Chapter 6

What Structures Are "Underlying" Structures?

6.0 Introductory Notes

Pattern matching analysis rejects the idea that meaning of surface forms and/or formations is given by so-called "deep" structures which are virtually deep(est) form(ation)s. By this rejection, I do not imply that there are no structure that underlie surface form(ation)s. The exact meaning of this claim is twofold.

First, I deny the idea that there are underlying structures that can be "represented", or rather "translated", by means of phrase markers in the sense of generative linguistics. Rather, if there are what one may truthfully call "underlying structures" of sentences, they must be more abstract than have been believed. In my view, if there are underlying structures, they can be best characterized as **sets of deep structures**, provided that deep structures are equated with what I have called "subpatterns".[1]

Second, if there are structures underlying surface formations, they must be something that anyone, and more importantly any infant, can "discover" by generalizing over them.[2] In claiming for discoverability by this sort of generalizations, I tacitly accept the existence of the "discovery procedure" in the sense of structuralist linguistics.[3]

What I reject by requiring that underlying forms must be "discoverable" from surface formation is exactly the idea that structures underlying surface formations are already "complete formations" of some sort. They can be incomplete "lists" of materials. Thus, the sense of underlying structure used in our pattern matching analysis departs drastically from the one used in the classical transformational grammar, which posits so-called "deep structure" or "D-structure" as underlying structure. In this sense, pattern matching analysis is conceptually incompatible with the research program of Chomskian linguistics, with the distinction between Chomskian and generative linguistics.[4]

To close this introduction, a pair of questions need to be addressed:

Q1. Is it possible to specify semantic structure without (minimally) specifying syntactic structure?
Q2. Is it possible to specify syntactic structure without (minimally) specifying semantic structure?

I believe that structure of language is so complicated that both questions cannot be affirmatively answered. More revealingly, specifications of syntactic and semantic structures are interdependent. Ironically, though, it is for this reason that I find it necessary to try to integrate good semantic analysis and good syntactic analysis, without trying reducing one into another.

Under preliminary remarks made so far, turn now to relevant phenomena and analyze them.

6.1 Pattern Matching Analysis of Structural Ambiguity

For illustration, let us consider interpretations assigned to the two sentences in (1).

(1) a. *Time flies like an arrow.*
b. *Fruit flies like a banana.*

The two illustrative examples are taken from Benjafield (1992: 255).

Benjafield comments, "When we hear [the] sentence [(1)a], it makes us think of something like an arrow flying rapidly through the air. Such an [imagistic] interpretation could also be imposed on sentence [(1)b] ... However, a banana with wings is not the usual meaning we extract from sentence [(1)b] ... In this context, we take *flies* to be a noun rather than a verb. Of course, such a reading is also possible with sentence [(1)a]. We can imagine a creature called a *time fly* that likes arrows".

Benjafield's description illustrates the classical problem of **structural ambiguity**. The question it raises is, "Why the same surface form has systematically different readings?" "What causes such differences?"

Benjafield's comment is accurate. Despite clarity, however, his conclusion looks like a mere reproduction of those typically made in the literature of generative linguistics. He explains, "[m]eaning is not given on the surface of a sentence, but is given by the deep structures interpretation of sentence. When we understand a sentence, we transform a surface structure into a deep structure. When we produce a sentence we go the other way: from a deep structure to a surface structure. Notice that all of this is quite similar to the way [Wilhelm] Wundt thought language worked" (pp. 255–256).

The problem of structural ambiguity is a real problem that deserves an appropriate account,[5] but the kind of conclusions that Benjafield suggests above are far from adequate, mainly because the postulation of deep structure is gratuitous. Crucially, even if there are deep structures, it is not clear at all the exact way in

which deep structures are interpreted.

There are two problems that should be separated. Given there is a structure based on which meaning is constructed, it must be asked:

i. How to specify the structure, and
ii. How meaning is constructed out of the structure.

Structure that meaning is constructed from, or hinted at, cannot be semantic structure, because, obviously, meaning should come from **something other than meaning**; otherwise, meaning arises from meaning itself, and this cyclic reference never ends. So, if different meanings arise, there must be different structures, which are distinct from semantic structures, that account for them.

Putting the latter, harder problem aside, I will concentrate on the former problem, attempting at a rebuttal of the alleged existence of deep structures.

6.1.1 An analysis of *Time flies like an arrow*

As I have stated above, PMA attempts to cleanse deep structure of its putative explanatory power, thereby getting rid of the notion altogether. This is a first step of a series of attacks on the prevailing derivational view of linguistic structure, for whose "patch up" most of our time have been wasted for too long.

For this specific purpose, it will suffice to compare two decompositions that can be obtained after diagonalizing *Time flies like an arrow* [= (1)a], which are given as follows, where *J* encodes conjunction (e.g., *and*) that takes the form of *S V* ***J*** *S V*.[6]

(2)	0.	***time***	***flies***	***like***	***an arrow***	***(flies)***
	1.	***time***	*V*			
	2.	*S*	***flies***			
	3.	*S*	*V*	***like***	*O*	
	4.	*S*	*(V)*	*P*	***an arrow***	

(3)	1.	***time***	*N*		
	2.	*(AdN)*	***flies***	*V*	*(O)*
	3.		*S*	***like***	*O*
	4.		*S*	*V*	***an arrow***

Encodings of grammatical structure specified in (2) and (3) offer necessary and sufficient information, based on which (imagistic) meanings are constructed.

Since encodings in (2) have certain intricacies, in contrast to straightforward specifications in (3), I will make a few notes on the former.

In (2), *like* is categorized as an *S V*-modifier of the form *S V* ***P*** *O*. Because of this, *an arrow* is allowed to take accusative form. But this understates the function

of *like*. In effect, *like* is categorized as an *S V*-conjunction *J* that gives S_1 V_1 ***J*** S_2 V_2. Based on this, we can give the following analysis instead.

(4)						
	0.	***time***	***flies***	***like***	***an arrow***	***(flies)***
	1.	***time***	*V*			
	2.	*S*	***flies***			
	3.	S_1	V_1	***like***	S_2	V_2
	4.	*S*	*V*	*P*	***an arrow***	
	4′.	*S*	*V*	*J*	***an arrow***	*V*
	5.				*S*	***(flies)***

But importantly, two instantiations are possible for *an arrow*. One is what 4 encodes, namely, *an arrow* as a simple *O* to match S_1 in 3 only semantically. Another is what 4′ encodes, namely, *an arrow* as an *S* of V_2.

While only the encoding by 4′ allows 5, yet, semantically, *an arrow* always matches S_2 in subpattern 3.

6.1.2 The nature of deviance in light of pattern matching

With those specifications in (2) and (4), we virtually have deep structures, despite the fact that there is no derivation. A simple compositional method suffices; vertical superposition of all subpatterns. This suggests that as simple a method as pattern superposition can achieve the same effect as a series of complex derivations which, at worse, are very unlikely to be freed from a lot of insignificant controversies.[7]

Returning to my main point, the deviance of the second interpretation resides in "semantic mismatches" among *(AdN)* ***flies*** *V*, *S* ***like*** *O*, and *S V* ***an arrow*** (= 2, 3, and 4 in (3)). Suppose the first two are composed by superposition to be *(AdN)* ***flies like*** *O*. Here, *O* denotes something that a (kind of) fly is likely to eat. This resists to combine with *S V* ***an arrow***, since no (known) class of flies "eat arrows", let alone liking it.

Suppose alternatively the last two are composed by superposition to be *S* ***like an arrow***. Here, *S* denotes something that, no matter how hard to imagine, likes an arrow. This resists to combine with *(AdN)* ***flies***, since no (known) class of fly is likely to eat an arrow. Presumably, *Square circles like an arrow* would be far more better than this.

6.1.3 An analysis of *Fruit flies like a banana*

Compare the two analyses (2) and (4) above with the following analyses for (1)b = *Fruit flies like a banana*.

(5)	0.	***fruit***	***flies***	***like***	***a banana***	***(flies)***
	1.	***fruit***	*V*			
	2.	*S*	***flies***			
	3.	S_1	V_1	***like***	S_2	V_2
	4.	*S*	*V*	*P*	***a banana***	
	5.				*S*	***(flies)***

(6)	1.	***fruit***	*N*		
	2.	*(AdN)*	***flies***	*V*	*(O)*
	3.		*S*	***like***	*O*
	4.		*S*	*V*	***a banana***

As with the case discussed above, the deviance of the first interpretation resides in the implausibility of the implicit verb *flies* in row 5. This is strange, on the ground that no (known) kind of 'banana' is likely to 'fly'.

To conclude, it is claimed that the pattern matching analysis is as much powerful and as much adequate as description based on deep structure, in that it captures correctly crucial effects that transformational grammarians attribute to deep structures without positing them.

6.1.4 An analysis of *Flying airplanes can be dangerous*

Turn now to another case of structural ambiguity shown by sentences in (7).

(7) ***Flying airplanes*** *can be dangerous.*

Sentences like (7) are ambiguous as to what *flying airplanes* means. On one reading, *flying airplanes* designates a kind of airplanes. On another reading, the phrase designates an event. In this case, *flying airplanes* instantiates Poss-*ing* construction. Morphological defectivity of *can* conceals the difference, as the following contrast shows:

(8) a. *Flying airplanes are dangerous.*
b. *Flying airplanes is dangerous.*

Clearly, *flying* in (8)a is an *AdN*, while *flying* in (8)b is a gerundive form.

Our account of this kind of ambiguity is straightforward, again. To show this, let us appeal to C/D table. To encode the reading where *flying* interprets as *AdN*, PMA gives the following analysis:

(9)	0.	**Ø**	***fly***	***-ing***	***airplanes***	***can***	***be***	***dangerous***
	1.1	**Ø**	*V*		*(O)*			
	1.2	*S*	***fly***		*O*			
	1.3	S_i	*V*	***-ing***	S_i			
	2.			*(AdN)*	***airplanes***	*V*		*(O)*
	3.				*S*	***can***	*V*	
	4.				*S*	*(U)*	***be***	*AdN*
	5.				*S*	*(U)*	*V*	***dangerous***

I assume here that S_i *V-**ing*** S_i, based on a cataphoric shifter, is an operator on *S **V** O* (e.g., *S **fly** O*) to derive an *AdN* (e.g., *S fly-**ing** S*).

To encode the latter reading, where *flying* interprets as a gerund, PMA gives another analysis as follows:

(10)	0.	**Ø**	***fly***	***-ing***	***airplanes***	***can***	***be***	***dangerous***
	1.1	**Ø**	*V*		*(O)*			
	1.2	*S*	***fly***		*O*			
	1.3	*S*	*V*	***-ing***		*V*		*(O)*
	1.4	*S*	*V*		***airplanes***			
	2.			*S*		***can***	*V*	
	3.			*S*		*(U)*	***be***	*AdN*
	4.			S_{+e}		*(U)*	*V*	***dangerous***

I assume here that *S V-**ing** V* is an *N*-deriver [*N*/*A*] to operate on *S **V** O* (e.g., *S **fly** O*) to yield an *N* (e.g., *S **fly-ing** O*), whose *S*-glue need not be realized.

Admittedly, details of the analysis in (10) are quite controversial, and I cannot provide enough justification for them. In particular, details of subpattern 1.3 are not clear yet. Despite a number of such controversial points, let me note crucial points.

The central claim of this analysis is that *S V **-ing** (O)* is the subject of *(can be) dangerous*, which we encoded by S_{+e}, assuming that S_{+e} is a special kind of event-denoting subject. In this construction, *S V **-ing** (O)* serves as a "determiner" of *S V (O)*, in the same way as *that* is a determiner in the construction ***that** S V (O)*.

Other examples comprising such subjects are:

(11) a. *It is dangerous (for us) to fly airplanes.*
b. *(For us) to fly airplanes is dangerous.*

(12) a. *It is hard to trust such a woman.*
b. *(For anyone) to trust such a woman is hard.*

The ambiguity under discussion is basically due to ambiguous functions of *-ing*, one as *N*-deriver and another as *A*-deriver which forces *fly* to be transitive and intransitive, respectively. Note incidentally that in both cases, *-ing* "orients to

subject"; in the case of (10), a leading gap, **Ø**, corresponds to causative subject of *S* ***fly*** *O* (with *airplanes* being accusative), whereas in the case of (9), the same gap corresponds to unaccusative (or ergative). On this basis, one may claim that two different uses of *-ing* may be reflection of difference in whether it takes *S* of transitive or intransitive sense of a verb. This point, though controversial, may be more clearly described by supposing the following contrast.

It should be emphasized that *our* cannot specify *S*/_ ***fly*** *O* in *Our flying airplanes can be dangerous*. Only possible is the reading on which *our* determines *airplanes*, as the following C/D table shows.

(13)	0	***our***	***Ø***	***fly***	***-ing***	***airplanes***	***can***	***be***	***dangerous***
	1.1	***our***				*N*			
	1.2.1		*S*	***fly***		*(O)*			
	1.2.2		S_i	*V*	***-ing***	S_i			
	1.3	*(D)*			*(A)*	***airplanes***	*V*		*(O)*
	2.					*S*	***can***	*V*	
	3.					*S*	*(U)*	***be***	*AdN*
	4.					*S*	*(U)*	*V*	***dangerous***

This can be contrasted to the following analysis.

(14)	0.	***our***	***fly***	***-ing***	***airplanes***	***can***	***be***	***dangerous***
	1.1	***our***		*-ing*				
	1.2.1	*S*	***fly***		*O*			
	1.2.2	*S*	*V*	***-ing***		*V*		*(O)*
	1.3	*S*	*V*		***airplanes***			
	2.			*S*		***can***	*V*	
	3.			*S*		*(U)*	***be***	*AdN*
	4.			S_{+e}		*(U)*	*V*	***dangerous***

Here, our matches all *S*'s of *fly*, *-ing* and *airplanes*, thereby serving as the subject of *fly*. As indicated, *-ing* is a functor that takes *(S) V* and converts it to *N*.

6.2 Where is the Subject of Imperatives, If There Is One?

Turn now to the case of "imperative subject deletion", which was argued to support deep structure. As the following pairs indicate, subject may (and in certain cases must) disappear in imperatives.

(15) a. *Wait a minute.*
a′. ***You*** *wait a minute.*
b. *Don't try to buy such a theory.*

b′. *Don't **you** try to buy such a theory.*
c. *Keep **yourself** off the track, please.*
c′. ***You** keep **yourself** off the track, please.*

Most generative linguists agree that expressions of plain versions are derived from primed versions, though there is disagreement about what operation is responsible for it (transformational rule or satisfaction of constraints). Without committing to technical points, I will call the phenomenon **imperative subject suppression**, by which I mean that the understood subject, *you*, need not, or even may not, be overt in expressions plain version above.[8]

6.2.1 Interaction with reflexivization

Irrespective of what kind of phenomenon the imperative subject suppression is, I need to stipulate that there is a subject, *you*, in all imperative clauses. Without this stipulation, I could not account for the impossibility of the following expressions:

(16) a. **Keep myself off the track.* a′. **Keep ourselves off the track.*
b. **Keep himself off the track.* b′. **Keep themselves off the track.*
b″. **Keep herself off the track.*

We need a stipulation to account for possible positioning of reflexive pronoun, which can be stated, though quite tentatively, as follows:

(17) **Stipulation.** Reflexive pronouns (of the form *X-self*) need to receive [+object] from a relational.[9]

Without this, PMA could not rule out *a*-versions, as contrasted with *b*-versions in the following pairs:

(18) a. **Himself started the round.*
b. *He (himself) started the round.*

(19) a. **Herself was blamed for lack of care.*
b. *She (herself) was blamed for lack of care.*

Even if moderately stated, the fact of reflexive control indicates either that there is underlying subject, *you*, to be optionally deleted, or that there is a surface subject which is phonetically unrealized.

6.2.2 A pattern matching analysis of *(You) keep yourself off the track*

Pattern matching analysis takes the latter under the rubric of imperative subject

suppression, thereby rejecting the former.[10] My position is to posit the following representation of the form of co-occurrence matrix.

(20)	0.	***(you)***	***keep***	***-Ø***	***your***	***-self***	***off***	***the track***
	1.	***(you)***	*V*			*(O)*		
	2.1	*S*	***keep***			*O*	*(P)*	
	2.2	*S*	*V*	***-Ø***				
	3.1	*(S)*	*(V)*		***your***	*N*		
	3.2	S_i	*V*		*D*	$\textbf{\textit{-self}}_i$		
	4.					*S*	***off***	*O*
	5.					*S*	*P*	***the track***

By convention, *(you)* denotes *you* or a gap, *Ø*.

This analysis claims, to summarize, that there is a subject that *keep*, among others, demands, and the subject is *you* because it controls *your* to combine with *-self*.

To account for the presence of "understood subject" of *keep*, it is necessary to stipulate *(you)* and it is sufficient. Thus, the presence of *(you)* is triply motivated. First, verbs, main or auxiliary, have a subject of their own. Second, verbs may appear only if its subject is given, overt or covert. Third, since the notion subject is not exclusively phonological, it is another problem whether or not phonology-free subjects can have nonzero contents.

6.2.3 Note on the generality of suppressed subject

So, PMA account lies exactly in an additional stipulation that in certain specifiable cases, *S V O* need not, or even may not, have specifiable phonology, though it is not phonology-free. Of course, the notion of unspecifiable phonology would not make sense unless the general idea of "underspecification" is accepted (Archangeli 1984, 1988). Relevant effects of underspecification can be illustrated by a simple example. Sentences in (21) have pronunciations, but the sentence in (22) do not.

(21) a. *I saw Ann today.*
b. *I saw Bill today.*
c. *I saw Ann and Bill today.*
d. *I saw them today.*

(22) a. ℑ *saw Ann today.*
b. *I saw* ℒ *today.*

ℑ and ℒ are glues.

Interestingly, suppressed subject is more general a phenomenon that is not confined to imperative. Consider the following cases:

(23) a. *Thank you.*
b. *See you later.*
c. *Meet you tomorrow.*
d. *Meet you in the dreamland.* (soliloquy in one's diary)

(24) a. *Fuck you.*
b. *Damn it.*

Those subjectless clauses, *Thank you*, *See you later*, on the one hand, and *Fuck you!*, *Damn it!*, on the other, all have something in common with, but should be distinguished, from imperatives.

It is interesting to note that *Fuck you*, for example, means something different from:

(25) *Fuck yourself!*

On this and other grounds, Quang Phuc Dong (1971) in fact argues that expressions in (24) are not imperatives. He suggests that the underlying subject of *Damn (it)* would be *God* (or a certain supernatural power) in view of paraphrasability with *God damn (it)*.

Expressions in (23) seem to be have a different ground, but could be treated in a similar way. Usually, the understood subject is *I*.

6.2.4 Remarks on formation without phonological content: A digression

It is possible to rehash the effect of suppressed subject by rendering it to fit assumptions in other theoretical frameworks, but a few comments are first needed.

The position taken here may be criticized for its gratuitous admission for introducing phonologically null elements. I suspect, in fact, that it contradicts with Langacker's **content requirement** in linguistic analysis. For relevant information, I cite from Langacker (1991*a*: 18-19), who remarks as follows:

> [T]he only units permitted in the grammar of a language are: i) semantic, phonological, and symbolic structures that occur overtly in linguistic expressions; ii) structures that are schematic for those in (i); and iii) categorizing relationships involving the structures in (i) and (ii).

Most cognitive linguists, along with Langacker, would argue that suppressed subject, if any, is purely semantic, and not syntactic, noting, based on a requirement of this sort, that phonologically null subject in *Ø keep yourself off the track* is "illegitimate" unit of linguistic analysis.

Putting aside some logical absurdities in it to be discussed below, I find Lan-

gacker's content requirement is too severe, and I claim that it should play no decisive role in theoretical or empirical consideration. If it is to work, it should work as a loose guideline.

My rejection of the content requirement and the like is basically based on my objection to some ideological import of Langacker's argument. He talks as if any of those "abstract" constructs, which do not have overt phonetic/phonological form (e.g., empty categories), were "unreal". By judging in this manner, he formulates a requirement of rejecting everything that he judges as having no reality.

But I do not totally agree with Langacker and his followers, since I find his arguments against generative linguistics and for cognitive linguistics are basically ideological rather than conceptual or factual. I say this because, as far as I can see, what is in question is in what sense syntactic elements are "real". I assume that covert subjects are real not only semantically but also "syntactically", because I do not dissociate syntax and semantics for reasons that I explained in Chapter 1.

My point is, Who can be fair to judge whether theoretical constructs have reality or not? It is ironic to see that even Langacker's analysis itself does not satisfy his content requirement. Who other than Langacker (and his followers) can believe that (parts of) semantic and symbolic structures can ever "occur overtly in linguistic expressions"? To me, it makes no sense to think that semantic structure "occurs overtly" unless *overtly* is used so loosely as to mean *covertly* instead. If a supporter of Langacker's program is unaware that those 'circles interconnected with bars with or without arrows' in his diagrams are nothing but abstract theoretical constructs (which may exist only in your mind), I am sure that his or her eyes may be open to Langacker's words, but are blinded to facts of the world. Who could ever require something that asks so much like Langacker's content requirement without believing that his favorite theory is superior to any other possible theories of grammar in all respects? Metaphorically, Langackerian requirement for the "contentfulness" of syntax and Chomskian requirement for the "autonomy" of syntax are Jekyll and Hyde.

To me, it makes no sense to ask which position is correct, or even which position is better. First, the question of how to study is determined by what to study. Second, what to study is determined by one's interest. Since generative and cognitive linguistics are supported by different kinds of people who have different interests and motivations, it is not surprising at all even if what generative linguists call language and its grammar are distinct from what cognitive linguists call language and its grammar. Any definition of language and its grammar will go as far as it defines distinct kinds of objects.

6.3 Where is the Source of "Logical" Ambiguity?

As discussed thus far, if there are underlying structures, they are nothing but "sets" of subpatterns. This leads to a number of substantial consequences. For one, most,

if not all, of the phenomena that have been treated in terms of **logical form** could be treated very straightforwardly as effects of pattern superposition.

6.3.1 Polarization emerging through composition

In this section, I will discuss **composition structure** in some detail to prepare the notion of **polarization** to be discussed later.

On a variety of grounds, it is claimed that the minimum specification for the underlying structure of surface formation F is $U = \{f_1, ..., f_n\}$, where f_i is the i^{th} subpattern of F, provided that subpatterns are obtained by diagonalizing F.

I claimed earlier that the underlying structure of surface form F comprises a set of subpatterns, $f_1, ..., f_n$, provided that F results from their "superposition". The effect of superposition can be written as follows:

(26) $F = f_1 \times ... \times f_n$

Here, the notion of **composition structure** comes into play. Composition structure is the structure that emerges as subpatterns, $f_1, ..., f_n$, are combined to form F. To make this notion clearly defined, let us first consider the complexity of composition.

For expository purposes, let $<f_i, f_{i+1},..., f_{j-1}, f_j>$ denote a sequence of composition that starts from the composition of f_i and f_{i+1} and ends by the composition of $f_i \times ... \times f_{j-1}$ and f_j. For illustration, let us examine a simply case where $n = 3$. The following diagram illustrates the relation of compositional sequences and combinatorial possibilities for set partition of the case. By composition structure, I will denote a structure diagrammed in Figure 6.1.

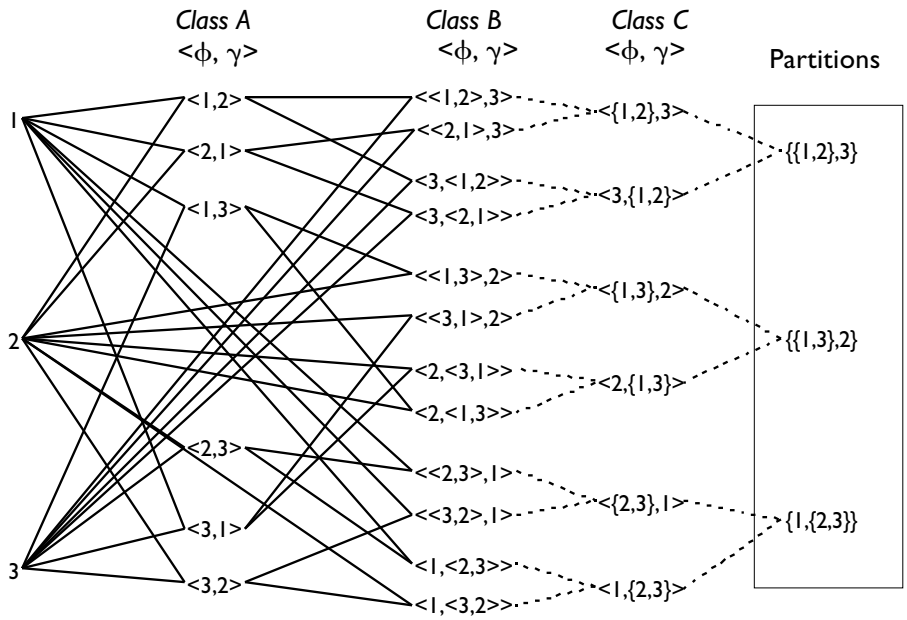

Figure 6.1

In the composition structure in Figure 6.1, there are three classes, *A*, *B*, and *C*, of equivalence. Of them all, class *C* is of greatest concern, which will be called **polarization in pattern composition**. The ordered pair <ϕ, γ> encodes "polar" subsets.

More generally, polarization correspond to cases where <ϕ, γ>, where ϕ and γ are proper subsets. As it turns out below, I will be interested in cases where ϕ is a single subpattern.

6.3.2 An analysis of *Many students read many books*

Pattern matching analysis does not rely on deep structures from which surface forms are derived. So, it should face the question of whether it can handle the kind of ambiguity exhibited by sentences such as:

(27) a. *Many students read many books.*
b. *Many books are read by many students.*

It is well known that (27)a is two-way ambiguous[11] so that the following sentences are paraphrases of (27)a, to which McCawley (1981, 1988) refers as "pseudo-relatives":

(28) a. *There are many students who read many books.*
b. *There are many books which many students read.*

It is commonplace to disambiguate these readings for (27) by translating them into so-called "logical form" of the form $\exists x(Fx)$. The very fact that the relevant ambiguity can be paraphrased by the sentences in (28) is sufficient enough. Indeed, without recourse to logical form, it is possible to employ (28)a, b, all of which begin with *there are many X*, to contrast with each other.

(29)

0.	***many***	***students***	***read***	***many***	***books***
1.	***many***$_1$	*N*	*(V)*		
2.	*(Q)*	***students***	*V*		*(O)*
3.		*S*	***read***		*O*
4.		*(S)*	*(V)*	***many***$_2$	*N*
5.		*S*	*V*	*(Q)*	***books***

Q encodes quantifier, which I assume is a special kind of *AdN*.

The two readings are simply accounted for by the two compositions, differentiated in terms of **polarization** defined in Section 6.3.1.

(30)	1×2.	***many***$_1$	***students***	*V*		*O*	Quantifier
	3×4×5.		*S*	***read***	***many***$_2$	***books***	Quantified Prop.
(31)	4×5.		*S*	*V*	***many***$_2$	***books***	Quantifier
	1×2×3.	***many***$_1$	***students***	***read***		*O*	Quantified Prop.

It is easy to see that the following was obtained by converting (30) so that *S* in 3×4×5 is replaced by *who*, and ***many students*** in 1×2 is modified by *there are*.

(32)	*F.*	***there***	***are***	***many students***	*V*	*O*
	G.			***who***	***read***	***many books***

Importantly, the upper half of each pair is corresponds to $\exists x$ and to expression *there are X*. Second, *S* or *O*, in the lower half can be identified with a "bound variable", especially when two readings are translated as in (28). Thus, the proposed analysis claims that it is artifactual to appeal to a machinery that generative linguists call "logical form" (May 1985), such as follows:

(33) i. $[_{IP}\ [_{NP}$ *many students* $]_i\ [_{IP}\ t_i$ *read many books* $]]$
ii. $[_{IP}\ [_{NP}$ *many books* $]_i\ [_{IP}$ *many students read* $t_i\ ]]$

In both examples, *many students* and *many books* are supposed to be raised by **LF-movement**.

More importantly, pattern matching analysis is able to free us from superficial explanation of ambiguity by making the quasi-logical forms totally unimportant. In short, if the analysis of logical ambiguity suggested above is correct, then PMA achieves the same exactness as logical forms provide, and, what is more, it can be done without no machinery other than surface formation.

6.3.3 Scope ambiguity with special reference to *S nearly V*

Now, turn to another class of phenomena that also ask for an underlying structure. It is called **scope ambiguity**, exemplified by the expressions in the following:

(34) a. *I **nearly** killed my wife.*
b. *I **almost** killed my wife.*

(35) a. *I **nearly** married my wife (again).*
b. *I **almost** married my wife (again).*

Putting aside for the moment the interpretation of (35)a, b, let us begin by analyzing (34)a, b.

Note first that (34)a is three-way ambiguous in that its meaning is either (36)i,

ii, or iii exclusively as the following translations describe:

(36) i. 'It was nearly the case that what I did to my wife was killing her'. (Proposition 'I did *x* to my wife' (where *x* is a variable for act/action) is presupposed).
ii. 'It was nearly the case that my wife was whom I killed'. (Proposition 'I killed *x*' (where *x* is a variable) is presupposed).
iii. It was nearly the case that I am the person who killed my wife. (Proposition '*x* killed my wife' (where *x* is a variable) is presupposed).

The order of readings here is intended to reflect the easiness of interpretation. Thus, (i) is the easiest to grasp, and (iii) is the hardest, though it is subtle which reading is preferred from (i) and (ii). Witness the three readings being induced by contexts such as follows:

(37) a. ***By kicking her stomach awfully***, *I nearly killed my wife.*
b. (An assassinator avows): ***Since she sat down next to my target***, *I nearly killed my wife.*
c. ***By cunning fabrication by the prosecutor's office*** , *I nearly killed my wife.*

Putting aside the problem of exactly what induces selection of one reading over others, let me concentrate on the problem of what provides these three (and only three) readings, which I find is a more fundamental problem which must be solved prior to the former, essentially pragmatic problem.

Ambiguity of the sort specified here is often claimed to correspond to specific "stages" in the series of derivations from a deep structure. This was roughly what McCawley (1971) demonstrated, within the framework of generative semantics, by equating underlying deep structures with "logical forms". But such kind of solution is not motivated in the proposed framework, and indeed turns out to be unnecessary.

Since no complete structure is posited which can be likened to logical form, a solution must be sought elsewhere. My interpretation is that this kind of problem, called (logical) ambiguity, that *nearly* shows, for example, reflects natural differentiation in the order in which subpatterns are unified. To see this, let me begin by giving an analysis to (34)a.

(38)

0.	***I***	***nearly***	***killed***	***my wife***
1.	***I***		*V*	*(O)*
2.	*S*	***nearly***	*V*	
3.	*S*	*(AdV)*	***killed***	*O*
4.	*S*	*(AdV)*	*V*	***my wife***

I will examine below different readings that arise from polarization through pattern composition of this matrix.

6.3.4 Illustrating pattern matching account

Suppose that what *nearly* does semantically is express (metaphorically) the "closeness" to a predicate's being "true". Thus, *S* ***nearly*** *V (O)* encodes a skeletal proposition *S V (O)* is 'nearly' true of variables *S*, *V*, and *O*, if any. Differently put, what *nearly* carries out is a sort of higher order predication, or "metapredication", since it takes a pair of predicates as argument and adjusts the semantic matching between slots of the predications, which are independently presupposed to be true, thereby affecting identification for a variable in a presupposed proposition.

Under these assumptions, the three way ambiguity of *nearly* can be well captured in terms of a difference in the pairing of subpatterns left to be unified, as the following three cases illustrate, where $i \times j$ denote unification of the i^{th} and j^{th} subpatterns.

(39)	3.	*S*		***killed***	*O*	Operator
	1×2×4.	***I***	***nearly***	*V*	***my wife***	Hedged presupposition

Here, ***nearly*** hedges *V* in ***I*** *V* ***my wife***. This means, "What I did to my wife was nearly killing her". Compare this with the following:

(40)	4.	*S*		*V*	***my wife***	Operator
	1×2×3.	***I***	***nearly***	***killed***	*O*	Hedged presupposition

Here, ***nearly*** hedges *O* in ***I killed*** *O*. This means, "What I killed is nearly my wife". Compare this with the following:

(41)	3×4.	***I***		*V*		Operator
	1×2.	*S*	***nearly***	***killed***	***my wife***	Hedged presupposition

Here, ***nearly*** hedges *S* in *S* ***killed my wife***. This means roughly, "The one who killed my wife was nearly I", or more exactly "I was nearly someone who killed my wife".

It is easy to see that (39), (40), and (41) correspond to three possible readings for *I nearly killed my wife*, as translated (i), (ii), and (iii) in (36), thereby taking care of the ambiguity under discussion.

6.3.5 An analysis of *I only killed my wife*

The proposed analysis would even be able to account for why the reading taken care of by (41) is the hardest, on the one hand, and the other ones taken care of by

(39) and (40) are not only possible but also nearly equally preferred, though (39) seems to be preferred, on the other hand. The key to this account is an observationally motivated assumption that *nearly*, like *only*, tends to modify rightward, and modify leftward only as fail-safe.

For illustration, compare the behavior of *only*, as exemplified by the following, with the behavior of *nearly* described above.

(42) *I only killed my wife.*

To this sentence, PMA gives the following analysis:

(43)	0.	***I***	***only***	***killed***	***my wife***
	1.	***I***		*V*	*(O)*
	2.	*S*	***only***	*V*	
	3.	*S*	*(AdV)*	***killed***	*O*
	4.	*S*	*(AdV)*	*V*	***my wife***

Based on this encoding, the scope ambiguity can be described:

(44)	3.	*S*		***killed***	*O*	Operator
	1×2×4.	***I***	***only***	*V*	***my wife***	Hedged presupposition

Here, ***only*** hedges *V* in ***I V my wife***. This means, "What I did to my wife was only killing her". Compare this with the following:

(45)	4.	*S*		*V*	***my wife***	Operator
	1×2×3.	***I***	***only***	***killed***	*O*	Hedged presupposition

Here, ***only*** hedges *O* in ***I killed*** *O*. This means, "What I killed is only my wife". Compare this with the following:

(46)	3×4.	***I***		*V*		Operator
	1×2.	*S*	***only***	***killed***	***my wife***	Hedged presupposition

Here, ***only*** hedges *S* in ***S killed my wife***. This means, "The one who killed my wife was only I", or more exactly "I was/am the only person who killed my wife".

It is interesting to note, however, that, for lexical reasons, the hardest reading becomes the one that (44) encodes, namely "What I did to my wife was only killing her". I guess this is due to the pragmatics of 'killing'.

6.3.6 Syncategorematism

Return to the original problem of why (39) and (40) characterize the preferred

readings; in *I nearly killed my wife*, *killed* and *my wife* are at right, whereas *I* is at left.

Note first that adjacency plays a secondary role. For one thing, there is no noticeable difference between (39) and (40), and for another, (41) is disfavored after all. The tendency for "rightness" of target predication is confirmed by considering some additional cases, such as:

(47) i. *I nearly killed my wife* ***with my old, rusty army knife*** .
ii. *I nearly killed my wife with my old, rusted army knife* ***by giving her a great deal of pain*** .

Further ambiguity brings about with the participation of *with my army knife* and *old, rusted ... by giving her a great pain*. To illustrate this, consider the following contrasts, where *O* and *P* stand for "operator" and presupposition (hedged by *nearly*):

(48) *O*: *S* *V* ***with my army knife***
P: ***I*** ***nearly*** ***killed*** ***my wife*** (A_1)

(49) *O*: *S* *V* ***by giving her pain***
P: ***I*** ***nearly*** ***killed*** ***my wife*** ***with my old knife*** (A_2)

A encodes adjunct.

The work of operator *O* in these cases is, similar to cases above, to elaborate restriction of an unfilled slot, A_1 and A_2, in hedged presupposition. In the former case, *O* specifies the "instrument" of someone's murder of his wife. In the latter, *O* specifies the "manner" of his murder of his wife.

But, additionally, the following reading must be allowed:

(50) *O*: *S* *V* *(O)* ***with my old knife by giving her pain***
P: ***I*** ***nearly*** ***killed*** ***my wife*** $(A_1' = A_1 \times A_2)$

In cases like this, *with my old, rusted knife by giving her pain* is a single, "syncategorematic" term.

6.3.7 Identifying unsolved problems

Even with partial success, I avow that there is no straightforward account of facts that the following case exemplifies.

(51) ?**I killed nearly my wife.*

This expression is deviant. But, as far as I can tell, even if it makes sense, what it means is "I killed someone (or some woman) who is *nearly* my wife". The problem

is how to differentiate the meaning from (40), repeated here for convenience.

(40)	1.	***I***		*V*	*(O)*	Operator
	2×3×4.	*S*	***nearly***	***killed***	***my wife***	Hedged presupposition

But this question is quite interesting because it leads to the question of what makes acceptable expressions of the following sort, repeated here for convenience.

(35) a. *I nearly married my wife (again).*
b. *I almost married my wife (again).*

Without appropriate contexts, these expressions would not make sense. But they make sense in contexts like the following:

(52) ***Replaying my life from youth, I fell in love with that woman again, and*** *I nearly married my wife.*

The relevance of expressions like (35) to *?*I killed nearly my wife* in (51) is that one of a few readings assigned to (35), I suspect, can be approximated by the following:

(53) a. *?*I married nearly my wife.*
b. *?I married a woman who nearly is my wife.*

The intended reading of *marry my wife (again)* has a certain bearing on the reading of *his mother* in the famous pair of sentences:

(54) a. *Oedipus married* ***his mother****.*
b. *Oedipus married* ***Jocasta****.*

It is traditional to say that the meaning, or rather "reference", of *his mother* in (54)a is **transparent** if this sentence has the same meaning as (54)b; otherwise, its reference is said to be **opaque**.

This kind of phenomena, called "opaque/transparent context", is what Fauconnier (1994) demonstrated his *mental spaces* theory is capable of insightfully handling. This issue is discussed in more detail in Section 6.4.

6.3.8 Additional note on *S nearly V*

Let me turn to another problem that I mentioned above. It is strange that (51)a is deviant while (51)b is not.

(51) a. *?*I killed nearly my wife.*
b. *I killed only my wife.*

Plainly, I cannot provide a fully consistent description of why *nearly* does not (and may not) take *I* and *killed* in examples like this; but let me give a few remarks.

To illustrate how it is strange that the rightness condition on *nearly*'s scoping is ever operative, it is necessary to notice the contribution of *not* in the following set of sentences.

(55) a. *I did not killed my wife.*
b. **I not killed not wife.*
c. *?*I killed not my wife.*

In (55)a, *not* does not restrict *killed my wife*. Rather, it restricts *did* which serves as an anaphor of *kill (my wife)*. This is odd in face of the fact that *nearly* is reluctant to restrict *I* in *I nearly killed my wife*.

Taking this into consideration, the rightness condition on *nearly*'s scoping can be more clearly stated:

(56) *Nearly*, unlike *only*, *not*, restricts the "innermost" **predicate relation**.

Thus, the problem is how to implement this condition. My best guess is that there is a lexical and pragmatic conditioning on the semantics of *nearly* to prefer 3′ over 3 in the following C/D table.

(57)

0.	***I***	***killed***	***nearly***	***my***	***wife***
1.	***I***	*V*			*(O)*
2.	*S*	***killed***			*(O)*
?*3.	*S*	*V*	***nearly***		
3′.			***nearly***	*S*	*V*
4.	*(S)*	*(V)*		***my***	*N*
5.	*S*	*V*		*(D)*	***wife***

This decomposition is differentiated from (38) in that *my wife* is divided into two instead of being treated a single subpattern. This is because I tacitly assumed, though in conformity with the fact, that ***nearly*** does not restricts ***my*** *N* and *(D)* ***wife***.

Under this interpretation, the rightness condition claims that if (51) is acceptable at all, it is only when what it modifies is an "implicit" verb, or rather a predicational relation, between *D* and *N*, as specified by the following two contrasts:

(58)

3,5.				*(D)*	***wife***	Operator
1,2,4.	***I***	***killed***	***nearly***	***my***	*N*	Hedged presupposition

(59)

3,4.				***my***	*N*	Operator
1,2,5.	***I***	***killed***	***nearly***	*(D)*	***wife***	Hedged presupposition

What (58) specifies is analogous to so-called "role reading" in the sense of Fauconnier (1994). What (59) specifies is, however, implicit in *I nearly killed my wife*.

6.3.9 Remarks on the descriptive adequacy

What I have said so far may be more or less peculiar to verbs of the same class as *kill*, on the one, and to adverbs of the same class as *nearly*, on the other. Putting aside the issue of verb class, consider the following cases, relating to adverb class.

(60) a. *Bill* ***nearly*** *was a woman.*
b. *Bill was* ***nearly*** *a woman.*

(61) a. ?*Bill* ***roughly*** *was a woman.*
b. *Bill was* ***roughly*** *a woman.*

In these cases, *b*-versions are not necessarily deviant, and more importantly differ from *a*-versions in their meaning. Roughly, (60)a means "Bill was nearly born as a woman", whereas (60)b means "Bill's character/behavior is very womanly". This difference is compatible with what I have suggested above in that in (60)a, *nearly* modifies the mode of ***Bill***'s matching *S*/__ ***was a woman***. By contrast, (60)b, *nearly* modifies the mode of *N*'s (in ***Bill was*** *N*) matching ***a woman***.

As (61) indicates, *roughly* (in the sense of roughly speaking) patterns like nearly, but with some differences. First, the slight deviance of (61)a should be accounted for. One of possible readings of it is: an individual of, in fossil form, was discovered, which receives 'Bill' as its code name. After examining the fossil in detail, an expert (or a team of experts) mentions its sex status by saying (61)a, intending, "We may conclude that this individual of ape, called Bill, was female. Thus, (61)a is more exactly a′, a "stylistic" variation of c.

(61) a′. *Bill,* ***roughly (speaking)*** *, was a woman.*
c. ***Roughly (speaking)****, Bill was a woman.*

But this use is not of *nearly*, *almost*. Witness the following deviance:

(62) a. ?*****Nearly****, I killed my wife.*
b. ?*****Almost****, I killed my wife.*

Noting these differences, I avow that I have no good account of them. But at any rate, it is sure that this is beyond the proper scope of pattern matching analysis.

6.4 Pattern Matching Analysis in Relation to *Mental Spaces*

Let us turn to issue related to Fauconnier's theory of **mental spaces** (1994, 1997).

6.4.1 Connectors

Relating to Jackendoff's work (1975) on "opacity-transparency phenomena", Fauconnier discusses the following examples, which are originally Fauconnier's (35)-(38) (1994: 12-13).

(63) a. *In Len's painting,* ***the girl with blue eyes*** *has green eyes.*
b. *In Len's mind,* ***the girl with blue eyes*** *has green eyes.*

(64) a. *Len believes that* ***the girl with blue eyes*** *has green eyes.*
b. *Len wants* ***the girl with blue eyes*** *to have green eyes.*

These are sentences where the notion of **mental spaces** plays a crucial role. On (63)a, Fauconnier (1994) explains:

> The adverbial phrase *in Len's painting* in [(63)] sets up an image situation. The model, *a* (say, *Lisa*, *a girl who has blue eyes*), triggers the image connector *F*, and the target, *b*, is the representation in the painting, with the property of having green eyes, as depicted in Figure [6.2]. (Fauconnier 1994: 12)

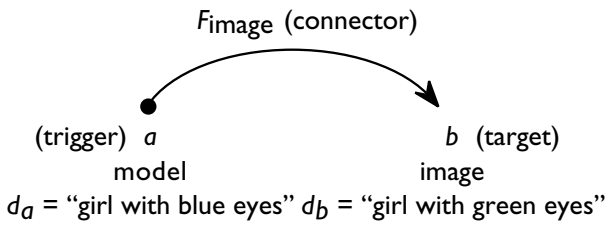

Figure 6.2

This figure is my reproduction of Fauconnier' figure 1.6.

Everybody will agree that Fauconnier's *mental spaces* theory is an excellent theory which is capable of solving, in a sophisticated way, a number of problems of reference, and related matters, some of which are classical since Frege, e.g., the Sinn-Bedeutung problem in *Phosphorus is Vesperus*. Therefore, it is very risky to challenge such a theory.

No matter how fine Fauconnier's theory may work, mental spaces are a "theory-internal" stipulation proposed to account for a given set of phenomena. So, I have rights to ask, Why are there mental spaces after all?

Notably, I regret the current conception of mental spaces as something "purely cognitive" that has no obvious relation to surface syntax, except so-called "space-

builders" that serves as a device to set up spaces. I find there is a sort of exclusivism that tries to "separate" semantic issues from syntactic ones.

I disagree, and I would like to suggest that there is a fruitful link between syntactic and semantic construction. My point is that some effects described in terms of mental spaces might automatically follow from pattern composition, if we countenance the idea of **composition structure** and **polarization**, defined in Section 6.3.1.

6.4.2 An analysis of *In Len's painting, the girl with blue eyes has green eyes*

To substantiate this claim, let me go into pattern matching analysis of relevant phenomenon.

To begin with, PMA gives the following analysis to (63)a.

(65)

0.	***In Len's painting,***	***the girl***	***with***	***blue eyes***	***has***	***green eyes***
1.	***In Len's painting,***	S_1			V_1	
2.		***the girl***			V_2	
3.		S_3	***with***	O_3		
4.		S_4	P_4	***blue eyes***		
5.		S_5			***has***	O_5
6.		S_6			V_6	***green eyes***

As usual, *with* is treated as a kind of verb. More generally, $P = R_{-t}$, distinguished from $V = R_{+t}$, where t is the mnemonics for [tensed].

The proposed analysis claims that *In Len's painting*, as a "space-builder", is an *S V* modifier, and modifies *S **has** O* in this case. With this noted, it is easy to see that *S **with blue eyes*** and *S **has green eyes*** are predicates in different mental spaces, *R* (for reality) and *L* (for Len's painting), respectively. This leads to the following schematic representation, where 3×4 and $1\times5\times6$ correspond to *R* and *L*, with 2 being suspended.

(66)

2.		***the girl***		*V*
3×4.		$S_{3,4}$	***with blue eyes***	
$1\times5\times6$.	***In L's painting,***	$S_{5,6}$		***has green eyes***

Ultimate polarization gives two different results, depending on whether subpattern 2, encoding the reference of ***the girl***, is incorporated into *R* or *L*, in the way specified below.

(67) *R.* ***the girl***$_{3,4}$ ***with blue eyes*** V_2
L. ***In L's painting,*** $S_{1,5,6}$ ***has green eyes***

(68) *R.* $S_{3,4}$ ***with blue eyes***
L. ***In L's painting,*** ***the girl***$_{1,2,5,6}$ ***has green eyes***

The difference is whether ***the girl*** identifies a "model" in *R*, or it identifies an "image" in *L*.

These results suggest that Fauconnier characterization of the phenomenon is naturally reinterpreted in terms of pattern matching analysis, as follows: entities *a* (model) and *b* (image) and their descriptions d_a and d_b meet the following conditions:

(69) i. 3×4 =corresponds to space *R*, which I claim is introduced by *S* ***with*** *O*
ii. 5×6 corresponds to space *L*, introduced by space-builder 1 = ***In Len's picture*** *S V*
iii. *S* in 3×4 identifies *a* = *the girl* as a "model", who as blue eyes in *R*
iv. *S* in 5×6 identifies *b* = *the girl* as an "image", who has green eyes in *L*

Basics of the proposed analysis are true of expressions like (64)a, b, repeated here:

(64) a. *Len believes that* ***the girl with blue eyes*** *has green eyes.*
b. *Len wants* ***the girl with blue eyes*** *to have green eyes.*

To (64)a, we give an analysis as follows, where *Len believes that* is treated as a single subpattern.

(70) 2. ***the girl*** *V*
3×4. *S* ***with*** ***blue eyes***
1×5×6. ***Len believes that*** *S* ***has green eyes***

Crucial points are the same as the above analysis of *In Len's painting* ___.

I find this interesting convergence is not by chance. Let me make some relevant points clearer below.

6.4.3 Effects of mental spaces integrated into pattern composition

Based on the results offered above, it may be claimed that pattern matching analysis provides the key to integrate Fauconnier's (1994, 1997) theory of mental spaces and Langacker' (1987, 1991*a*, *b*) cognitive grammar. To substantiate this controversial claim, let me appeal to the following diagram, where decomposed patterns (right) provide a basis for Fauconnier's notation, on the one hand, and Langacker's notation, on the other, provided *In M, S V′ O′ V O* encodes *In Len's*

panting/mind, the girl with blue eyes has green eyes = (63)a, b.

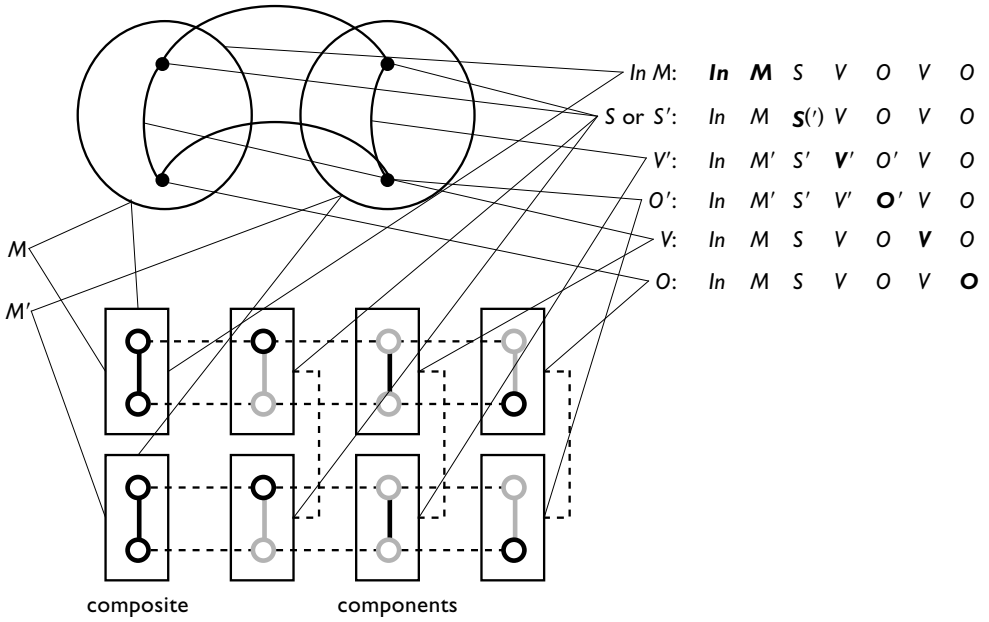

Figure 6.3

In this case, two mental spaces, *M* and *M′*, are involved. *M* is overt (described by *Len's painting/mind*), and *M′* is covert in that it is implicit in *with blue eyes*). Needless to say, *M′* need not be correspond to reality, it varies depending on its contexts.

If the proposed account is correct, it may be the case that mental space phenomena need not be characterized as isolated phenomena. For some cases, it is in fact suggested that mental spaces are something that subpatterns specify, and connections across spaces could be best characterized as effects of pattern composition (by superposition) in my sense. My point here is that, as far as I can tell, it is curious why Fauconnier tries to emphasize that mental space phenomena can be described independently of syntax, deep or surface, if not apart from it. In a sense, indeed, the notion of mental spaces plays, at least partly, certain roles that deep structure played in earlier generative grammar.

Fauconnier's strategy is, it seems to me, to separate, or even segregate, cognitive structure responsible for reference from syntactic structure. He thereby suggests, along with other cognitive linguists, that syntactic structure is irrelevant and irresponsible for the kind of problem. But it is unreasonable to me for anyone to suggest that the class of phenomena described in terms of mental spaces is primarily semantic which has nothing to do with syntax. Such an agnostic attitude needs justification, and would make, in the end, linguistics quite boring. Anything could be done by descriptive tools if they are so powerful as an unrestricted theory of mapping; for there is nothing in the world, real or artificial, that could not be described in term of mapping.

If my suggestion that Langacker's component structures are nothing but graph-

ical representations (and awkward approximations) of subpatterns in our sense is correct, then it follows that mental spaces *M* and *M′* can also be identified with composite structures, ***S V O*** and ***S′ V′ O′***, in the sense of Langacker, which comprise respective sets of component structures {***S*** *V O*, *S* ***V*** *O*, *S V* ***O***} (upper half) and {***S′*** *V′ O′*, *S′* ***V′*** *O′*, *S′ V′* ***O′***} (lower half). Again, this integration would not be within reach if composite structures (in Langacker's sense) and mental spaces are constructed by a superposition of subpatterns as explicitly given in this diagram.

6.4.4 Section summary

If my analyses and suggestions made in this section are correct, then it follows that I can retain the relation of mental spaces in the sense of Fauconnier (1994) to surface syntax, because all relational terms have potentially "domains of their own". Thus, what results in mental spaces phenomena is rather pattern composition, and more exactly polarization through composition. On this basis, I suggest that it is not necessary to stipulate mental spaces **in addition to** many other independently motivated constructs for syntax. Rather, mental spaces are one of many natural effects associated to relational terms.

Put somewhat differently, mental spaces are no longer purely conceptual constructs that are constructed independently of surface syntax. Baldly stated, to have *n* relational terms is to have *n* mental spaces. The phenomenon of mental spaces emerges naturally if syntactic structures of surface forms are sets of subpatterns that are to be unified in the suggested way.

6.5 Pattern Matching Account of *Syntactic Amalgams*

So far, I have shown that the proposed framework is capable of handling issues that have been ascribed to deep structure. In fact, problems of logical ambiguity, imperative subject suppression, and mental space phenomena are partly accounted for. I believe results are already impressive. In this regard, the notion of pattern composition/decomposition is qualified as a "real" alternative.

Before leaving from the issue of underlying structure, I want to give a pattern matching account of **syntactic amalgams**, to be illustrated below, by accepting Lakoff's (1974) challenge. He argued, I think correctly, that the notion of deep structure needs to be either drastically revised or abandoned by virtue of this class of syntactic phenomena in which "multiple deep structures" are necessary to represent meanings of surface forms.

In my view, Lakoff's challenge can be straightforwardly accounted for if only pattern matching analysis is assumed, since what is at issue is how meanings of subpatterns are reflected to the resulting meaning of the whole pattern. In other words, the problem raised by amalgams is exactly one of composition. Under these

preliminaries, let us proceed into details of the problem and suggest a solution.

6.5.1 What is syntactic amalgam?

Syntactic amalgams (Lakoff 1974) are presumably one of the best cases to show the descriptive and explanatory potentials of pattern matching analysis. I exemplified the phenomenon by examples in (71), which was taken from Lakoff (*ibid.*).[12]

(71) a. *John invited* ***you'll never guess how many people*** *to his party.*
b. *John invited* ***you'll never guess how many people*** *to* ***you can imagine what kind of a party*** *at* ***it should be obvious where*** *with* ***God only knows what purpose*** *in mind, despite* ***you can guess what pressure***.

Amalgams are indicated by boldface.

Syntactic amalgams in the sense of Lakoff (1974) are sentences like (71)a and b which contain one or more occurrences of strange forms such as *you'll never guess how many people*, each of which serves as an NP but does not conform to the canonical structure of it.

Intuitively, (71)a and b are variations of the following:

(72) a. *John invited a few friends to his party.*
b. *John invited many people to his party at his home with a purpose in mind, despite pressure.*

But what is the exact mechanism behind this that makes amalgams possible?

As Lakoff (1974) conclusively argues, the serious problem raised by sentences like (71)a and b is the existence of unusual segments such as follows:

(73) a. *invite* ***you'll never guess how many people***
b. *to* ***you can imagine what kind of a party***
c. *at* ***it should be obvious where***
d. *with* ***God only knows what purpose*** *in mind*
e. *despite* ***you can guess what pressure***

He points out that transformational grammar cannot provide a plausible account for segments of this sort.

Phenomenologically, those segments in question all take the form of R_1 *X (Y)* $(R_2$ *Z)*, where:

(74) i. *R* is either *V* or *P*, and R_2 *Z* (e.g., *in mind*) is optional,
ii. *X (Y)* is the core of amalgam that behaves as a NP, such that:
iii. *X* takes the form of *P = (S U (AdV)) V W*, where *W* is a *wh*-word such as *how*, *what*, *where*.

My point here is that given *P = (S U (AdV)) V W Y* as generalized pattern of amalgams, *P* is parsed as *D′ Y* , where *D′ = ((S U)(AdV)) V W* serves as composite determiner (or modifier) of *Y*.

6.5.2 Methodological remarks on amalgams

Why do we have to describe amalgams after all, which seem to be peripheral phenomena? Before launching into detailed analysis, let me discuss relevant methodological issues briefly.

I take, as Lakoff did, syntactic amalgams to be a real challenge to a theory of grammar, admitting that it is needed to account for both of the following questions. Q_1 is concerned with language comprehension, and Q_2 is with language production.

(75) Q_1 What algorithm provides the "parsability" or rather "interpretability" of sentences containing such odd fragments as *you'll never guess how many people*, etc.?
Q_2 What algorithm provides the "composability" of sentences containing such odd fragments?

Q_1 is less problematic than Q_2; for one can always "patch up" one's theory in some way or other. Q_2 is clearly more serious, because what is needed for this is not merely "licensing conditions", with "free" generation of strings being assumed, which can provide solution only to Q_1. Indeed, what Lakoff demonstrated is the impossibility of deriving amalgams from "deep structures" deterministically.[13]

Syntactic amalgams like those in (71)a and b were "solved" by the brute force of "ignoring them altogether". One can easily imagine some linguists seriously claiming that they are not part of the "core" grammar, and consequently, have little importance to a theory of (universal) grammar.

Actually, the contrary should be true. They have a great **theoretical** importance for the very reason that they are "considered to be" peripheral. Note that what phenomena do or do not belong to the core grammar should be itself an empirical question, though rarely noticed. As Kuhn (1970) points out, correctly I think, that the concentration of research efforts on so-called "core facts" is a symptom of "normal sciences". More importantly, what defines what facts belong to the core is not the facts themselves but the theory in which scientists (want to) view them. If you are not merely a "normal scientist", however, you will soon realize that it is quite gratuitous to banish to the "periphery" of grammar all the phenomena that an assumed theory can not easily handle.

To sum, I suspect that the real reason amalgams like (71)a and b were (and still are) considered to have little importance to a theory of (universal) grammar is merely because they are what most linguists hope to get rid of, because they are an

annoyance. I do not know what others feel, but I believe that life is exciting because you can sometimes find something that is far beyond your imagination. Amalgams are such a rare case.

6.5.3 Parse models

Putting a lot of interesting details aside, let me begin by consider how pattern matching analysis solves both Q_1 and Q_2.

First, PMA claims that (71)a and b, repeated here without boldfacing, are acceptable, or more exactly "parsable", because there are **parse models** such as in (76).

(71) a. *John invited you'll never guess how many people to his party.*
b. *John invited you'll never guess how many people to you can imagine what kind of a party at it should be obvious where with God only knows what purpose in mind, despite you can guess what pressure.*

(76) *A*= *S* ***invited*** *O* ***to*** *O*
B= *S* ***invited*** *O* ***to*** *O* ***at*** *O* ***with*** *O* ***in mind, despite*** *O*

Admittedly, the claim is controversial. To substantiate relevant points, several notes and comments will be necessary.

6.5.4 Amalgams composed and decomposed

My point is that patterns *A* and *B* in (76) serve as "models" of the parses of (71)a and b. This claims will be substantiated below.

For simplicity, let me concentrate on pattern *B*, because pattern *B* has *A* in it. Note that, as (77) below indicates, *A* is composed of subpatterns 1 and 2, which serves as the base for other subpatterns, 3, 4, and 5.

(77)

0.	*S*	***invited***	*O*	***to***	*O*	***at***	*O*	***with***	*O*	***in mind***		***despite***	*O*		
1.	*S*	***invited***	*O*												
2.			*S*	***to***	*O*										
3.	*S*	*V*		*(M^n)*		***at***	*O*								
4.	*S*	*V*				*(M^n)*		***with***	*O*	***in mind***					
5.	*S*	*V*						*(M^n)*				***despite***	*O*		

(M^n) ($n \geqslant 0$) denotes a cluster of optional intervening modifiers.[14]

Based on this co-occurrence matrix, it becomes clear that syntactic "tricks" of amalgams stem from mechanism of categorization for *O*. For illustration, consider *with God only knows what purpose in mind*, which instantiates pattern 4 = *S V (M)** ***with*** *O* ***in mind***. Compare this with a simpler case of *with some purpose in*

mind, as follows:

(78)	4.1	*S*	*V*	***with***		*O′*		*O*		
	4.2	*S (V)*		*P*		***some***		*N*		
	4.3					*(D)*		***purpose***		
	4.4					*S′*		*S*	***in***	***mind***

(79)	4.1	*S*	*V*	***with***		*O′*		*O*		
	4.2				***God only knows what***			*N*		
	4.3					*(D)*		***purpose***		
	4.4					*S′*		*S*	***in***	***mind***

Here, *O′* can be approximated by *D*.

This analysis is motivated by intuition, and, obviously, shows certain conflicts with the following analysis, which is formally motivated.

(80)	4.1	*S*	*V*	***with***		*O′*		*O*			
	4.2.1				***God only knows***			*C*			
	4.2.2	*S*	*(V)*	*P*	*(??)*		***what purpose***$_i$		*S V*	O_i	
	4.2.3								***Ø Ø***	*O*	
	4.2.4								*S V*	***Ø***	
	4.3							*S*			***in mind***

4.2.2 makes use of anaphoric shifter *what purpose*$_i$ *Y* δ(*what purpose*$_i$), *Y* = *S V*.

As indicated, at least three gaps should exist: two for *S* and *V* in 4.2.3, and one for *O* in 4.2.4; however, three gaps are not sufficient. Note that as many additional gaps are necessary as there are other modifiers. This is the serious problem that Lakoff (1974) points out concerning amalgams.

Note furthermore, that there is little evidence to specify *S* and *V* in 4.2.3 in the way suggested. In fact, it is rather inadequate that *V* = *had*, even if *S* = *John*, for *had* is not overtly given anywhere in this sentence. It is extrapolated based on its semantic relation to *with*.

With those remarks, I revise the analysis in (79) to compromise the crucial conflicts. Consider the following analysis.

(81)	4.1	*S*	*V*	***with***			*O′*	*O*			
	4.2.1				***God only knows***		*C*				
	4.2.2				*S V*		***what***	N_i	SVO_i		
	4.3.1	*S (V)*		*P*	*(AdD)*		*(D)*	***purpose***			
	*(4.3.2								***Ø***	)	
	4.4						*S′*	*S*		***in***	***mind***

It is not certain whether there is or is not a "simplified" gap, Ø, between *purpose* and *in mind* in this case, but we assume crucially that what results in amalgams

like this is (i) recategorization of *S V* in 4.2.2 as *(AdD)*, as indicated in 4.3.1, and (ii) its correlation to the suppression of realization of *S V* O_i in 4.2.2.

Admittedly, I am unable to account for why realization of *S V* O_i is suppressed in contexts like 4.2.2. The purpose here, however, is an adequate description of amalgams rather than an account of them.

Under the preliminary analysis, PMA gives analyses for other cases of amalgam in (73). First, it tentatively gives the following analysis to (73)a:

(82)

0.	*S*	***invited***	***you***	***'ll never guess***	***how many***	***people***	***Ø***	***to his party***
1.	*S*	***invited***				*O*		
2.1			***you***	*V (O)*				
2.2			*S*	***'ll never guess***	*C*			
2.3	*(S*	*V)*		*(AdA)*	***how many***	*N*	*S V* O_i	
2.4	*S*	*V*		*(AdA)*	*(AdN)*	***people***$_i$		
(2.5							***Ø***	)
3.						*S*		***to his party***

For a better understanding, compare this analysis with the following analysis of a simpler form of *John invited quite many people to his party*.

(83)

0.	*S*	***invited***	***quite many***	***people***		***to his party***
1.	*S*	***invited***		*O*		
2.			***quite many***	*N*		
3.	*S*	*V*	*(AdN)*	***people***		
4.				*S*		***to his party***

Comparison reveals that what is unusual in (82), if anything, is the collaboration of subpatterns 2.1, 2.2, and 2.3 (and 2.5, if any) in (82).

6.5.5 Discontinuous polarization

The pattern matching analysis presented above suggests that if something is wrong with syntactic amalgams, it is the peculiarity of the relation of *F* = ***(you'll never) guess how*** *A* N_i *S V* O_i ***to his party*** to *G* = *S* ***invited*** *AdA* ***many people to*** *O*. To illustrate, consider the following:

(84)

F:		***... guess how***	*A*	N_i	*S V* O_i	*to his party*	
G:	*S* ***invited***	*(AdA)*	***many***	***people***		***to his party***	

Metaphorically, segments like *F* are "parasitic" because no segment of *G* needs to

be any segment of *F*.

J. invited serves to extrapolate *S V* at the end of (82)4. Substrings like *John invited* should be suppressed for at least two specifiable reasons. For one, they are anaphoric in relation to *G*. For another, *G* cannot afford *John invited* to appear in the position that the composition necessitates.

Note also the duality of ***to his party*** as explicitly encoded in (84). Put differently, ***to his party*** is a segment of both *F* and *G* in that it is shared by two clauses (84)*F* and *G*. This characterizes one of the usual effects of amalgams.

More complex cases can be accounted for similarly, as far as the condition for amalgams are, in the end, conditions on head-internal relative clauses. In fact, (71)b, repeated here for convenience, can be accounted for as follows, irrespective of its superficial complexity.

(71) b. *John invited* ***you'll never guess how many people*** *to* ***you can imagine what kind of a party*** *at* ***it should be obvious where*** *with* ***God only knows what purpose*** *in mind, despite* ***you can guess what pressure***.

Since I have already examined *you'll never guess how many people*, let me concentrate on the account of other subpatterns.

To account for the presence of *to you can imagine what kind of a party*, one only have to show the way to unify *F* and *G* defined below, letting $\mathbf{O}_1$ = ***you'll never guess how many people***, and $M_2 = S\ V_1\ O_1$, which is a suppressed matrix such that *S* = *John*, V_1 = *invented*.

(85) *F*: ***J. invited*** $\mathbf{O}_1$ ***to*** *D′* ***party***
G: ***you can imagine what kind of a*** O_2 M_2

What this analysis crucially claims is that ***party*** is part of *F* and ***you can imagine what kind of a*** is part of *G*. This analysis also claims that there should be *D′* to match ***you can imagine what kind of a*** and thereby making it serve as a composite determiner of ***party*** in *F*. Admission of unusual segmentations like ***you can imagine what kind of a*** is admittedly one of the most controversial points of this analysis, but it is so much crucial a point in my account of amalgams.

6.5.6 Another potential link to mental spaces theory

The "unnaturalness" of the admission can be interpreted in terms of Fauconnier's (1994) **mental space theory**. It can be assumed that in (85) and other similar cases below, *F* corresponds to a space *R* standing for (what is deemed as) speaker's "reality", and likewise *G* corresponds to another space *M* standing for speaker's representation of it, or roughly his "thought". Thus, ***party*** in *F* identifies an entity in *R* and O_2 in *G* identifies an entity in *M*.

Note the effect that the superposition of *F* and *G* have on each other. As ***you***

can imagine what kind of a in *G* serves as *D* of ***party*** in relation to *F*, ***party*** in (85)*F* serves as a predicate of O_2 (only) in relation to *G* in that it "names" O_2. This means that ***you can ...*** is a "space-builder" in the sense of Fauconnier (1994). Put differently, the relation of O_2 to ***party*** is the one of **role** to **value**, or more generally, it is the one of **class** to **instance**.

Following similar steps, the following pair can be superposed in order to account for ***at it should be obvious where***.

(86) *F*: ***J. invited*** $\mathbf{O_1}$ ***to*** $\mathbf{O_2}$ ***at*** *D′* ***Ø***
G: ***it should be obvious where*** O_3 M_3

Here, $\mathbf{O_2}$ = ***you can imagine what kind of a party*** defined in previous operation.

This case is unusual because O_3 is not named in *F*, but how unusual it is depends on one's assumptions.

Next, to account for ***with God only knows what purpose in mind*** , there is the following pair to superpose.

(87) *F*: ***J. invited ... with*** *D′* ***purpose in mind***
G: ***God only knows what*** O_4 M_4

Here, as usual, ***God only knows what*** in *G* serves as a composite determiner of ***purpose*** in *F*. A note on a minor point: although $M_4 = S\ V_1\ O_1\ P_2\ O_2\ P_3\ O_3$ is covert, it should be placed in front of ***in mind***.

Finally, to account for ***despite you can guess what pressure*** , we should have the following pair to unify.

(88) *F*. ***J. invited ... in mind despite*** *D′* ***pressure***
G. ***you can guess what*** O_5 M_5

As usual, ***you can guess what*** in *G* serves as a composite determiner of ***pressure*** in *F*.

6.6 Concluding Remarks

It is clear from arguments exercised so far that the method of **pattern composition by superposition**, defined on a set of **subpatterns decomposition by diagonalization**, is as powerful as a "derivation" from a deep structure. With this result in mind, I claim that pattern matching analysis, if armed with the method, provides an alternative model of grammatical description and explanation.

I believe that this result is far from trivial, since my description and explanation of syntactic phenomena not only get rid of deep structures, but also provide a better account of relevant facts rather than ignoring them.

Notes

1. By constructions, I roughly mean a class of composite patterns, with varying degrees of schematicity. For example, *S V (O)* ***as soon as possible***, S_i *V (O)* ***as soon as*** S_i ***can***, *S V* ***as*** X_i ***as*** *S V* $\delta(X_i)$ are all constructions in my sense. Constructions are "superlexical" subpatterns that comprise more than one word. They are subpatterns that override other patterns, and we call them **overriders**. For example, *G* = *S V (O)* ***as soon as possible*** "overrides" *F* = ***I will reply*** to form *H* = *G*(*F*) = ***I will reply as soon as possible*** on the condition that *S* = ***I***, *V* = ***will***, and *(O)* = ***reply***. But those composite patterns are special in that they can no longer be decomposed into smaller units without changing their basic functions. I regret that we cannot discuss many interesting properties of overriders in sufficient detail in this thesis.

2. It is not clear whether one needs to access meaning in this process of discovery. At least, important connectionist results such as Elman (1990, *et seq.*), Servan-Shreiber, *et al.* (1988) show that conceptual sort of semantics is not a necessary condition for this sort of discovery.

3. Peter Bensch (1991) suggests, relating to Elman's works (1990*a*):

> ... Significantly, [Elman's simple recurrent] networks' output very closely follow the predictions of Harris [(1982)]. (Harris is one of the last remaining practitioners of pre-Chomskyan structuralism). The Chomskyan revolution was to some extent precipitated by the lack of sufficient computational tools to meet the goals of linguistic structuralism. Chomsky proposed that the structuralist program of inducing general principles from empirical data would never succeed. As part of his revolution, he advocated a research program based on deduction from general principles to empirical data.
>
> With the emergence of computational tools being developed by Elman, structuralism may again become a viable research program. Further support for this conjecture is provided by the continuing problems encountered by linguists attempting to deduce empirical data from base [*sic*] principles. Thus, a connectionist revolution seems to be emerging. And, this revolution may be fittingly called "neo-structuralism."

In the interpretation of Elman's work suggested here, lexical classes can be inferable by "discovery procedure". Thus, instead of hiding myself into an escape hatch of conceptualism, I would like to choose to assume that there is a correlation such that, abstracted from surface syntax, the more selectively interdependent units are with other units, the less autonomous they are.

4. It should be explicitly noted that all "generative" linguists are "Chomskian" linguists, suggesting that there are Chomskian linguists who are not generative linguists. For example, McCawley was one of the best generative linguists ever since the Chomskian revolution, but he was not a Chomskian. Incidentally, whether "minimalists" who follow Chomsky (1993, 1995) are generative linguists or not is questioned by Pullum (1996).

5. I know a few cognitively oriented linguists who disdainfully claim that this is a "pseudo-problem". As far as I can understand, however, their attitude is a dismissal of a real problem by ignoring it, or a solution by *brute force*. I suspect they are denying the existence of everything that their theory is unable to successfully accounted for.

6. To 4, we may append the fifth subpattern, *(S) V J S* ***flies***, where *J* (= *like*) encodes conjunction, to make overt the implicit verb *flies* which takes *an arrow* as subject and parallels the matrix verb.

7. The history of generative linguistics is, in a sense, a history of tiresome controversies rather than a history of glorious discoveries and achievements.

8. I don't know what cognitive linguists would say about the question of exactly how the subject of imperative is identified, if anything. As far as I can tell, no suggestion of solution is given in Langacker (1987, 1991*a*, *b*).

9. This condition is our analog to so-called "binding condition B" (Chomsky 1981).

10. The contrast is not as straightforward as suggested, since it is not factually clear what the term deletion denotes, especially whether it deletes only phonological contents by leaving semantic content, or deleting the two altogether.

11. I omit here two other readings, one of which is a very marginal reading that corresponds to *There are many ways in which a student reads a book*. This will require the notion of generalized quantifier, since *many* binds both of the determiners of *x student* and *x book*. Another is a simple event reading, There occurs an event in which many students read many books. This reading is dominant in past tense sentences. For evidence, *When I entered the library, many students read many books* would receive primarily this event reading, and marginally receive other logical readings.

12. There are other kinds of amalgams. For example, Lakoff (1974) cites examples such as follows as other cases of amalgam.

i. *John went to* ***I think it's Chicago*** *last Saturday.*

ii. *John married* ***guess who****.*

13. Lakoff, in conversation with Goldsmith, reflects as follows:

> ... I had given a paper at *CLS* — "Syntactic amalgams" — that had shown that there were sentences that did not have any single deep structure or logical form, sentences like *John invited you'll never guess how many people to you can imagine what kind of a party for God knows what reason* or *John is going to I think it's Chicago for I'm pretty sure it's a conference.* There are a variety of types of such amalgam sentences, and their existence showed that one could no longer maintain a theory in which the surface structure of all sentences were derived in step-by-step fashion from either deep structure or logical forms. (Huck and Goldsmith 1995: 117)

But what really matters, in my view, is not whether a theory of grammar is with or without deep structure, but exactly what kind of structure is an underlying structure.

14. I avoid to denote (M^n) by M^* because I want to use it for other purposes.