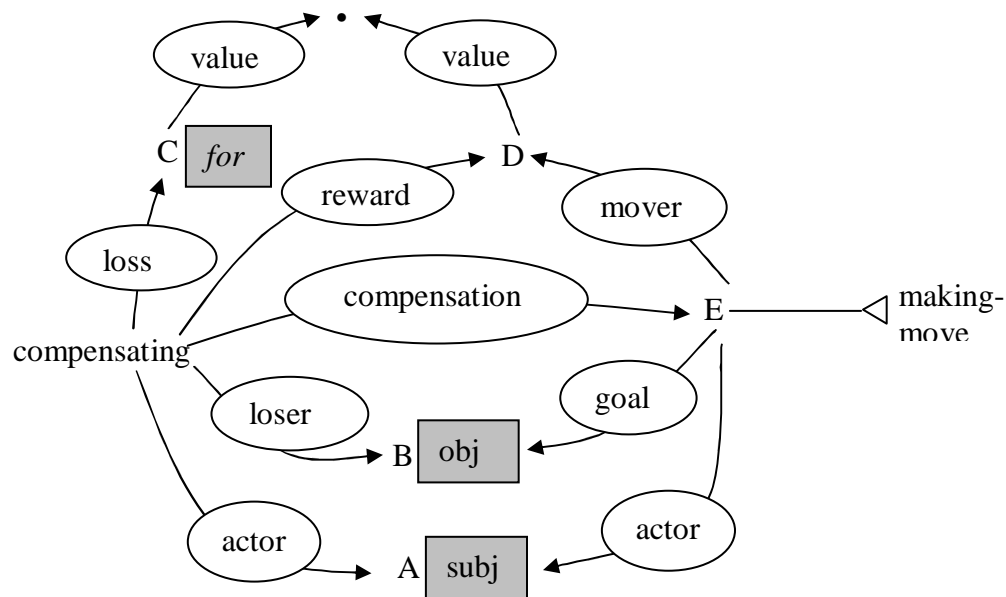


Figure 18: The structure of ‘compensating’

If paying is a ‘compensating’ as well as ‘giving’, this explains why it combines the syntactic possibilities of both. But it does more than this, because it also helps to distinguish paying from other kinds of giving. Paying is giving money with the intention

of compensating the payee for the loss of goods. Similarly, buying and selling involve money because they are examples of trading, but trading is different from compensating with money; these differences explain the cases noted in section 2 where we can pay for things that we cannot buy. Trading is necessarily an exchange of goods for money, but we compensate people for losses other than the loss of goods, including the loss of time and energy involved in providing services. When applied to paying, this means that we can pay people for services such as providing a hotel room or mowing our lawn, neither of which counts as buying.

(76) Bert paid the receptionist fifty pounds for the room.

(77) *Bert bought the room from the receptionist for fifty pounds.

The two models for ‘paying’ are shown in Figure 19 with their competing construals of the payee: as goal (realized by *to* or the indirect object) or as ‘loser’ (realized by the direct object).

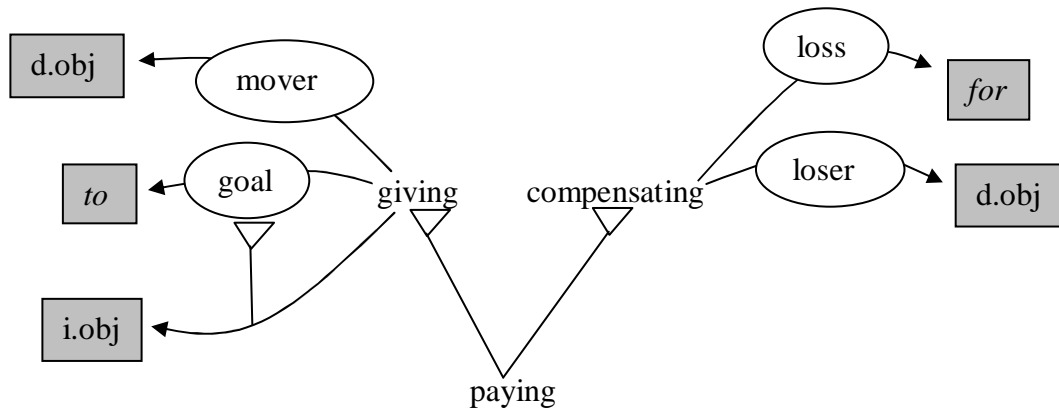


Figure 19: ‘Paying’ isa ‘giving’ and ‘compensating’

6.3 Accepting and price

The other syntactic peculiarity of PAY is that it may be used intransitively as in *Bert paid*. This is not explained by the link to ‘compensating’, because COMPENSATE cannot be used intransitively, so we look elsewhere for a precedent and find it in verbs such as ACCEPT, which can be used with an understood but unrealized object:

(78) When Sam asked for a pound, Bert accepted and paid.

What is understood here is not that Bert accepted a pound, but that he accepted Sam's price and paid it. This model is semantically relevant to paying because the price has to be accepted by both parties as a fair compensation. One accepts something offered by someone else, whether a thing or a suggestion, so we can call the role of the object the 'offer'. When the model of accepting is applied to paying, the offer is identified with an element that we have not yet discussed, 'price'. A thing's price is the money that needs to be paid for it, so it can be defined in relation to a typical example of paying, as shown in Figure 20. According to this analysis, the direct object that realizes the price is optional, which is why PAY may be used intransitively.

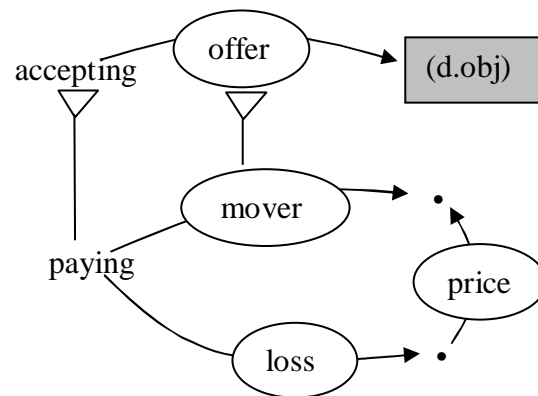


Figure 20: 'Price' may be unrealized

6.4 Synthesis

In summary, then, paying inherits its syntax from three models:

- giving (subject, direct object realizing the money, *to*, indirect object realizing the payee)
- compensating (*for*, direct object realizing the payee)
- accepting (optionality of direct object realizing the money)

In addition, paying imposes its own requirement that the mover must be money. These interrelations are summarised in Figure 21.

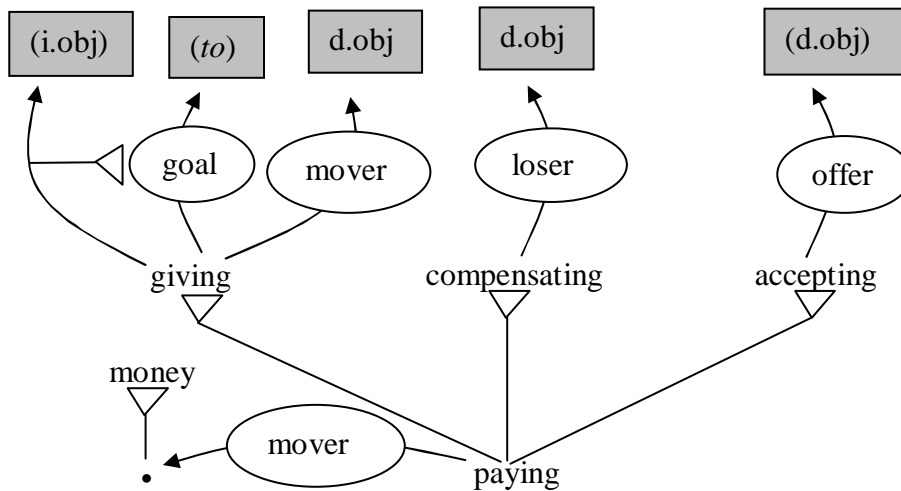


Figure 21: Explaining the syntax of PAY

7 CHARGE

The syntax of CHARGE appears rather odd at first sight, because it has almost the same range of possibilities as PAY although its meaning is the reverse – if Bert pays Sam, then Sam charges Bert. (In contrast, the syntax of BUY was very different from that of its counterpart SELL.)

- (79) *Sam charged a pound to Bert (for some apples).
- (80) Sam charged Bert a pound (for some apples).
- (81) Sam charged a pound (for some apples).
- (82) Sam charged Bert (for some apples).
- (83) * Sam charged to Bert (for some apples).
- (84) Sam charged (for some apples).

The only difference compared with PAY is the ungrammaticality of sentence (79), but this detail demands an explanation, as does the overall similarity to PAY.

This pattern of options is somewhat harder to explain than the ones discussed earlier, so the following analysis is quite tentative and not yet ready for diagramming. Nevertheless, it is possible to see the outlines of an explanation in terms of a number of competing models each of which has a relevant meaning and explains one or two of the

syntactic patterns found with CHARGE. In contrast with the other verbs, the models are themselves very small clusters of semantically and syntactically similar verbs.

- For the pattern ‘Seller *charges* Buyer Money’, as in (80), the model is what we might call ‘verbs of withholding’ such as REFUSE, DENY and FINE which use the ditransitive pattern but have no prepositional alternative:

(85) Sam refused Bert a pound.

(86) *Sam refused a pound to Bert.

- For ‘Seller *charges* Money’, as in (81), the model is verbs of asking such as DEMAND and ASK:

(87) Sam demanded a pound.

- For ‘Seller *charges* Buyer’, as in (82), the model is ‘verbs of punishment’ such as PUNISH and (perhaps) TAX.

(88) Sam punished Bert.

- Where there is no object, as in (84), the model is ‘accepting’, which is as relevant to charging as it was to paying given that in both cases the price has to be accepted by both parties.

As with PAY, each of these models combines with compensating as defined in section 6.2 above.

8 SPEND

Syntactically, SPEND is quite different from the other CT verbs. Whereas we buy, sell, pay and charge *for* something, we spend money *on* it. The options are quite limited compared with other verbs:

(89) Bert spent a pound on some apples.

(90) Bert spent a pound.

(91) *Bert spent on some apples.

(92) *Bert spent.

The obvious model for SPEND is the verbs of resource-management such as WASTE, USE, TAKE (time) and SQUANDER, which also select *on* with the same meaning:

(93) Bert wasted a pound on some apples.

Moreover, like the other resource-management verbs, SPEND may be applied to any kind of resource, and not just money: time, energy, and so on.

(94) Bert spent an hour on the project.

(95) Bert took an hour on the project.

These verbs define three participant roles, whose details need not concern us:

- ‘manager’, realized by the subject.
- ‘resource’, realized by the object.
- ‘target’, realized by *on*.

Little more need be said about SPEND, except to make the rather obvious point that it goes well beyond any imaginable interpretation of the ‘commercial transaction’ frame. However, the concept of spending will play an important part in the analysis of COST in the next section.

9 COST

The verb COST is the most exceptional of all the CT verbs because its subject realizes the goods rather than one of the human participants. It allows the following syntactic options:

(96) The apples cost Bert a pound.

(97) The apples cost a pound.

(98) *The apples cost (Bert).

(99) *The apples cost from/to Sam.

At first sight, examples like (96) look as though they have a standard double-object structure as found with verbs such as GIVE, or (even more relevantly) DENY (Levin 1993:47); but this analysis clashes with the fact that neither of its (apparent) objects can be passivized (Lawler 1989):

(100) *Bert was cost a pound.

(101) *A pound was cost Bert.

(102) *A pound was cost.

These unusual features call for an explanation, which the following rather tentative analysis may provide. I start with two preliminary observations.

The first concerns the structure of the sentences containing COST. Although the two dependent nouns after the verb in (96) look like objects, the impossibility of passivization suggests that this is not a correct analysis. Since there is no other general grammatical function that fits them better, we need to invent a special syntactic relation just for the complements of this verb (and of a handful of similar verbs that I review below). It does not matter what we call these relations, so long as we do not call them ‘objects’; we may as well call them ‘comp1’ and ‘comp2’. It is tempting to analyze the complement in (97) as a predicative, on the grounds that *cost* can be replaced by *were*:
(103) The apples were a pound.

But although this analysis would explain the impossibility of passivizing *a pound*, it would create more problems as well, such as why the supposed predicative cannot be an adjective:

(104) *The apples cost expensive.

The challenge, of course, is to explain why these two post-verbal nouns do not have the expected syntactic functions, and how we all learned this curious fact.

The second observation is that there is one other verb whose syntax is just like that of COST, namely TAKE, as in the following examples:

(105) The project took Bert an hour.

(106) The project took an hour.

(107) *An hour was taken by the project.

(108) *Bert was taken an hour by the project.

The meaning of TAKE (in this use) is very similar to that of COST (Levin 1993:272), and indeed the only difference between them is that TAKE only deals with time whereas COST applies to any kind of valued asset; so as well as money, something can cost one a job, a life, a reputation and many other good things.

The proposed analysis builds on two groups of verbs which resist passivization even though they appear to be transitive. One group comprises the ‘verbs of measuring’ such as MEASURE and WEIGH, which take an unpassivizable noun complement (our ‘comp2’):

(109) The rope measures three metres. ~ *Three metres are/is measured by the rope.

(110) The book weighs a kilo. ~ *A kilo is weighed by the book.

Unusually, these verbs can be replaced by BE, with an optional prepositional phrase specifying the dimension concerned (Huddleston and Pullum 2002:693):

(111) The rope is three metres (in length).

(112) The book is a kilo (in weight).

The possibility of BE suggests that these noun complements may be predicatives. This analysis is encouraged by the possibility of a dimension adjective with MEASURE

(113) The rope is three metres long.

On the other hand, even the obvious adjective HEAVY is not possible with WEIGH, which is an odd restriction for a predicative:

(114) *The book is a kilo heavy.

The evidence for a predicative analysis is unclear, but at any rate a direct-object analysis is even less supported. Moreover, their semantics is much nearer to that of a predicative than a typical direct object because the complement identifies a property of the subject – its size or weight – rather than a distinct entity.

Exactly the same is true of our focus verbs, COST and TAKE. These too take an unpassivizable noun complement, may be replaced by BE and resist an adjective:

(115) The book cost a pound. ~ *A pound was cost by the book.

(116) The book was a pound.

(117) *The book cost a pound expensive.

(118) The journey took an hour. ~ *An hour was taken by the journey.

(119) The journey was an hour.

(120) *The journey took an hour long.

And crucially, of course, COST and TAKE have exactly the semantic structure expected of a verb of measuring, where the complement defines a value for some property of the subject – its cost or its duration. In short, COST and TAKE are both verbs of measuring, and inherit the same complementation pattern, whatever this may be.

The second group of verbs relevant to COST and TAKE might be called ‘verbs of fitting’ and include RESEMBLE, SUIT and FIT, all of which are also well known for resisting the passivization which might be expected from their apparent direct object (Quirk et al 1985:162).

(121) John resembles his father. ~ *His father is resembled by John.

(122) That hat suits John. ~ *John is suited by that hat.

(123) That hat fits you well. ~ *You are fitted well by that hat.

What makes these verbs into a semantically coherent class is that in each case the subject argument shares some property with the other dependent noun. For example, if John resembles his mother then he shares some part of his appearance with her, and suiting similarly involve the same idea of ‘fitting’ or reconciling the properties of the two entities. Presumably it is this special semantic structure that prevents the complement noun from being taken as a direct object. COST and TAKE are somewhat similar in meaning, in that they fit the cost to the buyer. For instance, the cost of a pound of apples may vary from customer to customer in just the same way that hat-size varies from person to person.

My suggestion, then, is that the verbs of fitting may provide the model for ‘comp1’, the unpassivizable first complement after COST and TAKE. However, costing and taking time are more complicated than the other kinds of fitting because they involve an extra participant. Fitting normally involves just two entities, which we might call ‘instance’ and ‘template’; so if the hat fits you, the hat is the instance and you are the template. In the case of costing, however, it is the cost of the goods (instance) which is fitted to the customer (template), so the goods need to be expressed separately from the cost and the customer. Hence the need for three noun dependents: a subject and two complements. Hence also a more complex semantic structure which I now explain.

We start with the simpler case where COST or TAKE have just one complement as in *The book cost a pound* or *The journey took an hour*. Here the only relevant model is the verbs of measuring, as shown in Figure 22. This apparently simple figure contains one noteworthy feature: the ‘attribute’ link from ‘measuring’ (a class of entity concepts) to ‘size’, which names a kind of relation. If the analysis is correct, then networks have the logical power to treat one relation as the value of another relation. One of the main claims of Word Grammar is that this much power is needed in a model of cognition (Hudson 2007:16). This network explains why COST can be used with a complement noun which is not passivizable because its function is ‘comp2’ rather than object. It also provides a definition for ‘cost’, the sense of the noun COST. (A similar diagram for TAKE would define ‘duration’.)

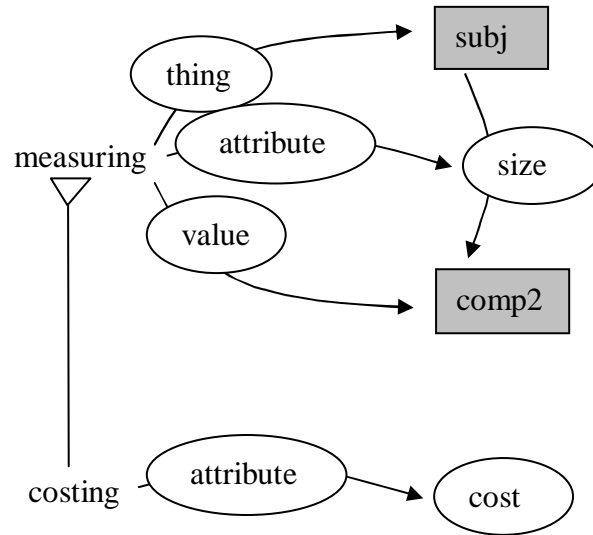


Figure 22: Costing is a kind of measuring

In a complete analysis, the various attributes such as size would have definitions in terms of other framing concepts such as height, verticality and so on, which we take for granted in the present analysis. However, we can do better in the case of ‘cost’ because the earlier analyzes provide the relevant frame. If something costs a pound, someone spends a pound on it; so spending is the ‘frame’ for costing. Section 8 defined three participants for spending:

- resource, the resource
- target, what the resource is applied to
- manager, the person who spends the resource.

In *The book cost a pound*, the resource and target are expressed, but the manager is merely implied. This framing is displayed in Figure 23. Notice that costing does not have an ‘isa’ relation to spending, so it inherits none of the latter’s syntactic mappings.

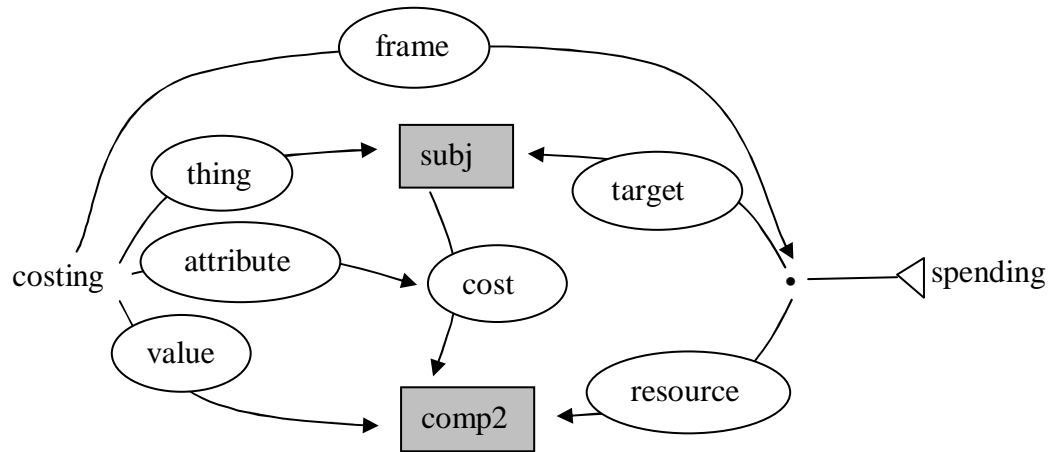


Figure 23: Costing involves spending

This analysis of single-complement structures provides the basis for the analysis of the double-complement examples such as *The book cost me a pound* and *The journey took me an hour*. These examples provide a realization for the person who spends the resource, a realization which is based on the pattern found with verbs of fitting, but this extra model must be stipulated by adding another meaning called ‘costing-manager’. The complication is how to realize the cost. According to the ‘fitting’ model, where its role is ‘instance’, it should be realized by the subject (as in *That hat fits you.*), but according to the ‘costing’ model it should be ‘comp2’ and the subject role is assigned to the goods. Inevitably, perhaps, the competition between these two models is resolved in favour of ‘comp2’. Figure 24 shows how ‘costing-manager’ is related to costing and fitting, and how the inheritance conflict is resolved.

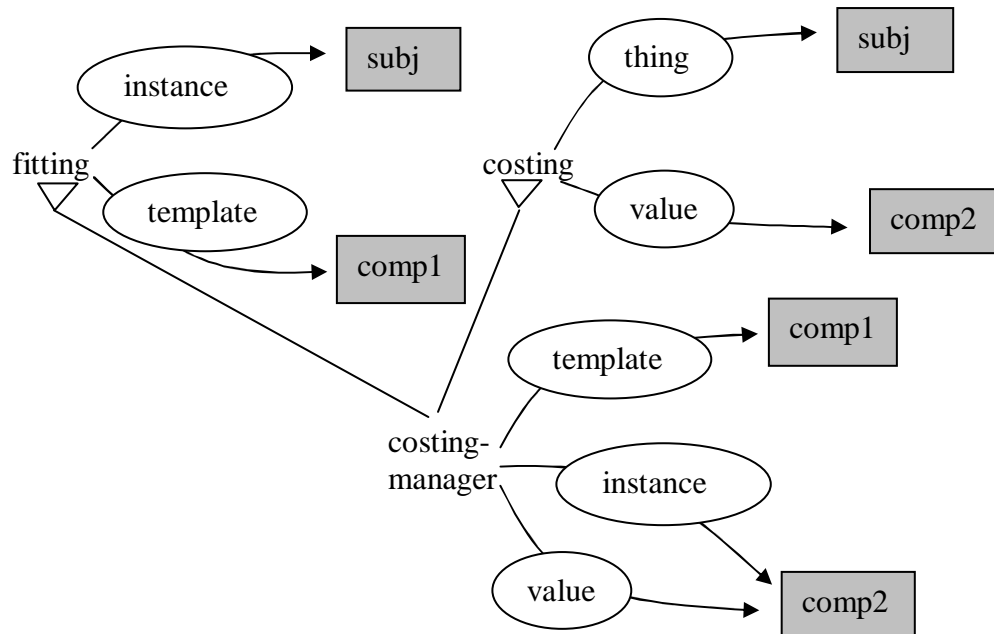


Figure 24: Costing someone isa fitting as well as costing

10 Conclusion

We now return to the general concern with which we started. How predictable is syntax? What emerges from this detailed analysis of the so-called Commercial Transaction verbs is that, for these verbs at least, syntax is entirely predictable. However, this is only true if we allow what I have called ‘deep’ analysis in which a verb’s meaning is embedded in a complex conceptual network and inherits from one or more models in this network. It seems unlikely that the same success could be achieved by a shallower analysis in which the only part of semantic structure that was ‘visible’ to the syntax was a single predicate and its arguments.

Paradoxically, therefore, it seems that a revealing grammar, in which the details of syntax can be explained as regular realizations of the semantics, is only possible if we allow a much richer semantics which penetrates deeply into general conceptual structure, well beyond any imaginable boundary between ‘language’ and ‘thought’. For instance, the syntactic double-object construction realizes semantic structures in which the indirect object ‘has’ the direct object, but this relation is only indirectly related to the verb’s

meaning; and the *for* which appears before either the goods or the money can only be explained in terms of a deep analysis of compensating which is quite far removed from any of the individual verbs' meanings. In short, a detailed analysis of grammar shows that there can be no boundary around language.

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