The Informational Component

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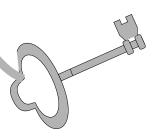
**The Informational Component
(Ph.D. Dissertation)**

by

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THE INFORMATIONAL COMPONENT

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ABSTRACT

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Even though the relevance of non-truth-conditional notions like 'topic' and 'focus' in sentence structure and interpretation has long been recognized, there is little agreement on the exact nature of these notions and their role in a model of linguistic competence. Following the information-packaging approach (Chafe 1976, Prince 1986), this study argues that these notions are primitive elements in the informational component of language. This component, informatics, is responsible for the articulation of sentences qua information, where information is defined as that part of propositional content which constitutes a contribution of knowledge to the hearer's knowledge-store. Informational primitives combine into four possible distinct information-packaging instructions, which direct hearers to retrieve the information of a sentence and enter it into their knowledge-store in a specific way.

After a discussion of previous approaches to the informational articulation of the sentence, a hierarchical articulation is proposed: sentences are divided into the focus, which is the only information of the sentence, and the ground, which specifies how that information fits in the hearer's knowledge-store. The ground is further divided into the link, which denotes an address in the hearer's knowledge-store under which s/he is instructed to enter the information, and the tail, which provides further directions on how the information must be entered under a given address.

Empirical support for this representation of information packaging comes especially from the surface encoding of instructions in Catalan, which is then contrasted with that of English. Using a multistratal syntactic theory, it is then proposed that information packaging is structurally and purely represented at the abstract level of IS, which acts as an interface with informatics. Finally, in order to further argue for informatics as an autonomous linguistic component, some proposals that attempt to include informational notions under logical semantics are reviewed and countered.

This study is an effort to gain insight into one subdomain of pragmatics by integrating it into the larger process of language understanding. This is done by giving otherwise elusive informational notions a specific role in the component responsible for the entry of information into the hearer's knowledge-store.

Contents

Chapter 1

Introduction

1.1 Goals

One of the major goals of linguistics is to explain how meaning is encoded in linguistic structure. Linguists try to understand and describe the process by which the human mind takes a string of acoustic signals, interprets it, and turns it into a conceptual structure. Indeed, we have gained a fair amount of understanding about our linguistic competence. It is generally agreed that the physical reality of an utterance's phonetic shape is mapped onto an abstract phonological representation where bundles of acoustic parameters are converted into bundles of distinctive phonological features with inherent linguistic value. On the basis of this phonological representation, in turn, we are capable of capturing the syntactic structure of a sentence, and once this syntactic object is available, we proceed to its interpretation.

But what does interpretation consist of? Traditionally, linguists have considered that meaning is abstractly represented in the semantic component of language. Interpretation, then, can be viewed as a translation from syntactic objects into semantic objects or propositions, which will in turn be converted into more general nonlinguistic conceptual structures in the mental knowledge store. We have relied on truth-conditional logic to provide us with a way to formally represent meaning, and, since Richard Montague, in the late 1960s, we can also compositionally translate syntactic objects into semantic formulae with extreme systematicity.

Truth-conditional semantics, however, while yielding important results, cannot account for the entire range of phenomena we would normally include under the label of meaning. In order to benefit fully from truth-conditional semantics, we need an

additional sort of meaning interpretation beyond, or along with, truth-conditional interpretation. In fact, and due mostly to the influence of Paul Grice in his 1967 W. James lectures, such an assumption underlies much work in modern linguistics, hence the methodological division of labor between the study of semantics and the study of pragmatics.

The object of study of this dissertation lies outside the realm of truth-conditional semantics and within the realm of pragmatics. The kind of non-truth-conditional meaning we shall be concerned with is INFORMATION PACKAGING or, equivalently, INFORMATIONAL MEANING.[1] Even though information packaging is traditionally regarded as just one subtype of pragmatic understanding, it is sufficiently distinct and self-contained to warrant our studying it without considering other types of pragmatic phenomena. Such an approach has led to the identification of two important primitives in the study of information packaging, the familiar notions of FOCUS and TOPIC.

What sort of 'meaning' is information packaging? It has long been noted by linguists that different sentential forms can express the same propositional content, or, inversely, that one and the same semantic proposition can be expressed by a variety of constructions. For instance, (1)a and (1)b,

(1)   a. He hates broccoli.
       b. Broccoli he hates.

are truth-conditionally equivalent, i.e., the same conditions that must be met for (a) to be true must be met for (b) to be true. The difference between (a) and (b), therefore, is not in what they say about the world, but in how they say what they say about the world. This non-truth-conditional difference in sentence understanding that we observe in (1) is a difference in information packaging. In other words, (a) and (b) are equivalent logico-semantically but not informationally: while their propositional contents are the same, they do not provide the same INFORMATION, where two sentences with the same propositional content may convey different information in different speaker-hearer interactions depending on how and how much

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[1]As a norm, the term 'information packaging' will be used, but 'informational meaning' comes in handy especially when information packaging is contrasted with logico-semantic meaning and when emphasizing the importance of information within the global process of interpretation (or 'meaning' in the wide sense of the word).

this propositional content contributes to the hearer's knowledge-store at the time of utterance.

Indeed, speakers seem to structure or package the information conveyed by a sentence at a given time-point (cf. Chafe 1976, Prince 1986) according to their assumptions about their interlocutors' beliefs or knowledge and attentional state. Hearers' knowledge and attentional state, due to the mere effect of the discourse input, change continually in a given linguistic encounter and, therefore, so changes the way in which speakers package information. With this packaging speakers seem to instruct hearers to retrieve the information carried by a sentence and enter it into their knowledge-store in a particular way. Each one of this particular ways to package information will be referred to as an INSTRUCTION. Different packaging structures license different sentential configurations like the ones in (1).

In this sense, then, information packaging is a very context-sensitive component of language understanding, springing from each particular speaker-hearer interaction and, furthermore, reflecting the changes in (the speaker's beliefs about) the knowledge and attentional state of the hearer that take place during this interaction. Truth-conditionally equivalent sentences encoded in different information-packaging instructions are, therefore, not mutually interchangeable in a given context of utterance, preserving felicity. It is this context-sensitivity that has traditionally placed information packaging within the scope of pragmatic inquiry.

Example (1) showed that the same logico-semantic proposition may be encoded in different packaging structures. The opposite is also true; the same packaging instruction may be used to encode different logico-semantic propositions. In a sentence like (2),

(2)   Broccoli he loves.

there is a certain interpretive equivalence with (1)b, having to do with the linear order of phrases[2], which is absent from (1)a. Sentences (1)b and (2), while truth-conditionally distinct, may be said to represent the same packaging instruction, i.e. their informational structure is identical. In these sentences there are two overlapping elements that are simultaneously expressed in the sentence structure: logico-semantic propositional content and information-packaging instructions. A

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[2]The syntactic configuration in (1)b and (2) is traditionally referred to as 'topicalization'.

complete linguistic theory, of course, must ultimately explain what these elements are, describe their representation, and study their interaction.

One way in which the issue may be addressed is by viewing logico-semantic meaning and information packaging as belonging to two separate independent components of language. Although both components are interpretive in some sense, the sort of 'meaning' each component deals with is of a different nature. This is, in fact, the thesis of this dissertation: that a complete model of linguistic competence must include a component, which I will call INFORMATICS, that is merely concerned with the interpretation and generation of information packaging. Even though informatics is an autonomous component, one expects there to be much indirect interaction between it and other components of language, e.g. syntax, semantics, and phonology. Interaction with syntax and phonology is the necessary result of having to express information packaging through the structural components of language. Interaction with logical semantics is the unavoidable consequence of a close coexistence within the interpretive end of language.

Despite abundant research in the area, the exact nature of informational notions remains evasive and controversial. This study shows that, by adopting a strict literal interpretation of the notion PACKAGING, originally Chafe's (1976), a more explicit definition of information packaging and a clearer idea of what its niche is within the larger linguistic apparatus can be offered. Our theory, which builds upon previous research in the area[3], includes an informational ontology with four basic primitive notions arranged in a hierarchical articulation S={FOCUS, GROUND} and GROUND={LINK, TAIL}, the combinatorial rules by means of which the different packaging instructions are obtained, and the interpretive rules by means of which such packaging instructions are interpreted.

The mere availability of a coherent and comprehensive theory of informatics indirectly validates the tacit assumption that informatics is a well-defined, autonomous component. Nevertheless, other approaches may be taken —and have been taken— to attain the incorporation of informational meaning into a theory of language competence. One may try to account for the facts discussed around (1) and (2)

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[3]Most notably, in this particular respect, in the work of Bolinger 1954, Kuno 1972, Dahl 1974, Gundel 1974, 1988, Chafe 1976, Prince 1981a, 1986, Reinhart 1982, Ward 1985, Lambrecht 1987, and Välimaa-Blum 1988, among others.

differently, for instance, by saying that all differences observed between the three sentences in question are all of the same kind. In fact, it has been argued that the difference between sentences like (1)a and (1)b is indeed truth-conditional (see Szabolcsi 1981 and Svoboda & Materna 1987 for analyses along these lines). Some plausibility for this claim comes from the fact that some informational notions seem to have truth-conditional effects, especially with sentential operators like negation, the yes/no interrogative operator, and exhaustiveness (cf. Jackendoff 1972, Horn 1981, Rooth 1985).

In order to show that informatics is indeed a distinct, autonomous part of linguistic interpretation, this study discusses some of these truth-conditional effects and offers alternative analyses that account for the data without requiring direct interaction between logico-semantic operators and informational elements. It is shown that sometimes the putative interaction is merely a pragmatically induced mirage—in the case of exhaustiveness—and that at other times—in the case of negation and interrogation—it is the result of the indirect interaction between parallel but autonomous components.

Our theory emphasizes the autonomy of informatics not only with respect to truth-conditional logico-semantic meaning but also with respect to other types of non-truth-conditional interpretation. It is fair to say that we now know that Bar-Hillel's (1971) 'pragmatic wastebasket' is not just one basket but a cover term that encompasses various distinct phenomena of a very different nature. While phonology, syntax, and semantics refer to both a linguistic area of inquiry and a component in a model of linguistic competence, pragmatics has only a methodological connotation.

By providing a rigorous theory of informatics, we want to contribute to the enterprise of hooking up 'pragmatic competence' to the larger linguistic apparatus, following Prince 1988a. To do so one needs to identify the 'real' linguistic components currently encompassed under the overarching label of pragmatics and find their place in the model. This study must be considered, then, a move towards improving our understanding of some pragmatic phenomena in language and their relationship with other types of linguistic evidence: if it is possible to come up with a sound theory of informatics, another fragment of the reputedly 'messy' pragmatic mosaic will have become clearer.

Informational understanding and the packaging instructions that encode it must obviously be recoverable from the overt structure of any language. Information packaging is structurally represented by syntactic, morphological, or prosodic means, or a combination of these, as is usually the case. It is well known that in English information packaging may be expressed exclusively by means of prosody (cf. e.g. Selkirk 1984, Rochemont 1986). Compare, for instance, (3)a to (3)b, where small caps signal the constituent containing prosodic prominence:

(3)   a. The boss hates BROCCOLI.
       b. The boss HATES broccoli.

Sentences (3)a and (3)b are logico-semantically equivalent, the truth-conditions that must be met for them to be true are exactly the same. Still, the understandings we obtain from them, their 'meanings' in a wide sense of the term, are different in some respect. As in the case of (1) above, the difference between (a) and (b) is a difference in information packaging. These sentences embody two different informational structures that represent two different packaging instructions, let us call them x and y, with nevertheless the same propositional content.

Not all languages, however, represent instructions x and y as English does. In fact, there is considerable crosslinguistic variation in this respect. Catalan, for example, does not allow the equivalent of (3)b. In Catalan, prosody alone is not enough to represent information packaging; it must be accompanied by a syntactic operation (cf. Vallduví 1988a). The Catalan equivalent to the contrastive pair in (3), representing instructions x and y, respectively, is shown in (4):

(4)   a. L'amo   odia   el BRÒQUIL.
         the.boss 3s-hate the broccoli
         'The boss hates BROCCOLI.'
       b. L'amo l_1'   ODIA t_1, el bròquil$_1$.
         the.boss *obj-cl* 3s-hate   the broccoli
         'The boss HATES broccoli.'

We notice the similar prosodic pattern between (3) and (4), but also that (4)b has undergone a syntactic operation absent in (4)a, a rightward detachment of *el bròquil* 'broccoli', the syntactic evidence for which is the object clitic (l_1) that must be coindexed with an empty argument position (t_1) (cf. Borer 1981, inter alia). In

other words, different languages choose different structural means to spell out the same packaging instruction.

In order to gain insight into the exact nature of the syntax-informatics interface, this study offers a detailed analysis of the syntax of information packaging in Catalan. Catalan, as just mentioned, requires overt syntactic operations where English requires only prosodic marking. By contrasting English and Catalan in this respect some crosslinguistically valid generalizations regarding the mapping between syntax and informatics may be attained.

While syntactic theory has long dealt with issues concerning the structural representation of theta relations, case requirements or logico-semantic structures, the representation of informational structure has been generally neglected.[4] Even most of the work done in the functionalist tradition, where informational relationships are the central concern, seems to view them as basically asyntactic, that is, untreatable in terms of a traditional syntactic analysis.[5] This study takes the position that information packaging, while part of an autonomous interpretive component, is just another type of abstract structure that has to be represented at the surface. In other words, the lexical item *everybody*, for instance, in a given sentence, must be interpreted not only as a quantifier over a proposition and as an argument of a predicate, but also as having a particular standing in a packaging instruction. All of these things must be recoverable from the surface shape of a sentence and it is the job of a theory of syntax to explain how. This study, using one of the most widely-accepted theories of syntax, the Principles & Parameters Theory (cf. Chomsky 1981, 1986 and subsequent work by his associates), suggests how this might be done.

1.2 Contents

Beyond this first chapter, where the general purpose and concrete goals of this work is outlined, the dissertation is organized as follows. Chapter 2 discusses the place

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[4]Exceptions are Culicover & Rochemont 1983, Horvath 1986, and Rochemont 1986, inter alia. Several others have dealt with some informational notions in isolation under the conviction that they were dealing with logico-semantic elements.

[5]A different perspective is found within the so-called 'generativist' discourse analysis (Kuno's (1978) term) approach, where the discovery and study of informational effects on syntactic structure is not seen as a substitute for this structure but as a complement to it.

of informatics within the wider field of pragmatics and its task within the model of linguistic competence. The issue of what pragmatics is and what the field covers as an area of inquiry is briefly surveyed and then we consider different phenomena that belong to linguistic pragmatics, both at the level of the sentence and at the level of the discourse. Also in this chapter, information packaging is examined and defined. The goal of this chapter is to clarify the relationship between information packaging and other pragmatic but distinct phenomena and, at the same time, ascertain the role of information packaging within the complex process of language production and comprehension.

Chapter 3 provides a comprehensive critical survey of the previous literature on information packaging, from the early Prague School proposals to the current so-called 'generative' functions-of-syntax analyses. We concentrate on two of the approaches, namely the 'focus-presupposition' approach and the 'topic-comment' approach, pointing out the advantages and the shortcomings of the binomial informational articulations they put forward. Finally, we present a trinomial hierarchical articulation of the sentence based on the insights gained from the survey of the previous approaches.

In Chapter 4, building upon the trinomial hierarchical articulation and following the notion of information packaging literally, we provide a coherent notation for the representation of information packaging and propose a small finite inventory of packaging instructions, i.e. speakers' instructions on how hearers must retrieve the information carried by the sentence and enter it into their knowledge-store, stated in procedural terms. This instructions are obtained from the arrangement of the informational primitives in a given sentence in a compositional way.

Chapter 5 studies in detail the surface manifestation of information packaging in one language: Catalan. Catalan surface syntax presents a straightforward encoding of information packaging which provides empirical support for the representation of informatics proposed in the previous chapter. The chapter includes a brief introduction to Catalan syntax, a discussion of the syntax of information packaging, and a comparison between Catalan and English.

Chapter 6 focuses on the nature of the syntax-informatics interface. As mentioned above, the interpretation of information packaging must be guaranteed by an appropriate and unambiguous representation in the structural component of lan-

guage. Within the multistratal framework of the Principles & Parameters Theory, we suggest how information packaging can be connected to the syntax. It is proposed that an abstract level of representation—Information Structure—mediates the mapping between informatics and the surface syntactic configuration of sentences, in the same way the level of LF mediates between semantic interpretation and surface syntactic structure, thus offering a pure structural representation of information packaging. The proposal involves a discussion of the configuration of Information Structure, the operations that map it to S-structure, and its independence from LF.

In Chapter 7 we return to the assumption that informatics and semantics are two distinct interpretive components in our linguistic competence. This assumption is not universally shared and analyses are found in the literature than argue or tacitly assume that certain informational notions have truth-conditional effects. This chapter contains counteranalyses of these putative truth-conditional effects. In particular, we concentrate on the interaction between focus and negative and interrogative sentences and the apparent dependence of exhaustiveness operators like *only* on focus. Alternatives are provided that show that the truth-conditional effects are in fact the result of indirect interaction between the semantic and informational components, thus avoiding the use of informational notions in a logico-semantic representation.

Finally, in Chapter 8 we conclude by evaluating the findings and proposals presented in this dissertation. These remarks are centered around the advantages of our proposal, the place of informatics within the larger linguistic apparatus, and its relevance within the general context of meaning and interpretation and in the mapping between the structural and the interpretive components of language.

Chapter 2

Pragmatics and Informatics

2.1 Scope of Pragmatics

As pointed out in the introductory chapter, this dissertation is meant as a contribution to our understanding of certain pragmatic phenomena in language. The scope of pragmatic inquiry, however, is extremely wide, and, moreover, different scholarly traditions have different ideas about what this scope is. For instance, within the Continental European tradition pragmatics includes the study of issues more commonly studied within applied linguistics, sociolinguistics, ethnolinguistics, psycholinguistics, and the sociology of language.[6] The term pragmatics is used here as in the Anglo-American linguistic and philosophic tradition. Following Levinson (1983), pragmatics is understood as being 'the study of those relations between language and context that are grammaticalized, or encoded in the structure of language' (1983:9).

Unfortunately, even after leaving social and applied pragmatics aside and concentrating on linguistic pragmatics, we still must deal with the very confusing array of phenomena that Bar-Hillel (1971) called the 'pragmatic wastebasket'. In fact, the term pragmatics in current linguistic theory differs from its sister terms syntax and semantics in a crucial way. Both syntax and semantics refer to a methodological area of inquiry within linguistics, but simultaneously they also refer to a coherent and distinct part of our cognitive linguistic apparatus. Pragmatics, in contrast, while used indeed to refer to an area of linguistic inquiry, lacks its other meaning as

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[6]See Levinson 1983 (Ch. 1) for a thorough discussion of the origins and use of the term 'pragmatics' in the different traditions and the scope of pragmatics as an area of inquiry.

a single coherent component of linguistic competence.

There exist, of course, works that argue convincingly that human linguistic abilities must include a pragmatic competence of sorts (e.g. Prince 1988a). But, even accepting the reality of pragmatic competence, one serious question remains: What kind of competence is a competence that includes knowledge of such diverse phenomena as illocution, discourse structure, reference resolution, implicature, empathy, and information packaging? It seems clear that we are not dealing with a single component of our linguistic apparatus. It makes no sense to presume that, let us say, the cognitive process responsible for illocutionary meaning interpretation is also responsible for processing the segmentation of discourse chunks. There is no empirical or conceptual support for such a presumption, beyond the fact that both types of structural phenomena involve contextual effects of some sort.[7]

The 'wastebasketness' of pragmatics is an artifact of our methodological division of labor. Lumping together all elements of linguistic structure that involve contextual notions (Levinson 1983) or, similarly, all aspects of meaning that have no truth-conditional effects (Gazdar 1979) has been very useful in advancing our understanding of the nonpragmatic phenomena of language. The result of such a methodological approach, however, has been the enormous heterogeneity of pragmatics as an area of inquiry. Undoubtably, if we want to gain insight into the pragmatic end of language, plausible subdomains of inquiry must be teased apart and their role in the linguistic system and its relationship with other better-known areas of linguistic competence must be studied. This is precisely what this study attempts to do with respect to one such domain of inquiry: information packaging.

In what follows the pragmatic subdomain of information packaging will be introduced and defined. Also, it will be useful to give an overview of some of the different domains of inquiry within current pragmatics, briefly outlining their object of study and their relationship to information packaging.

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[7]Ward 1985:1, taking a pro-pragmatic-competence stance, also expresses his doubts about 'a unitary pragmatic competence' and states that 'as research in pragmatics develops, it will become increasingly possible to identify and classify the various types of extra-semantic contributions to utterance interpretation'.

2.2 Information Packaging

It has long been noticed that there are syntactic operations which are not triggered by the need to satisfy any known 'purely' structural requirements—like the Case filter, agreement, or thematic structure—, and which are logico-semantically vacuous as well. These operations include topicalization, VP-preposing, left-dislocation, right-dislocation, adverb-preposing, gapping, it-clefting, pseudo-clefting, heavy NP-shift, and probably many others. A large number of studies, within the 'functions of syntax' approach, have pursued the task of establishing a raison d'être for all these 'non-structurally-motivated' syntactic operations. This raison d'être is generally called the 'functional load' of a sentence. In fact, some of these studies claim to have found functional loads for the existence of core syntactic operations like passive, NP-raising, tough-movement, relativization, and so on. Among the many valuable examples of this kind of work are Bolinger 1954, 1972, Hatcher 1956, Firbas 1964, Halliday 1967, Kuno 1972, 1987, Gundel 1974, 1985, Creider 1979, Wilson & Sperber 1979, Green 1980, Prince 1978, 1986, Givón 1983, Silva-Corvalán 1983, Ward 1985, Lambrecht 1987, 1988, and Välimaa-Blum 1988, even though the list could evidently be much longer.[8]

Following many of these works (e.g. Halliday 1967, Chafe 1976, Prince 1981a, 1984, 1986, Ward 1985, Välimaa-Blum 1988), functional load may be viewed as a packaging or structuring of the information contained in sentential structures. This packaging reflects the speaker's beliefs about how this information fits the hearer's knowledge-store. The term INFORMATION PACKAGING is used in this study to denote this nonsyntactic non-logico-semantic structuring of sentences. Information packaging can be thought to be part of the 'meaning' of sentences, if 'meaning' is understood in a generous way as encompassing several distinct types of interpretation necessary in achieving full understanding of sentences. In other words, the successful interpretation of sentences requires not only the interpretation of logico-semantic meaning—generally referred to as just meaning in its narrow sense—but

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[8]Within a different linguistic tradition, there are a number of works that have looked at these 'functionally-motivated' constructions from a purely syntactic point of view: Akmajian 1979(1970), Chomsky 1971, 1976, Guéron 1980, Kiss 1981, Williams 1981, Huang 1982, Culicover & Rochemont 1983, Selkirk 1984 (these two last works deal with the phonological interface as well), Solan 1984, Horvath 1986, Rochemont 1986, 1989, inter alia.

also, at least, the interpretation of informational meaning.

The notion of information packaging was explicitly introduced by Chafe 1976:

> I have been using the term <u>packaging</u> to refer to the kind of phenom-
> ena at issue here, with the idea that they have to do primarily with how
> the message is sent and only secondarily with the message itself, just as
> the packaging of toothpaste can affect sales in partial independence of
> the quality of the toothpaste inside (1976:28).

Prince (1981a, 1986, among others) picks up Chafe's packaging idea and states
that speakers 'tailor sentences in various ways to (their assumptions about) their
interlocutors' (1988:1) or, in more detail:

> Information in a discourse does not correspond simply to an unstruc-
> tured set of propositions; rather, speakers seem to form their utterances
> so as to structure the information they are attempting to convey, usu-
> ally or perhaps always in accordance with their beliefs about the hearer:
> what s/he is thought to know, what s/he is expected to be thinking
> about. (1986:208)

Our use of the rubric 'information packaging', however, differs in some respects
from Chafe's and Prince's. Chafe 1976 uses the term in a generally vague way. It
comprises not only the notions dealt with here, but also other reflexes of the speaker's
attitude towards the event reported in the sentence, i.e. empathy, contrast, and a
notion of 'subjecthood'. Empathy is totally different from information packaging
as understood here. Hopefully this will become clear in the following discussion.
Contrast, following Prince 1984, is most likely a derived notion and not a primitive.
This issue will be addressed below in § 4.3.2. As for Chafe's subjecthood, it will not
be dealt with at all here.

The term information packaging as used by Prince has a wider coverage as
well (cf. Prince 1988c, for instance). Information packaging is used to designate
both the formal marking of *sentences* to indicate the speaker's beliefs about the
hearer's knowledge and attentional state—information packaging (her information-
structure)—and the formal marking of *NPs* to indicate the status of discourse enti-
ties with respect to the discourse model—referential status (her information-status).

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Prince, however, is careful to point out that 'the two levels are mutually independent, though statistical relationships may exist between them' (1988c:1).

We have thus taken the term 'information packaging' and reduced its coverage to only one of the two 'levels' in Prince 1988c, namely her 'information-structure'. The reason is twofold; first, the term 'information structure' is used with a different meaning in Chapter 6, and information packaging seems actually a better designator of the phenomenon we are trying to account for; second, in agreement with Välimaa-Blum 1988, it seems that the use of the term 'information' for both NP-level and sentence-level phenomena is potentially misleading, especially when the phenomena to be distinguished are so closely related (cf. § 2.3.2 for discussion).

Our conception of information packaging is a literal interpretation of the notion of 'packaging'. Namely, information packaging—the structuring or packaging of information—is taken to consist of a small set of INSTRUCTIONS with which a speaker directs a hearer to retrieve the information encoded in a sentence and enter it into her/his knowledge-store. The purpose of information packaging is precisely to optimize the entry of data into the hearer's knowledge-store.

Before moving on, the use of the term INFORMATION in this study needs some clarification. Information, quoting Dretske 1981, 'is that commodity capable of yielding knowledge, and what information a signal carries is what we can learn from it' (1981:44). Dretske's view of information, taken from the notion of information in information theory, will be adapted for our purposes: two sentences with the same propositional content may carry different information in different speaker-hearer interactions depending on how much of that propositional content is unknown by the hearer at the time of utterance. Let us illustrate this with the following example. Suppose a speaker has the knowledge represented by the proposition in (5) and wishes to communicate it.

(5)   hates (broccoli, the boss)

The speaker will encode this proposition in a sentence and will utter it so that the hearer may incorporate this knowledge into her/his knowledge-store. Suppose further that the speaker, in separate occasions, communicates the proposition in (5) to two different hearers: *a*) to a hearer H_1, who at the time of utterance knows nothing about or is not attending to the boss' relation to broccoli, and *b*) to a

hearer H_2, who at the time of utterance knows that there exists a relation between the boss and broccoli (and is attending to it) without knowing what the relation is. A sentence encoding proposition (5) will carry different information in the case of H_2 than in the case of H_1. In H_1's situation, the information of the sentence is, given the salient existence of the boss, that he hates broccoli. In H_2's situation, the information of the sentence is, given a salient relation between the boss and broccoli, that this relation is 'hate'. The contribution of knowledge to the hearer's knowledge-store made by (5) is smaller in the case of H_2, despite the fact that the proposition is the same in both situations.
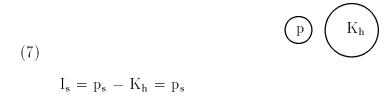
Information, as viewed in information theory, is by definition a reduction of uncertainty: the information carried by two sentences with equal propositional content is different when the reduction of uncertainty they bring along to the hearer's knowledge-store is different. The incorporation of the proposition in (5) into the hearer's knowledge-store represents a greater reduction of uncertainty in the case of H_1 than in the case of H_2. H_2's uncertainty is reduced by (5) only with respect to the exact relation that holds between the boss and broccoli, since, before the time of utterance, H_2 knew that a relation between the two entities in question existed. In contrast, H_1 was uncertain not only about the relation that holds between the boss and broccoli but also about the actual existence of a relation at all.[9]

The information of the sentence (I_s) is, then, the part of the propositional content (p_s) that makes a contribution of knowledge to the hearer's knowledge-store, i.e. that is not part of the knowledge of the hearer (K_h) at the time of utterance (or, in information-theoretic terms, the part of the propositional content that reduces uncertainty in the hearer's knowledge-store). This may be schematically represented as in (6):

(6) $I_s = p_s - K_h$

If the entire propositional content makes a contribution of knowledge to the hearer's knowledge store, the information of the sentence is equivalent to the propositional content:

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[9]See Pierce: 'The more we know about what message the source will produce, the less uncertainty, the less the entropy, and the less the information' (1961:23).

(7)

$$I_s = p_s - K_h = p_s$$

If the propositional content makes no contribution to the hearer's knowledge-store, the information of the sentence is null:[10]

(8)

$$I_s = p_s - K_h = \emptyset$$

Finally, if some of the propositional content of a sentence makes a contribution of information to the hearer's knowledge-store, the information of the sentence coincides only with a subset of the knowledge encoded in that proposition:

(9)

$$I_s = p_s - K_h = n, \text{ where } \emptyset < n < p_s$$

Information, then, unlike propositional content, is crucially defined with respect to the particular hearer a sentence is addressed to. As noted, the information carried by a sentence encoding the proposition in (5) is, roughly, 'hates broccoli' for H_1, but 'hates' for H_2. Speakers are sensitive to these differences in the hearer's knowledge-store and thus encode information in the structure of the sentences they produce. This encoding of information is 'information packaging'. A speaker of English, for

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[10] In Ch. 3 it is pointed out that sentences with zero information do not occur. In other words, if (the speaker assumes) there is no contribution of knowledge there is no reason for the sentence to exist.

instance, when wishing to communicate (5), might do so with sentence (10)a in case (a) (to hearer H_1) but with sentence (10)b in case (b) (to hearer H_2):[11]

(10) a. The boss hates BROCCOLI.
      b. The boss HATES broccoli.

This adaptation of Dretske's notion of information is in agreement with Dahl 1976 and Lyons 1977:33, who characterize information as a hearer-based contribution to sentence production and understanding. In fact, this notion of information has several precedents in the literature. The notions *progression* and *marche parallèle* in Weil 1844 and Gabelentz's (1868) psychological articulation of the sentence seem to be analogous to the articulation of information. The notion of communicative dynamism (Daneš 1968(1957), Firbas 1964, 1971) is also similar in that it suggests that different sentence elements 'contribute to the development of communication', 'push the communication forward' to different extents (Firbas 1964:270), i.e. some elements are more communicative than others. If 'contribution of knowledge', i.e. information, is substituted for 'contribution to the development of communication' in the above quote, communicativeness can be equated to information.[12]

Another notion that seems analogous to the view of information in this study is Erteschik-Shir's (1973, 1979, 1986) dominance. Dominance, which is reviewed below in § 3.1.5, is a property that a constituent has if the speaker intends to direct the attention of his/her hearer to the intension of that constituent (cf. Erteschik-Shir & Lappin 1983:420). There is no further specification of what 'directing the attention of the hearer to something' is, but, in a sense, one may say that the constituent that encodes the information in the sentence is 'dominant' in that it is singled out by the packaging instruction. The hearer's attention, in some way, is directed to that constituent as the carrier of the information of the sentence. Finally, there is Sasse's (1987) 'expectation', which he uses to redefine the thetic/categorical distinction of Brentano and Marty (cf. § 3.2.3). What has been called information here is identified by Sasse as unexpected or contrary to expectation. The connection

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[11]Of course, here and in the above discussions, what matters is the speaker's *assumptions* about the hearer's knowledge and attentional state, not the hearer's actual knowledge and attentional state.

[12]In fact, as will be seen below, Firbas' rheme is equivalent to the focus of information in our proposal. Communicative dynamism, however, is a continuum, but information and its complement in the sentence are discrete notions.

between the notions of information and unexpectedness is clear.[13]

Sentences, then, are packaged in different ways according to the different information carried by the sentence. But, as pointed out, they must also guarantee that that information is retrievable. In other words, the informational articulation of the sentence indicates not only the information but also how this information must be entered into the hearer's knowledge-store. In fact, as will be discussed in Ch. 4, the role played by information and its packaging in language understanding concerns the entry of data into the hearer's knowledge-store. Therefore, a sentence must specify how and where in the hearer's knowledge-store the information of the sentence is entered. A compact definition of information packaging may be stated as in (11):

(11)   INFORMATION PACKAGING: A small set of instructions with
            which the hearer is instructed by the speaker to retrieve
            the information carried by the sentence and enter it into
            her/his knowledge-store.

Chapters 3 and 4 contain a discussion of the informational primitives proposed in the literature, a proposal for a revised set of primitives, and the development of an account of information packaging following the definition in (11). In order to develop this account a number of notational decisions had to be made. It is clear that other alternatives may be possible or even superior to describe the facts under discussion with accuracy. Unlike in other research (i.e. standard syntactic or semantic theory), in this study there will not be a strong defense of some of the notational choices made. The study of the representation of information packaging is at too early a stage to be able to perceive the advantages or disadvantages of different notational variants with detail. Before going into this, however, other types of pragmatic understanding will be reviewed.

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[13]Apparently, the first time the term 'information' was used to refer to issues we are dealing with is in Halliday's (1967) 'information structure'. It must also be noted that information is used in the philosophical and linguistic literature with different meanings. For instance, information in Situation Semantics is used in a general and nonlinguistic sense. The information conveyed by a (linguistic or nonlinguistic) event is what we learn about a situation from that event. Information is prior to language and the purpose of language is to convey information (Barwise & Perry 1983:29ff.). Our use of information, although originating in the same tradition, has a smaller coverage, since it was defined as that part of the knowledge represented in a given proposition that is unknown to the hearer. Information in Situation Semantics is also the knowledge we gain by means of a sentence, but it is not restricted to the proposition encoded in that sentence (e.g. the sentence *The boss is short*, in a context where the hearer believes short men do not like broccoli, conveys the information, in the Situation Semantics sense, that the boss does not like broccoli).

2.3 Discourse Pragmatics

The definition of pragmatics as the study of the aspects of linguistic structure affected by context presupposes a previously agreed-upon definition of 'context'. By 'context', in theory, one refers to extralinguistic elements—like the users of language and the time and place of utterance—that are relevant for language production and understanding. Interestingly, though, due to the prevalent methodological practice of focusing on the study of sentential grammar, the term 'context' is also used to refer to anything beyond the sentential level. Thus, discourse, understood as a cohesive sequence of sentences, while in principle as purely linguistic as a sentential syntactic object, is referred to as 'linguistic context' or 'discourse context'. Notice, however, that the extralinguistic context may affect both sentential structure and discourse structure.

First, we will consider pragmatic phenomena that concern the linguistic or discourse context and, second, we will look at 'sentential pragmatics', i.e. nonlinguistic contextual phenomena that affect the structure of the sentence regardless of linguistic context.

2.3.1 Discourse Structure

As Chomsky 1980 points out, 'linguistic knowledge, of course, extends beyond the level of the sentence. We know how to construct discourses of various sorts, and there are no doubt principles governing discourse structure' (1980:225). Precisely, through the study of discourse structure—a.k.a. discourse syntax, discourse grammar—linguists try to ascertain what are the principles that underlie the well-formedness of discourses or texts and which is the appropriate way to organize discourses into constituent units.[14]

Among the important contributions in this area are Grosz & Sidner 1986, Polanyi 1986, 1988, and Webber 1988. These works independently propose similar ways in which discourses can be segmented into hierachical constituent structures. The result is a tree-like representation where constituency reflects the chunking of the discourse into sequences of related units. What gives these chunks their unity is their

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[14]Discourse structure is not related in any direct way to information packaging. Its inclusion here is meant to provide a complete picture of discourse pragmatics.

sharing a common purpose with respect to the speaker's plans (Grosz & Sidner 1986) or their representing a single state of affairs (Polanyi 1988).[15]

A theory of discourse segmentation is necessary to account for textual coherence and the non-permutability of sentences in a given discourse and the intuition that sentences group together in suprasentential units. It has also been shown that some discourse particles or cue phrases—*well, anyway, ok*—are used to signal the beginning and end of discourse segments (Hockey 1989, Polanyi & Martin 1989). Webber 1988 provides a formal treatment of 'discourse deixis', i.e. reference to a discourse segment, as illustrated by the *that* in (12),

(12)   It's always been presumed that when the glaciers receded, the area got very hot. The Folsum men couldn't adapt, and they died out. *That*'s what is supposed to have happened. It's the textbook dogma. But it's wrong. They were human and smart. They adapted their weapons and culture, and they survived. (Webber 1988:ex. 1)

that depends on discourse segments having their own mental reality. Moreover, discourse segmentation seems necessary to account for reference phenomena, as argued, for instance, by Grosz & Sidner (1986), whose theory of the structure of discourse includes also a discourse-model-like component of 'focus of attention' where notions like reference are dealt with. Apparently, the position of an element in the hierarchical discourse structure determines the choice of referring expression in the consequent mention of that element. Reference phenomena are dealt with in the following section.

2.3.2 Reference Issues

It is clear that, as Prince 1988c puts it, 'if a speaker evokes an entity in a discourse, s/he first hypothesizes the information-status of that entity in the hearer's mind, with respect to both familiarity and saliency' (1988c:1).[16] In other words, not all entities that enter a discourse may be encoded alike in the linguistic structure, since there are crucial differences in the referential status of these entities. Entities may be known to hearers but not salient at the time of utterance, they may be salient at the

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[15]Polanyi (1988) calls her theory of discourse structure a 'discourse model'. Obviously, her use is different from the use of 'discourse model' in, for instance, Prince 1981b or Webber 1982 as a hearer's mental model of the ongoing discourse containing entities, attributes, etc.

[16]As noted above, in Prince 1988c 'information-status' means what referential status means here.

time of utterance, they may be completely new to the hearer, they may be inferrable from what the hearer knows, etc. These differences in referential status determine the linguistic shape of the referring expressions that refer to these entities: speakers may use definite NPs, indefinite NPs, pronouns, zero anaphora in some languages, and so forth, depending on the status of the entities they encode.

Prince (1981b, 1988b) offers a taxonomy of referential status and its impact on the choice of referring expression. Prince 1988b, recasting her own 'assumed familiarity hierarchy' (Prince 1981b), introduces the following distinctions in the referential status of discourse entities. On the one hand, entities may be discourse-old or discourse-new: they may or may not be linguistically or contextually evoked, i.e. already introduced in the current discourse. On the other hand, they may be hearer-old or hearer-new, where hearer-old means already present in the hearer's knowledge-store via the current discourse or via previous knowledge. This distinction yields three possible referential statuses: discourse-new/hearer-new (new to the discourse and new to the hearer's knowledge-store), discourse-new/hearer-old (new to the discourse but known via previous knowledge to the hearer), and discourse-old/hearer-old (evoked in the discourse and therefore in the hearer's knowledge-store).[17] This categorization captures in a simple manner the many definitions of givenness and newness that have haunted the linguistic literature for decades (Chafe-givenness, Clark-givenness, recoverability, conceptual definiteness, and so on, as proposed or discussed in Halliday 1967, Kuno 1972, Haviland & Clark 1974, Chafe 1976, Clark & Haviland 1977, among others). Prince's (1988b) categorization will be used here to refer to the referential status of discourse entities when necessary.

An intimately related—actually overlapping—issue is the continuation of reference to a given entity once that entity has already entered the previous linguistic context. That is, given a discourse model with several discourse entities, how do we encode each one of them? How do we keep track of which referential expression refers to which discourse entity? This was, as noted, one of the concerns of Grosz & Sidner (1986) and the main concern of Centering theory (cf. Grosz, Joshi

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[17]The cell discourse-old/hearer-new is obviously empty. In Prince 1981b discourse-new/hearer-new was called brand-new, discourse-new/hearer-old was called unused, and discourse-old/hearer-old was called evoked. 'Inferrable' entities represent another referential status, but will not be referred to here.

& Weinstein 1987 and related research). These theories provide an account of the different degrees of saliency of discourse entities in the discourse model across the text, i.e. how entities maintain or change their degree of saliency and how that affects their encoding in the linguistic structure. Another approach to this very same issue, stemming from a very different linguistic tradition, is found in the work of Givón (1983) and associates. Where Centering talks about degree of saliency, Givón talks about topicality or topic continuity, but both approaches are strikingly similar and share similar goals.[18]

Referential status is an absolute property of discourse entities, which is reflected in English and many other languages through the formal marking of NPs. It concerns the status of a given entity with respect to its presence or absence in the previous discourse or the hearer's discourse model or knowledge-store, depending on the approach. Several authors have made a point of noting that referential status must be teased apart from information packaging (cf. Reinhart 1982, Prince 1988c, Välimaa-Blum 1988, Horn 1989, etc.). Other authors, however, define information packaging in terms of referential status (e.g. modern Prague School, Rochemont 1986). This approach is problematic. Let us consider the discourse in (13):

(13)   a. The boss hates broccoli.
        b. But vegetables are important in a balanced diet,
        c. so he'll have to eat some anyway.

The discourse entity 'the boss' is introduced into the discourse in (a), so at the time (c) is uttered its referential status is discourse-old, i.e. given, and, furthermore, since it was *just* introduced, we may assume it is salient. That is why, most approaches would say, 'the boss' is encoded in a pronominal form in (c) (*he*). Now, the referential status of 'the boss' at the time (c) is uttered is absolute: it is independent of the sentential context in which the referential expression *he* appears. Moreover, even if no mention of 'the boss' was made in (c), this discourse entity would still be salient and discourse-old at the time (c) is uttered.

Similar observations apply to discourse-new and hearer-new entities. In sentence (14)b,

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[18]Givón (1986) is addressed again in Chapter 3 (§ 3.1.2) to dispel any potential confusion between his use of the term topic and the use of the term topic in the topic-comment framework.

(14)   a. I was lost in the Colombian jungle.
        b. Suddenly, I stumbled onto a broccoli plantation.

The referent of the NP *a broccoli plantation* is neither previously mentioned nor hearer-old, i.e. it is not yet in the discourse model or in the hearer's knowledge-store. The indefiniteness of the NP marks it as encoding a hearer-new entity. Again, the referential status of the entity 'broccoli plantation' in the expression *a broccoli plantation* in (14) as hearer-new would be the same regardless of the actual sentence in which it occurs.

Information packaging, in contrast, is an intrinsically relational notion. A focus, for instance, is a focus only by virtue of its standing in a given relation to the other elements of the sentence in a packaging instruction. Let us consider (15) and (16):[19]

(15)   a. Q: What is he going to have?
        b. A: He'll have [F a broccoli QUICHE] tonight.

(16)   a. Q: Are you and John coming out to dinner?
        b. A: Oh, no. He's cooking broccoli,
        c.   so I'll [F stay home with HIM] tonight.

The constituents *a broccoli quiche* and *stay home with him* are foci, they are the informative part of the sentence. In (15)b, the speaker assumes the hearer knows and is attending to something like 'he is (or isn't) going to have something tonight'. With (15)b, the speaker singles *a broccoli quiche* out as the conveyer of information, while the remainder of the structure indicates to the hearer how to enter this information into her/his knowledge-store efficiently. Similarly, in (16)c, the speaker assumes the hearer knows and is attending to something like 'she'll be doing something tonight'. Therefore, the speaker singles out *stay home with him* as the conveyor of information within this particular sentence, i.e. the speaker assumes in this particular utterance that, out of the propositional content of the sentence, only the predicate (minus the adverbial) makes a contribution to the hearer's knowledge-store.

In principle, referential status has nothing to do with this. Referential status is a reflection of the status of a given discourse entity with respect to the discourse model or the hearer's knowledge-store. Whether a discourse entity is old or new

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[19] In the following examples '[F]' signals the focus of the sentence, while small caps still indicate the prominent element within it. Brackets will be used below in cases where the focus is larger than the element receiving prominence.

is independent of its ability to be informative within a given propositional context, i.e., to increase the knowledge of the hearer as a result of its standing in a particular sentence. In (15)b the focus *a broccoli quiche* encodes a discourse-new entity, but in (16)c the pronoun *him*, part of the focus, encodes the discourse-old entity 'John'. If information packaging is divorced from referential status, the ability of foci to be either given or new is not surprising. Further evidence is provided by examples like (17), where the focus is just a pronominal form:

(17)   [At a grocery's cash register]
        a. S_1:It's $1.20...ok...Here's your change and here's your broccoli.
        b. S_2:Thank you.
        c. S_1:Thank YOU.

Such cases, so-called 'contrastive focus' (e.g. Rochemont 1986), are fairly common. There is no sense in which *you* in (17)c can be considered hearer- or discourse-new, but *you* is the focus nevertheless.[20] The speaker assumes thanking (or not thanking) somebody is already being attended to by the hearer. The information conveyed by (17)c is exclusively located on *you*, which is thus properly singled out.

Consider also cases where the informative part of the utterance is not a referential expression but a predicate:

(18)   The boss HATES broccoli.

In what sense can one say that *hates* is hearer-new? If focus is defined in terms of newness one is forced to state counterintuitively that *hates* in (18) is hearer-new (cf. Ward 1985, where this is also pointed out). And compare minimal pairs like (19), where the adverb tonight has a different information-packaging force in (a) and in (b), although its referential status is presumably the same:

(19)   a. Guess what! John's coming TONIGHT.
        b. Guess what! John's COOKING tonight.

In (a) the speaker presumably assumes that John's coming sooner or later is in the hearer's knowledge-store and that *tonight* is informative with respect to this

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[20]It may be said, as in Prince 1981a, 1986 (see § 3.1.4), that the referent of *you* is not new in absolute terms, but rather that what is new is the fact that *you* is what appears in the position of *x* in the context 'thank *x*' in (c). This is correct and 'newness' here is equivalent to 'information' in our analysis. 'Newness' in this sense is definitely void of its meaning as a referential-status label.

knowledge. In (b), on the other hand, John's engaging in some activity tonight is presumably assumed to be uninformative, but *cooking* is assumed to be a contribution to the hearer's knowledge-store with respect to this knowledge about John and tonight. This, of course, is independent of whether the speaker assumes the entity 'tonight' is in the hearer's knowledge-store or not (most likely s/he does). Clearly, a referential view of information packaging is at a loss in both (18) and (19) and the need for a relational notion becomes evident.

As noted above, von Stechow 1981 and Reinhart 1982 share the view that information packaging cannot be defined in terms of referential status.[21] Reinhart provides the following example:

(20)   a. Who did Felix praise?
         b. Felix praised HIMSELF. (Reinhart 1982:ex. 37)

The referential expressions *Felix* and *himself* refer to one and the same entity 'Felix'. Nevertheless, *Felix* is, following Reinhart, the topic of (20)b, while *himself* is the focus. It would seem, then, that the entity 'Felix' is marked as being new just after it has been introduced, but, as von Stechow points out, 'the information of a constituent like *himself* qua focus is not a referent' (1981:97). Identifying the information-packaging force of a constituent cannot be done on the basis of the referential status of the entity it represents.

Another well-known information-packaging notion is the topic. Reinhart argues at length that topichood cannot be viewed as a property of referents either (1982:§5). She says that, since elements other than the topic may encode discourse-old referents, it is insufficient to state that oldness is what identifies topics. Furthermore, she derives the fact that topics 'strongly tend' to be discourse-old from independent reasons having to do with discourse cohesion. Notice, though, that topics need not be discourse-old in the strict sense of the word, as (21)b shows:

(21)   a. I can't find broccoli anywhere.
         b. Crack they sell at every corner,
            but broccoli it's like they don't grow it anymore.

The topicalized NP *crack* in (21)b, while a topic, is not discourse-old in the sense of being already evoked in the previous discourse. It is true that the entity 'crack'

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[21]Von Stechow 1981 actually draws from a prepublication draft of Reinhart 1982.

acquires some discourse-oldness by virtue of its standing in some relation to the discourse-old entity 'broccoli', but the 'discourse-oldness' of 'crack' is quite peculiar and clearly deviant from the traditional meaning of givenness.[22]

Whether topichood is a property of constituents or referents or both is actually not very clear. What seems unjustified, following Reinhart, is to assume that the discourse task of topics is to mark or signal the referents they encode as hearer-old. The data, as viewed by Reinhart 1982, Välimaa-Blum 1988, Horn 1989, and others, suggest that the hearer-oldness of a discourse entity encoded by a given linguistic expression may be a necessary condition for that expression to become a topic, but it is clearly not a sufficient condition. If topics are hearer-old it is because discourse-oldness is a pre-condition for topichood, not because topichood is a marker of discourse-oldness in the strict sense.

Referential status and information packaging are distinct, i.e., the givenness/newness distinction and information-packaging notions like focus and topic are orthogonal to each other. However, given the nature of both phenomena and their intimate relationship within the linguistic apparatus, there are clear correlations between the two. Once the account of information packaging in Chapter 4 is introduced, the distinction between referential status and information packaging will be discussed further.

2.3.3   The Discourse Model

Pioneering work in this area was done by Karttunen (1971), where the idea of 'discourse referent'—later renamed discourse entity—was introduced as a mental construct. This notion, as a mediation between referring expression and real-world referents, is extremely useful in accounting for some long-observed problems in all theories of reference encoding and resolution.

But the notion of discourse entity is generally not considered to be an isolated mental construct. Many approaches to reference place the discourse entity within a larger mental construct called the discourse model. A discourse model is a par-

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[22]Ward 1985, and Ward & Prince 1986 identify the peculiar relation between 'crack' and 'broccoli' as a partially ordered set (poset) relation. Identity—when the referent of a topic expression is identical to a previously evoked entity, i.e. traditional givenness—is just one of many poset relations. This approach will be discussed below in § 4.3.2.

ticipant's evolving model of the discourse and contains a mental representation not only of the entities involved in the current discourse but also of their attributes and the links between them. Webber 1982, for instance, thinks of discourse entities as mental hooks on which attributes are hung. Discourse models have been used extensively to provide a formalization for the distinction between salient entities, nonsalient entities, and discourse-new/hearer-old entities.

Another view of discourse models is found in the work of Kamp 1981 and Heim 1983. Their theories are a hybrid between a dynamic truth-conditional semantics and a true theory of the discourse model. Kamp's discourse representation structures (DRSs) and Heim's file-change semantics provide both a discourse-model account of definiteness and a suprasentential method of truth-value computation. Despite this hybrid character, Heim's files and file cards seem to be analogous to Webber's (1982) discourse model and its hooklike entities. Each file card represents a discourse entity, and attributes and links with other entities are written on the card in the same way attributes are hung from Webber's hooks. Indefinites cause hearers to open a new file card (add a new hook) and definites to retrieve a different but already existing file card (or hook). Heim's file card metaphor will be used in Chapter 4 to describe the hearer's knowledge-store. Kamp's DRSs, however, cannot be equated with Webber's hooks in any straightforward way but seem to be constructs that reflect some or all of the functions assigned to a discourse model as viewed above, have some of the characteristics of discourse segmentation and structure, and contain an alternative notation to represent logico-semantic operators of the traditional type.

2.4   Sentential Pragmatics

The pragmatic issues discussed in this section are of a different type in that the linguistic unit they concern is not the discourse but the sentence. These phenomena—actual-world felicity, empathy, illocution, and implicature—are pragmatic in that they all involve the context of utterance in a crucial way,[23] but the linguistic effects

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[23]It is actually unclear whether all types of implicature involve the context of utterance. Conventional implicature and generalized conversational implicature, in particular, can be accounted for independently of the language users and the time and place of utterance, but since their contribution to meaning is non-truth-conditional, they are traditionally considered part of pragmatics (cf. Horn 1989:Ch. 2, Levinson 1983:Ch. 3).

they have are primarily felt at the sentential level, both in sentence structure and sentence in interpretation.

Some of these are more relevant to the topic of this dissertation than others. The relevance of each of the issues will be noted in each section.

2.4.1 Actual-world Felicity

It has been traditionally considered one of the central tasks of pragmatic inquiry to determine the set of contexts in which a given sentence may be uttered appropriately or felicitously (cf. Austin 1962, Lyons 1977). The felicity or infelicity of a given sentence is the result of several different factors. For instance, it may be infelicitous due to wrong referential encoding, the presence of contradictory empathy relationships, the encoding of implicata that cannot coexist with certain truth-conditional readings, or the use of unwarranted packaging instructions. To obtain acceptable utterances, therefore, the satisfaction of these linguistically-motivated felicity conditions is as important as the satisfaction of purely syntactic grammaticality requirements.

Nevertheless, there exists another kind of felicity condition which is clearly not linguistically based. Sometimes, sentences that are syntactically, semantically, and linguistico-pragmatically perfect still sound unacceptable when used in most contexts. The reason is that the contextual nonlinguistic conditions that we would need to make the sentence felicitous are never or rarely present in the world as we know it, which makes the sentence practically unusable or, equivalently, pragmatically unlikely. This kind of felicity may be called 'actual-world felicity'.

Actual-world felicity, in fact, has no bearing whatsoever on the structural properties of language. However, it deserves mention here because in Chapter 7 this notion will be used in providing an account of the rarity of a certain type of sentences (sentences containing an exhaustiveness operator in non-association with focus) which our analysis predicts are syntactically and informationally well-formed.

Interestingly, one can find in the recent linguistic literature accounts along these lines of several syntactic and semantico-pragmatic phenomena. For instance, Kroch 1989 argues that the putatively ungrammatical long wh-extraction from 'non-referential' adjuncts (cf. Cinque 1989, Rizzi 1989), as in (22),

(22)   (*)How much money was John wondering whether to pay?

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is not ungrammatical at all. The reason for their awkwardness is that the existential claim presupposed by this sentence—that there existed a sum of money about which John was wondering whether to pay it—is possible but very odd, which renders the question in (22) unusable under most actual-world circumstances.

Similarly, Searle 1989 offers a radical revision of the traditional analysis of performative verbs, in which the infelicity of (23)

(23)   # I hereby fry an egg.

is not due to any inherent linguistic property of the verb *fry*, but to the fact that in the world as we know it, we cannot fry an egg by just saying that we fry an egg, even though an English-speaking almighty creature of sorts could clearly fry an egg by uttering (23).

2.4.2   Empathy

Empathy as a pragmatic component or perspective is basically defined and studied in Kuno & Kaburaki 1977 and Kuno 1987. Chafe 1976 also refers to this phenomenon using the term 'point of view', and his are the examples in (24), which illustrate the kind of data empathy sets out to account for:

(24)   a. John hit his wife.
         b. Mary's husband hit her. (Chafe 1976:54)

While (24)a describes the facts from John's side, (24)b describes the facts from Mary's side. The speaker empathizes either with John (in (24)a) or with Mary (in (24)b). Kuno defines empathy as 'the speaker's identification, which may vary in degree, with a person/thing that participates in the event or state that he describes in a sentence' (1987:206), and along this definition he sets a number of constraints to account for the infelicity of certain sentences like (25),

(25)   # Mary's husband hit his wife.

which violate his ban on conflicting empathy foci within one sentence.

Kuno draws a convincing analogy between empathy and movie-making. The speaker is like a film director who can choose the location of the camera: given a scene involving A and B, the director can choose a neutral angle, can place the

camera closer to A (empathizing with A), or place it closer to B (empathizing with B). This notion of empathy seems relevant even for the use of some contrasting lexical items which reflect empathy relations, such as *come/go* and *bring/take*. Finally, choice of deictic elements (*here/there* or *this/that*) could also be thought of as reflecting speakers empathy or, metaphorically, the positioning of a camera over the event they report.

There is a definite intuitive appeal behind the notion of empathy and a lot of lexical, morphological, and syntactic properties can be derived from it. Nevertheless, empathy falls outside the scope of this study. The reason for its inclusion in this chapter is that Chafe, as noted in § 2.2, includes empathy under the label 'information packaging'. Information packaging as defined in this study excludes empathy. Empathy, being the expression of speaker identification with a discourse participant, is unrelated to information packaging as defined above.

2.4.3   Illocution

Beyond the mere locutionary act carried out in uttering a sentence with a given meaning, there is always an illocutionary act. The illocutionary force conventionally associated with a sentence utterance, i.e. what we do by means of a locutionary act, clearly affects sentence structure. Different illocutionary forces—announcements, assertions, questions, commands, denials, requests, exclamations, etc. (cf. Levinson 1983: Ch. 5)—have different structural effects on the syntax, the phonology, or both, and must, therefore, be coherently represented at some level.

Pioneering work on illocution was done from within the philosophical tradition by Austin (1962) and Searle (1969). A recent proposal by Jacobs (1984, 1986) includes the addition of an interpretive level for illocutionary meaning to our model of linguistic competence. In principle, illocution has very little in common with the topic of this study, but it is precisely Jacobs' work which motivates the inclusion of illocution here. Jacobs (1984, 1986) suggests that certain information-packaging notions are represented at the level of illocution.

Illocution, however, has to do with what kind of speech act is performed when a sentence is uttered. We may perform an act of commanding, requesting, denying a previous statement, and so on. Information packaging has to do with the information

carried by a given sentence at a given time-point. In principle, these two aspects of sentential 'meaning' appear to be mutually independent. Some confusion may arise, however, from the ambiguity of the term 'assertion' as used both with an illocution-relevant sense and as an informationally-relevant notion. To 'assert' as a speech act is based on Russell's (1905) use of the term with the sense of committing oneself to the truth of the statement one is uttering. Thus, when speakers Russell-assert sentence (26),

(26)   The boss ate broccoli on Monday.

they commit themselves to the truth of the boss' having eaten broccoli on Monday.

Jacobs (1984, 1986) proposes that informational notions like topic and focus be represented at the level of illocutionary meaning. He views the focus of a sentence as the 'focus of the assertion'. Whatever this means, it is obvious that Jacobs is not using the term 'assertion' in the Russellian sense of the word. When uttering a sentence like (27), where BROCCOLI is the focus,

(27)   The boss ate BROCCOLI on Monday.

speakers carry out the same Russell-assertion they carried out in uttering (26). When Jacobs states that (26) and (27) assert different things he is using 'assert' more in the sense of Stalnaker 1979. As will be seen below in § 3.1.4, for Stalnaker 'assertion' is a reduction of the context set, i.e. a contribution of information. Including Jacobs' notion of assertion into the list of speech acts, however, would significantly stretch the definition of speech act, since it does not seem natural to view information packaging as belonging to the same class of acts as requests, commands, announcements, etc.[24]

2.4.4   Implicature

Ever since the seminal work of Grice (1975) implicature has enjoyed a central status within the field of pragmatics. In order to preserve the truth-conditional approach

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[24]Jacobs' line of argument is very interesting. He starts with cases in which focus is apparently associated with a scalar particle like *only* or *even* and licenses these foci, his 'bound foci', by virtue of their being bound to the scalar particle (see Ch. 7, where it is argued that this kind of association is only an epiphenomenon). He then needs to find a binder to license his 'free foci'—normal foci that do not occur with a scalar particle—and he resorts to an abstract illocutionary 'assertion' operator to perform the task.

to meaning that logical semantics had adopted, Grice suggests that the differences that exist between most logical operators in first-order logic and their natural language counterparts are to be accounted for by additional pragmatic mechanisms that operate above logical semantics. The gap between logic and natural language operators is bridged by a single principle, the Cooperative Principle, that comprises four maxims of conversation: the maxims of quality, quantity, relevance, and manner. See Levinson 1983, Green 1989, and Horn 1989 for surveys of the Gricean maxims and their coverage, and Horn 1984 and Sperber & Wilson 1986 for important modifications of Grice's original proposals.

Observance and deliberate flouting of Grice's maxims is what generates all the interpretive inferences above logico-semantic meaning that we call (conversational) implicatures.[25] Among the best studied cases (cf. Gazdar 1979, Atlas & Levinson 1981, Horn 1981, 1984, Hirschberg 1985, etc.) we find scalar implicature (if speakers assert that a given point in a given scale obtains, they also implicate that a higher point does not obtain), clausal implicature (given the assertion of a weak claim, we obtain the implicature that a stronger claim cannot be asserted at this point), and exhaustiveness (if speakers assert, in certain contexts, that 'something' about a given entity is the case, they also implicate that the same 'something' is not the case about another entity in the same salient set).

Implicature is responsible for many linguistic contrasts at the lexical, morphological, and syntactic level (cf. Horn 1981, Rubinoff 1987), from the presence of discourse particles like *in fact* to the morphology of reflexives in some languages and, partly, for the existence of constructions like it-clefts, under some analyses (cf. Atlas & Levinson 1981). But our interest in implicature here stems from a crucial difference that exists between it and another area of pragmatic interpretation, information packaging. It has been argued (Atlas & Levinson 1981, Levinson 1983) that implicatures cannot be obtained directly from uninterpreted surface syntactic struc-

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[25]Conventional implicatures, in Grice's original formulation, are not obtained with the use of the maxims but are attached by convention to particular lexical items. So, for example, the 'contrast' implicature in (i)

(i) He's poor but honest.

is conventionally attached to the lexical item *but*. With some additional assumptions, however, conventional implicatures can be made to follow from the maxims in the same way conversational implicatures do.

tures but have to be derived from logico-semantic structures. If this is correct, the interpretive component in which implicatures are computed and interpreted must be linked, in the model of linguistic competence, not to the syntax but to the truth-conditional, logico-semantic component. In fact, Atlas & Levinson 1981 suggest that implicatures be consistently incorporated into the logical form of sentences.

As noted above, our working assumption is that logico-semantic meaning is relevant for information packaging only indirectly. Of course, there would be no information without the existence of propositional content. However, it is not necessary that information packaging bleed logico-semantic meaning, since surface syntactic structure may feed both information packaging and logical semantics in parallel. In other words, the sentence is structured to encode both propositional content and information simultaneously. If this approach is correct, there exists an important difference between implicature and information packaging: while the pragmatic understanding obtained from implicatures lies *beyond* logico-semantic meaning, the pragmatic understanding obtained from information packaging is interpreted *along with*, not after, logico-semantic meaning.

2.5 Summary

Pragmatics is a field of inquiry with a very wide scope. Under the label 'pragmatic competence' linguists subsume phenomena that in fact belong to different modules of our linguistic apparatus. When the phenomena surveyed here are incorporated into our linguistic competence with precision, it is obvious that they cannot possibly all fit within one 'pragmatic component'.

The focus of this study, information packaging, is just one of the linguistic modules currently studied under pragmatics. In consequence, the account of information packaging presented here should not be expected to account for every pragmatic aspect of language understanding. As defined, information packaging has a very specific role in language understanding and production, and only matters relevant to this role should be taken into account when building up a theory. Of course, which matters are actually relevant is ultimately an empirical question.

Several other interpretive components of language will, of course, be in close relation to informatics, and all sorts of indirect interactions and statistical correlations

should be expected. In particular, one should expect interaction between informatics and the referential status of discourse entities and logical semantics. The existing literature on these issues confirms these expectations.

Chapter 3

Informational Articulations: An assessment

In § 3.1 the several informational articulations put forward in the literature are critically reviewed. The discussion in § 3.2 contains a global evalution of their insights and shortcomings and, based on this evaluation, a trinomial hierarchical articulation is proposed. Finally, the differences and similarities between the hierarchical trinomial articulation and previous approaches are discussed.[26]

3.1 Previous Approaches

A number of proposals for the informational articulation of the sentence—sometimes incompatible—are found in the literature. The differences among them are significant but they can be grouped, as will be done below, in two larger approaches. What all the approaches have in common is the recognition that in the sentence there is some sort of informational split between a more informative part and a less informative part. Where that split is and what kind of split it is—a continuum or a dichotomy—is a matter of disagreement, but the split is nevertheless present. In our terms, it could be said that information is concentrated on a subpart of the sentence, while the remainder is licensed only as an anchoring vehicular frame for that informative part to guarantee an optimal entry into the hearer's knowledge-store.

In the next sections, the following approaches will be reviewed, pointing out their differences, their similarities, their insights, and their shortcomings:

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[26]Some of the issues discussed in this chapter were the topic of a paper presented at the 1990 International Pragmatics Conference in Barcelona, July 9-13.

- theme-rheme (Ammann 1928, Daneš 1968(1957), Firbas 1964, 1971, 1975, Halliday 1967, Contreras 1976).

- topic-comment (Mathesius 1915, Hockett 1958, Strawson 1964, Gundel 1974, 1988, Dahl 1974, Li & Thompson 1976, Kuno 1980, Reinhart 1982, Davison 1984).

- topic-focus (Sgall & Hajičová 1977-78 and many others by them and their associates (cf. Hajičová 1984 for a relation), von Stechow 1981).

- focus-presupposition or focus/open-proposition (Akmajian 1970(1979), Chomsky 1971, Jackendoff 1972, Dahl 1974, Rochemont 1978, 1986, Wilson & Sperber 1979, Williams 1981, Prince 1981a, 1984, 1986, Selkirk 1984, Ward 1985, Lambrecht 1987, 1988, Välimaa-Blum 1988).

- dominance (Erteschik-Shir 1973, 1979, 1986, Erteschik-Shir & Lappin 1979, 1983).

The shortcomings these proposals contain can be classified into two types: definitional problems and incomplete empirical coverage. Both types are discussed for each one of the approaches.

3.1.1 Theme-Rheme

The terms *thema* and *rhema*, according to Hajičová 1984:190, were introduced by Ammann 1928. In the theme-rheme perspective, the rheme is the informative part of the utterance, and the theme is the anchoring or vehicular part. While the authors that work in this framework, listed above, agree in this respect, they also use the term 'theme' is different ways. There are, at least, two 'themes', that will be called Firbas-theme and Halliday-theme. Firbas 1964, 1971 and Daneš 1968(1957) operate with the notion of 'communicative dynamism' (cf. § 2.2 above) defined as a continuum into which all sentence elements fall. Firbas asserts that 'the theme is constituted by the sentence element (or elements) carrying the lowest degree(s) of communicative dynamism within the sentence' (1964:272). It is, therefore, the least informative part of the sentence. The rheme pushes the communication forward the most and may be viewed as the informative part of the sentence. Contreras' (1976)

theme-rheme articulation is taken directly from Firbas', although he does away with the continuum in favor of a discrete dichotomy.

For Halliday, the theme 'is what is being talked about, the point of departure for the clause as a message', and it is 'what comes first in the clause' (1967:212). Halliday illustrates this with the three sentences in (28) (1967:212),

(28)   a. John saw the play yesterday.
        b. Yesterday John saw the play.
        c. The play John saw yesterday.

where, in his view, the themes are, respectively, *John, yesterday,* and *the play.* In Halliday's system, the rheme is defined merely as the complement of the theme. Firbas-theme and Halliday-theme may coincide in a given sentence, but they need not. Firbas, for example, is careful to remark that it is wrong to consistently associate the theme with the beginning of the sentence (1964:274), which enters in clear conflict with Halliday's assumptions.[27]

Even without understanding the full implications and technicalities of Firbas's and Halliday's theories, one can appreciate the difference between their two interpretations of the notion theme. Interestingly, a Firbas-theme is more or less analogous to the topic in the topic-focus framework, while a Halliday-theme is almost equivalent to the topic in the topic-comment framework. Given these equivalences, then, we will subsume the discussion of theme-rheme under the discussion of each of these, pointing out the relevant differences between either theme and either topic as needed.

3.1.2   Topic-Comment

Along with the focus-presupposition approach, it is one of the most widely found in modern American linguistics. They are mutually (partially) incompatible. Unfortunately, the term 'topic' has been used in the literature with a multiplicity of denotations. This has led to important misunderstandings. Before moving on, in order to try to avoid confusion, some uses of the term 'topic' that will not be dealt with here should be mentioned.

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[27]Halliday's (1967) system is extremely complex. He also invokes the notions 'given' and 'new', and develops a theory of information units that interact with the syntactic structure of the sentence in intrincate ways.

First, there is the notion of discourse topic (Keenan-Ochs & Schieffelin 1976, Bayer 1980): a given text is understood as being about a certain proposition or a certain discourse entity, which is the topic of that text. This is a suprasentential notion, with no relevance for sentential structure, even though the topic of a discourse may be linguistically represented in one or more of the sentences in that discourse.[28]

Second, there is Givón's (1983) topicality. Topicality is a property that all participants in a discourse possess to a larger or a lesser degree. The degree of topicality—also called continuity—of a referent will determine the way it is encoded by referential expressions as well as, Givón claims, word order. In Chapter 2, Givón's topicality was included in § 2.3.2, since the theory of topic continuity actually deals with referential status of entities with respect to their presence in the previous discourse and not with information packaging of propositions as defined above.[29] The most topical referents need the 'weakest' encoding—zero-anaphora or pronominalization—and the least topical the strongest—indefinite NPs. Comparisons with Givón's topic will be drawn as needed through this discussion.

Let us now focus on the topic-comment articulation. Mathesius 1915, one of the precursors of the notion of 'aboutness', articulates the sentence into what the speaker wants to speak about, the topic, and what is to be said about this topic (cf. Hajičová 1984). About four decades later, Hockett 1958 affirms that 'the most general characteristic of predicative constructions is suggested by the terms "topic" and "comment" for their ICs [immediate constituents]: the speaker announces a topic and then says something about it' (1958:201), and illustrates it with the sentences in (29), where the vertical line (|) separates the topic from the comment:

(29) a. John | ran away.
      b. That new book by Thomas Guernsey | I haven't read yet.

It is precisely the shared notion of 'aboutness' which underlies these two views that is crucial in the make-up of the topic-comment approach. The topic is what the sentence is about; the comment what we say about it. Example (29)a is about

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[28]See Välimaa-Blum 1988 for discussion of the difference between sentential topic and discourse topic and an interpretation of the latter as a psychological Gestalt.

[29]Amidst the terminological maze around 'topic' and the inescapable confusion that comes with it, it is nice to observe that while Givón and associates talk about the 'topicality' of a constituent, the workers in the topic-comment framework talk about its 'topichood', reflecting the fact that they are talking about two different things.

John, i.e. *John* is the topic, and the comment is that he ran away.

This notion is extremely widespread and is used in many accounts of word order variation in the most diverse languages (cf. Gundel 1987 and Herring 1990 for a crosslinguistic survey). Pragmatic aboutness, as we know it now, is first outlined within the philosophical tradition in Strawson 1964 and first adopted into linguistic research in a systematic way by Gundel 1974.[30] Up to this point, however, the only definition available for aboutness was that of Mathesius and Hockett or variations on it.[31]

Reinhart 1982 notices that the notion of pragmatic aboutness needs explication. She adopts Strawson's (1964) insights, but she further combines them with the pragmatic analysis of assertions in Stalnaker (1978), incorporating his idea of 'context set' into her explication of aboutness. She suggests that the context set—Stalnaker's set of propositions accepted to be true at a given time by speaker and hearer in common—is organized and classified in some way by speakers and it is in this classification that topics play a role: 'sentence-topics, within this view, are one of the means available in the language to organize, or classify the information exchanged in linguistic communication—they are signals for how to construct the context set, or under which entries to classify the new proposition' (1982:24). For Reinhart, then, a topic represents an address or a file card—she explicitly uses this metaphor—under which the oncoming information, i.e. the comment, is stored or classified in the context set.[32]

In the sentences in (29), for instance, the propositions *John ran away* and *I haven't read that new book by Thomas Guernsey yet* would be classified in the context set under *John* and *that new book by Thomas Guernsey*, respectively. Notice that Reinhart's system, within which topics play a role, is, in a sense, reminiscent of

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[30] Independently, and stemming directly from Mathesius', Firbas', and Halliday's work, the notion of 'theme' or 'topic' is found in Kuno 1972 and Dik 1978, for instance.

[31] See, for example, the definition of topic in Gundel 1988:210, an elaboration on the notion of 'aboutness':

> 'An entity, E, is the topic of a sentence, S, iff in using S the speaker intends to increase the addressee's knowledge about, request information about, or otherwise get the addressee to act with respect to E.'

[32] Reinhart's adaptation of Stalnaker's context set substantially alters his original conception of the notion.

the approach to information packaging presented in this dissertation. Both analyses use the idea of information retrieval and entry and both make use of the vision of 'topic' as an address of sorts. The difference between the two analyses are several and important and will become apparent as our analysis is developed (cf. § 3.2). Despite these differences, however, Reinhart's contribution provides us with a more explicit definition of what topichood is.[33]

All the cases of topic seen so far have in common that the topic phrase is sentence-initial: it is either the subject or a preposed, 'topicalized' phrase. In fact, the sentence-initial position for preposed constituents is called the 'topic slot'. According to Gundel 1988, for instance, any constituent found in this slot must be interpreted as the topic of the sentence. It is not the case, however, that the topic of the sentence has to be encoded in sentence-initial position. Any (referential) phrase in a sentence is allowed to be the topic of that sentence, depending on the interpretation intended (cf. Reinhart 1982, Davison 1984, Gundel 1988).[34] In a sentence like (30),

(30)   Rosa is standing near Felix. (Reinhart 1982, ex. 24)

the topic could be, depending on the context, either *Rosa* or *Felix* (even though Reinhart points out that *Felix* is an 'unexpected' topic).

Now, the main problem with the topic-comment approach is precisely that of identifying what the sentence is about, i.e. identifying the topic. If we are forced to take the sentence-initial phrase as a topic, sentence-initialness can be used as an operational criterion to identify topics. If we take the position that the topic can be encoded in any position in the sentence, identification becomes problematic. The authors working in the topic-comment framework, especially Gundel (1974) and Reinhart (1982), have set a number of tests for topichood which are meant to provide an operational tool to identify the topic of a sentence: the 'as-for' test, the 'what-about' test, and the 'said-about' test. The first one determines that an NP is

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[33]There is one further difference between Reinhart's and Gundel's topics. For Reinhart topichood is a property of constituents (which encode a given discourse entity), but for Gundel it is a property of entities (which are encoded in a given constituent).

[34]Gundel 1988 actually states that 'a pragmatic topic is not always encoded as a syntactic topic [=in the sentence-initial topic slot]; in fact, a pragmatic topic does not have to have overt expression in the sentence at all' (1988:211). It seems odd to assume that the informational articulation of a given sentence may contain a topic if this topic is not represented in the structure of the sentence at all. It seems that Gundel's view of topic here has been modified to include aspects of the discourse topic and Givón's topic.

the topic of a sentence if it can be left-detached and preceded by *as for*. The second one establishes that an NP is the topic of a sentence if this sentence can answer the question *What about x?*, where x is the topic NP. The third one identifies the topic with the NP that can be inserted as x in the frame *She said about x that 'comment'*.

Unfortunately, these tests are problematic, as Gundel herself indirectly suggests (1974:110) and as Prince 1984, Ward 1985 and Vallduví 1988a argue with examples from English and Catalan. For example, many examples of 'topicalized' phrases, which are, following Gundel, necessarily topics, fail to pass the tests, rendering these tests too strong. In particular, 69% of the topicalizations in Ward's corpus fail the 'as-for' test and 53% fail the 'what-about' test (Ward 1985:23). The tests, furthermore, are too weak in that they identify as topics of the sentence more than one element. Let us take the sentence *Linguistics fascinated me*. In the discourse in (31) the topic of this sentence would be, following Reinhart's and Gundel's criteria, *linguistics*.

(31)   She told me I needed a change in my life, like getting a new
          job. It was to no avail. *Linguistics fascinated me*. Wall Street
          would have to wait.

But both *linguistics* and *me* seem to pass the aforementioned tests:

(32)   a. i.   I said about linguistics that it fascinated me.
           ii. (?) As for linguistics, it fascinated me.
           iii.   What about linguistics? It fascinated me.
        b. i.   I said about myself that linguistics fascinated me.
           ii.   As for myself, linguistics fascinated me.
           iii.   What about myself? Linguistics fascinated me.

The conclusion that the notion of topic used in the topic-comment framework, as it stands, is not operationalizable seems unavoidable.

As noted above in §3.1.1, Halliday 1967 also defines his Halliday-theme in terms of aboutness, so he should run into the same problems as the workers in the topic-comment framework. Halliday, however, is very strict in requiring that the Halliday-theme be sentence-initial. This is a positive move in two respects: first, with this requirement we regain the operationability lost in letting any constituent be the topic and, second, it is more consistent to use 'topic' to designate only those phrases that intuitively feel like they are directing the hearer to some element about which

the speaker will *consequently* assert something. This is actually the spirit behind Mathesius' and Hockett's notion of 'aboutness'.[35]

Unfortunately, Halliday's strictness about sentence-initialness leads him to state that all sentence-initial elements are a Halliday-theme. This is a counterintuitive position, as seems clear from his sentence in (33) (1967:222),

(33)   What | did John see yesterday?

where he claims that *what* is the Halliday-theme of the sentence. In a sentence of this type Gundel and Reinhart would choose the subject *John* as the topic. Furthermore, and this applies to Reinhart as well, it seems extreme to claim that all sentences have a topic. Both Gundel (1985:94) and Välimaa-Blum (1988:21) argue that topicless sentences exist and so do, in a different vein, Kuroda 1972 and Sasse 1987—their thetic-judgment sentences. If this position is correct, Halliday's sentence-initial requirement, while positive in certain respects, is too strong in at least two counts.

It is not just the definitional problems around the notion of aboutness that weaken the solidity of the topic-comment approach. The incompleteness of empirical coverage of the topic-comment articulation is also an important shortcoming that must be resolved. This incomplete empirical coverage is due to the fact that a mere division between topic and comment does not suffice to capture all the informational distinctions detected in a sentence. This becomes clear in sentences like (34):

(34)   a. She gave the SHIRT to Harry. (Prince 1986:ex. 1)
         b. To Harry she gave the SHIRT.

The two sentences in (34) represent one and the same logico-semantic proposition, but they also reflect two different information-packaging structures. Within the topic-comment framework, the contrast between these two sentences can be accounted for by saying that the phrase *to Harry* is a topic in (b) but not in (a) and that that is why it is preposed in the former but not in the latter. In (a) the topic is most likely *she* and the comment *gave a* SHIRT *to Harry*. This is indeed intuitively plausible and accounts for one of the informational splits of this sentence.

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[35]See, for example, the definition of topic in Bland 1980 (in Ward 1985:33): 'The T[opic] provides a way for the Sp[eaker] to retrieve something from previous discourse in order to indicate what s/he is going to talk about *before* s/he actually does talk about it' (1980:3) [emphasis not in original].

However, there is another clear informational split, especially in (a), that the topic-comment framework has nothing to say about. In (a) there is a clear informational distinction between the prosodically-prominent *a shirt* and the nonprominent *to Harry*, even though they are both within the comment. This distinction within the informationally-complex comment is left unaccounted for. The binomiality of the topic-comment articulation is not enough to capture the informational subtleties of both (34)a and (34)b. The prosodically-prominent part of the comment in (34)a is what the focus/open-presupposition approach calls 'focus', and the nonprominent part of the comment that follows the focus is part of the open-proposition (along with the topic). The focus corresponds to only a segment of the comment. Focus, therefore, must be invoked to complement the topic-comment division if we wish to account for the information-packaging articulation of the sentence.

Before concluding this section on the topic-comment articulation, it is worth speculating on the source of the definitional problem described above. There is a clear intuitive notion that the sentence-initial 'topic' phrase has some special informational standing within the sentence. This is the original intuition behind the notion of topic as found in Mathesius 1915 and Hockett 1958. The problem arises when one tries to extend this notion to other sentences, so as to force the topic-comment articulation onto all structures.

This extension is done, it seems, at the cost of causing the pervasive confusion and amalgamation of three phenomena labeled topic: *a*) the original topic, a sentence-initial phrase that acts as an address for the appropriate entering of information and becomes a topic only relationally with respect to the comment—a true information-packaging primitive; *b*) topicality as a measure of the salience of a discourse entity, as in Givón 1983, that reflects the status of that entity with respect to its presence or absence in the previous discourse. This is most obvious in the variants of the theory that suggest topichood is a property of discourse entities, and especially in Davison 1984; and *c*) the suprasentential notion of discourse-topic, referring to an entity, proposition, or event that is felt to be the topic of a discourse, i.e. what that discourse is about, which may or may not be structurally encoded in all of the sentences contained in the discourse in question. This is especially so in the literature on topic in some Asian languages (e.g. Li & Thompson 1976; cf. Välimaa-Blum 1988:18-27) and in Gundel 1988, where she states that topics need not be

expressed in the sentences they are topics of.

Let us compare Givón's topicality with standard topichood with example (35):

(35)   a.   Does he want mustard on his broccoli?
        b. i. I don't think so, thanks. Brown mustard he likes,
           ii. but this yellow stuff he doesn't touch.

The Givón-topic of sentence (b.ii) is *he*. It is the most salient entity and is therefore 'weakly' encoded in a pronominal form. The topic in Hockett's sense is clearly *this yellow stuff*: it announces a topic about which we then say something. These two notions of topic, as pointed out, are clearly distinct. Some workers in the topic-comment framework, having tried to conflate the two into one overarching 'topic', have lost consistency and operationalizability in the process.[36]

Summing up, the topic-comment articulation introduces a useful notion to account for the existence of a sentence-initial constituent in many clauses (especially Reinhart's explicit characterization of it). It is sufficient to capture the informational split of the sentence in simple cases where there is a leftmost 'topic' phrase—be it an overtly topicalized phrase or a topical subject—and a noncomplex comment. Unfortunately, it seems inadequate to deal with all sentence types, given the common occurrence of complex comments like the one in (34)a.

3.1.3   Topic-Focus

The topic-focus articulation is the one defended by most present-day Prague School linguists (cf. Sgall, Hajičová & Panevová 1986) and other European scholars like von Stechow (1981). Within Prague School linguistic theory, informational considerations are just one of several that constitute the underlying or tectogrammatical representation of the sentence. In contrast, von Stechow (1981) views the topic-focus articulation as a structuring of logico-semantic propositions.

The definitions of topic and focus are phrased in terms of contextual boundedness or contextual freeness, respectively, where contextually bound means 'accessible in the hearer's memory, i.e. salient, activated over a certain threshold in the stock of

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[36] Even when the two notions are conflated, their disparate structural behavior requires some terminological means to distinguish between 'contrastive or shifted topics' (=sentence-initial aboutness expressions) and 'continuous topics' (=Givón-topics) (cf. Herring 1990).

shared knowledge' (Hajičová 1984:193). A sentence like (36), with prosodic prominence on *dams*,

(36)   Beavers build DAMS. (S., H. & P. 1986:57)

is claimed to display, in isolation, an informational three-way ambiguity: *a) beavers* is the topic and *build dams* is the focus; *b) beavers build* is the topic and *dams* is the focus; and *c)* the entire sentence is part of the focus and the topic is null.

Notice from this example that 'topic' here is not analogous to 'topic' in the topic-comment framework. The latter kind of topic for sentence (36) would be invariably *beavers*. The Prague notion of topic encompasses the topic-comment notion of topic and a part of its comment. In the next section it will be noted that the Prague School topic is equivalent to the open-proposition in the focus/open-proposition approach. Similarly, the Firbas-theme discussed above in § 3.1.1 is also equivalent to the Prague School topic, even though the former is defined in terms of communicative dynamism ('pushing the conversation forward') and not in terms of contextual boundedness ('salience in hearer's memory'). Contextual-boundedness is indeed a property of the nonfocal part of the sentence (cf. § 2.3.2, § 3.2), but this is an artifact of its informational role in the sentence. More problematic is the definition of focus as contextually free, since in § 2.3.2 it was noted that a focus constituent may encode discourse-old, even salient, entities.

The focus-topic articulation is, for all intents and purposes, equivalent to the focus-open-proposition articulation. Discussion of its advantages and shortcomings is therefore subsumed under the discussion of the latter articulation undertaken in the next section.

3.1.4   Focus/Open-proposition

The focus/open-proposition articulation or focus-presupposition articulation has a strong history in modern linguistics. The term 'focus' has its origin in Halliday (1967), who uses it to designate a subset of the rheme in his theme-rheme articulation which he calls the 'informative part'. While focus is the informative part of the sentence, the open-proposition is just the anchoring or vehicular part. It is important to point out that (a subpart of) the focus constituent is always marked by prosodic prominence, which happens to be a valuable operational criterion to

identify the focus in a given sentence. The term 'focus' soon made its way into generative grammar, due mainly to its role in the battle between interpretive and generative semantics (cf. Chomsky 1971, Jackendoff 1972). Sometimes it is also called, somewhat misleadingly, 'focus of new information'. Although there does not seem to be as much terminological confusion around 'focus' as there is around 'topic', a couple of paragraph's worth of clarification is in order.

In the last decade the term 'focus' has been introduced into computational linguistics with a very different denotation. This use of 'focus' originates in the work of Grosz and Sidner (Grosz 1977, Sidner 1979, 1981, Grosz & Sidner 1986) and is found in much work in artificial intelligence (AI). This 'focus' is of no direct relevance for information packaging. As mentioned above, the notion of a 'focus stack' is used in Grosz & Sidner's (1986) theory of discourse-entity salience and encoding. All discourse entities are ranked for salience in the focus stack. The most salient entity at a given point, which is generally encoded in a pronominal form, is called the (AI-)focus. The AI-focus is the equivalent of the backward-looking center (BLC) in the Centering approach, and, ironically, it also corresponds to the most topical element, i.e. the topic, in Givón's (1983) framework[37]

Another less common use of the term 'focus' is as 'focus of contrast'. Contrast is yet another term which is used ambiguously in the literature, there existing both a contrastiveness of sentence-initial topics and a contrastiveness of foci. Chafe (1976) uses 'focus of contrast' to refer to both types of contrast with unfortunate results, since he ends up referring to some topics as foci (of contrast). This confusion seems to have been inherited by a few studies like Diesing 1988, where contrastive topics are equated to (narrow) foci of new information. Some issues regarding contrast will be discussed below in § 4.3.2.[38]

In modern American linguistics the focus of new information, or just 'focus',

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[37]See Hajičová 1987 for a comparison of AI-focus and focus. This paper also contains a discussion of how information packaging and entity salience may interact.

[38]An extreme case of misguiding terminology is found in the literature on Philippine languages, where, according to Herring (1990:fn.1), 'topic' designates the focus and 'focus' designates the topic. Just in case the reader has lost count of the different types of topic and focus, here is a brief list: discourse-topic, Givón-topic, sentence-initial topic (or topic-topic, if we may put one over the others), and Prague-topic (= topic-topic + part of the comment), and AI-focus (= Givón-topic), focus of new information (or focus-focus), and focus of contrast (= sometimes a focus-focus and sometimes a topic-topic).

was introduced as a complement of the presupposition in the focus-presupposition articulation (Akmajian 1970(1979), Chomsky 1971, Jackendoff 1972, inter alia). The presupposition, following Jackendoff, 'denote[s] the information in the sentence that is assumed by the speaker to be shared by him and the hearer' (1972:230). For Prince (1981a, 1984, 1986)—Prince uses the term open-proposition instead of presupposition—the presupposition is also 'shared knowledge', which in most cases is salient (i.e. currently in the discourse model or consciousness of the hearer), and Chafe 1976, analogously states that the presupposition represents background knowledge. In Wilson & Sperber 1979 it corresponds to a logico-semantic background entailment of the actual sentence. More recently, Culicover & Rochemont 1983 and Rochemont 1986 have defined the presupposition of a sentence as that which is c-construable, where c-construable means having a 'semantic' antecedent in the previous discourse.

The focus, then, is generally defined negatively as the complement of this presupposition; it is, respectively, that which is not shared by the speaker and the hearer, that which is not background knowledge, that which is not part of the (first) background entailment, or that which is not c-construable. This is generally represented as follows: the presupposition is equated to the sentence (or proposition) with a variable substituted for the focus. So, for instance, a sentence like (37)a has the 'presupposition' in (37)b, with *the shirt* as focus:

(37)   a. She gave the SHIRT to Harry.
        b. She gave x to Harry. (Prince 1986:ex. 1)

In other words, sentence (37)a 'presupposes' *She gave something to Harry* and the focus says that that something is the shirt.

Although this articulation has great intuitive appeal and has proved useful in the description of information packaging, most of the particular proposals just mentioned are problematic in some way. First, as pointed out already by Jackendoff (1972:246), analyses that assume that the 'presupposition' is entailed or presupposed in the traditional sense of the word (e.g. Wilson & Sperber 1979) run into immediate trouble when dealing with examples like (38)a:

(38)   a. I saw NOBODY at the party.
        b. I saw x at the party.

If (a) were to entail or presuppose (b) we would run into a logical contradiction: if it is true that I saw nobody at the party then it is true that I saw somebody at the party (entailment), or that seeing nobody at the party presupposes seeing somebody at the party (presupposition). Clearly, the 'presupposition' can be neither entailed nor presupposed by a given focus-presupposition sentence.[39] This has led several authors to abandon the unhappy term 'presupposition' and adopt Prince's (1981a, 1986) open-proposition (cf. Ward 1985).

Prince's view of the open-proposition as salient shared knowledge is less problematic as far as this issue is concerned. If 'shared knowledge' is understood as the set of propositions believed to be true by both speaker and hearer at the time of utterance, as Jackendoff 1972 did, using shared knowledge is no less problematic: the open-proposition in (38)b, being shared knowledge, would have to be believed true by the speaker. This cannot be the case here, since the speaker of (38)a cannot believe (38)b to be true. But if shared knowledge is viewed, as in Prince's work, as 'what the speaker assumes about the hearer's beliefs' (Prince 1985:65), we do not run into the problem of assigning contradicting beliefs to the speaker. Speakers can utter (38)a if they assume that the hearer believes (38)b to be true, even when they themselves do not believe it to be true.

Culicover & Rochemont's (1983) c-construability is not free of problems either. C-construable means 'having an antecedent in the previous discourse' and focus is described as not being c-construable. In many cases, however, the focus of a sentence refers to an entity already introduced into the previous discourse, i.e., the focus is as c-construable as its corresponding open-proposition. Rochemont (1986) calls the cases in which the focus is c-construable 'contrastive focus' and stipulates a rule by means of which c-construable contrastive foci are allowed. In this case it is the fact that the focus is the focus of a particular focus/open-proposition structure— and not of some other—which is not c-construable. Although this takes care of the facts, a unified characterization of focus is lost in the process. Rochemont's problem stems from the unwarranted assumption that information packaging can be explained in terms of the absolute referential status of discourse entities as observed

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[39] A misunderstanding based on this misleading ambiguity was at the root of a controversy between Chomsky 1971 and Lakoff 1971 and is the main reason for which Erteschik-Shir (1973, 1986) rejects the notion of focus in favor of dominance (cf. § 3.1.5).

in the previous linguistic context.

In fact, Prince (1981a, 1984, 1986) points out that it is always the case that the 'new information' carried along by the focus is *not* a discourse-entity-based notion. What constitutes new information is the fact that a particular focus instantiates the variable in the open-proposition. For example, in example (37) above, repeated here as (39),

(39)   a. She gave the SHIRT to Harry.
        b. She gave x to Harry. (Prince 1986:ex. 1)

the new information is not *the shirt* per se, i.e. the discourse entity represented by the NP *the shirt*, but the fact that the constituent *the shirt* is what instantiates the variable in the open-proposition *she gave x to Harry.* Prince's account, therefore, is equivalent to a generalization of Rochemont's proposal for just contrastive foci to all cases of focus. Thus, the need to state two separate c-construability conditions for two putatively different kinds of foci is avoided.

Besides, Prince's analysis of focus/open-proposition informational relations makes crucial use of a relational view of focus and open-proposition. A given constituent is the focus of a sentence by virtue of its being in a particular relation with the open-proposition in that sentence. This is in accordance with the fact that focushood cannot be an absolute property of constituents/referents, the way newness or givenness is. The notion of focus cannot be defined in terms of c-construability, contextual-freeness, or hearer-newness.

There is another bit of terminology that must be introduced regarding the focus/open-presupposition articulation. Chomsky 1971, Jackendoff 1972, von Stechow 1981, and Lambrecht 1987, 1989 state that the focus is the 'assertion of the utterance'. This use of 'assertion' must not be confused with the use of assertion as found in the philosophical writing of Russell (1905) in the sense of commitment to the truth of a statement, which is an illocutionary notion. Rather, it is based on Strawson's (1950) adaptation in the sense of 'to give information of some kind to an audience' (cf. Kempson 1975:101), and, especially, on Stalnaker 1978, for whom

> 'to make an assertion is to reduce the context set [= set of possible worlds compatible with what is accepted to be true by both speaker and hearer at a given time-point] in a particular way [...]. The particular

way in which the context set is reduced is that all the possible situations incompatible with what is said are eliminated.' (1978:323)

This definition of assertion is similar to the definition of information as a reduction of uncertainty introduced above in 2.2. The difference is that while 'information' was defined as a reduction of the uncertainty in the hearer's knowledge-store at a given time-point, Stalnaker defines his assertion as a reduction of uncertainty in the set of common beliefs shared by both hearer and speaker. Some authors have adopted Stalnaker's assertion to define the notion of focus in the focus-presupposition articulation (e.g. von Stechow 1981, Lambrecht 1987, 1988). These authors state that sentences assert their focus and that the open-proposition is not asserted. As noted in the discussion regarding (38), Stalnaker's asertion cannot be taken to define the focus/open-proposition distinction or the informativeness of the focus, since it is incorrect to assume that the open-proposition represents a 'shared belief'. It is the hearers' belief (at least the speaker assumes so), but clearly it is not a shared belief. Despite this observation, one can easily see that, when these authors say that the focus is the Stalnaker-assertion of the utterance—a reduction of the context set, they are close to saying that it is the informative part of the utterance—a reduction of the uncertainty in the hearer's knowledge-store at a given time-point.

Finally, before discussing the incompleteness of empirical coverage of the focus-open-proposition approach, the work of Välimaa-Blum (1988) must be mentioned. Välimaa-Blum's informational articulation is identical to the focus/open-proposition articulation discussed here. In general, the discussion in this section is applicable to her approach. Her terminology, however, is quite different from the standard one in an unfortunate way. She calls the focus 'NewInfo' and the open-proposition 'OldInfo'. We share her use of 'info(rmation)' to refer to the component of language understanding under study, but the use of the terms 'old' and 'new' is, again, misleading in the sense that it is reminiscent of the old/new distinction regarding the referential status of discourse entities. The problem is only terminological, however, since she states very clearly that NewInfo and OldInfo must be viewed as relational notions among constituents and not as a property of entities in a discourse (1988:5). Välimaa-Blum, along with the NewInfo-OldInfo articulation, also makes use of a

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sentential sentence-initial topic. Her topic (S-topic) is based on 'aboutness' à la Reinhart 1982, but, unlike it, it is restricted to sentence-initial position (1988:18ff.). Below it will become clear that our proposal is very similar to Välimaa-Blum's in this respect.

Despite its advantages and sound position in current work, the focus/open-proposition articulation is not empirically adequate to cover all possible sentence types. Interestingly, it appears that what this articulation fails to account for, the topic-comment articulation takes care of, and vice versa. Let us consider the same example discussed in reference to topic-comment:

(40)   a. She gave the SHIRT to Harry. (Prince 1986:ex. 1)
        b. To Harry she gave the SHIRT.

Sentences (40)a and (40)b, while representing the same logico-semantic proposition, represent two different packaging instructions. The topic-comment framework fails to account for the informational split within the comment in, for example, sentence (a), between *the shirt* and *to Harry*. It has nothing to say about the fact that *the shirt* is focal, while *to Harry* is not. Obviously, the focus/open-proposition framework does have something to say about this split: *the shirt* is the focus that instantiates the variable in the open-proposition *She gave x to Harry*, thus capturing the fact that *the shirt* and *Harry* belong to two different informational units.

Now, there is one further difference between sentences (a) and (b): the position of the phrase *to Harry*; it is postfocal in (a) but sentence-initial in (b). This difference is captured by the topic-comment framework, as noted, by saying that *to Harry* is a topic in (b) but not in (a). In contrast, the focus/open-proposition approach is at a loss here, since from its perspective the two sentences are the same: a focus, *a shirt*, and an open-proposition, *she gave x to Harry*. Why is then *to Harry* preposed in (b)?

This fact has not gone unnoticed. In fact, Välimaa-Blum, as already noted, incorporates an S-topic into her description of information packaging, presumably, because she noticed a gap in the empirical coverage of her OldInfo-NewInfo distinction. Furthermore, there exists a proposal within the focus/open-proposition approach to account for topic preposing in the work of Prince 1981a, Ward 1985, and Ward & Prince 1986. Basically, these authors suggest that topic-initial constructions perform two 'discourse functions' or informational tasks: one, marking

the sentential focus/open-proposition structure—the packaging instruction in our terms—and, the other, marking the preposed NP as encoding an entity that stands in a particular referential standing with another entity already introduced in the previous linguistic context. In particular, it is argued, drawing on work on linguistic scales by Hirschberg 1985, that the entity encoded in the preposed phrase 'must be related, via a salient partially ordered set [poset] relation to one or more entities already evoked in the discourse model' (Ward & Prince 1986:4). As will be shown in § 4.3.2, our proposal indirectly incorporates the main insight of Ward & Prince's proposal.

Summing up the review of the focus/open-proposition articulation, it must be pointed out that the distinctions it makes are necessary for a complete theory of information packaging. Several problems arise, however, when attempting to define the notions involved, especially when using traditional semantic terms like entailment and presupposition. Prince's proposal in terms of salient 'shared knowledge', with the understanding that shared knowledge is not really 'shared' (it's what the speaker assumes are the hearer's beliefs, in Prince's terms), is unproblematic. A different kind of problem, which it shares with the topic-comment approach, is the incompleteness of empirical coverage concerning the existence of sentence-initial preposed elements. Empirically thorough solutions to this void have been proposed (Ward 1985, Ward & Prince 1986, Välimaa-Blum 1988) and will be taken into consideration in our account.

3.1.5   Dominance

One further approach to information packaging is found in Erteschik-Shir 1973, 1979, 1986 and Erteschik-Shir & Lappin 1979, 1983: the notion of 'dominance'. Dominance, in contrast to all the approaches seen above, does not come in a bipartite structure, but is rather a discourse property which is assigned to a constituent according to the intentions of the speaker. Dominance is defined as follows:

> DOM: A constituent c, of a sentence S, is dominant in S if and only if the speaker intends to direct the attention of his/her hearer(s) to the intension of c, by uttering S. (Erteschik-Shir & Lappin 1983:420)

As noted in § 2.2, in a sense, one of the things the packaging instruction does is single out the informative part of the sentence, i.e. the focus. One could say, à la Erteschik-Shir, that the speaker directs the hearer's attention to this focus (although it also provides detailed instructions about how to retrieve the information embodied in that focus and enter it into her/his knowledge-store efficiently).

In fact, Erteschik-Shir herself states that 'dominance is meant to cover those cases for which focus is generally used' (1986:120), even though she lists two differences between a dominant constituent and a focus. First, she rejects 'presupposition' as the complement of dominant constituents. Presupposition, she argues, does not exclude dominance, since presupposed material can be dominant, as in (41) (Erteschik-Shir 1986:ex. 11):

(41)   A: John regrets *that he quit his job.*
         B: Yes I know. It has been filled and he can't go back.

The italicized portion in (41)A is the dominant constituent of the sentence. But, as complement of *regret*, the embedded sentence is also presupposed—in the traditional meaning of the word—by (41). Her objection to presupposition, however, is based on a misunderstanding of the sense in which the practitioners of the focus-presupposition framework use the term. As mentioned above, a sentence does not actually presuppose its 'presupposition', but the ambiguity of the term has led to this same equivocation in several occasions. And second, she claims that, while focus is defined in terms of 'nuclear stress assignment', in her framework 'stress' pattern follows from the assignment of dominance. For most workers in the focus-background framework, however, including this study, intonational prominence is just one of the structural manifestations of focushood.

For all intents and purposes, then, the dominant constituent is equivalent to the focus of the sentence. Even though Erteschik-Shir's proposal is thorough (she even sets an operational test—the lie test—to determine what constituent is the dominant one in the sentence), her notion of hearer's attention seems less transparent than the notion of information packaging. Since most of the insights gained by the dominance approach are also captured by the focus-background approach, the former is included in the discussion of the latter.

3.2   Proposal

In this section an informational articulation meant to incorporate all the insights of the approaches just surveyed, while avoiding their shortcomings, is presented. First, however, we shall provide a global assessment of these previous approaches.

3.2.1   Assessment of Previous Approaches

As noted, there are two kinds of problems with the approaches available in the literature. On the one hand, there are some definitional problems, especially concerning the notion of topic and the exact nature of the open-proposition. On the other, both articulations—topic-comment and focus/open-proposition—are incapable of accounting for all the possible informational splits of the sentence.

The first problem will be avoided by staying away from the problematic definitions. For the open-proposition, which is adopted in our system with the name of 'ground' (cf. § 3.2.2), Prince's analysis in term's of 'hearer's knowledge' will be adapted, avoiding any definitions of this informational notion in logico-semantic or traditional presuppositional terms. We also adopt a topiclike sentence-initial phrase, under the name of 'link', modifying Reinhart's analysis in terms of a 'cataloguing address or file card'. By restricting the 'link' to be sentence-initial one can elude the problematic extension of topichood to other elements of the sentence. It was with this extension that rendered topichood a nonoperationalizable notion. Finally, the 'givenness/newness paradox'—how can the 'focus of new information' be discourse-old?—is avoided by making clear that referential status is a property of discourse entities and the phrases that encode them and information packaging is a relational property that constituents have by virtue of their standing in a particular relationship with the other element of the sentence.

The second problem, the incompleteness of empirical coverage which both these informational articulations suffer from, is due to the fact that a binomial informational division of the sentence is simply not enough. The topic-comment framework cannot account for the informational split within the comment, and the focus/open-proposition framework fails to provide an explanation for the existence of sentence-initial topiclike phrases. This, in fact, has been noticed by several authors in the Praguean tradition (cf. Hajičová 1984) and by Dahl 1974, and, tacitly but clearly by

Välimaa-Blum 1988 and Prince & Ward (Prince 1981a, Ward 1985, Ward & Prince 1986).

The Prague School finds a potential solution to this insufficiency in the articulation of the informational structure along a continuum of communicative dynamism that involves notions from the thematic structure of the predicate. In other words, the informational split within the open-proposition—their topic—is accounted for not in informational terms but in terms of a communicative hierarchy of thematic roles that determines word-order changes within the otherwise monolithic Prague-topic of a sentence. Presenting the details of this proposal is impossible here, although it must be pointed out that it violates any autonomy-of-levels hypothesis, since it brings along a direct interaction at the same level between thematic and informational considerations.

Dahl's (1974) position is more germane to the proposal of this study. He suggests that sentences must have two distinct articulations, namely, topic-comment and focus-background (= focus/open-proposition), 'if for no other reason because longer sentences may exhibit a tripartite structure' (1974:2). His example of a tripartite structure is (42) (Dahl 1974:ex. 3), in which the narrowest of the possible readings of focus is assumed.

(42)   What does John drink? -

	topic	comment	
	John	drinks	beer.
	background		focus

His proposal, however, is somewhat redundant in that the two articulations in question partially overlap. The verb *drinks*, for instance, is both comment and background. While it is indeed necessary to make the distinction between information and ground, it is less clear that it is useful to group the nontopical elements together into an informational primitive. As will be seen below, it is unnecessary to preserve two superordinate informational units (the ground and the comment), since the same empirical ground can be covered with a simpler ontology. One can indeed divide the sentence in (42), for instance, into three parts within one single articulation instead of having Dahl's two redundant partially-overlapping ones, but this is done at the cost of foregoing both the superordinate units, the comment and the background (gt=background-topic, gc=background-comment, fc=focus-comment):

(43) $\underbrace{\textit{John}}_{\text{gt}}$ $\underbrace{\textit{drinks}}_{\text{gc}}$ $\underbrace{\textit{beer}.}_{\text{fc}}$

This consequence is too strong in that the distinction focus-ground seems to be a basic one, since it reflects the core distinction between information and anchoring material. In order to obtain a tripartite division, and respect at least one of the superordinate informational units, a hierarchical articulation must be used.

The articulation presented in the next section is a tripartite hierarchical articulation that captures the appropriate divisions of both the topic-comment and the focus-background frameworks while digesting them into one single structure. This trinomial structure is empirically equivalent to Dahl's parallel articulations (but see the observations about redundancy above) or Välimaa-Blum's (1988) Old-Info/NewInfo plus S-topic. The main difference between our proposal and Välimaa-Blum's is that the trinomial articulation presented below integrates all the informational primitives into the purpose of information packaging, unlike Välimaa-Blum's. In her account the S-topic has an independent existence of its own totally unrelated to the OldInfo/NewInfo split. It is clear, however, that the S-topic does perform some specific task in the accommodation of information (NewInfo) in the hearer's knowledge-store. The articulation proposed in the next section captures this by incorporating the S-topic, the link, as part of the ground and giving it a specific subtask within the larger information-retrieval task of the ground. Similar comments about unintegration could be made about Dahl's parallel articulations.

Before moving on to the next section, let us summarize the positive aspects to be preserved and the negative aspects to be avoided in the approaches to information packaging reviewed above:

- To be avoided:

  - nonoperationalizable criteria (for topic)
  - incomplete empirical coverage
  - semantic and (real) presuppositional accounts and nonrelational definitions (for focus-presupposition)
  - redundant or unintegrated informational articulations

- To be preserved:

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- an optional sentence-initial topiclike expression

- the focus-background distinction

3.2.2 Trinomial Hierarchical Articulation

A sound account of information packaging must provide a clear representation of the informational split of the sentence incorporating all the informational units observable. Furthermore, it must describe in detail the combinatorial operations by means of which the informative and the noninformative part of the utterance are put together to yield packaging instructions, and a specification of the interpretive rules that lead to their interpretation. This section is devoted to the first task. Adopting several insights inherited from previous work, the primitives that constitute the informational articulation of the sentence will be established. The description of the combinatorial and interpretive rules that build on these primitives is undertaken in Chapter 4.

It is proposed that the sentence is informationally articulated into a trinomial hierarchical structure consisting of the FOCUS and the GROUND, while the latter is further subdivided into the LINK and the TAIL. This partition is represented in (44):[40]

(44)   S={FOCUS, GROUND}
        GROUND={LINK, TAIL}

It reflects both the focus-background split and the fact that within the ground there often is a 'special' topiclike element, the link, which appears in sentence-initial position. The informational unit 'comment' is foregone, since it is rendered unnecesary in the account presented below (cf. Ch. 4).

The focus corresponds exactly to the focus in the frameworks reviewed above (the topic-focus and the focus/open-proposition or focus-background approaches). It constitutes the only informative part of the sentence, as in Halliday 1967, i.e., the segment of the sentence in which all the information is encoded. It is, therefore, the only nonelidable part of the sentence, since it is the only contribution to the

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[40] The hierarchical nature of this representation does not automatically imply continuous constituency. No claim is made with respect to linearization, since, in particular, the two parts of the ground may or may not constitute a linear unit at the surface.

hearer's knowledge-store at the time of utterance (or so the speaker assumes). The name focus is preserved due to its widespread use in the American, Hallidayan, and Praguean traditions. Also, the other main use of the term, the AI-focus, appears to be distinct enough to permit the existence of a healthy homonymity. The focus of a sentence is operationally identified by context—with the now habitual warnings about givenness/newness—and thanks to its invariably being intonationally prominent.

The ground is the complement of the focus and is equivalent in coverage to the presupposition, the open-proposition, the Prague-topic, or the background in the approaches reviewed in § 3.1.4. The term 'ground' is taken, as a terser version, from Dahl's (1974) and Chafe's (1976) background, moving away, as many other authors before, from the conflictive term 'presupposition', but also from 'open-proposition' due to its semantic connotation. The term 'ground' is free from any connection to logico-semantic meaning.

The informational force of the ground consists exclusively of acting as a vehicular frame for the informative focus, i.e. it guarantees an appropriate entry of information into the hearer's knowledge-store, indicating to the hearer where and how the information must be entered. Since the focus is the information in the sentence, it follows that the ground does not make any contribution to the hearer's knowledge-store. The knowledge encoded in the ground portion of a communicated proposition is knowledge the speaker assumes that the hearer already possesses. It is also the case, however, that the ground must, in some sense, be 'relevant' enough to perform the anchoring task it is assigned, i.e., it is licensed only to guarantee that the information carried by the sentence is entered into the knowledge-store appropriately. If (the speaker assumes) hearers can figure out how the information in the sentence contributes to their knowledge-store, the sentence may not have a ground. The focus is the only nonelidable segment of the sentence and may exist by itself, either as an all-focus sentence or as a sentence-fragment utterance. The ground is divided into the link and the tail, each performing a particular task within the more general anchoring role of the superordinate unit.

The link in this articulation is analogous to the sentence-initial topiclike expression found in some of the theme-rheme and topic-comment approaches discussed in § 3.1.1 and § 3.1.2. The term 'topic' is avoided due to its multiple ambiguity and

choosing 'theme' to designate the sentence-initial topiclike expression is not any better, owing especially to the use of 'theme' and 'thematic' in a completely unrelated but central component of linguistic structure.

Moreover, the notion of link does not match one-hundred-percent the 'topic' in the topic-comment articulation on which it is based. It does match the topic as originally presented in Mathesius 1915, Hockett 1958, and Halliday 1967, as noted, but it does not incorporate later extensions of topichood to elements other than the sentence-initial topic-announcing phrase, as in Reinhart 1982 and Gundel 1988. The label 'link' is used in order to avoid possible misunderstandings in what the term is meant to cover. A notion of 'linking up' is found here and there in the literature, as in Trávníček 1962, for instance, where his theme (akin to a Halliday-theme) is described as 'the sentence element that links up directly with the object of thought, proceeds from it and opens the sentence thereby' (1962:166).[41]

The link in the trinomial hierarchical articulation performs precisely this task of 'linking up with the object of thought'. This linking-up is expressed by means of a Reinhart-like view of links as designating an address of sorts under which the oncoming information is classified (cf. Reinhart 1982 and § 3.1.2). A link is an address pointer in the sense that it directs the hearer to a given address (or file card in Reinhart's (1982) or Heim's (1983) terms) in the hearer's knowledge-store, under which the information carried by the sentence is entered. Pointing to this address is part of the information-anchoring role of the ground. By starting a sentence with a link speakers indicate to hearers that the focus must be entered under the address denoted by that link, i.e. that hearers must go to that address (or pull out that file card), and enter the information under its label.

Links, as noted, must be sentence-initial, following the restriction required by, for example, Trávníček 1962 and Halliday 1967. Using the definition of link as an address pointer, a practical processing reason for their sentential-initialness is automatically obtained, since an address must be pointed to *before* the information to be entered under it is spelled out. Herring 1990, a crosslinguistic study of topic and focus encoding, states that 'languages of *all* types are consistent in putting

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[41]The term 'link' is also used by Fowler 1927 to describe some sentence-initial phrases (Catherine Ball, p.c.). Fowler's use of the term, however, is based on the idea that these phrases constitute a 'linking' with the previous discourse, not a 'linking with the object of thought'.

shifted topics [=links] first' (1990:9).[42] If the view that links are address pointers is correct this is not surprising at all. Defining links as address pointers also derives, as Reinhart 1982 does, the aboutness feeling that is central to the topic-comment approach. In contrast with Reinhart, however, in this study aboutness is treated as an epiphenomenon resulting from the very relation of links as address pointers with the informative part of the sentence: if the information is retrieved and entered under a given address, that information will be felt as being about the denotation of that address.

Even though links appear only in sentence-initial position—and this is their main structural characteristic, which can be used as an operational criterion for identification—not all sentence-initial elements have to be links. The link is part of the ground and, as noted, the ground exists only if necessary to guarantee a successful retrieval of the information encoded in the sentence. Therefore, linkless sentences are also possible in situations in which the address under which information must be entered is already established or in which, for whatever reason, there is no particular address for the information encoded in the sentence.[43]

The definition of links as sentence-initial must be understood as including the case of multiple links. Sentences may have more than one link, as in the Catalan example (45):

(45)   El bròquil   a l'amo   l'hi   van regalar.
        the broccoli to the.boss *obj.iobj* 3p-pst-give
        Approx.: 'The broccoli the boss (they) gave it to him (for free).'

In these cases the speaker directs the hearer to go to two addresses and enter the information under both. The second link in example (45) is not sentence-initial. Instead of having each link be sentence-initial, it should be made clear that it is the link string (link*) that is sentence-initial.

The tail, the last informational primitive, is the complement of the link within the ground. The term 'tail' is borrowed from Dik's Functional Grammar theory

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[42]It is clear from Herring's paper that her 'shifted topic' is analogous to the link, while her 'continuous topics' refer to something akin to a Givón-topic.

[43]Even though the link points to an entity in the knowledge-store (an address), it is not the case that the link is marking the discourse entity it represents as hearer-old. The fact that the entity must be hearer-old is an artifact of the informational task of the link: in general, an address cannot be pointed at unless it exists already (even though in some cases the creation of an address and the pointing to it can be simultaneous).

(1978). Like its synonym 'antitopic' (Chafe 1976, Lambrecht 1981), it has been used to describe right-detached constituents, especially in languages like French, but it has never been defined except by its structural position (cf. Lambrecht 1981 for discussion). The original use by Dik and his associates, however, describes only a subset of tail elements of this proposal. Right-detached constituents, at least in some languages, are indeed part of the tail, but the tail may also be encoded in other positions within the sentence structure as, for instance, in English (see Ch. 5).

Within the vehicular, anchoring informational force of the ground, the tail performs a more specific task regarding the exact way in which information is retrieved and entered under a given address. It would take us too far afield to describe the exact mechanics of the tail here. First, the combinatorial rules by means of which the aforementioned informational primitives interact must be introduced. This is done in the next chapter. Pretheoretically, the tail may be viewed as an element that acts as a signalling flag to indicate exactly how the information carried by the sentence must be entered under a given address.

The position of the tail within a sentential structure is not universally constant. While, as noted, both link and focus have some universal structural characteristics (sentence-initialness and intonational prominence, respectively) there is no such correlate in the case of the tail, although it is true that it is never marked with prosodic prominence. Structural properties of each individual language (basic word order, basic intonation contour, verb-secondness, etc.) may determine the position in which tails end up surfacing in a sentence. The tail, therefore, must be negatively identified as the nonfocal nonlink part of the sentence, although within each language particular informational/structural correlates should be found. As with links, more than one element may constitute the tail.

3.2.3 Application of the Articulation

Given the trinomial hierarchical articulation presented in (44), repeated here as (46),

(46)   S={FOCUS, GROUND}
        GROUND={LINK, TAIL}

and its characteristics, i.e. non-elidability of the focus, optionality of the ground elements and sentence-initialness of the link, one is led to expect four possible in-

formational structures for a sentence: link-focus sentences, all-focus sentences, link-focus-tail sentences, and focus-tail sentences. These expectations are empirically met, as attested by the literature on informational sentence types. In this section, these four informational structures will be illustrated and the correspondences with their equivalents in the literature pointed out.

Link-focus

In this type, the only ground is the link. Hearers are instructed to go to a given address and enter the information of the sentence under that address. The speaker directs the hearer to enter the information by merely *adding* it under the relevant address. The following are some examples in English and Catalan:[44]

(47) a. The boss CALLED.
      b. L'amo [F ha TRUCAT].

(48) a. The boss [F visited a broccoli plantation in COLOMBIA].
      b. L'amo [F va visitar una plantació de bròquil a COLÒMBIA].

(49) a. The boss$_1$ [F I wouldn't BOTHER t$_1$].
      b. L'amo$_1$ [F no l$_1$'EMPRENYARIA t$_1$].

(50) a. Broccoli$_1$ the boss [F doesn't EAT t$_1$].
      b. De bròquil$_1$ l'amo [F no en$_1$ MENJA t$_1$].

These examples illustrate the two standard cases of link-focus structure, with the link being either the subject in (47) and (48), a preposed complement in (49), and a case of multiple links in (50).

The link-focus structure corresponds to the typical topic-comment articulation (with a noncomplex comment) of the topic-comment framework (cf. § 3.1.2 above). It is also equivalent to the categorical judgment in the thetic/categorical distinction of Kuroda 1972 and Sasse 1987. This distinction, originating in the writings of the nineteenth-century philosophers Franz Brentano and Anton Marty, was meant as an alternative to the unique Aristotelian bipartite judgment. Categorical judgments consist of two acts: a naming of an entity and an expression of a statement

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[44]Since the Catalan examples are equivalent to the corresponding English ones, no translation is provided.

about it. It corresponds to the traditional Aristotelian judgment and to the topic-comment articulation. Thetic judgments merely express an event or state, and they correspond to our all-focus structure, as will be pointed out below.[45]

Link-focus sentences are also equivalent to the predicate focus structure of Lambrecht 1987, 1988. He considers it the 'unmarked' type of informational structure and defines it as a structure 'in which the subject [or a topical non-subject constituent] is the topic, thus in the domain of the pragmatic presupposition, and in which the predicate expresses a [Stalnaker-]assertion about this topic' (1988:6). In other words, the entire sentence, except for the link sentence-initial constituent, lies within the scope of his Stalnaker-assertion.

All-focus

All-focus structures correspond to sentences where the ground is null. In such cases, speakers assume that hearers are capable of retrieving the information carried by the sentence without any need for a vehicular anchoring frame: information can be entered into the knowledge-store without the need for an address pointer, and there is no need for a tail to indicate how the information fits under an address. There are two reasons for the existence of linkless sentences: *a*) the information of the sentence must be entered under a particular address, but the speaker assumes that the hearer knows which one already from context, i.e., does not have to go to it because s/he is already there, or *b*), no particular address is relevant for the entry of information. A temporary all-purpose 'situation address' may be used (cf. Ch. 4).

The following are some examples. They include general descriptions (51), pure existential sentences (52), and sentence fragments (53):

(51) a. [$_F$ The BOSS called].
      b. [$_F$ Ha trucat l'AMO].

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[45]Two points about the thetic/categorical distinction. One, categorical judgments are thought to represent a predication. The topic-comment articulation and our link-focus structures have nothing to do with syntactic or semantic predication. And two, Sasse 1987 explicitly states that 'the thetic/categorical distinction is not a matter of information structure, as is often assumed, but can be explained in terms of expectation' (1987:511). It seems clear, though, that 'information structure' in his discussion designates referential status of discourse entities and not information packaging. That being the case, his position is in agreement with this study. In fact, his 'hearer's expectation' seems analogous to what is called 'information' here.

(52)   a. Waiter! [F There's a fly in my cream of broccoli soup]!
        b. Cambrer! [F Tinc una mosca a la crema de bròquil]!

(53)   a. What doesn't the boss like?
          BROCCOLI.
        b. Què no li agrada, a l'amo?
          el BRÒQUIL.

Some all-focus structures (at least those in (51) and (52)) correspond to Kuno's (1972) neutral descriptions ('sentences that represent nothing but new information' (1972:298)), Schmerling's (1976) news sentences or all-new utterances,[46] and other labels like event-reporting sentences (cf. Lambrecht 1987).

In the thetic/categorical distinction, they correspond to the thetic judgment, as defined above. Sasse 1987 lists the following types of thetic judgments: weather expressions, existence, presence or appearance, description of situations, and in response to a question like 'what happened?' (1987:547). Lambrecht 1988 refers to these sentences as sentence-focus structures, 'sentences in which the focus domain is the entire sentence' (1988:11), involving no 'pragmatically presupposed open-proposition'.

Tailful Structures

Both the link-focus-tail and the focus-tail structures are included here. The tail, as noted, is an indication that further instructions are needed to guarantee the felicitous entry of information under a given address. The following are examples of link-focus-tail structure (54) and focus-tail structure (55). The tail in these examples is the material following the focus:

(54)   a. The boss HATES broccoli.
        b. L'amo l₁'ODIA, el bròquil₁.

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[46]Schmerling 1976 offers a nice minimal pair between a link-focus sentence ((i)) and an all-focus sentence (ii):

(i) Truman's DIED.
(ii) JOHNSON's died.

Both sentences, she reports, were reactions to the news about their deaths, but (i) was uttered after several days of discussion about whether and when Truman would die and (ii) was uttered as an out-of-the-blue report.

(55)   a. I can't believe this! The boss is going crazy!
          BROCCOLI, he wants now.
       b. No m'ho hagués cregut mai! L'amo està ben boig!
          BRÒQUIL, vol ara.

(56)   a. The farmers [$_F$ already SENT] the broccoli to the boss.
       b. Els pagesos [$_F$ ja l$_1$'hi$_2$ van ENVIAR t$_1$ t$_2$], el bròquil$_1$, a l'amo$_2$.

Both the link-focus-tail and the focus-tail structures correspond to Prince's (1981a, 1986) focus/open-proposition sentences (cf. § 3.1.4).[47] These sentences have also been referred to as 'narrow focus', 'constituent focus', or 'contrastive focus' sentences by many of the workers in the focus/open-proposition framework. In fact, for nonlinguistic historical reasons, the unmodified term 'focus' is understood many a time as referring exclusively to the focus in tailful sentences, i.e. narrow focus.

Having introduced, defined, and illustrated the informational primitives that constitute the informational articulation of the sentence, we are now ready to discuss how these are combined into packaging instructions and what the interpretation of each of the different packaging instructions is. This is the subject of the next chapter.

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[47]A subset of the sentences Prince discusses under this rubric are treated as link-focus structures (e.g. *Beer I like*). This discrepancy is actually an artifact of the way in which the tail is analyzed.

Chapter 4

A Theory of Informatics

In § 2.2 information packaging was characterized as a non-logico-semantic type of sentence 'meaning' concerned with the retrieval of information and its entry into the hearer's knowledge-store. Information packaging was defined as in (57) (=(11)):

(57)   INFORMATION PACKAGING: A small set of instructions with
                which the hearer is instructed by the speaker to retrieve
                the information carried by the sentence and enter it
                into her/his knowledge-store.

where information is defined as that part of the propositional content which constitutes a contribution of knowledge to the hearer's knowledge-store. These instructions are meant to optimize the update of the hearer's knowledge-store by singling out the informative part of the sentence and articulating the ground in such a way as to indicate how this information fits the hearer's knowledge-store.

It was already pointed out in Ch. 2 that information packaging is sufficiently distinct from other types of pragmatic understanding to grant it autonomous status and, despite its close coexistence with logico-semantic meaning within the interpretive end of language, they also remain independent.[48] Therefore, it was suggested that the generation and interpretation of information packaging must be dealt with in an autonomous module, i.e. INFORMATICS.

This chapter provides an account of the exact nature of the role of informatics in the larger language apparatus. If building a coherent and comprehensive theory

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[48]As noted in Ch. 1 this belief is not universally held, and proposals that try to reduce information packaging to logico-semantic meaning exist, as well as proposals that, despite recognizing a difference between the two, require the presence of informational elements in the logico-semantic representation. These proposals are addressed in Ch. 7.

of informatics independent of these other interpretive modules proves feasible, it constitutes indirect validation of the autonomy hypothesis assumed. This account is based on the informational primitives discussed in § 3.2.2. It describes the means by which this primitives interact to yield the information-packaging intructions and the exact interpretation of these instructions.

4.1 The Role of Informatics

4.1.1 The Knowledge-store

The definition of information-packaging presented in Ch. 2 presupposes the existence of a hearer's knowledge-store with a given structure. In order to be able to describe the role of information-packaging in language understanding, it will be necessary first to discuss how the hearer's knowledge-store might be structured. To this purpose, the file metaphor in Heim's File Change Semantics (Heim 1983) will be adapted.

Heim views discourse referents as file cards in a file. Before the beginning of a discourse the hearer has a file with zero file cards (F_0). As the discourse progresses file cards are added and updated. For instance, after the utterance of (58), the hearer puts the cards (59) in her/his file (ignoring the speaker's own file card):

(58)   Pat told me a weird story today.

(59)

addr.: pat
told z to speaker (pat)

addr.: story(z)
weird(z) told by pat(z)

In Heim's terms, the hearer has gone from an F_0 to a given F_1. As the discourse continues, every utterance will cause a change of files from F_n to F_{n+1}. Given the following three-utterance continuation to the discourse started with (58), the hearer's F_4 will contain the file cards and the entries in (61) (ignoring the file card for 'a story'):

(60)   She saw this man with a broccoli stalk.
        Well, the guy starts munching on it,
        and, lo and behold, he's arrested right away.

	addr.: pat	addr.: man(x)	addr.: br. stalk(y)
(61)	told z to speaker (pat) saw x(pat)	seen by pat(x) has y(x) munch on y(x) arrested(x)	had by x(y) munched on by x(y)

File F_4 has three cards which list all the attributes and relations between them specified by the propositional content of the sentences in (58) and (60). The file change from F_1 to F_4 involved the update of Pat's file card and the addition of cards for the man and the broccoli stalk and their update.

Heim's file, as pointed out in § 2.3.3, is akin to the notion of discourse model viewed as a mental representation of the entities involved in a discourse and their attributes and the links between them. For our purposes here, however, Heim's file metaphor will be applied to the hearer's knowledge-store. The knowledge-store is taken to be a large file with a number of file cards or ADDRESSES. Each address denotes an entity and under each address there are a number of entries specifying attributes and relations pertaining to that entity. Unlike in Heim's, there is no file F_0 before the beginning of a discourse, since the hearer's knowledge is not null at the start of an interaction, i.e., at the start of a discourse the knowledge-store contains addresses denoting hearer-old discourse-new ('unused') entities. So, for instance, in (58) the hearer would not add a file card 'Pat' because it would already be there from previous shared knowledge.

How is the knowledge-store modified and updated? The referential status of entities (cf. 2.3.2) plays a crucial role in this process. According to Heim and others, an indefinite NP will cause the hearer to start a new file card or create a new address and a definite NP will indicate that an already-existing address must be activated. In example (60) above, the indefinites *this man* and *a broccoli stalk* instruct the hearer to create a new address and the pronominal forms *she*, *he*, and *it* indicate that the address they denote has been already created.[49] The relations and attributes that

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[49] Actually, to be exact, there is a further difference between definites in general and pronouns in particular. Both denote preexistent addresses but differ in that pronouns denote salient preexistent addresses (cf. Chafe 1976, Prince 1988b) and other definites nonsalient ones. In other words, definites trigger an activation of a dormant preexistent address. Pronouns simply indicate that their referent is in activation at the time of utterance.

make up the propositional content of the utterances in (60) are then entered under each one of the addresses involved in those utterances. In (61), the address for 'man' contains the knowledge that he was munching on a broccoli stalk and the address for 'broccoli stalk' contains the knowledge that it was being munched on by the man. This reflects the fact that, after the discourse in (60), one knows *a*) about the broccoli stalk that it was munched on, and *b*) about the man that he was munching on a broccoli stalk.

The role of referential status marking in language understanding, then, is the management of addresses in the hearer's knowledge-store: creation and activation of addresses or file cards. This is not only the view in Heim 1983 and Prince 1988b, for instance, but it agrees with the observation made repeatedly in the literature (cf. § 2.3.2 above) that referential status is a property of NPs and/or referents independent of the sentential context in which they occur.

This schematic view of the knowledge-store will be enough to allow a description of the role of information packaging. Information packaging is concerned precisely with the update of the knowledge-store only with respect to the entry of information. In other words, while referential status marking is responsible for the creation of new addresses or activation of existing addresses, information packaging is responsible for the actual update of these addresses. It indicates what part of the utterance constitutes information and, furthermore, it shows where this information goes and how it fits under a particular address. This will be discussed in what follows.

4.1.2   Redundancy in the Entry of Data

In spite of its advantages and intuitive appeal, the file metaphor has an important drawback: its inefficiency. This inefficiency is due to two charateristics of the file metaphor: *a*) it does not take into account the knowledge already existent in the file, and *b*) it requires multiple entry of the same propositional content. Let us discuss them in this order.

Preexistent Knowledge

Suppose a speaker has just uttered sentence (62)a with the propositional content in (62)b.
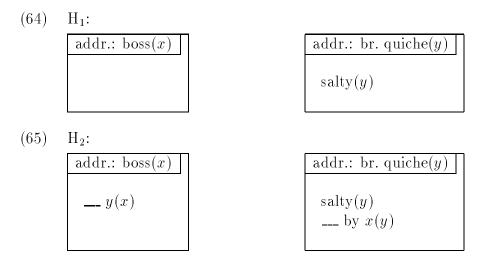
(62)   a. The boss hated the salty broccoli quiche.
         b. hated (the salty broccoli quiche, the boss)

Referential-status marking indicates, in this case, that no addresses need be created, only that two already-existing addresses, 'the boss' and 'the salty broccoli quiche', must be activated. Then the hearer must perform her/his filing task and must enter this data into her/his knowledge-store. After this task is performed, a partial view of the hearer's knowledge-store may be represented as in (63):

(63)

addr.: boss(x)
hated $y(x)$

addr.: br. quiche(y)
salty(y) hated by $x(y)$

There are two addresses, one for 'the boss' and one for 'the broccoli quiche', and under each of them the relevant attributes, i.e. that the quiche was salty, and the relations that hold between the two addresses, i.e. that the boss hated the quiche and that the quiche was hated by the boss, are recorded.

Returning to the two hypothetical hearers H_1 and H_2 introduced in § 2.2, let us again assume that H_1 knows nothing about the existence of a connection between the boss and the broccoli quiche and that H_2 knows of the existence of such a connection but does not know which one it is. The following is what their knowledge-store might look like before proposition (62) is communicated, (64) for H_1 and (65) for H_2:

(64) H_1:

addr.: boss(x)

addr.: br. quiche(y)
salty(y)

(65) H_2:

addr.: boss(x)
___ $y(x)$

addr.: br. quiche(y)
salty(y) ___ by $x(y)$

The difference in what H_1 and H_2 know is represented in the difference between the content of the file cards in (64) and (65). In (64) there is no information about the

connection between the boss and broccoli, but in the case of (65), both the knowledge of the connection and the fact that the nature of this connection is unknown must be represented. This is done by means of the blank (___).

Within the file metaphor, however, there is no way to take this difference into account. Propositional content is entered in the same way independent of what the hearer may or may not already know. This process is not very efficient given that some of the entry of data in the case of H_2, for instance, is totally redundant and unnecessary. What is needed to avoid the redundant entry of data is the notion of information. A view of data entry in terms of propositional content does not allow us to take into account the distinction between H_1's knowledge-store and H_2's knowledge-store. Information does, since it is defined precisely with respect to the hearer's knowledge-store. As noted above, it is information that is responsible for the different structural encodings of the proposition in (62) when addressing H_1, shown in (66)a, or when addressing H_2, shown in (66)b:

(66)   a. The boss hated [$_F$ the salty broccoli QUICHE].
        b. The boss HATED the salty broccoli quiche.

Speakers are sensitive to the different make-ups of different hearers' knowledge-stores and package the proposition they want to communicate in different packaging instructions accordingly. Even though the propositional content of (66)a-b is the same, the information they carry is different. The marking of information allows for a more efficient process of data entry, since the hearer need not re-record knowledge s/he already has.

Multiple Entry

In the discussion around the discourse in (60) it was pointed out that in Heim's approach—and indeed in any other discourse model account—the propositional content encoded in a given sentence is recorded on every file card whose referent is evoked in the discourse. Under the address for 'man', for instance, it was entered that he was munching on a broccoli stalk, and under 'broccoli stalk' it was entered that it was being munched on by a man. This means that the *same* knowledge is entered into the hearer's knowledge-store twice or more depending on how many participants are involved in a given utterance. The updating of the hearer's knowledge-store after sentence (67),

(67)   The boss gave Mary a broccoli stalk.

would require that the same propositional content be entered three times, one for each address involved in the sentence.[50] As noted, this seems to be a necessary process to guarantee that all the knowledge one has about a given entity is available when evoking that entity.
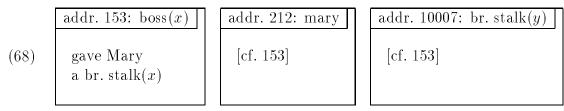
There is, however, another way to achieve the same results. The traditional file metaphor is based on a now 'old-fashioned' filing system. Let us consider the following example: in 1950 Smith's Body Shop from Anytown, a new customer, purchased 25 alternators from Jones Auto Parts. Mrs. Jones kept a customer file, where she kept track of their purchases, a stock file, where she kept track of the inventory, and a third file containing file cards for each city in her business area, where she listed all customers from that city. After Smith's purchase Mrs. Jones had to update three file cards. She had to create a file card for Smith's Body Shop and enter that he had purchased 25 alternators, update the 'alternator' card by registering Smith's purchase and subtracting 25 alternators from the stock, and update the 'Anytown' card by adding Smith's Body Shop to the list of customers in Anytown. This process is parallel to the process assumed to take place in the entry of data into the hearer's knowledge-store from the perspective of a traditional file metaphor.

Suppose now the same purchase takes place in 1990. Mrs. Jones abandoned her files and acquired a computer where she still keeps track of the same data. After Smith's purchase, Mrs. Jones enters the following data into her database: Smith's Body Shop from Anytown, 25 alternators. She only enters the data once, probably under the 'Smith's Body Shop' card, but if she wants to check her stock, she can call up the 'alternator' card and will find that the sale of 25 alternators to Smith's Body Shop has been registered there too, and if she wants to see which customers she has in Anytown, she may call up the 'Anytown' card and Smith's Body Shop will be there.

This, of course, is how any current database or hypercard program works. It is clearly less costly and it achieves the same results. This hypercard efficiency can be applied to the file-structured knowledge-store quite straightforwardly. Let us

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[50] Independently, the hearer is instructed here, via referential-status marking, to activate the preexistent addresses 'the boss' and 'Mary' and create a new address for 'a broccoli stalk'.

consider sentence (67) again. The updating of the hearer's knowledge-store need not require that the data be entered three times. It may be entered only under, let us say, 'the boss' and is then made available somehow to the other two addresses corresponding to the other participants in the sentence. This availability may be achieved in two ways. The data may be entered under the other addresses at a later stage, or the other addresses may get a crossreference index corresponding to the address 'John' through which the relevant knowledge stored under 'John' becomes accessible. The second option is chosen for expository purposes, but the implications of each option are left unexplored:

(68)

addr. 153: boss(x)	addr. 212: mary	addr. 10007: br. stalk(y)
gave Mary a br. stalk(x)	[cf. 153]	[cf. 153]

The information-packaging articulation of the sentence is also responsible for the entry of data in this hypercard fashion, thus avoiding the redundancy that would otherwise arise. As noted, a packaging instruction does not merely signal what the information of the sentence is, it further specifies *how* this information contributes to the hearer's knowledge. This is the role played by the ground, with specific subtasks for both the link and the tail. First, given a certain information, where in her/his knowledge-store must the hearer enter it? Taking the discussion above into account, it is proposed that the particular task of the link as an address-pointer is to 'point to' the address in the hearer's knowledge-store under which information is entered. In example (67) *the boss* is the link. This means that the address 'the boss' in the hearer's knowledge-store is designated as the address under which the oncoming information of the sentence must be entered. This avoids the need for multiple entry under several addresses, thus improving in efficiency the necessary task of knowledge-store update.

Second, there are cases where knowledge communicated to the hearer in a given proposition partially overlaps with knowledge already present in the hearer's knowledge-store. Without the notion of information, the entry of propositional content becomes redundant in this respect as well. The ground, and specifically the tail, allows the hearer to relate the information in the sentence with the relevant knowledge already present in her/his knowledge-store in the way to be detailed below.

This potential second source of inefficiency is avoided as well, thanks to information packaging.

4.1.3 Information Packaging as Data Entry

Information packaging must be viewed then as being responsible for the entry of data into the hearer's knowledge-store. If propositional content were entered into the hearer's knowledge-store without any further articulation, as in the traditional file metaphor, the result would be a very inefficient system of data-entry. The role of information packaging is to achieve an efficient and nonredundant update of the hearer's knowledge-store. By representing not only propositional content but also information, natural language improves the overall efficiency of the process of communication.

The role of informatics as a linguistic component, then, is to generate and interpret packaging instructions. Structuring sentences into information-packaging instructions is as fundamental a part of language production as encoding propositional content in sentence structure, and interpreting these instructions is as important as decoding propositional content. Information is superimposed on or represented in parallel with propositional content. The interpretation of both types of 'meaning' must remain independent. The propositional content of a sentence represents knowledge that speakers have and wish to communicate to hearers. This knowledge speakers have is, in principle, definable independently of the hearer that will benefit from receiving it. Information is a reflection of the speaker's assumptions about the hearer's knowledge-store. When speakers wish to communicate a proposition they take into account how much of the knowledge represented in that proposition will actually contribute something to the hearer's knowledge-store. Information packaging is crucially affected by the linguistic context by virtue of this dependence on the speaker's assumptions about the hearer's knowledge and attentional state, but propositional content is constant across speaker-hearer interactions.

Information is a notion relevant for the *entry* of data into the heare's knowledge-store. What is *entered* in the knowledge-store is information; what *is* in the knowledge-store is knowledge. In other words, the knowledge-store contains knowledge but receives information. The speaker's knowledge must be 'squeezed' into informa-

tion in order to be transferred to the hearer's knowledge-store. Squeezing proposi-
tions into instructions increases the efficency of the transfer by avoiding all redun-
dancy in the process of data entry into the hearer's knowledge-store. Informatics,
then, is not concerned with the interpretation or the representation of meaning in the
sentential structure, but with the interpretation and representation of information
for the purposes of data entry into the knowledge-store.

Having stated what the exact role of informatics is within the larger task of
language production and understanding, let us now proceed to a description of the
manner in which this role is carried out by discussing the elements of the theory.

4.2 Elements of the Theory

4.2.1 Primitives

The primitives of the theory and their hierarchical configuration were introduced
and discussed in § 3.2.2. It is the trinomial hierarchical articulation in (69) (=(44)):

(69)   S={FOCUS, GROUND}
        GROUND={LINK, TAIL}

This articulation is based on the insights of the proposals previously made in
the literature. In particular, it reflects both the focus-ground split (i.e. focus-
presupposition, focus/open-proposition, or focus-background) and the fact that with-
in the ground there generally is a 'special' topiclike element, the link, which appears
in sentence-initial position (analogous, with the provisos noted in Ch. 3, to the topic
in the topic-comment framework or the theme in the theme-rheme approach).

These primitives and their arrangement in a given sentence make up the informa-
tion-packaging instruction represented by that sentence. The INSTRUCTION is the
central object in the informatics, much in the same way the proposition is the
central object in the semantics. In order to represent these packaging instructions,
we will need to introduce some notation. The notation used may resemble on some
occasions the language used in representing logico-semantic meaning. It must be
emphasized, though, that the instructions spelled out in this manner evidently do
not represent logico-semantic meaning but information packaging. Any similarity
between the two is, therefore, purely notational.

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Before starting the discussion of the different instructions that can be construed with these atomic primitives, one notational detail must be introduced. Information packaging, as noted, is concerned with the representation of information and the directions needed to enter that information into the hearer's knowledge-store. It was also noted that every uttered sentence must provide some information since otherwise there is no raison d'être for the sentence to exist in normal communication.

Let us represent the (variable amount of) information that all sentences must provide as in (70):

(70) Φ [*information*]

The symbol Φ (capital phi) stands for an informational one-place operator. It will be called 'focus operator'. Everything within its scope (the clause) is informative, i.e., the scope of Φ constitutes all the information provided by the sentence. Given that packaging instructions are a speaker-designed information-retrieval mechanism for the hearer, the operator Φ may be read procedurally as 'retrieve', and the instruction in (70) as 'retrieve *information*', whatever the value of this information may be.

The structure in (70) is the simplest of information-packaging instructions, where an entire sentence is information, corresponding to the all-focus sentences seen in § 3.2.3. Many times, however, not all of the sentence is information: a ground is licensed to indicate how the information must be entered into the hearer's knowledge-store. Sentences with a ground correspond to the link-focus, link-focus-tail, and focus-tail structures discussed in § 3.2.3. Let us now turn to the structure of these more complex instructions.

4.2.2   Packaging Instructions and Interpretation

The information carried by the sentence is encoded by the focus constituent, even though its informational force is a relational property crucially dependent on its relation with the ground. This means that the focus will always be within the scope of Φ, but, as will be seen in a moment, the focus, strictly speaking, is not *all* there can be within the scope of Φ. The ground, in contrast, is not information, its only informational force being to permit the appropriate entry of information into the hearer's knowledge-store. Therefore, it cannot appear within the scope of Φ.

Let us start by looking at the informational value of links. Links, as part of the ground, play the anchoring role in the instruction. It was noted in § 3.2.2 that the link was an address pointer of sorts. In the previous section, it was concluded that links point toward the address in the hearer's knowledge-store under which the information of the sentence must be entered. It instructs hearers to 'go to' the address it denotes in their knowledge-store and then enter the information provided by the sentence under that address. Links, therefore, are informationally interpreted as a bipartite element: the instruction 'go to' and the address hearers are instructed to go to.

This interpretation may be represented with a quantifier-like element that will be called Λ (capital lambda): Λx is read 'go to x' and the address denoted by the link constitutes the range of x. The representation of the link is, then, as in (71)a (for an address α), while (71)b is the representation of the link expression *the boss* in the link-focus sentence *The boss* CALLED, which is read 'go to address 'the boss'':

(71) a. $\Lambda x, x = \alpha$.
       b. $\Lambda x, x =$ the boss.

The fact that the information of the sentence is to be entered under the address denoted by the link is represented by the latter taking scope over this information. The informational task of the link—pointing to a given address—is independent of the referential status of the NP that acts as link. A definite NP instructs the hearer to activate a preexisting address whether the NP is a link or not. But only if it is a link will the hearer be instructed to go to that address and enter information under it. Links tend to be definite NPs becuase, as a default, the speaker cannot point to an address in the hearer's knowledge-store if that address is not there already. It is not impossible, however, to instruct the hearer to create an address and to point to that address simultaneously. This is the case in sentences where the link is an indefinite NP. The exact way in which the link takes scope over the information of the sentence will be discussed further after the notation for focus is introduced.

The focus, which must be entirely within the scope of Φ, will be represented by simply writing it in boldface within that scope. The actual formalization of an all-focus sentence, therefore, will not be as in (70) above, but as in (72)a. A particular instantiation of this instruction, for the all-focus sentence [F *The* BOSS *called*] is (72)b:

(72)   a. Φ [**focus**]
       b. Φ[**the boss called**]

Taking this into account, a link-focus sentence may be represented in the following manner. The link's relation to the information of the sentence is represented through a quantifier-variable structure, i.e. the quantifier Λ binds a variable in the clause, as shown in (73)a. In (73)b, this abstract instruction is illustrated with the particular instruction for the link-focus sentence *The boss* CALLED:

(73)   a. $\Lambda x, x = \alpha$ [Φ [x **focus**]]
       b. $\Lambda x, x =$ the boss [Φ[x **called**]]

The instruction in (73) is the instruction encoded in all link-focus sentences. It combines the interpretation of the link with the interpretation of the focus operator. From a speaker's point of view, it may be procedurally read as follows: 'I instruct you to go to address α in your knowledge-store and then retrieve the information of the sentence by adding **focus** under α.' Or, in the case of (73)b, 'I instruct you to go to the address "the boss" in your knowledge-store and then retrieve the information of the sentence by adding under "the boss" that he called.' It is clear now why it was noted that the focus is not *all* that stays within the scope of Φ; the variable bound by the link-operator is also found within that scope. As will be seen below, the fact that this variable bound by the link remains within the scope of Φ is actually quite important for the interpretation of information packaging.

Finally, the notation for the tail must be introduced. The tail, being part of the ground, must escape the scope of Φ. This may be represented by abstracting the tail away from the clause, leaving a variable behind within the scope of Φ. This 'abstraction' will be represented by means of a lambda-like construct. The *graph* λ will be borrowed from the lambda-calculus used in logical semantics. Again, it must be pointed out that all that is borrowed is the symbol, but none of the semantics of the lambda-calculus. The notation for tails is illustrated in (74) for a given tail β:

(74) λx[Φ[**focus** x]] (β)

The tail's task, as noted above, is to further specify how the information must be entered under a given address. If the ground contains a tail it means that the information of the sentence cannot be simply *added* under the address denoted by the

link. Instead, it indicates that part of the proposition communicated is knowledge already contained under that address and that the information of the sentence must be construed in some way with that knowledge instead of merely added.

But how exactly does the presence of a tail affect the nature of the packaging instruction? The operator Φ instructs the hearer to retrieve the information contained in its scope, but in the discussion on the representation of link-focus sentences, the operator Φ was read as 'retrieve information by adding **focus**'. This is because the operator Φ actually comes in two brands: 'retrieve information by adding **focus**' and 'retrieve information by substituting **focus** for the blank in the ground "link __ tail" (which is already under the address denoted by the link)'. These may be abbreviated as 'retrieve-add' and 'retrieve-substitute'. What the presence of the tail does in a given packaging instruction is alter the nature of Φ, turning it from a 'retrieve-add' to a 'retrieve-substitute'.

Let us see this by comparing the link-focus sentence in (75) with the link-focus-tail one in (76). The (b) examples are the representations of the packaging instruction they encode (instruction (76) represents both the link-operator and the tail in one instruction):

(75)   a. The boss [$_F$ hates BROCCOLI].
         b. Λx_1, $x_1 =$ the boss [Φ[x_1 **hates broccoli**]]

(76)   a. The boss HATES broccoli.
         b. Λx_1, $x_1 =$ the boss [λx_2[Φ[x_1 **hates** x_2]] (broccoli)

Both (75) and (76) have the same link. The representation of the link is, therefore, identical in both sentences, and can be read as 'I instruct you to go to the address "the boss" and then...' Once the address denoted by the link is 'gone to', the hearer is in a position to retrieve the information provided by the sentence, at least in the case of (75). In the case of (76), the hearer needs to know more about the way in which the information must be entered.

This difference is reflected in the distinction between 'retrieve-add' and 'retrieve-substitute'. In (75), the instruction continues '...and then retrieve the information of the sentence by adding under "the boss" that he hates broccoli'. In the tailful (76), the instruction continues '...and then retrieve the information of the sentence by substituting *hates* for the blank in *he __ broccoli*, which is already under "the

boss" '. In other words, in (75) the information 'hates broccoli' is merely added under 'the boss', while in (76) the information 'hates' is taken to fill the gap in the knowledge already existent under 'the boss', since under this address there is already an entry for '___ broccoli'. This filling of the gap is represented by the tail's triggering of the retrieve-substitute brand of Φ. The tail, then, in the fashion discussed above, prevents the hearer from redundantly treating part of the proposition communicated by the hearer as information. A tailful instruction directs the hearer to some entry under a given address and indicates that the focus completes or alters in some way that entry.

The previous discussion shows how informational primitives interact and combine to form packaging instructions. The number of possible packaging instructions totals four, corresponding to the four informational articulations discussed in § 3.2.3. The following is a list of the four possible informational articulations of a sentence and the packaging instructions associated with them. Their interpretation is discussed in detail immediately below:

1. Link-focus: $\Lambda x_1, x_1 = \alpha[\ \Phi[\ x_1\ \textbf{focus}\ ]]$

2. All-focus: $\Phi[\ \textbf{focus}\ ]$

3. Link-focus-tail: $\Lambda x_1, x_1 = \alpha[\ \lambda x_2[\ \Phi[\ x_1\ \textbf{focus}\ x_2\ ]]\ ] (\beta)$

4. Focus-tail: $\lambda x_2[\ \Phi[\ \textbf{focus}\ x_2\ ]\ ] (\beta)$

The basic constant informational operator is the one-place Φ, which takes scope over the clause. In the informatics, every sentence is interpreted as having the minimal structure '$\Phi[\ information\ ]$', i.e., it is interpreted as 'retrieve the information carried by the sentence'. This is a mere representation of the fact that all sentences must carry information. More complex instructions are derived from this basic skeleton. Their purpose, as noted above, is to assure a nonredundant entry of information into the hearer's knowledge-store.

All-focus sentences represent the simplest of instructions, their structure being identical to the basic skeleton '$\Phi[\ information\ ]$'. The information in the sentence is carried by the entire structure, i.e., the focus is the entire sentence. This was represented as in (77):

(77)   Φ[**focus**]

The following sentences are the examples of all-focus structure that were seen in § 3.2.3, and (c) represents the instruction each sentence encodes):

(78)   a. [$_F$ The BOSS called].
       b. [$_F$ Ha trucat l'AMO].
       c. Φ[**the boss called**]

(79)   a. Waiter! [$_F$ There's a fly in my cream of broccoli soup]!
       b. Cambrer! [$_F$ Tinc una mosca a la crema de bròquil]!
       c. Φ[**(there's) a fly in my cream of broccoli soup**]

(80)   a. What doesn't the boss like?
          BROCCOLI.
       b. Què no li agrada, a l'amo?
          el BRÒQUIL.
       c. Φ [**broccoli**]

Their interpretation is as follows. Sentence (78), already seen in (72), is interpreted in the following terms (from a hearer's point of view): 'I am instructed to retrieve the information of the sentence by adding to my knowledge-store that the boss called'. Similarly, in (79), the waiter informationally interprets the sentence as 'I am instructed to retrieve the information of the sentence by adding to my knowledge-store that there is a fly in the speaker's soup'. Basically, what this instruction says is that the entire propositional content is a contribution of knowledge to the knowledge-store, i.e., that the information of the sentence is equivalent to its propositional content. Sentence (80) is of a different kind and will be discussed in a moment.

The linkless sentences just discussed are peculiar in that no particular address in the hearer's knowledge-store is specified for the subsequent entry of information. These all-focus sentences have been described as portraying a state of affairs or event (cf. e.g. Sasse 1987), i.e., contrary to link-focus sentences, all-focus sentences are not 'about' a specific entity. This intuition is captured by having the information of the sentence be entered under a temporary or situation address. The contents of this situation address are not meant to be permanent the way the content of regular addresses is. Before the contents of the situation address are deleted they are transferred to the addresses of the entities that participate in the discourse by means of the mechanisms described in the previous sections.

The link indicates that information must be entered under the address denoted by the link. Links are interpreted as 'go to address x (the range of x being determined by the denotation of the link phrase) and under x Φ'. The following are the interpretations for some of the sentences in §3.2.3 (the example *The boss* CALLED has been discussed already):

(81)　a. The boss [$_F$ visited a broccoli plantation in COLOMBIA].
　　　b. L'amo [$_F$ va visitar una plantació de bròquil a COLÒMBIA].
　　　c. Λx_1, $x_1 =$ the boss [Φ[x_1 **visited a broccoli plantation in Col.**]]

(82)　a. The boss$_1$ [$_F$ I wouldn't BOTHER t$_1$].
　　　b. L'amo$_1$ [$_F$ no l'EMPRENYARIA t$_1$].
　　　c. Λx_1, $x_1 =$ the boss [Φ[I **wouldn't bother** x_1]]

A hearer interprets the instruction encoded in (81) as 'I am instructed to go to the address "the boss" and then retrieve the information of the sentence by adding under "the boss" that he visited a broccoli plantation in Colombia', and the one encoded in (82) as 'I am instructed to go to the address "the boss" and then retrieve the information of the sentence by adding under "the boss" that the speaker wouldn't bother him'.[51]

The discussion around example (76) showed already how tailful sentences are interpreted, but they will be reviewed here as well for the sake of completion. While the presence of a link indicates that information must be entered under a given address, the presence of a tail indicates that, under the address denoted by the link, the information fills a gap in some partial entry instead of being a mere addition. This property of tails was captured by saying that it alters the nature of Φ from a 'retrieve-add' to a 'retrieve-substitute'. Let us illustrate this with the following examples:

(83)　a. The boss HATES broccoli.
　　　b. L'amo l'ODIA, el bròquil.
　　　c. Λx_1, $x_1 =$ the boss [λx_2[Φ[x_1 **hates** x_2]] (*broccoli*)

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[51]In the sentence representing this instruction there is a subject pronoun *I* which is not part of the focus, but still appears within the scope of Φ. The role of pronouns in information packaging will be discussed in § 4.3.3 below.

(84) a. I can't believe this! The boss is going crazy!
         BROCCOLI, he wants now.
      b. No m'ho hagués cregut mai! L'amo està ben boig!
         BRÒQUIL, vol ara.
      c. $\lambda x_1 [\, \Phi [\text{ he } x_1 \textbf{broccoli} \,] \,]$ (wants)

Sentence (83), as mentioned, is interpreted as 'I am instructed to go to the address "the boss" and then retrieve the information of the sentence by substituting *hates* for the blank in *the boss ___ broccoli* which is already under "the boss" '. 'Hates' is not merely added, but substituted for the gap in the entry '___ broccoli(x)' under boss(x). This is what distinguishes (83) from its corresponding tailless sentence.

Example (84), in contrast, has no link, since it is assumed that the hearer is already at the address under which information must be entered. As noted, links are pointers. They are only necessary if the hearer needs to *go* to a given address to enter the information of the sentence under that address. At the time a sentence S_n is uttered, the hearer is located at a given address a, under which s/he was entering the information of sentence S_{n-1}. If S_n is a linkful sentence, the hearer is instructed to move to another address b before proceeding to enter the information carried by S_n. However, if the information in S_n is to be entered under a, there is no need to instruct the hearer to move to a different address, since s/he is currently at a already. Therefore, the presence of a link is unnecessary in S_n, which will be a linkless sentence.

Therefore, the hearer would interpret the instruction of sentence (84) as 'I am instructed to retrieve the information of the sentence by substituting **broccoli** for the blank in *he wants ___* under the current address.' Example (80), the all-focus sentence fragment seen above, is parallel to (84) in that a link is rendered unnecessary. But, in addition, (80) requires no tail either, since (the speaker assumes) the hearer needs no ground at all to enter the infromation of the sentence appropriately. The instruction encoded in (80) is then 'I am instructed to retrieve the information of the sentence (fragment) by adding **broccoli** under the current address'.[52]

The instruction interpretations discussed in this section have been spelled out in a rather cumbersome way. For convenience, the following shorthand notation will also be used:

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[52]What gets added is not actually '**broccoli**' but '$x_1 \; x_v$ **broccoli**', where the free variables are independently identifiable. See § 4.3.3 and § 5.3 for discussion.

1. All-focus (Φ_A): RETRIEVE-ADD(**focus**)

2. Link-focus (Λ, Φ_A): GO-TO(link), RETRIEVE-ADD(**focus**)

3. Link-focus-tail (Λ, Φ_S): GO-TO(link), RETRIEVE-SUBSTITUTE(**focus**)

4. Focus-tail (Φ_S): RETRIEVE-SUBSTITUTE(**focus**)

The account of informatics presented in this chapter explains how from the informational articulation of the sentence, encoded by syntactic and prosodic means, one may derive the packaging instructions that indicate to hearers what the information of the sentence is. The four instructions proposed are derived in a systematic way from the informational primitives of the sentence. Moreover, these four instructions seem to cover most, if not all, the informational articulations described in the literature. In the remainder of this chapter, some further features of this theory of informatics will be discussed.

4.3 Features of the Theory

4.3.1 Motivation

The account of informatics presented in the previous section is empirically based on the informational primitives identified in the literature as revised above in § 3.2. It is further validated by its wide coverage, attained with only a very small set of instructions. Nevertheless, there are other motivations, both empirical and conceptual, for the particular representations chosen. These further motivations are discussed in this section.

One of the features of the theory is the representation of links as informational quantifiers in quantifier-variable structures. There is an additional clear empirical motivation for viewing links as quantifier-variable structures. Links, given their informational task, are inherently sentence-initial. Now, if the link phrase is a complement or an adjunct—or a subject in a VS language—it must move from its postverbal thematic position to the sentence-initial slot leaving a gap behind. The result is clearly a surface configuration where the link c-commands the clause and binds its trace. This syntactic configuration, is matched, in the informatics, by a

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quantifier-variable structure where the link-operator takes scope over the clause and binds a variable in it.

A putative exception to this syntactic configuration is the case of the subject in languages with basic SV order. Subjects in English, for instance, tend to be interpreted as links, given their default existential force (cf. Horn 1989), but there is no movement and trace-binding structure to represent it. In the last few years, however, a number of proposals for both Romance and Germanic languages have appeared that suggest that the surface sentence-initial position of the subject is a derived one.[53] If these proposals are correct, even preverbal subjects would fit the pattern. In any event, the quantifier-variable structure in the informatics matches a generalized XP_1-t_1 structure in the syntax.

In packaging instructions, tails, like links, are removed from the scope of Φ to reflect the fact that they are part of the ground and, therefore, not informative. This characteristic of tails was formalized by abstracting the tail phrase from the scope of Φ. It is interesting that in several languages, including Catalan, French and Italian, the phrases that make up the tail are found in a derived position as well. Thus, in these languages, tail phrases are removed from the clause by means of a right-detachment, as in Catalan (85) (=(4) in Ch. 1) and Italian (86) (the (b) sentences are the corresponding canonicals):

(85)   a. L'amo l_1' ODIA t_1, el bròquil$_1$.
         the.boss *obj* 3s-hate   the broccoli
         'The boss HATES broccoli.'
    b. L'amo odia el bròquil.

(86)   a. Il capo li_1 ODIA t_1, i broccoli$_1$.
         the boss *obj* 3s-hate the broccoli
         'The boss HATES brocccoli.'
    b. Il capo odia i broccoli.

The presence of the clitic object pronominals (l_1 and li_1) in the (a) sentences reveals that the tail phrases, coindexed with these clitics, are not in their base positions,

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[53]Cf. Fukui & Speas 1986, Kroch, Heycock & Santorini 1988, Bonet 1988, Fernández-Soriano 1989, Santorini 1989. We will return to this issue in Chs. 5 and 6. All preverbal subjects in Catalan are interpreted as links, but that is not the case in English. Most are, but some are not, as in the case of [$_F$ *The BOSS called*] (cf. the 'ambiguity' of subjects with regard to their existential force of lack thereof; Horn 1989 suggests that the former are topics and the latter are not).

since cooccurrence of clitic and argument is otherwise illicit. In this respect, Catalan and Italian differ from English.

As a result of detaching both links and tails from the clause, the core clause is left, at the surface, containing only the focus of the sentence. In other words, these languages seem to reflect information packaging in a much more salient way than, for example, English, involving not only prosody but the syntax in the process. The informational representation of sentences proposed in the previous chapter reflects closely these structural operations performed in Catalan and Italian, with respect to both links and tails.

A different kind of empirical motivation comes from the fact that with the representation proposed above, one is able to reflect the relational nature of informational properties without any need for stipulation. As pointed out in § 4.2.2, the focus is not all there is within the scope of the focus operator Φ. This is indeed the case in all-focus sentences, but as soon as there is a ground, one or more variables are found with the focus within the clause, bound by either the link-operator or the tail's λ-like operator. Let us illustrate this with the by now familiar instruction in (87):

(87)   a. The boss HATES broccoli.
        b. L'amo l_1'ODIA t_1, el bròquil$_1$.
        c. Λx_1, $x_1 =$ the boss $[\ \lambda x_2[\ \Phi[\ x_1$ **hates** $x_2\ ]]\ (broccoli)$

The presence of these variables within the scope of Φ, i.e. within the information of the sentence, is not accidental. The clause portion in the instruction (87)c,

(88) $\Phi[\ x_1$ **hates** $x_2\ ]$

reflects the fact that the information to be retrieved by the hearer is not just '**hates**' in isolation but 'x_1 **hates** x_2', where the values of the variables are fixed by the operators that bind them. In other words, the information of the sentence is 'hates' but only when interpreted with respect to the ground 'the boss is in some relation with broccoli'.

This crucial relational nature of focus has been defended by many authors in the literature and is the gist of Prince's (1981, 1986) account of focus, in which the 'new information' carried by the sentence is the fact that the focus instantiates the

variable in the open-proposition (see § 3.1.4 above). The representation proposed for tailful sentences adopts Prince's insight straightforwardly.

There is also an important conceptual motivation behind this representation. If the view of information packaging argued for in this study is correct, the purpose behind information-packaging instructions is to optimize the entry of information in the hearer's knowledge-store. They single out what part of the sentence makes a contribution to the hearer's knowledge-store and indicate where and how the hearer should enter that contribution. Information therefore, is central to the packaging instruction. As noted, all sentences must carry information since, otherwise, there is, in principle, no informational reason for the utterance to exist.

Most semantic and syntactic analyses of focus (cf. Chs. 6 and 7) put forward representations of focus-background structure where the focus is the element that is, in some way or another (as a quantifier-like element or a λ-abstracted term), abstracted away from the sentence to a peripheral position. Such an approach does not reflect the core status of focus as the informational motivation of the sentence. The representation proposed here captures this conceptual point by taking the all-focus sentences as basic and have Φ take scope over the clause. The cases where there is a ground are, in some sense, derived from this basic all-focus structure by abstracting away the ground phrases, so that they can perform their task as data-entry instructions. In other words, a link and a tail exist only when they are needed to make sure that information is entered appropriately.

Taking this stance, we automatically obtain an efficient handling of the all-focus and the link-focus sentences, where most of the overt material is focal. In representations of focus that take the ground as basic and have the focus raise to a peripheral position, the incorporation of all-focus and link-focus cases is problematic.[54]

4.3.2   Some Facts Captured

There are a number of additional facts discussed in the pragmatic literature that the account as presented above did not incorporate directly but that are nevertheless captured in an indirect way. One is the feeling of 'aboutness' that has inspired the

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[54]See, for example, Rochemont's (1986) development of an LF rule of Focus Raising within the Government & Binding Theory of syntax, where all-focus sentences are focus-raised in their entirety leaving an empty clause behind (cf. Ch. 6).

notion of topic. Contrary to the view of the topic-comment approach, aboutness here is not a causal correlate of linkhood, but just a consequence of the fact that the information carried by the sentence is entered under the address denoted by the link. This is why speakers intuitively feel that, in some sense, the sentence is about the link and not about the other entities involved in the sentence, whose addresses are updated only via crossreferencing. Two other facts that are also incorporated into our analysis are contrastiveness and felicity conditions in topicalization. Discussion of these two issues, which was postponed above, is undertaken in this section.

Contrast

Contrast is a discourse notion which is found pervasively in the literature. Even though it is considered a primitive in, for example, Kuno 1972 and Chafe 1976, it has no place in our informational articulation. Contrast, however, is not a unified phenomenon in that there exist two distinct types. These two types of contrast are evident in examples (89) and (90):

(89)   Broccoli I like,
         but pork rinds I hate.

(90)   She gave a SHIRT to Harry, not a tuxedo.

There is a feeling of contrast both between the link phrases in (89) and in the focus of (90). Chafe seems to conflate the two in his 'foci of contrast', but, as Szabolcsi (1981:158) observes, these two types of contrast are different in nature. We may label them link-contrast and focus-contrast.

Prince (1984:220), writing about felicity conditions for topicalization, argues that link-contrast is not a primitive but a derived notion. In her account of topicalization the topicalized phrase must represent an entity already evoked in the discourse, or else an entity standing in a salient set relation to another evoked discourse entity. The feeling of contrast that is obtained in most topicalizations is just an artifact of the set understanding that licenses the construction. Prince's formulation is later modified in Ward 1985 and Ward & Prince 1986, as will be seen in the next section, but they all share the view that contrastiveness is derivable as a 'side-effect' of the actual reason for topicalization.

In fact, link-contrast is also a derived notion from the perspective of aboutness. If a sentence is understood as being about a topic, then it may be understood that it is not about another topic, given the right opposition exists between both topics. In our system, link-contrast is derived in a similar way. If in (89), for instance, the hearer is told that s/he has to go to the address 'broccoli' and enter the information of the sentence there, then it must mean that another (related) address like 'pork rinds' should not be 'gone to', and that, therefore, the information must not be entered under it. Link-contrast can be derived, then, the way it was derived in previous acounts.

Ward 1985, in order to account for the contrastive or set feeling of foci (focus-contrast), proposes that foci must belong to a relevant scale. Ward argues that the variable in the open-proposition must be on a scale and that the focus that instantiates the variable represents a value on that scale. Ward's proposal is valid for standard focus/open-proposition structures, but if one expands the notion of focus to include the focus in cases of all-focus and link-focus sentences, his approach loses some appeal, since it would be hard to find a scale for, let us say, all-focus sentences. In our theory, focus-contrast is also a derived notion. As Ward points out, contrast occurs, for the most part, in the focus/open-proposition sentences, i.e. our link-focus-tail and focus-tail structures. In these tailful structures the focus operator Φ is interpreted not as RETRIEVE-ADD but as RETRIEVE-SUBSTITUTE, i.e. retrieve the information of the sentence by substituting 'focus' for the blank in the relevant ground frame. The blank in the relevant ground frame may be a real *blank*, as is in the examples discussed so far or the context in (91), where the utterer of (91)b assumes his/her hearer has the entry '__ broccoli(x)' under the boss.

(91)　　a. S$_1$ So we gave him [=the boss] this huge bouquet of broccoli for
　　　　　　his birthday and it looked like he was very happy with it.
　　　　b. S$_2$ I don't get it. The boss HATES broccoli.

But the blank need not be a real blank. It may be some preexistent element that the hearer is instructed to substitute in an entry under a given address. For example, in (90), *a shirt* is meant as a substitute for *a tuxedo*, i.e., the speaker assumes that the hearer has the entry 'gave a tuxedo to Harry(x)' under the current address and indicates with his/her informational encoding that 'a tuxedo' must be removed and substituted by 'a shirt'. What is substituted here is not a real blank but the

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entry segment 'a tuxedo', so that after (90) is uttered the entry under the current address is not 'gave a tuxedo to harry(x)' but 'gave a shirt to Harry(x)'. It is clear that in this case there is an inherent contrast between the two arguments of the focus operator 'substitute x for y', one of which is the focus. In example (90), the contrastive feeling is provided by the operation of substitution carried out from 'a tuxedo' to 'a shirt'. The blank notation, then, is used as shorthand for any element that gets substituted in the manner described, be it a real blank or a preexistent elements that needs substitution.

Felicity in Topicalization

When the incompleteness of coverage in the focus-background articulation was discussed in § 3.1.4, it was mentioned that there was a sound proposal to cover the gap in the work of Prince 1981, Ward 1985, and Ward & Prince 1986. Ward & Prince 1986, for instance, argue convincingly that the correct generalization capturing what felicity conditions must be met for topicalization to be licit is as follows:

> Discourse Condition on Preposing in Topicalization:
> The entity represented by the preposed constituent must be related, via
> a salient partially ordered set relation [poset], to one or more entities
> already evoked in the discourse model. (1986:4)

This criterion seems to account for all the data at hand, but there is one objection that may be raised: that this condition on preposing is a necessary condition but not a sufficient one. In other words, there may be NPs that encode entities that are related via a poset to another entity in the discourse model which nevertheless appear in situ and not in a preposed slot. An example is (92), from Ward (1985:ex.109):

(92)   Colonel Bykov had delivered to Chambers in Washington six
            Bokhara rugs which he directed Chambers to present as gifts from
            him and the Soviet Government to the members of the ring who
            had been most co-operative. *One of these rugs Chambers delivered
            to Harry Dexter White.* Another he gave to ...

Here it is not only the preposed phrase *one of these rugs* which is in a poset relation with an entity in the previous discourse (set-subset), but also *Chambers* (identity), and *Harry Dexter White* (set-subset; HDW is a member of the ring).

There is one way, however, in which Prince and Ward's insight with respect to preposing can be adapted into the approach presented here. Given the interpretation of links as denoting an address in the knowledge-store and an instruction to go to that address, Ward & Prince's Discourse Condition can be reinterpreted as a constraint in the mutual accessibility of these addresses. In other words, hearers cannot jump from one address to the other unless those two addresses are related via a poset relation. The ban on the preposing of constituents that denote addresses that fail to be in a poset relation with some already-evoked address is, then, a reflection of the fact that the address the hearer is instructed to go to is not accessible from the address s/he is at at the time of utterance. Only addresses that are in a poset relation with the current address are accessible. This observation on the poset relation condition on the mutual accessibility of addresses is, of course, made with a speculative slant. It remains for a more general theory of cognition to determine whether this observation is a valuable one or not.

4.3.3   Pronouns

It was mentioned in passing in § 4.2.2 above that the role of pronouns in our information-packaging instructions needed further discussion. This section is devoted to this.

The informative part of the sentence—the scope of Φ—crucially includes the variables bound by the link and the tail, if there is a ground at all. These bound variables permit the interpretation of focus as a relational notion. The question that may arise now is whether there may be free variables as well. The answer to this question is yes: pronominal forms, for the most part, enter the informational structure of the sentence as free variables under the scope of Φ.

The pronouns that participate in the packaging instruction as free variables are the so-called 'weak pronouns' (cf. Rigau 1986). In English, weak and strong pronouns are not phonologically distinct, but in many languages, including some Germanic and Romance varieties, there exist sets of both weak and strong pronouns. Weak pronouns are always unstressed—this applies to English as well—and generally cliticize onto other sentence elements or may even be phonetically null. Strong pronouns are always stressed and have fuller phonetical shape than their

weak counterparts.

Let us compare a packaging instruction with free variables ((93)a) to a packaging instruction with bound variables ((93)b):

(93)   a. Φ [x_1 **focus** x_2]
         b. Λx_1, $x_1 = \alpha$, λx_2[Φ [x_1**focus** x_2]] (β)

In this abstract representation it may be observed that while the instruction with the bound variables, (b), is a tripartite link-focus-tail sentence, the instruction with the free variables, (a), is a simple all-focus sentence. This means that the (b) sentence is interpreted as GO-TO plus RETRIEVE-SUBSTITUTE while (a) is merely a RETRIEVE-ADD. The following are particular instantiations of the instructions in (93):

(94)   a. The boss HATES broccoli.
         b. L'amo l_1'ODIA t_1, el bròquil.

(95)   a. He HATES it.
         b. *pro* l'ODIA.

The information-packaging instruction encoded in (94) is 'I am instructed to go to the address "the boss" and then retrieve the information of the sentence by substituting **hates** for the blank in *he ___ broccoli* under "the boss" ', but the information packaging of (95) is just 'I am instructed to retrieve the information of the sentence by adding x_1 **hates** x_2 under the current address.' In other words, in (95) there is no need for an address or for further specification on how to enter the sentence under that address. The speaker assumes that the hearer is already at the correct address and, further, that he does not possess any of the knowledge encoded in that proposition. In contrast, in (94) the speaker assumes the hearer needs to be told how the sentence contributes to her/his knowledge-store. To make this distinction between (94) and (95) may seem, at first blush, quite counterintuitive. After all, the two sentences have a parallel syntactic structure and parallel prosodic contour. But while this is true, it is also true that, somehow, there is a difference in markedness between (94) and (95): the former is clearly marked compared to its canonical *The boss likes* BROCCOLI, but the latter is obviously unmarked when compared to *He hates* IT, which is on the verge of ungrammaticality. This difference in markedness matches the intuition that while *broccoli* feels like a tail in (94), *it* does not feel like

a tail in (95). In fact, a comparison of the Catalan sentences (the (b) sentences) in (94) and (95) suggests that these two postfocal elements in English are informationally distinct. The object *el bròquil*, equivalent to English postfocal *broccoli* is encoded in the syntax typical of tails in that language (cf. § 4.3.1), but the object clitic equivalent to English *it* is not.

One could actually view sentences like (95) as equivalent to sentence fragments as the one discussed in § 4.2.2. That is, sentence (95) is informationally parallel to an all-focus sentence and the presence of the pronouns is due to independent syntactic motivations, namely, the θ-criterion and the idiosyncratic requirement in some languages that all arguments of the verb be phonologically spelled out. In other words, in languages where zero-anaphora is permitted the verb would be the only overt element in the phrase, as is partially the case in Catalan, where the subject is omitted. The prediction here is that sentence (95), repeated here in context in (96)b, is informationally equivalent to sentence (97)b (=(53) in § 3.2.3)

(96)   a. How does the boss feel about broccoli?
         b. He HATES it.   (cf. *HATES)

(97)   a. What doesn't the boss like?
         b. BROCCOLI.

This equivalence, at least at the intuitive level, seems to be correct. In both (96) and (97) the link is missing. As noted, this is because the information must be recorded under the address the hearer is currently at. Links denote an address, but they also instruct the hearer to go to that address. If the address relevant for information entry is the current one, there cannot be a link in the sentence. Sentence (96)b, however, is a tailless sentence as well. The hearer is instructed to add 'he hates it' under the address s/he is currently at. Contrary to the use of a tailful structure, which is designed by the speaker to avoid redundant data entry in the hearer's knowledge-store, the use of (96)b indicates that the speaker does not assume that the hearer has any of the knowledge encoded in the proposition communicated, e.g. the knowledge that 'he is in some relation to it'. Therefore, the presence of the pronoun in (96)b must be due to noninformational requirements. It is true that the address denoted by *it* is already not only hearer-old but also active, which allows the correct interpretation of the anaphoric form. But, as noted in the discussion of

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referential status, that process is independent of information packaging. In other words, the variable in (96)b is free as far as the packaging instruction is concerned. It remains for a theory of reference to say how the free variable is referentially identified.

However, in natural language there are strong pronouns as well. In our representation, due to the formal characteristics of strong pronouns pointed out above, they are treated like regular lexical material. Strong pronouns, within a given sentence, may be part of the focus, or even make up the focus by themselves, as pointed out in § 2.3.2 and further illustrated by the following example:

(98) S_1: Good morning. I am here to see Mrs. Bush again.
         S_2: Sure, Mr. Smith. Let's see... One of her assistants will be with you
                 in a second.
         S_1: Could I see HER today? I'm always talking to her assistants.

And they can be part of the ground as well, as illustrated by the link pronominal phrase in (99):

(99)   a. Him I don't want.
         b. A ell$_1$ *pro* no el$_1$ vull.

In this example the hearer is instructed to go to the address denoted by *him* and enter information there. Independently, *him* is marked for referential status as being an already-activated address, thus allowing the hearer to know which address it denotes. This identification, as noted, is the responsibility of reference resolution and not of information packaging.

Chapter 5

Syntactic Representation: Catalan

The informational articulation proposed in § 3.2, like the ones that came before it, is motivated by the need to account for variation found in the syntactic and prosodic structure of otherwise truth-conditionally equivalent sentences. In building the account of informatics presented in Chapter 4, several empirical observations drawn from the representation of information packaging in Catalan and English were taken into acount. In fact, as was mentioned in § 4.3.1, the configuration of the proposed information-packaging instructions matches very closely the surface syntactic configuration of Catalan sentential structure.

This chapter contains a thorough investigation of the syntactic representation of information packaging in Catalan and a systematic comparison with English. In § 5.1 the necessary background about the syntax of Catalan is introduced, especially concerning the specific syntactic operations and constructions relevant for the representation of information packaging. The manner in which these constructions encode different possible packaging structures is discussed in § 5.2, where a general informational principle on surface syntactic configuration will be proposed. Finally, in § 5.3, some comparisons with the facts of English are established. Some of the conclusions drawn in this chapter will serve as input for the study of the syntax-informatics interface presented in Chapter 6.

5.1 Preliminaries

In order to describe the relevant syntactic facts of Catalan, the framework of Principles & Parameters Theory will be used. In particular, we will make explicit use of its multistratal nature (especially in Chapter 6), the Move-α mapping procedure between strata, its phrase structure theory, and many terminological and notational conventions made available by this framework.

Catalan is generally described as an SVO null-subject language. The sentences in (100) illustrate these two characteristics (*pro* stands for the null subject).

(100)   a. Nosaltres fiquem el ganivet al calaix.
        b. *pro*   fiquem el ganivet al calaix.
          we/*pro*   1p.put the knife in.the drawer
          'We put the knife in the drawer'

However, it has two main particularities. First, it has at least two surface positions for the subject, preverbal and postverbal, and second, pronominalization of the verbal complements is carried out by means of procliticization onto the verbal head, yielding a partial order OV.[55] Next, let us consider the syntax of verbal complements and, then, turn to the syntax of subjects.

5.1.1 Verbal Complements

Catalan is a null-subject language, but all the complements of V must be overtly expressed. When the complements are pronominal, they appear as clitics attached to the verbal head. Sentence (101) is a canonical sentence, with a null subject. In (102) *el* is the pronominal direct object and in (103) *hi* pronominalizes the locative phrase. The (b) sentences show that the absence of the pronominal clitics renders the sentences unacceptable (*pro* informally stands for the 'missing' complement in its canonical position):

(101)   Fiquem el ganivet al calaix.
        1p.put the knife in.the drawer
        '(We) put the knife in the drawer.'

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[55] In the case of [-tns] verbal heads (infinitives, gerunds, and imperatives), however, the pronouns are enclitic and not proclitic, so the string order is still VO.

(102) a. El$_1$ fiquem *pro*$_1$ al calaix.
          obj 1p.put   in.the drawer
          '(We) put it in the drawer.'
      b. *Fiquem *pro* al calaix.

(103) a. Hi$_1$ fiquem el ganivet *pro*$_1$.
          loc 1p.put the knife
          '(We) put the knife there.'
      b. *Fiquem el ganivet *pro*.

The pronominal clitics are taken to be generated in the preverbal position, following the standard approach in Strozer 1976, Rivas 1977, Borer 1983, Jaeggli 1982, Zubizarreta 1982, or Suñer 1988.[56]

In particular, the approach in Borer 1983 is taken, according to which clitics do not occupy a syntactic position, but are affixed to their verbal head in order to express a number of agreement features (number, person, gender and case) when the actual argument is not present. In fact, clitic doubling, i.e. the coocurrence of a clitic and an argument (in A-position), is in general impossible:[57]

(104) a. *El$_1$ fiquem   el ganivet$_1$ al calaix.
      b. *Hi$_1$ fiquem   el ganivet al calaix$_1$.
      c. *L$_1$'hi$_2$ fiquem el ganivet$_1$ al calaix$_2$.
          obj.loc 1p.put the knife   in.the drawer

Clitics may pronominalize nonarguments as well. Clitic *hi* pronominalizes not only subcategorized locative phrases, but also other locative adjuncts (105) and adjunct and subcategorized PPs in general (106) (except for PPs headed by *de* 'of', which pronominalize into *en*):

(105) Que ets   de Margalef? No, però hi tinc   cosins.
      Q   2s-be from M.   but *loc* 1s-have cousins
      'Are you from Margalef? No, but I have cousins there.'

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[56]Kayne 1975, 1990, Quicoli 1976, and Emonds 1978 argue for or assume a movement analysis of clitics. The clitic pronoun is in this view base-generated to the right af the verb and is moved to a preverbal slot. This approach accounts for some facts that the standard approach leaves unaccounted, but fails to capture others that follow unproblematically from the latter.

[57]There are two exceptions to this generalization: indirect objects and so-called strong pronouns. The presence of the clitic is variable in the first case and compulsory in the second case (*(el) vaig veure a ell 'I saw him') (cf. Rigau 1988). This issue will not be addressed here.

(106) Que viviu amb el Mec? No, només hi treballem.
     Q   2p-live with the M.   only   *obl* 1p-work
     'Do you live with Mec? No, we only work with him.'

The absence of the clitic in this cases, however, as expected, does not cause ungrammaticality, although it alters the propositional content of the sentences. Catalan has several other clitics that are used to pronominalize nonoblique determinerless arguments and *de*-headed PPs (clitic *en*), [+tns] sentential complements and predicate nominals (clitic *ho*), and determiner-headed arguments (the *l*-clitics).

The order of the complements of the verb is fixed, the direct object must precede the indirect object or the locative phrase. Compare (107)a with (101) above, and witness (107)b:

(107)   a. *Fiquem al calaix el ganivet.
        b. Donem la clau al fuster.
          1p.give the key to.the carpenter
          '(We) give the key to the carpenter.'
          *Donem al fuster la clau.

Analogously, complements must come before adjuncts, as (108) indicates:

(108)   (Ja no devem res,)
        perque vam tornar les peles al banc l'any passat.
        because 1p-past-return the money to.the bank the.year last
        'We don't owe anything anymore,
        because we returned the money to the bank last year'
        * ..., perque vam tornar l'any passat les peles al banc.
        * ..., perque vam tornar les peles l'any passat al banc.

Below, in the discussion on detachment operations, it will become clear that these facts are important in helping to determine the configuration of the structures under examination.[58]

5.1.2 Subjects

As noted, pronominal subjects in Catalan may be either overt or null. Example (100) above, repeated here as (109), illustrates this:

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[58]Heavy-NP shift is also an available syntactic operation in Catalan. Any 'heavy' argument may be shifted to a VP-final position, thus yielding constituent sequences that do not fit the pattern just described.

(109)   a. Nosaltres fiquem el ganivet al calaix.
         b. *pro*   fiquem el ganivet al calaix.
            we/*pro*   1p.put the knife in.the drawer
            'We put the knife in the drawer.'

The phonetically null form is the unmarked one if we consider both frequency and distribution (cf. Vallduví 1987). In fact, null anaphora in subject position is equivalent to the weak pronominal clitics that pronominalize complements of V. Overt subject pronouns are the equivalent of the so-called strong pronouns for verbal complements (cf. Rigau 1986, 1988). English, unfortunately, does not mark the distinction between weak and strong pronouns except by prosody, so an exact parallel cannot be drawn. An approximate contrast in English is the comparison of a regular subject pronoun, (110)a, with a 'contrastive' subject pronoun, (111)a. The prosodic difference in English is matched by the overt/null difference in Catalan (compare the (b) sentences):[59]

(110)   a. And then he smiled.
         b. I   llavors *pro* va somriure.
            and then   3s-past-smile

(111)   a. He smiled, but she was making faces.
         b. Ell va somriure, però ella feia   ganyes.
            he 3s-past-smile but she 3s-impf-do grimaces
         c. #*pro* va somriure però *pro* feia ganyes.

It has traditionally been considered that the canonical position for subjects in Catalan is preverbal. As mentioned above, however, there are at least two possible surface positions for the subject, preverbal (112)a and postverbal (112)b:

(112)   a. Ahir el Pere va rentar la roba.
         b. Ahir va rentar   la roba   el Pere.
            yest. 3s-past-wash the clothes the P.
            'Yesterday Pere washed the clothes.'
         c. *Ahir va rentar el Pere la roba.

When the subject is postverbal, it is in a VP-final position, as the example in (112)b and its ungrammatical counterpart (112)c show.[60]

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[59]See § 4.3.3 above, where it was suggested that 'contrastive' pronouns in sentence-initial position are links, while regular ones are not.

[60]It is possible that subjects of inaccusative, psych, and maybe intransitive verbs occupy a distinct slot to the right of the verb, structurally closer to it than subjects of regular transitive

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The issues around subjects will be further discussed in § 5.2, after some facts about right- and left-detachment and intonation in Catalan are presented in the next section.

5.1.3 Right- and Left-detachments

Complements of V can be detached from their A-position and placed in an adjoined nonargument position (A′-position), either to the right or to the left of the core clause. When such a detachment takes place, leaving the A-position of an argument empty, a clitic pronominal, which is bound by the detached phrase, appears with V. These detachment processes are mostly known as right- and left-dislocation, in the general linguistic community, or as 'emarginazione' in Italian linguistics (Antinucci & Cinque 1977, Calabrese 1982, 1990).[61] The sentences in (113) are left- and right-detachments of the object, and those in (114) are left- and right-detachments of the locative phrase (*t* stands for the D-structure thematic A-position of the detached arguments):[62]

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verbs. Their behavior in pronominalization is different, and the linear order facts also seem to point in that direction (although, for independent reasons, it is hard to come up with evidence of this sort):

(i) *Si vol ningú res, em truqueu.
    Si vol   res   ningú, em truqueu.
    if 3s-want anyth. anyby. *obj* 2p-call
    'If anybody wants anything, give me a call.'

(ii) *Si cal a ningú res, em truqueu.
     Si cal   res   a ningú, em truqueu.
     if 3s-be.needed anyth. to anyby. *obj* 2p-call.
     'If anybody needs anything, give me a call.'

The verb in (i), *voler* 'want', a regular transitive, must have the subject after its complement, but in (ii) the subject of *caldre* 'be necessary' must sit between the verb and its complement.

[61]The reason for staying away from the term dislocation is the following. In American linguistics there is a syntactic distinction between topicalization (gap-binding) and left-dislocation (pronoun-binding). Catalan detachment is both ([XP_1...cl$_1$...t$_1$...]) (or, assuming there is no gap in A′-position, is a left-dislocation). Catalan left-detachment, however, is informationally equivalent to (most) English topicalizations. The uncompromising term 'detachment' is already used by Barnes 1985 for French. Left-detachment is also known as exbraciation in the English literature and Ausklammerung in the German tradition.

[62]Catalan orthographic convention is used in the following discussion in that a comma is used to separate right-detached phrases from the core clause, but nothing (generally) to indicate left-detachment.

(113) a. El ganivet$_1$ el$_1$ fiquem t$_1$ al calaix.
      the knife   *obj* 1p.put   in.the drawer

     b. El$_1$ fiquem t$_1$ al calaix,   el ganivet$_1$.
       obj 1p.put   in.the drawer the knife

(114) a. Al calaix$_1$ hi$_1$ fiquem el ganivet t$_1$.
      in.the drawer *loc* 1p.put the knife

     b. Hi$_1$ fiquem el ganivet t$_1$, al calaix$_1$.
      loc 1p.put the knife   in.the drawer

As with (102) and (103) above, these sentences are ungrammatical if the clitic pronominal is missing:

(115) a. *El ganivet$_1$ fiquem t$_1$ al calaix.
     b. *Fiquem t$_1$ al calaix, el ganivet$_1$.
     c. *Al calaix$_1$ fiquem el ganivet t$_1$.
     d. *Fiquem el ganivet t$_1$, al calaix$_1$.

Notice that (115)d is starred but that (101) above, which has the exact same linear order, is perfectly grammatical. How does one tell (115)d from (101), given that they look, apparently, exactly alike? The answer to this question is prosody; the prosodic structure of these sentences is crucially different:

(116) a. Fiquem el ganivet al CALAIX.
     b. *Fiquem el GANIVET t$_1$, al calaix$_1$.
     c. *Hi fiquem el ganivet al CALAIX.
     d. Hi fiquem el GANIVET t$_1$, al calaix$_1$.

Comparing (a) and (b), one can observe that shifting the intonation peak to the left results in ungrammaticality. Sentence (c) illustrates the ban on the cooccurrence of clitic and argument, but as soon as the intonation peak is shifted to the left (d), the sentence becomes grammatical again. The existence of left-detachment is widely recognized and is a familiar construction often dealt with in the Romance syntactic and functional literature (cf. Hirschbühler 1975, Contreras 1976, Cinque 1977, Rivero 1980, Jaeggli 1982, Silva-Corvalán 1983, Campion 1984, Barnes 1985, inter alia), but identification of right-detachment is less straightforward, due to the fact that it sometimes has null string effects. In some works, for instance, there is

no mention of a distinction between right-detached subjects and regular postverbal subjects.[63]

Fortunately, prosody is not the only structural property that distinguishes the grammatical from the ungrammatical sentences in (116). First, and foremost, there is the evidence provided by the presence of the clitics. As discussed, copresence of a clitic and an argument in A-position is illicit, but as soon as the argument is left-detached the clitic must appear. Compare (117)a and (117)b:

(117)   a. (*La$_1$) vaig veure la BARALLA$_1$.
            obj   1s-past-see the fight
            'I saw the fight.'
         b. La baralla$_1$ la$_1$/(*∅) vaig VEURE t$_1$.
            'The fight I saw.'

Given the theory of clitics adopted here, this is not surprising, since the clitic is sensitive to the presence of the empty category in argument position, whatever the nature of this category. Now, compare (118)a and (118)b:

(118)   a. (*La$_1$) vaig veure la BARALLA$_1$.
            'I saw the fight.'
         b. La$_1$/(*∅) vaig VEURE t$_1$, la baralla$_1$.
            'I SAW the fight.'

If it is assumed that the NP *la baralla* 'the fight' in (118)b is in a position equivalent to the position of the left-detached *la baralla* in (117)b (albeit to the right of the clause), the presence vs. absence of the clitic follows unproblematically: in (118)a the presence of the clitic is illicit because it would cooccur with the argument in argument position; the presence of the clitic in (118)b is necessary because the argument position it binds is empty.

Second there are some string order facts, which were noted in passing in (107)a and (114)b, that are of relevance to show that right-detached phrases are really right-detached. In (107) it was noted that the order of the verbal complements is fixed, the object coming before the indirect object or the locative phrase, but in (113)b we also showed a right-detached object that followed a locative. Let us view the paradigm in (119):

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[63]Romance right-detachment is discussed or touched upon in Antinucci & Cinque 1977, Cowper 1979, Lambrecht 1981, Calabrese 1982, 1990, Campion 1984, Ashby 1988, and Vallduví 1988a (cf. Rodman 1974 and Geluykens 1987 for English, and Packard & Shi 1986 for Chinese).

(119) a. Fiquem el ganivet al CALAIX.
       b. *Fiquem al calaix el GANIVET.
       c. *El$_1$ fiquem el ganivet$_1$ al CALAIX.
       d. El$_1$/(*∅) fiquem t$_1$ al CALAIX, el ganivet$_1$.

Sentences (a) and (b) illustrate the fixed order of the arguments and sentence (c) illustrates the ban on clitic-argument cooccurrence. What (d) shows is that when *el ganivet* 'the knife' cooccurs with a clitic it must appear to the right of the locative. This confirms that *el ganivet* is in an external position. Right-detached phrases appear to the right of adjuncts as well:

(120) a. (*La$_1$) va trencar   la vidriola$_1$ l'any PASSAT.
          obj   3s-past-break the piggybank the.year past
          'She broke her piggybank open last year.'
       b. *Va trencar l'any passat la VIDRIOLA.
       c. La$_1$/(*∅) va trencar t$_1$ l'any PASSAT, la vidriola$_1$.

(121) a. (*La$_1$) va trencar   la vidriola$_1$ amb un MARTELL.
          obj   3s-past-break the piggybank with a hammer
          'She broke her piggybank open with a hammer.'
       b. *Va trencar amb un martell la VIDRIOLA.
       c. La$_1$/(*∅) va trencar t$_1$ amb un MARTELL, la vidriola$_1$.

Finally, there is further evidence from the placement of clause-peripheral particles like the vocative *xec* 'man' and the tag-particle *oi* 'right?'. This particles may not occur between the verb and its arguments, as shown in (122)a-b, but they may occur between a clause and a right-detached phrase, as in (122)c-d:

(122) a. Fica (*xec) el ganivet (*xec) al CALAIX, xec!
          'Put the knife in the drawer, man!'
       b. Ficarem (*oi) el ganivet (*oi) al CALAIX, oi?
          'We'll put the knife in the drawer, right?'
       c. Fica'l$_1$ t$_1$ al CALAIX, xec, el ganivet$_1$ (xec)!
       d. El$_1$ ficarem t$_1$ al CALAIX, oi, el ganivet$_1$ (oi)?

All this evidence together shows that right-detached phrases are found outside the core clause. It will be assumed, therefore, that left-detachment and right-detachment are the mirror image of each other, both being clause-external but different in their directionality. Their clause-externalness will be represented through the structural configurations in (123), where detached phrases are adjoined to the phrasal node at S-structure:

(123)   `left-detachment:`   `right-detachment:`

```
              IP                              IP
             / \                             / \
           XP   IP                         IP    XP
               /  \                       /  \
              /    \                     /    \
            - cl-   t-                 - cl-   t-
```

The adjunction-to-IP analysis of left- and right-detachment is in accordance with the adjunction-to-IP analysis of topicalization found in Rochemont 1978, 1989, Baltin 1982, and Saito 1989.[64]

There is no structural restriction on the number of phrases that may be right- or left-detached, and the linear order in which these phrases appear is free (contrasting with the strict linear order of the phrases in situ). The following illustrate this point:

(124)   a. el ganivet$_1$ al calaix$_2$ l$_1$'hi$_2$ fiquem t$_1$ t$_2$.
         b. al calaix$_2$ el ganivet$_1$ l$_1$'hi$_2$ fiquem t$_1$ t$_2$.
         c.   el ganivet$_1$ l$_1$'hi$_2$ fiquem t$_1$ t$_2$, al calaix$_2$.
         d.   al calaix$_2$ l$_1$'hi$_2$ fiquem t$_1$ t$_2$, el ganivet$_1$.
         e.   l$_1$'hi$_2$ fiquem t$_1$ t$_2$, el ganivet$_1$, al calaix$_2$.
         f.   l$_1$'hi$_2$ fiquem t$_1$ t$_2$, al calaix$_2$,   el ganivet$_1$.

Sentences (a) and (b) are multiple left-detachments, (e) and (f) are multiple right-detachments, and (c) and (d) are mixed examples. Catalan, then, in a sense allows for flexible word order, since the complements of the verb may appear in situ or in left- or right-detachment slots. But, on the other hand, the order is not free in the strict sense of the word, since strict fixed linearity is required when the complements of V are within the core clause.[65]

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[64]There are two other analyses of topicalization, both involving [Spec, CP] in some way. I will refer the reader to Rochemont 1989 for a comparison of the three approaches. His conclusion is that the adjunction-to-IP analysis is empirically superior to the others. Rochemont also notes that Romance clitic left-dislocation—our left-detachment—behaves exactly like English topicalization in its syntactic effects (1989:154f.).

[65]Saito 1989 argues that the putative free word order (non-configurationality) of Japanese should be viewed in the following way: there is one fixed basic A-position for each argument and then there is free multiple (left-)adjunction to IP. The situation in Catalan is somewhat similar to this analysis of Japanese word-order 'freeness'. Many details aside, the difference between Catalan and Japanese would be that Catalan has a set of telltale clitics to signal clause-externalness and Japanese does not.

5.1.4   Prosodic Structure

As noted, prosody in Catalan is correlated with syntactic structure in an important way. In particular, prosody allows us to distinguish the grammatical (125)a from the ungrammatical (125)b:

(125)   a. Hi_1 fiquem el GANIVET t_1, al $calaix_1$.
        b. *Hi_1 fiquem el ganivet al $CALAIX_1$.

Prosody helps determine that the phrase *al calaix* in (a) is in a clause-external right-adjoined slot, in contrast to the same phrase in argument position in (b). In fact, given the correlation between prosody, the clitic facts, linear order, and the presence of clause-peripheral particles, we are drawn to one conclusion: intonation in Catalan has a fixed invariable contour. From all the examples in the previous section it must be concluded that intonational prominence in the Catalan sentence falls on the clause-final position. This accounts for the following pattern, which was partially shown in (116):

(126)   a. Fiquem el ganivet al CALAIX.
        b. *Fiquem el GANIVET al calaix.
        d. Hi_1 fiquem el GANIVET t_1, al $calaix_1$.
        e. *FIQUEM el ganivet al calaix.
        f. L_1'hi_2 FIQUEM t_1 t_2, el $ganivet_1$, al $calaix_2$.
        g. L_1'hi_2 FIQUEM t_1 t_2, al $calaix_1$, el $ganivet_2$.

Shifting the intonation peak to the left is actually illegitimate, as illustrated by (b) and (e). The cases in which it *looks* like the intonation peak is shifted to the left, (d) and (f-g), are actually cases of right-dislocation.[66]

The Catalan sentence, then, has an intonation contour like the one in (127), which we illustrate with our pet sentence *Fiquem el ganivet al calaix*. This is a schematic representation of the fundamental frequency (F^0) contour:

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[66]Examples (b) and (e) are actually not impossible, but they have an extreme metalinguistic flavor to them. Sentence (e) could be used as a correction of the pronunciation or another aspect of the verb, or, as pointed out by L. Payrató, p.c., can be used in baby-talk, as in

(i) No TOQUIS   això.
    no 2s-sbjv-touch this
    'Don't TOUCH this.'

instead of *No ho_1 TOQUIS t_1, $això_1$*. Horvath 1986 points out that the situation in Hungarian is analogous.

(127)

```
                                          /------
                     --------------------/
                     fiquem el ganivet al calaix
```

The right-detached phrase in a right-detachment construction, however, does not fall under the pitch peak, since it is located in a clause external position. Right-detached phrases follow the clause-final peak under a flat intonation contour. This is represented in (128):

(128)

```
                                   /-----
                  ------------------/          -----------
                  hi fiquem t el ganivet, al calaix
```

Intonation also signals that clitic-argument cooccurrence within the clause is ungrammatical:

(129)

```
                                        /---
                  -----------------------/
                  *hi fiquem el ganivet al calaix
```

Prosodic prominence in Catalan unambiguously signals the end of the clause. Material may occur to the right of the intonational peak, but it is clear that it appears in clause-external slots, right-adjoined to IP. The accuracy of this prosodic marking is confirmed by the pattern of clitic cooccurrence, the linear order of phrases, and the placement of clause-peripheral particles like *xec* 'man' and *oi* 'right?'.[67]

Given this, the structural position of certain adverbial adjuncts that do not have matching clitic proforms can also be established. For example, the temporal adjunct *aquesta nit* 'tonight' is located in different positions in (130)a and (130)b, despite the invariant string order:

(130)   a. Enllestiré   el treball aquesta NIT.
             1s-fut-finish the paper this night
             'I'll finish up the paper TONIGHT.'
         b. Enllestiré el TREBALL, aquesta nit.
             'I'll finish up the PAPER tonight.'

---

[67]Prosodic prominence is known to perform several tasks and therefore there may be uses of prominence unrelated to the above. The metalinguistic use of prominence cited above and the intonational encoding of illocutionary meaning are good examples of this.

In (a) the adverb is in situ, adjoined to VP, but in (b) the adverb has to be adjoined to IP, since it follows the clause-final intonation peak on *treball*. There are no linear order facts here to show that this is indeed the case, but it would not be logical to assume that intonation is fixed in the case of arguments and adjuncts that have a clitic proform but shiftable in the case of adjuncts that lack such a proform. Furthermore, the reliability of intonation signalling is confirmed by the possible placements of the clause-peripheral particles *xec* and *oi*:

(131)   a. Enllestiré el treball (*xec) aquesta NIT.
        b. Enllestiré el TREBALL, xec, aquesta nit.
           'I'll finish up the PAPER tonight, man.'
        c. Enllestirem el treball (*oi) aquesta NIT?
        d. Enllestirem el TREBALL, oi, aquesta nit?
           'We'll finish up the PAPER tonight, right?'

5.1.5   Focus-preposing

In the previous sections the two following conclusions were reached: *a*) an empty category in a VP-internal argument position must be licensed by the presence of a coreferential clitic binding that position (with the exception of wh-movement traces), and *b*) intonational prominence falls invariably on clause-final position. In this section a construction that is an apparent counterexample to both claims is discussed: focus-preposing. This construction is illustrated in (132):

(132)   a. [$_F$ Al calaix de DALT$_1$], vaig ficar   el ganivet t$_1$.
              in.the drawer of top   1s-past-put the knife
           [$_F$ 'In the top DRAWER] I put the knife.'
        b. El GANIVET$_1$, vaig ficar t$_1$ al calaix de dalt.
           'The KNIFE I put in the top drawer.'

First, intonational prominence is not at the end of the clause, as one would expect from the discussion in the previous chapter, but on the preposed phrase, with the whole clause following with a flat contour. Second, the argument position that corresponds to the preposed phrase is empty as expected, but, contrary to expectation, there is no clitic attached to the verb binding that position.[68] In fact, there may

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[68]This gap-binding configuration has led to the standard analysis of focus-preposing in Romance as a wh-movement. The wh-movement analysis of focus-preposing is not adequate for Catalan, as argued below.

not be one, as (133) shows:

(133) a. *[$_F$ Al calaix de DALT$_1$], hi$_1$ vaig ficar el ganivet t$_1$.
       b. *El GANIVET$_1$, el$_1$ vaig ficar t$_1$ al calaix de dalt.

Focus-preposing and left-detachment are similar constructions in that both seem to involve movement to the left, but there are two distinctions between the two. One, the focus-preposed phrase is intonationally prominent, while the left-detached phrase is not. And two, the left-detached phrase binds a trace and and empty category in the clause, while the focus-preposed phrase can only bind a gap. In (134) the two are contrasted. The (a) sentence is a left-detachment and the (b) sentence is a focus-preposing (cf. Vallduví 1988b for a comparison of focus-preposing and left-detachment in Catalan and Spanish):

(134) a. El ganivet$_1$ el$_1$ vaig ficar t$_1$ al calaix de DALT.
       b. El GANIVET$_1$ vaig ficar t$_1$ al calaix de dalt.

Focus-preposing is also known as Yiddish-Movement or Y-movement (Hankamer 1971), Focus Topicalization (Gundel 1974), Focus-Movement (Prince 1981), or Rhematization (Hernanz & Brucart 1987). The name 'focus-preposing' is taken from Ward 1985, who provides a thorough analysis of the pragmatics of this construction. Catalan focus-preposing is analogous to English focus-preposing, although without any restrictions on the type of argument that might undergo it.[69] The discussion of the syntax of focus-preposing is postponed until the next section, where we shall consider whether the generalizations formulated above must be changed in view of the existence of focus-preposing, or whether another solution can be found. Before, however, the informational value of all the aforementioned constructions, right-detachment, left-detachment, and focus-preposing will be discussed in § 5.2.

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[69]Prince 1981, and others before her, argues for a further distinction between Focus-Movement and Yiddish-Movement. The latter is restricted to some Yiddish-background varieties of English, which use these constructions much more often than standard English. Catalan focus-preposing covers both Focus-Movement and Yiddish-movement and its use is more like the use in the Yiddish-background varieties of English than in the standard language.

5.2 Information Packaging at the Surface

5.2.1 Prosody and Detachments

In this section the importance of left- and right-detachment for information packaging will be discussed. The informational articulation proposed in § 3.2.2 above is as in (135):

(135)   S={FOCUS, GROUND}
        GROUND={LINK, TAIL}

where the focus is the informative part and the ground is a vehicular frame that instructs the hearer to enter that information appropriately into her/his knowledge-store (cf. Ch. 4). In the following sections the encoding of this articulation in the surface syntax in Catalan will be discussed.

Left-detachment

Catalan left-detachment is, for all intents and purposes, equivalent to English topicalization or nonfocal preposing, as described in Chapter 3 (cf. Gundel 1974, Prince 1981, Ward 1985), i.e., it is a link-preposing construction. The following are examples of this construction[70]:

(136)   [written on an aerogram; first line on the extra space overleaf]
        Amb-aquest-tros-de-paperet$_1$ ja   no hi$_1$ COMPTAVA t$_1$.
        with-this-little-piece-of-paper anymore no *obl* 1s-impf-count-on
        'This-little piece-of-paper I wasn't COUNTING on anymore.'
                              [P.C. 02-87]

(137)   Quant al Joan i la Isidora no t'ho   sé   dir,
        as-for the J. and the I.   no *iobj.obj* 1s-know to-say

        doncs el Joan$_1$ [$_F$ el$_1$ veiem t$_1$ ben POC].
        since the J.   *obj* 1p-see   quite little
        'As for Joan and Isidora I can't say, since Joan we see very little of.'
                        [J.P. 03-87]

---

[70]Naturally occurring data are labeled by speaker's initials or written source and date.

(138) [after mentioning something nasty that the hearer had done to the
speaker a long time ago]
Això$_1$ ho$_1$ tinc clavat t$_1$ al fons del COR.
this   *obj* have pstppl-stick at.the depth of.the heart
Lit.: 'This I have it stuck deep in my heart.'
'This I won't forget how it hurt.'

[C.G. 02-87]

According to the informational typology established in § 3.2.3 these examples are
link-focus constructions. This sentences reflect the information-packaging instruc-
tions in (139),

(139)   a. =(136) Λx_2, $x_2=$ this-piece-of-paper[Φ[x_1 wasn't counting on x_2]]
        b. =(137) Λx_2, $x_2=$ Joan[Φ[x_1 see very little of x_2]]
        c. =(138) Λx_2, $x_2=$ this[Φ[x_1 has x_2 stuck deep in heart]]

The free variables represent the (free) weak pronominal forms, which are all null
subjects in the above examples. In the form of illustration, sentence (137) infor-
mationally means 'I am instructed to go to the address "Joan" and retrieve the
information of the sentence by adding that x_1 (whose identity is independently es-
tablished) sees very little of him [= 'Joan']'. The preposed phrases are links: they
have the 'aboutness' feeling typical of linkful structures and satisfy the poset re-
lation condition on preposed phrases of Ward & Prince 1986 (cf. § 4.3.2 above)
with the relations 'is-identical-to (a contextually evoked entity)', 'is-a-subset-of',
and 'is-identical-to', respectively.

Notice how these left-detachments represent not only the linkhood of the pre-
posed phrase, but also the fact that the nonpreposed part of the sentence left in the
lower IP is the focus, i.e., that the focus, along with the free and bound variables
in the clause is what constitutes the information carried by the sentence. The focus
is, as expected, marked by intonational prominence. In fact, given that intonational
prominence in Catalan is fixed on clause-final position, the preposing of the link,
as in (136)-(138), has a double effect: it signals the linkhood of the link, and it
removes it from the clause-final position, allowing the focus to find itself under the
intonational peak.

Right-detachment

It may be the case that a constituent that would normally sit at the end of the clause and therefore receive intonational prominence must, in a particular speaker-hearer interaction, be marked as nonfocal even when it is not a link. In other words, what if a nonfocal nonlink element, i.e. a tail element, must be removed from the intonationally-prominent slot? It cannot be left-detached, because that would make it a link, but it cannot stay there either. This is when right-detachment comes into the picture: it takes care of the marking of tails. The following are examples of right-detachment:

(140) [*ametllons*: 'green shelled almonds as they are on the tree before they ripen'; morphologically though, it is 'almond+augmentative']

    a. S_1. Saps què són, ametllons?
       'You know what 'ametllons' are?'
    b. S_2. Ametlles grosses, suposo.
       'Big almonds, I guess.'
    c. S_1. Bueno, són semblants, sí. Però aixís amb la closca i tot.
       'Well, they're similar, yeah. But like with the shell and all.'

    d. S_2. Les ametlles també en_1 TENEN, de-closca$_1$.
       the almonds also   *obj* 3p-have of-shell
       'Almonds also HAVE a shell.'
              (CC/EV 11-86)

(141) [explaining why Gerard could not find Joan's number in the phone book]
    El Gerard es veu   que no se'n$_1$ RECORDAVA t_1,   del-cognom-del-J.$_1$.
    the G.   3s-seem that no *refl.obj* 3s-impf-remember of J.'s surname
    'It seems Gerard didn't REMEMBER Joan's last name.'
                   [M.R.B. 06-90]

(142) Vet aquí la veu de l'autoritat, això cal, això no cal: aquesta és la realitat.
    'Here's the voice of authority, this is necessary, that isn't:
    this is reality.'
    Ah, carall, que pro_1 n_2'ÉS, de-dura$_2$, de-vegades$_3$, la-realitat$_1$.
    Lit.: 'It IS so, tough, sometimes, reality.'
    'Oh, shit, reality IS tough sometimes.'
      (Pau Faner, *La primera oració*, AVUI 1-25-87)

Examples (140)d and (141) are link-focus-tail structures, and (142) is an example of focus-tail structure.

As discussed in Chs. 3 and 4, the presence of the tail alters the brand of the Φ 'retrieve-information' operator, turning it from a plain 'add' into a 'substitute-for' (cf. § 4.2.2). This notational operation represents the fact that the tail indicates that, under a given address, the information carried by the sentence must not be merely added, but construed with the material denoted by the tail. Let us illustrate this with (140)d. The instruction it represents is (143)

(143) Λx_1, $x_1 =$ almonds, $\lambda x_2[\ \Phi[\ x_1$ **also have** $x_2 \ ]]$ (a shell)

This may be read as 'I am instructed to go to the address "almonds", and then retrieve the information of the sentence by substituting **also have** for the blank in 'almonds __ shells', which is already under "almonds" '. In other words, the speaker assumes the hearer knows that a relation holds between almonds and shells so s/he treats 'x_1 also have x_2' as the information conveyed by this sentence at the time of utterance. In addition, s/he also specifies how this sentence contributes to the hearer's knowledge-store by directing the hearer to the adress 'almonds' to add the information there.

The right-dislocation in (140)d indicates that *de closca* 'a shell' is a tail. It removes that phrase from the 'scope' of the intonational peak without converting it into a link. If the intonation contour in Catalan were malleable, prominence could be shifted to the left and the same effect would be achieved. This is, in fact, what English does: what Catalan right-detaches, English demotes intonationally. This has been pointed out in several occasions, as with the example in (144), where (a) and (b) are informationally accurate translations of each other:

(144)   a. L'amo l_1'ODIA, el bròquil$_1$.
          b. The boss HATES broccoli.

Before closing this section on right-detachment, it must be mentioned that there are other informational analysis of right-detachment in Romance and in natural language in general. These analyses are of two kinds: those that suggest that right-detachments are an 'afterthought'—an analysis that reduces the phenomenon to a language-production error of sorts—and those that take the right-detached phrase to be a topic, be it a topic-topic or a Givón-topic. As pointed out in Vallduví 1988a, these analyses have several conceptual problems and are empirically inadequate to handle the phenomenon in Catalan.

5.2.2 Subjects Revisited

It was noted in § 3.1.2 that subjects in SVO languages, as a default, are interpreted as links (cf. van Oosten 1986, Horn 1989:Ch. 7). Catalan preverbal subjects do not seem to constitute an exception to this generalization, as the discussion in previous chapters indicates. They show the same aboutness feeling, the same existential force, and seem to obey Ward & Prince's poset relation condition on preposing as well. What about postverbal subjects? By definition, they cannot be links, since links are thought to be universally sentence-initial. This means they have to be tails or (part of) the focus.

Right-detached Subjects

If the postverbal position of subjects in Catalan is VP-final, they will automatically be under the scope of intonational prominence, since intonation is fixed (and therefore interpreted as focal). Subjects, however, can undergo right-detachment as well, as seen already in (142). Example (145) shows the three positions of a subject: preverbal (a), VP-final (b), and right-detached (c).

(145)   a. La Coia [$_F$ pararà   la TAULA].
            the C.   3s-fut-set the table
            'Coia will set the TABLE.'
        b. [$_F$ Pararà la taula la COIA].
        c. [$_F$ Pararà la TAULA], la Coia.

Notice that (c) has the intonation contour typical of right-detached phrases: the fixed clause-final prominence precedes the clause-external right-detachment. However, in contrast to the verbal complements discussed in previous sections, right-detached subjects do not need to bind a clitic in the clause. This fact, not surprising given that Catalan is a null subject language, makes (b) and (c) in (145) look structurally alike except, of course, for the intonation contour. Recall that in the case of right-detached objects (b) and (c) would have been further distinguished by the mandatory presence of a coreferential clitic in (c) and its mandatory absence in (b).

Furthermore, even though the clitic facts cannot be used to determine the location of subjects, the evidence provided by the prosodic pattern is, as expected,

backed by the evidence provided by the placement of the clause-peripheral particles *xec* 'man' and *oi* 'right?':

(146) a. [F Pararà la taula (*xec) la COIA], xec.
       b. [F Pararà la TAULA], xec, la Coia.
          'Coia'll set the TABLE, man.'
       c. Pararà la taula (*oi) la COIA, oi?
       d. Pararà la TAULA, oi, la Coia?
          'Coia'll set the TABLE, right?'

The evidence provided by prosody is firm and the subject *la Coia* in (145)c and (146)b-d can be assumed to be in a clause-external right-adjoined-to-IP position. Right-detached subjects, like any right-detached phrase, are interpreted as tails.

VP-final Subjects

Postverbal clause-internal subjects, then, fall under the intonation peak and must therefore be part of the focus. This is the case in (145)b above and in the cases seen in previous chapters, like the following:

(147) [F Ha trucat l'AMO].
          3s-perf-call the.boss
       [F 'The BOSS has called].'

Sentence (147) is an all-focus structure representing the instruction Φ[**the boss called**], and its meaning is as in 'I'm instructed to retrieve the information of the sentence by adding that the boss called into my knowledge-store under a temporary situation address'. Notice that in English these sentences show intonational prominence on the subject. This signals their status as all-focus sentences. The equivalence between VS order in Romance and the all-focus (news-sentence, thetic judgment, etc.) intonation pattern in English has long been noticed (cf. Bolinger 1954, Hatcher 1956, Contreras 1976, Lambrecht 1987, 1988, etc.)

A subject, then, like any other sentence constituent, may be part of the focus (VP-final) or part of the ground; if part of the ground, it may be a tail (clause-external right-detached), or a link (preverbal). Examples (148) to (150) illustrate the three positions/informational-roles of subjects:

(148)   Focal:
         Tot està ben posat
         perque [F ha parat la taula la COIA]. Aquesta és la raó.
         'Everything is in its right place
         because Coia's set the table. That's the reason.'

(149)   Tail:
         S_1: El meu xiquet no m'ajuda mai, amb les feines de casa.
         S_2: Ah, no? Doncs a casa [F sempre para la TAULA], la Coia.
         'S_1: My son never helps me with the housework.
         S_2: He doesn't? At home she always sets the TABLE, Coia.'

(150)   Link:
         Vosaltres fregueu el plats, que la Coia [F ja ha parat la TAULA].
         'You guys do the dishes. Coia already set the table.'

Preverbal Subjects

What is the structural position of preverbal subjects? Traditionally it has been considered that subjects are located in the [Spec, IP] slot, which was an underived position. This view, however, is undergoing thorough revision in current research. Many authors suggest that the surface position of preverbal subjects in English and Romance, for instance, is a derived position (cf. Zagona 1982, Kitagawa 1986, Kuroda 1986, Fukui 1986, Fukui & Speas 1986, Koopman & Sportiche 1988, Bonet 1989, Pollock 1989). Others, like Contreras 1986, Kroch, Santorini & Heycock 1988, Rigau 1988, Fernández-Soriano 1989 and Santorini 1989, even suggest that the surface position of the subject is a left-adjoined position.

The situation so far is as follows: *a*) we have two apparent positions for subjects within the core clause, but only one for other arguments; *b*) complements of the verb that are informational links occur in a left-adjoined-to-IP position; and *c*) sentence-initial preverbal subjects are interpreted as links. If Catalan preverbal subjects were not located in [Spec, IP] but in a left-adjoined position, like some of the research mentioned above suggests, we would obtain an explanation for facts a) to c). Subjects would have only one possible position within the core clause—VP-final—just like the other arguments, and subjects, like any other argument, when interpreted as links, would move to a sentence-initial adjoined-to-IP slot.

The left-adjunction-to-IP hypothesis for subjects is a desirable one in that it takes care of some irregularities in the syntactic distributional facts and homogenizes the informational representation of links. Left-adjunction is already necessary for the preposed link complements of the verb, so there is no need to make any addition to our phrase structure. In addition, it is obvious that subjects may be left-adjoined as well: sentence (151) contains an embedded subject adjoined to a matrix IP; sentence (152)b is a double left-detachment, with an object occurring between the subject and the clause; and sentence (153)a shows the clause-peripheral particle *xec* between the subject and the clause, just as it occurs between preposed links and the clause in (153)b:

(151)   El Pep$_1$ no crec   que t$_1$ vulgui   peix.
          the P.   no 1s-think that   3s-sbjv-want fish
          'Pep I don't think will want fish.'

(152)   a. De peix$_2$ el Pep no en$_2$ voldrà t$_2$.
             of fish   the P. no *obj* 3s-fut-want
             'Fish Pep won't want any.'
          b. El Pep$_1$ de peix$_2$ t$_1$ no en$_2$ voldrà t$_2$.

(153)   a. El Pep$_1$, xec, t$_1$ no en$_2$ voldrà t$_2$, de peix$_2$.
          b. De peix$_2$, xec, t$_1$ no en$_2$ voldrà t$_2$, el Pep$_1$.

Of course, this evidence does not show that *all* preverbal subjects occur in a left-adjoined slot. It only shows that they may appear on a left-adjoined slot. There are some additional facts that suggest that subjects may *always* appear in a left-adjoined position. We turn to these facts in the next section, where the exact adjunction location of detached phrases is discussed. Nevertheless, taking the facts reviewed so far into consideration, it will be assumed henceforth that the base position of the subject is the VP-final one.

5.2.3   The Adjunction Site for Left-detachment

It was noted above that left-detached phrases must be in a clause-external position and, following Baltin 1972, Rochemont 1989, and others, it was assumed that they were adjoined to IP. This section provides further evidence that this is indeed the correct analysis and then focuses on the repercussion of the analysis for the structural position of preverbal subjects.

It is well known that links in some Romance languages, including Catalan, appear to the left of wh-phrases (cf. Rivero 1980, Plann 1982). This is illustrated in (154):

(154)   a. Al Roc$_1$ que$_2$ li$_1$ donaràs t$_2$ t$_1$ *pro*?
           to.the R. what *iobj* 2s-fut-give
           'To Roc what are you going to give?'

        b. El ganivet$_1$ on$_2$ el$_1$ fiquem t$_1$ t$_2$ *pro*?
           the knife   where *obj* 1p-put
           'The knife where do we put?'

        c. El Roc$_1$ qui$_2$ el$_1$ va veure t$_1$ t$_2$?
           the R.   who *obj* 3s-past-see
           'Roc who saw (him)?'

At first blush, this suggests that the left-detached phrase does not adjoin to IP but to CP, i.e. to the left of the [Spec, CP] position where wh-phrases apparently land. But this option is soon discouraged by the relative order of links and complementizers: links are located to the right of the complementizer, as shown in (155) and (156):

(155)   a. Diu   que el ganivet$_1$ on$_2$ el$_1$ ficaràs t$_1$ t$_2$ *pro*.
            2s-say that the knife   where *obj* 2s-fut-put
            Lit.: 'He's asking that the knife where you'll put.'
            'He's asking where you'll put the knife.'
         b. *Diu el ganivet$_1$ que on$_2$ el$_1$ ficaràs t$_1$ t$_2$ *pro*.

(156)   a. Pregunten que la feina$_1$ qui$_2$ la$_1$ farà t$_1$ t$_2$.
            3p-ask   that the work who *obj* 3s-fut-do
            Lit.: 'They're asking that the work who will do?'
            'They're asking who will do the work.'
         b. *Pregunten la feina$_1$ que qui$_2$ la$_1$ farà t$_1$ t$_2$.

This indicates that wh-words are not actually in [Spec, CP], to the left of the complementizer, but in some lower position within the clause.[71] Left-detached links, therefore, are found lower than CP but higher than IP, i.e. adjoined to IP.

Furthermore, it is also well known that preverbal subjects must appear to the

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[71]See Plann 1982 for an alternative analysis where certain matrix verbs select for a double CP structure with a slot for the link between the two complementizer projections. This proposal seems to enrich phrase structure excessively.

left of the wh-phrase and to the right of the complementizer as well.[72] This is shown in (157) and (158), and (159):

(157)   a. El Lluc$_1$ on$_2$ va ficar   el ganivet t_2 t_1?
            the L.   where 3s-past-put the knife
            'Where did Lluc put the knife?'
    b. *On$_2$ el Lluc$_1$ va ficar el ganivet t_2 t_1?

(158)   a. El Lluc$_1$ qui$_2$ va veure t_2 t_1?
            the L.   who 3s-pst-see
            'Who did Lluc see?'
    b. *Qui$_2$ el Lluc$_1$ va veure t_2 t_1?

(159)   a. Pregunten que el Lluc$_1$ qui$_2$ va veure t_2 t_1.
            3p-ask   that the L. who 3s-pst-see
            Lit.: 'They're asking that Lluc who saw.'
            'They're asking who Lluc saw.'
    b. *Prequnten el Lluc$_1$ que qui$_2$ va veure t_2 t_1.

This distribution has led several researchers (e.g. Campos 1986, Eguzkitza 1986) to propose that (some) wh-movement in Romance, especifically Spanish, does not involve [Spec, CP] in any way. Instead, they suggest, following Horvath's (1986) proposal for Hungarian, that there exists a special structural slot adjoined to V^0 or I^0, which serves as a landing site for wh-movement. There is a problem, however, with Campos' and Eguzkitza's analysis: the fact that they have to posit an ad hoc slot for the wh-word to land. The adjunction-to-I^0 analysis is problematic because, following Chomsky 1986 and Fukui 1986, adjunction is only possible to maximal projections. The adjunction to V^0 analysis has the same problem but, in addition, it also turns wh-movement into a downgrading movement.

Now, if one assumes that all preverbal subjects appear in a left-detached slot, a non-ad-hoc structural position, [Spec, IP], becomes automatically available for wh-words to land. If this position is always empty, it may be used as a landing site for wh-movement. In other words, Campos' and Eguzkitza's proposal may be implemented and still avoid the problem of creating a new structural position for

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[72]In Catalan, as noted, subjects may also be VP-final or right-detached. In Spanish there seems to exist a process of subject-verb inversion that places the subject between the verb and the direct object (cf. Torrego 1984). This operation is not available in Catalan (cf. Picallo 1984 for dissent; this might be due to dialectal difference).

the purpose of accommodating the wh-phrase. Although this last point must be taken in a speculative note, it seems to provide further support for the idea that subjects are always left-detached if preverbal.

To summarize, getting rid of a base preverbal position for subjects eliminates the need to accept two base positions for subjects, levelling subjects with the other arguments of the verb in that all would be able to surface in one single postverbal base position, a right-detached slot, and a left-detached slot. It also correlates with the fact that preverbal subjects are always interpreted as links. Finally, given the Campos-Eguzkitza proposal for wh-movement in Romance, it provides a landing site for the wh-element, thus freeing that analysis of its main problem.

It seems, then, that after all these considerations, there is a very straightforward representation of information packaging in Catalan surface syntax. All links are left-detached, all tails are right-detached, and whatever is left in the core clause (under the lowest IP) must be interpreted as focal (with the exception of clitics). Focus-preposing, as introduced above in § 5.1.5, is the only apparent counterexample to this generalization. The next section looks at focus preposing and shows that, despite its apparent configuration, it may be incorporated into the general pattern of information-packaging representation in Catalan.[73]

5.2.4 Focus-preposing Revisited

All the cases of left- and right-detachment seen above have one characteristic in common. They detach any argument or complement of the verb to the left or to the right to mark it as a link or as a tail, respectively. As a consequence, the nonclitic nondetached material that appears within the core IP must be all focal. Unavoidably, the focal material will be either V or a projection of V, i.e. V^n. It appears, then, that left- and right-detachments are used only when the focal constituent is V^n.

How does Catalan express cases in which the focal material excludes the verbal head, i.e. cases in which V is part of the ground? The answer to this question is focus-preposing. Focus-preposing is an anomalous construction in that it violates two of the generalizations established on the basis of the other configurations: intonational

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[73]An earlier version of the discussion in § 5.2.4 is the subject of Vallduví 1989.

prominence is not clause-final but clause-initial, and the preposed phrase does not bind a clitic in the clause but only a gap. The following examples illustrate the construction:

(160)   [S_1 is addressing S_3. S_2 is present]
          S_1: Hòstia! S'hem acabat la botella, eh! Que som... que som...
          S_2: Les dues botelles ja!
          S_1: DUES-BOTELLES$_1$, s'hem polit t_1.
          'S_1: My god! We finished the bottle! We are... we are...
          S_2: The two bottles already!
          S_1: TWO-BOTTLES$_1$, we polished off t_1.'
                            [QM 10-85]

(161) S_1. Xec, avui vaig perdut.
          S_2. Com sempre...
          S_3. CERDO$_1$, ha anat t_1 tots aquests dies! CERDO$_1$, va t_1!
          'S_1. Boy, I'm really drunk today.
          S_2. As usual...
          S_3. WASTED$_1$, he's been t_1 lately! WASTED$_1$, he is t_1!'
                            [PC 10-85]

In (160) the focus is the direct object and in (161) the focus is the predicate nominal. In both cases, the verb is excluded from the scope of the focus operator and is, therefore, part of the ground.

Once the particular task of focus-preposing and detachment qua information-packaging constructions is clear, it becomes obvious that they stand in complementary distribution: while, as noted, detachment is used in cases where the focus is V^n, focus preposing is used to signal the focus in cases where the focus is not V^n.[74] This complementarity is most clearly seen from the focus-tail examples in (162) to (165), although the same pattern would be obtained with linkful structures. Examples (162)-(163) are right-detachments that, by right-detaching the tail, signal that the V^n material in the clause is focal. Examples (164)-(165) are focus-preposings that isolate the non-V^n focus of the sentence by preposing it to the left. The tail material is left in the clause:

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[74]One must exclude, of course, cases of all-focus sentences where the focus is the entire IP. Notice, however, that in these cases we need neither detachment nor focus-preposing.

(162)   Right-detachment: Focus-tail. Focus is V.

Els$_1$ TÉ t$_1$ t$_2$, molts amics$_1$, la Núria$_2$.
obj 3s-have   many friends the N.
'Núria HAS many friends.'

(163)   Right-detachment: Focus-tail. Focus is VP.

[$_F$ Té   molts AMICS t$_1$, la Núria$_1$.
   3s-have many friends   the N.
'Núria has many FRIENDS.'

(164)   Focus-preposing: Focus-tail. Focus is object NP.

molts-AMICS$_1$, la Núria té t$_1$.
many friends   the N.   3s-have
'Many FRIENDS, Núria has.'

(165)   Focus-preposing: Focus-tail. Focus is subject NP.

La NÚRIA$_1$, t$_1$ té   molts amics.
the N.   3s-have many friends
'NÚRIA, has many friends.'

Apparently, then, the full range of focal choices within a given packaging instruction, here a focus-tail structure, is represented at surface structure by the constructions here discussed.[75]

The situation so far is the following: a) two syntactic constructions encode the same information-packaging instruction and stand in complementary distribution with respect to the particular constituent they mark as focus; b) both constructions are prosodically homophonous, with a pitch maximum on the focus, as expected, and an ensuing flatter contour over the nonfocal material; and c) yet these constructions are thought of as radically different in strict syntactic terms, due to the pivotal nature attributed to the [+TNS] verb cluster.

In principle, there is nothing wrong with this situation: linguists interested in describing the mapping between surface structure and informatics could take note

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[75]Notice that in the case of focused subjects, the last example above, one cannot determine from string order whether they are in situ or in an A′-position. They will be assumed to be focus-preposed, following the overt structure of parallel object focus-preposings. Notice, also, that when the focused constituent is a [+TNS] verbal element the actual focus could be the lexical category V^0, the functional category [TNS], or even the affirmation/negation scale [yes/no].

of the mismatch and incorporate it into their theory. But, of course, there is a very attractive alternative: exploring the possibility that focus-preposing and right-detachment are identical in strict syntactic terms as well. If there is evidence for it, this move is highly desirable, not only because of the spirit of the structuralist method, but also because it provides us with a much more elegant account of the syntax of information packaging. If they can be reduced to one and the same construction we may be able to maintain the generalization o the representation of information packaging in Catalan surface syntax introduced above. Let us look closely at the syntactic facts around focus-preposing and right-detachment

Syntactic Structure

Traditionally, focus-preposing has been viewed as a wh-movement operation, totally parallel to wh-question formation. This is the approach followed by Bonet & Solà (1986:138f.) for Catalan, and Hernanz & Brucart (1987:96ff.) for Spanish, among others. The structure of a sentence like (166), would be, then, identical to the structure of a wh-question (167), with the focus-preposed phrase in [Spec,CP]:[76]

(166)   Focus-preposing:

   $[_{CP}$ Molts-AMICS$_1$ [té t$_1$ *pro*]].
   'Many FRIENDS, (she) has.'

(167)   Wh- question:

   $[_{CP}$ Què$_1$ [TÉ t$_1$ *pro*]] ?
       what   3s-have
   'What does (she) have?'

This analysis certainly captures the generalization that both focus-preposed XPs and wh-phrases bind an empty category in the clause to their right, contrary to link left-detachment, which must bind a pronominal clitic, and which was assumed to have the structure in (168), involving an adjunction to IP and not involving CP in any way.

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[76]Bonet & Solà's (1986) account, following Chomsky 1976, actually base-generates the XP in a fixed topic position and posits a null-operator movement into [Spec,CP] (i.e. [XP$_1$ [O$_1$ [...t$_1$...]]]). Both approaches, though, crucially involve a wh-movement into CP. Also, for the sake of argument, the discussion here on the position of wh-words in Catalan in the previous section will be ignored and it will be assumed that they move into [Spec, CP].

(168)   Link-marking left-detachment:

[$_{CP}$ [$_{IP}$ Molts amics$_1$ [$_{IP}$ els$_1$ TÉ t$_1$ *pro*]]].
'Many friends (she) HAS.'

In order to capture this generalization in this fashion, it has to be assumed that the wh-phrase in a wh-question is interpreted as the focus of the sentence in which it occurs. If wh-phrases are focused constituents, it makes perfect sense that both are structurally the same. That wh-phrases are the focus of the sentence in which they occur is a widespread belief within the syntactic literature on focus, as illustrated, for instance, by Rochemont 1986:19, Horvath 1986:118, Hernanz & Brucart 1987:97ff., Campos 1986, Eguzkitza 1986, etc. From the informational point of view, however, there is no reason to believe that wh-phrases are focused constituents. In fact, this is a problematic assumption: in a paper on the informational role of gap-containing constructions in English, Prince 1986:215 suggests that wh-questions have a 'special story', and that they are very different from information-packaging constructions. Kuno 1980, 1982 has argued that, in Japanese, the focus of a question must contain the wh-phrase, but not that the focus of a question is *only* the wh-phrase. Erteschik-Shir 1986 offers a number of arguments against considering that wh-phrases in wh-questions are interpreted as informational foci. Moreover, Wunderlich 1981 describes wh-questions where the wh-phrase is the focus, but also wh-questions where it is not. Finally, if the prosodic characteristics of questions are taken into account, it will be noticed that intonational prominence does not fall on the wh-word, even though focus is always marked by prominence in any other situation.[77]

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[77] Actually, Catalan presents different intonation contours for different types of wh-questions, along the lines of the division made by Wunderlich 1981. Unmarked wh-questions have clause-final intonational prominence, like the wh-question seen above or (i) here. Marked wh-questions are also allowed, as in (ii), with intonational prominence on the wh-phrase (and they are not echo questions):

(i) Qui$_1$ VINDRÀ t$_1$?
     who 3s-fut-come
     'Who$_1$ t$_1$ will COME?'
(ii) QUI$_1$ vindrà t$_1$?
     'WHO$_1$ t$_1$ will come?'

The focus in (ii) is the wh-phrase, but not necessarily so in (i). The phrases to the right of the wh-phrase in sentences like (ii) do behave as if they had been right-detached.

Perhaps the fact that both wh-questions and focus-preposing involve the binding of a gap can be captured somehow else. In fact, the main piece of evidence in support of the wh-like behavior of the focused XP in focus-preposing is that both focus-preposing and wh-questions, at least in Spanish, trigger subject-verb inversion (cf. Torrego 1984 for Spanish and Picallo 1984 for wh-questions in Catalan). Hernanz & Brucart (1987:96f.) present an analysis of Spanish focus-preposing (their *rematización*) along these lines. Unfortunately, in Catalan, while it is true that the uninverted order is impossible in wh-questions, focus-preposing does not require subject-verb inversion. In other words, Catalan (169) and Spanish (170), wh-questions without inversion, are both ungrammatical, but when it comes to focus-preposing without inversion, Catalan (171) is perfect, whereas Spanish (172) is out:[78]

(169) Catalan Wh-movement:

    *[$_{CP}$ Què$_1$ [$_{IP}$ la Núria té t$_1$]]?
       what   the N.   3s-have
    'What does Núria have?'

(170) Spanish Wh-movement:

    *[$_{CP}$ Qué$_1$ [$_{IP}$ María tiene t$_1$]]?
       what   3s-have
    'What does María have?'

(171) Catalan focus-preposing:

    [$_{CP}$ Molts-AMICS$_1$ [$_{IP}$ la Núria té t$_1$]].
    'Many FRIENDS, Núria has.'

(172) Spanish focus-preposing:

    *[$_{CP}$ Muchos-AMIGOS$_1$ [$_{IP}$ María tiene t$_1$]].
    'Many FRIENDS, María has.'

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[78]Above it was stated that Catalan presented no subject-verb inversion (cf. Picallo 1984 for dissent). If this position is correct, then the evidence in these examples must be interpreted differently: whatever factor it is that does not allow the subject to go between wh-words and the verb in Catalan (in our terms it is just a matter of string order, since subjects are clause-external and the wh-word is clause-internal) does not affect subjects in the case of 'focus-preposing'. This shows that the two constructions are different.

The facts around subject-verb inversion, then, cannot be used to structurally equate wh-questions and focus-preposing in Catalan, in the way they seem to support this equation in Spanish. This suggests that perhaps there exists an important difference between the otherwise parallel constructions in Catalan and Spanish.

That 'focus-preposing' is not a wh-movement operation in Catalan seems to be further confirmed by the fact that it does not obey the island constraints. Compare the grammatical Catalan sentence in (173) to the ungrammatical Spanish sentence in (174) (from Hernanz & Brucart (1987:97; ex. 72)), where extraction from within an island apparently results in ungrammaticality:

(173)   Els CALÉS, la Núria no sap   qui té.
         the money the N.   not 3s-know who 3s-have
         'The MONEY, Núria doesn't know who has.'

(174)   *El DINERO, ignora   María quién tiene.
         the money   3s-not.know M.   who   3s-have
         'The MONEY, María doesn't know who has.'

Sentences like (173), however, pose a problem also for the analysis that will be presented below. Once this analysis is laid out, this problematic example will discussed in more detail.

As noted above, the distribution of these constructions, regarding the different parts of the sentence they respectively signal as focus, seems natural if we assume that we have a fixed undetachable [+TNS] verbal core. However, another possible approach becomes obvious if we assume that the [+TNS] element in the clause is indeed detachable.

A first hypothesis from this point of view would suggest that apparent right-detachment of the arguments of V^0 could actually be the focus-preposing of V^0 itself (assuming clitics attach to V^0). So, in a sentence like (175)b ((175)a is the corresponding canonical), one could argue that the focused V^0 has been preposed to [Spec, CP] from its clausal slot between the subject and the object (S=subject, V=verb, 0=direct object, I=indirect object):

(175) a. La Núria$_S$ donarà$_V$ les claus$_O$ al fuster$_I$.
     the N.   3s-fut-give the keys   to.the carpenter
     'Núria will give the keys to the carpenter.'

     b. Les$_O$ hi$_I$ DONARÀ, la Núria$_S$, les claus$_O$, al fuster$_I$.
     obj   iobj 3s-fut-give the N.   the keys   to.the carpenter
     'She WILL GIVE the keys to the carpenter, Núria.'
     c. Les$_O$ hi$_I$ DONARÀ, {S,O,I;S,I,O;O,I,S;O,S,I;I,S,O;I,O,S}.

Unfortunately, the fact that the elements to the right of the focus can be freely ordered, as represented by (175)c, does not support this approach. One could, if anything, postulate free scrambling of constituents, without any informational relevance, in the clause following the focused V^0. However, there is no independent motivation to support this move, since canonical (i.e. non-focus-preposing) sentences in Catalan do not accept free scrambling at all. Moreover, if (175)c is in fact a right-detachment construction, the linear order variation that its postfocal constituents present is not a problem: one of the characteristics of right-detachment is that, when multiple detachment occurs, the detached phrases end up in any possible linear order. The range of linear order possibilities in (175)c is just what one should expect.

Taking these facts into account, and still assuming that the [+TNS] element in the clause is detachable, there is yet a second possibility. If from the canonical sentence in (175)a one derives a sentence where the only focal material is the indirect object PP, one obtains (176):

(176) Al FUSTER,   la Núria donarà   les claus.
     to.the carpenter the N.   3s-fut-give the keys
     'To the CARPENTER, Núria will give the keys.'

Example (176), according to the traditional analysis, is a focus-preposing. But, observing the behavior of the phrases to the right of the focus with respect to linear order, it is clear that they behave exactly like the right-detached phrases in (175)b-c: here, again, any order among the phrases to the right of focus is grammatical,

(177) a. Al FUSTER, la Núria$_S$, donarà$_V$, les claus$_O$.
     'To the CARPENTER, Núria will give the keys.'
     b. Al FUSTER, {S,V,O;S,O,V;V,S,O;V,O,S;O,S,V;O,V,S}.

If (177)b is viewed as a focus-preposing, the free linear order among the phrases to the right of the focus remains unexplained, unless one is willing to postulate free scrambling, which is not a desirable approach, as noted above. If, on the other hand, it is viewed as a right-detachment, where the V^0 has been detached to the right along with the subject and object NPs, parallel to (175)b-c, the problem automatically disappears, given that right-detached phrases can appear in any linear order. The structure of our 'focus-preposing-turned-right-detachment' should be, then, as in (178), allowing free linear order among the detached phrases:I

(178)   a. $[_{IP=F}$ v$_1$ molts AMICS t$_2$], té$_1$, la-Núria$_2$.
        b. $[_{IP=F}$ v$_1$ molts AMICS t$_2$], la-Núria$_2$, té$_1$.
          '$[_F$ Many FRIENDS], Núria has.'

It was already mentioned that by considering focus-preposing to be an actual right-detachment, the otherwise problematic free linear order among the postfocal phrases can be accounted for. It is also clear that there is no reason now for 'focus-preposing' to trigger subject-verb inversion, since it is does not involve a fronting, let alone a movement into [Spec,CP], unlike wh-question formation. The linear order of the subject and the verb in (178), for instance, is free, because they are individually detached phrases.

Furthermore, consider an example like (179)a, for which (179)b is the corresponding canonical:

(179)   a. $[_F$ tenir-ne$_2$ MOLTS], vol   d'amics$_2$ la Núria.
          to-have.*obj* many   3s-want of-friends the N.
          Approx.: 'Friends, it is $[_F$ having MANY] that Núria wants.'
        b. [La Núria vol [(PRO) tenir molts amics]].
          'Núria wants to have many friends.'

If the structure in (180), i.e. the traditional focus-preposing analysis where the focused embedded infinitival clause has been moved to [Spec,CP], is assumed for (179),

(180) $[_{CP}$ (PRO) $[_F$ tenir-ne$_2$ MOLTS] $[_{IP}$ vol d'amics$_2$ la Núria]].

we run into trouble when trying to account for the position of *d'amics* 'of-friends', a complement of the embedded verb *tenir* 'to have'. One would have to say, then, that part of this embedded clause, namely the N$'$ in the object QP, has been lowered back

inside IP leaving a clitic copy behind, *ne*. This derivation, involving a downgrading movement, has no parallel in the language, and is extremely hard to justify. In contrast, accepting (181),

(181) $[_{IP=F}$ v_1 $[$ (PRO) tenir-ne$_2$ MOLTS $]$ t_3 $]$, vol$_1$, d'amics$_2$, la Núria$_3$.

the structure presupposed by this proposal, where the embedded clause remains in situ, and where the matrix V^0, the matrix subject, and the object of the embedded clause are right-detached, this sentence is just one more unproblematic example of right-detachment. It is interesting to note here that, once more, the linear order among the postfocal phrases in (179)a (=(181)) is free.

Notice, furthermore, that, from this standpoint, we can also account for the fact that, while link-preposing left detachment and right-detachment require a pronominal clitic in the clause coreferential with the XP, 'focus-preposed' XPs must bind a gap in the same situation. Right- and left-detachment bind a clitic in IP because they are detached away from their head, V^0, and V^0 requires the presence of the clitics when its arguments are not present in the clause. But XPs in the alleged 'focus-preposing' construction are not detached XPs anymore. They remain in situ, and it is the V^0 head now which is detached, subject to right-detachment, leaving its original slot in the clause empty. Therefore, no clitic, coreferential with the focus, appears with V^0, since the focus remains in its canonical argument position in the clause, and, therefore, does not license the presence of a clitic. Both our proposal and the traditional approach, then, account for the clitic-versus-gap distribution.[79]

The apparent 'focus-preposing' of Catalan is not a 'preposing' at all but a right-detachment, and what has been traditionally considered a detached XP is actually an XP in situ. It is perhaps surprising that such a difference should underlie the apparently similar 'focus-preposing' configurations of Catalan and Spanish. The facts, though, seem clear: in Catalan the order of the postfocal phrases, the verb

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[79]Positing the detachment of the [+TNS] verbal element to a clause-peripheral right-dislocation position might strike one as an unusual proposal. However, if V^0 adjoins to IP, the detached [+TNS]-carrying verb can properly govern the trace in I^0 position, a necessary condition to license verbal empty categories, according to Koopman (1984:170ff.). Also, this proposal runs counter to the Head Movement Constraint as posited by Travis (1984:131): 'An X^0 may only move into the Y^0 which properly governs it'. The detachment slots we are considering in this paper are not Y^0 positions, but see Torrego 1984, Kayne 1989, Schlonsky 1990 for analyses where X^0 is adjoined to XP. If the movement into the adjoined-to-XP position is terminal, as in our case, the problems with barrierhood that the HMC was designed to prevent do not even arise.

and the subject, in the apparent 'focus-preposing' of an object is free (cf. (178)) (as it should if they were right-detached); in Spanish, in contrast, it is not, given that sentences like (170) are out, since the verb and the subject must be inverted. In Catalan, 'extraction' of a 'focus-preposed' phrase from within islands is possible (given that there is actually no extraction, since the focused phrase remains in situ); in Spanish it is not. It follows, then, that Spanish should not allow the free arrangement in the linear order of the postfocal phrases that Catalan presents in sentences like (177)b. And, in fact, it does not, as shown by (183), from Contreras (1976:106; ex. 10.12) ((182) is the canonical):

(182)   Don Fermín sacó sus espuelas de la sala.
        'Don Fermín took his spurs out of the room.'

(183)   a. De-la-SALA, sacó don Fermín sus espuelas.
        b. De-la-SALA, sacó sus espuelas don Fermín.
        c. *De-la-SALA, sus espuelas don Fermín sacó.
        d. *De-la-SALA, don Fermín sus espuelas sacó.
        e. *De-la-SALA, don Fermín sacó sus espuelas.
        f. *De-la-SALA, sus espuelas sacó don Fermín.

In Catalan, as pointed out above, all the linear orders to the right of the focus are grammatically generated:

(184)   a. Del CALAIX, la Núria$_S$ va treure$_V$ els esperons$_O$.
           of.the drawer the N.   3s-past-take-out the spurs
           'The DRAWER, Núria took the spurs out of.'
        b. Del CALAIX, {S,V,O;S,O,V;V,S,O;V,O,S;O,S,V;O,V,S}.

A consequence of this proposal is, then, that the representation of focus at surface structure is crucially different in Catalan and Spanish, despite the apparent similarity between 'focus-preposing' configurations in both languages.[80]

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[80]Italian seems to pattern like Catalan in this respect: both (i) and (ii) are grammatical strings ((i) is from Antinucci & Cinque (1977:123; ex. 17)):

(i) UN'AUTOMOBILE, Giorgio,   ha comprato.
(ii) UN'AUTOMOBILE, ha comprato, Giorgio.
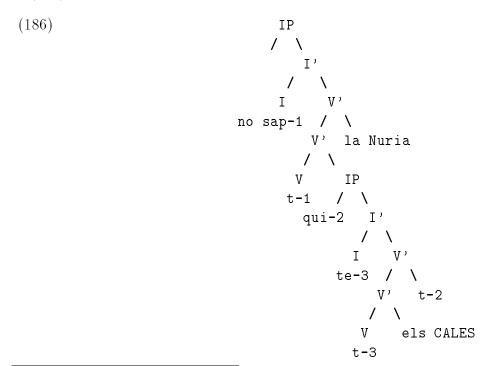   a car   3s-pst-buy   G.
    'A CAR, Giorgio bought.'

But in wh-questions only one order is possible:

(iii) Che cosa ha comprato Giorgio?

Before closing this section, let us return to the problematic example (173), repeated here as (185):

(185)   Els CALÉS, la Núria no sap   qui té.
         the money the N.   not 3s-know who 3s-have
         'The MONEY, Núria doesn't know who has.'

This example was brought up as a problem for the position that focus-preposing is a wh-movement because it involves a clear violation of the wh-island constraints. It was also noted, though, that it presented a problem for the 'focus-preposing as right-detachment' analysis as well.

The 'focus-preposing as right-detachment' analysis states that the focal phrase *els calés* stays in situ and that the postfocal phrases are detached according to constituency. Assuming that wh-movement and V-to-I movement take place before right-detachment in the derivation from D-structure to S-structure, the pre-detachment equivalent of (185), *No sap qui té els calés la Núria*, has the structure in (186):

(186)
```
                        IP
                       /  \
                           I'
                          /  \
                         I     V'
                     no sap-1 /  \
                             V'  la Nuria
                            /  \
                           V     IP
                          t-1   /  \
                             qui-2  I'
                                   /  \
                                  I    V'
                               te-3   /  \
                                     V'    t-2
                                    /  \
                                   V    els CALES
                                 t-3
```

(iv) *Che cosa Giorgio   ha comprato?
     what   G.   3s-past-buy
     'What did Giorgio buy?'

If Italian 'focus-preposing' were really a focus-preposing, i.e. with movement into [Spec,CP] of the focused phrase, (ii) should be ruled out by the same reasons for which (iv) is ruled out.

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With this structure, there are four constituent units that are available for detachment: *la Núria*, *no sap*, *qui*, and *té*. The following grammatical strings, some of them underivable in the traditional analysis, are correctly predicted,

(187)   Els CALÉS, la Núria, no sap, qui té.
        Els CALÉS, la Núria, qui té, no sap.
        Els CALÉS, no sap, la Núria, qui té.
        Els CALÉS, no sap, qui té, la Núria.
        Els CALÉS, qui té, no sap, la Núria.
        Els CALÉS, qui té, la Núria, no sap.

but, unfortunately, strings where the phrases *qui* and *té* do not appear together, like in (188), are also predicted to be licit, even though they are utterly ungrammatical:

(188)   *Els CALÉS, no sap, té, la Núria, qui.
        *Els CALÉS, qui, no sap, té, la Núria.

Similarly, the same pattern is found in examples with a [-wh] complementizer, as in (190) (sentence (189) is the pre-detachment equivalent):

(189)   Vaig dir   que no vindria   la Neus.
        1s-past-say that no 3s-cond-come the N.
        '(I) said that Neus wouldn't come.'

(190)   La NEUS, vaig dir, que no vindria.
        La NEUS, que no vindria, vaig dir.
        *La NEUS, no vindria, que, vaig dir.
        *La NEUS, que, vaig dir, no vindria.

It seems that there is a constraint on the detachment of complementizers and wh-elements in isolation. They apparently have to be right-detached in one 'group' with the verbal head of the clause they belong to. Searching for a solution to this problem would lead us astray from the main point of this chapter. It should be noted, though, that, even though our approach manages to predict correctly the existence of some of the sentences at issue, there is a small residue that cannot be accounted for. In any event, more cases are covered here than in the traditional approach.[81]

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[81] A possible explanation for the undetachability in isolation of complementizers could be related to their status as phonological clitics, since they need a stress-bearing host to lean on. Wh-elements, however, bear their own stress.

5.2.5 The Informational Representation Condition

The exact syntactic configuration of the putative 'focus-preposing' construction has been discussed at length because the results obtained are important for the global characterization of the syntactic representation of information packaging in Catalan. By reducing 'focus-preposing' to just another case of right-detachment, the generalizations about Catalan surface structure stated above in § 5.2 can be maintained: *a*) intonational prominence is invariably clause-final (even for 'focus-preposing'), and *b*) any right- or left-detachment extracting a complement of the verb from IP must leave a clitic copy behind (since 'focus-preposing' is not a preposing anymore and, possibly, wh-movement is to a clause internal position).

The conspiracy carried out by these right- and left-detachments invariably leaves the focus of the sentence in clause-final position, where it bears the pitch maximum that is normally associated with that position. In fact, the focus of the sentence is associated with the entire core IP-slot. No part of the ground may remain within the core IP at the surface. All the overt material within the core IP at surface structure (with the exception of clitics) is interpreted as the focus of the sentence, and all the nonfocal constituents are removed and detached from the core IP. If the analysis in the previous sections is correct, Catalan surface structure, without exception, shows the following mapping to the informational articulation of the sentence:

(191)   [$_{IP}$ link [$_{IP}$ [$_{IP}$ **focus**] tail]]

In (191), the ground material lies on both sides of the focus, while the latter is invariably associated with the lowest IP as just described. Given the mapping in (191), the rule for focus representation in Catalan could be stated along the lines of (31):

(192)   Informational Representation in Catalan:
             In a given sentence S, S={ **focus, ground**}, all and only the
             overt nonclitic material in the core IP-slot is **focus**.

In Catalan, therefore, the material within IP at the surface constitutes the information of the sentence, i.e. it is the part of the sentence that contributes to the hearer's knowledge-store. The basic configuration, then, seems to correspond to the cases where the entire sentence is informative (all-focus sentences). The ground

is added as needed, both in the way of links—left-detachments—and tails—right-detachments—to insure that the information in the core IP is entered appropriately into the hearer's knowledge-store.

Notice that, if focus-preposing and right-detachment had been kept as separate constructions in strict syntactic terms, the surface representation of information packaging for Catalan could not be described as in (191) and (192), since there would have been two positions relevant to focus interpretation: [Spec,CP], on the one hand, and the IP-slot in the other. A potential rule of informational representation at the surface in this situation should include specific information about the fact that the focus of a given sentence would be represented by the material in [Spec,CP] if **focus**$\neq$**V**^{n}, and by the material in the core IP-slot if **focus**=**V**^{n}. Our proposal provides a much simpler and less arbitrary condition on the representation of information packaging at the surface.

5.3 More on Catalan and English

This section considers some further difference between Catalan and English with respect to their encoding of information packaging. In § 5.3.1, the fact that Catalan may not encode information packaging exclusively by means of prosody, as English does, and its relevance for the structural encoding of English and Catalan tails is compared. Finally, § 5.3.2 offers a brief discussion of it-clefts, a construction that has not been mentioned so far in this study.

5.3.1 Tails in Catalan and English

Example (193) illustrates the contrast between an English link-focus-tail structure and a Catalan link-focus-tail structure:

(193)   a. The boss HATES broccoli.
        b. L'amo l'ODIA, el bròquil.
        c. $\Lambda x_1, x_1 = $ the boss $[\lambda x_2[\Phi[x_1$ **hates** $x_2]] (broccoli)$

Both (a) and (b) represent the packaging instruction in (c), i.e. they are informationally equivalent, yet they are encoded in different surface syntactic structures. The English sentence, except for the intonation, is a canonical structure, while the

Catalan one has a right-detached constituent. It was suggested above that this contrast was due to the fact that prosodic prominence in Catalan seems to be fixed on clause-final position, while in English it may be shifted to clause-internal positions.

The sentences in (193) show a contrast in the way tails are encoded in the surface syntax. While tails in Catalan are always right-detached, in English they are not. In cases like (193), where the tail is the default clause-final element, the fact that the tail is right-detached in one language but not in the other does not affect the linear order of the sentence in any important way. In both languages the link precedes the focus and the focus precedes the tail. In contrast, other tail assignments will cause greater discrepancies between the Catalan and the English linear order. This is the case in an example like (194), where only the clause-final locative is interpreted as focus:

(194)   a. The boy kissed everybody [$_F$ at the PARTY].

If the focus is restricted to the clause-final locative, and the subject *the boy* is taken to be the link, the V′ constituent *kissed everybody* must constitute the tail. A natural rendering of (194) into Catalan is (195):

(195)   El xiquet$_1$ [[$_{IP}$ t$_2$ t$_1$ a la FESTA] [$_{V′}$ va petonejar tothom]$_2$].
         'The boy kissed everybody [$_F$ at the PARTY]'.

Catalan surface structure, as expected, signals the tail status of the V′ constituent unambiguously, by right-detaching it. This alternative is not available in English, as (196) indicates:

(196)   a. *The boy at the PARTY kissed everybody.

This example illustrates the point made above that tails do not have a universal structural correlate. In English, for instance, they may either precede or follow the focus, while in Catalan they must follow it. Language-particular syntactic and prosodic constraints presumably determine how the tail is encoded in each language. The availability of the right-detachment rule in Catalan and the possibility of applying it to verbal projections allows the operation in (195). English, in this case, must determine that the V′ constituent *kiss everybody* is nonfocal by independent means.

Other examples are more problematic. What is the English equivalent of an example like (197), where the tail is just the direct object?

(197)   L'Iu   [F el$_1$ va ficar t$_1$ al CALAIX],   el ganivet$_1$.
         the I.   *obj* 3s-past-put in.the drawer the knife
         Approx.: 'Iu put it in the drawer, the knife.'

Is it, following the translation provided for the Catalan sentence, a right-detachment construction in English as well? If not, what is it? The standard rules for focus encoding by means of prosody in English do not allow the sequence *put in the drawer*, with the exclusion of the direct object to be marked as focus, and there do not seem to be any syntactic means to represent it structurally either, other than the awkward *It is putting it in the drawer that Iu did with the knife*. The right-detachment in (197) is certainly an available option in English, but it is also clear that in other cases exclusive use of prosody, as in (198)a, is preferred over right-detachment:

(198)   a. The boss HATES broccoli.
         b. The boss HATES it$_1$, broccoli$_1$.

Another case that seems to be hard to translate to English is the case of subject tails. What does the informational equivalent of (199) in English look like?

(199)   De pa$_1$ [F no en$_1$ MENJA t$_1$ t$_2$], mon germà$_2$.
         of bread   no *obj* 3s-eat   my brother
         Approx.: 'Bread he doesn't eat, my brother.'

Again, the example has been translated by means of an English right-detachment. Despite the rarity of right-detachment, this sentence seems to be the best approximate to the informational understanding of the sentence as encoded in the Catalan equivalent. Encoding the tail subject as a preverbal subject is not appropriate, since preverbal subjects in English are interpreted either as links, as in *The boss* CALLED, or as being (part of) the focus when they receive intonational prominence, as in [F *The* BOSS *called*] or [F *The* BOSS] *called*.

These examples raise interesting questions about the role of right-detachment in English. Is English right-detachment an information-packaging construction as well? If so, is it used only in cases like the ones discussed in this section, where no other structural means are available? It is true that, while right-detachment in Catalan is an option which is frequent and available in all registers, right-detachment in English is a more elusive construction (cf. Vallduví 1988a). English seems to share with Catalan the right-detachment encoding of tails, but restricted to nonverbal

projections, and, furthermore, used mostly in cases where the exclusively prosodic alternative is not available. Addressing the above questions would require a comprehensive study of right-dislocation in English. The point of this section, however, was to show that tails in English may be either preverbal or postverbal, and that, on some occasions, it seems one has to resort to English right-detachment to find informational equivalents of some Catalan constructions.

5.3.2 It-clefts

It-clefts constitute a core case of focus-ground marking constructions (cf. Akmajian 1979(1970), Prince 1978, 1986). It may then seem surprising that they have not been addressed in this study. This section briefly discusses the reason for this omission.

It-clefts in English represent a way to mark (narrow) foci by stripping them away from the ground. It is generally assumed that the two sentences in (200) are informationally equivalent:

(200)   a. The boss hates [$_F$ BROCCOLI].
        b. It is BROCCOLI that the boss hates.

In principle, this seems correct: the same focus-ground understanding is obtained from (a) and from (b). But, if some additional data is considered, it becomes clear that it-clefts perform some additional encoding task that is absent from its 'equivalent' (a) sentence. Compare the following sentences:

(201)   a. She saw NOBODY at the party.
        b. *It's NOBODY that she saw at the party.

If (201)a and (201)b are equivalent, what is responsible for the ungrammaticality of (b)? There is clearly some additional 'meaning' in (b), absent in (a), which is responsible for the difference is acceptability between the two sentences (cf. Rochemont 1976, where this contrast was already noticed).

As discussed in § 3.1.4, it is not the case that in a focus-ground sentence the ground is entailed or semantically presupposed. The ground is just assumed by the speaker to be believed by the hearer. This is why sentence (201)a is good: the ground 'She saw x at the party' is (assumed to be) believed by the hearer, but the sentence cannot entail or semantically presuppose 'She saw x at the party', since the proposition it encodes would be inconsistent with its entailment or presupposition.

The cleft in (201)b, however, does entail or presuppose the proposition 'She saw x at the party', and therefore the sentence is semantically unacceptable. The same must be the case, then, with the examples in (200), even though no effects are observable at the surface with respect to contradictory entailments or presuppositions. The conclusion arrived at is that it-clefts do not only perform a focus/ground-marking task, but also that they have a true semantic role as well.[82]

Catalan has it-clefts as well, but they do not occur as often as they occur in English. Many times, an English it-cleft may be translated into a Catalan 'focus-preposing', as in (202)b, even though it-clefts are also available, as in (202)c:

(202)   a. It's BROCCOLI that I bought.
          b. BRÒQUIL, vaig comprar.
          c. És BRÒQUIL que vaig comprar.

As noted above, Catalan 'focus-preposing' has more in common with Yiddish Movement than with Standard English Focus Movement. It is known that in Yiddish-background varieties of English Yiddish Movement does the work of Standard English it-clefts (cf. Prince 1981a). That could account for the more restricted use of it-clefts in Catalan. One could even speculate that perhaps Catalan it-clefts only have a role as markers of certain entailments or 'real' presuppositions, but not as focus-ground structures. There is some recent work that might shed some light on these issues. First, Ball (to appear) is a thorough study of the history of it-clefts in English. This work may allow us to determine what factors intervened in the rise and expansion of it-clefts in English. Second, Delin 1990 is an analysis of it-clefts which takes into account their dual status as both an informationally and a semantically relevant construction. Once more is known about its dual status, it will be possible to understand what additions it brings into our depiction of information packaging.

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[82]It is not the case that the ungrammaticality of *It's NOBODY *that she saw at the party* is the result of a potential incompatibility of quantifiers and the clefted position in it-clefts. Sentences like *It's every* CHAPTER *that you have to read* or *It's only* SOME PEOPLE *that hate their kids* are grammatical.

Chapter 6

The Syntax-Informatics Interface

Chapter 4 described how sentences are articulated into packaging instructions and how these instructions may be represented. The different possible informational articulations of the sentence were captured in four distinct information-packaging instructions. These instructions mark the information carried by the sentence and direct the hearer as to how this information must be entered into her/his knowledge-store.

Accepting the position that informatics and logical-semantics are two distinct autonomous components of our linguistic apparatus, one may then wonder how the interpretive component where instructions are generated and interpreted is connected to the structural components through which they are expressed. It has been pointed out that in Catalan surface syntactic structure allows for a very straightforward mapping to information packaging. The informational scope of the Φ operator corresponds in the syntax to the material dominated by the lowest IP, and ground elements which are found outside the scope of Φ in the informational representation are detached to a clause-external position in the syntax.

It was also noted, however, that in English this is not quite the same. While a subset of the ground, the link, is indeed detached from the core clause, other ground elements remain in situ dominated by the lowest IP. In English, it is not the position of a (nonlink) constituent in the surface syntactic configuration which tells us whether that constituent is focal or not, but rather its position with respect to prosodic prominence. This contrast is evident in the informationally-equivalent Catalan and English examples (203)a-b:

(203)   a. The boss HATES broccoli.
          b. L'amo l_1'   ODIA t_1,   el bròquil$_1$.
            the.boss *obj-cl* 3s-hate   the broccoli

Nevertheless, these two distinct syntactic configurations reflect the same information-packaging instruction.

This chapter focuses on the nature of the mapping between surface syntactic configuration and informatics. It indicates how Catalan surface structure may be translated into abstract information-packaging instructions and then it extends this procedure to English. This mapping operation is represented using the Principles & Parameters theory of syntax.[83]

6.1   Information Packaging in the Grammar

6.1.1   The Structure of Grammar I

It is obvious that all sentences that can be generated by a given grammar must be fully interpretable and that the surface structure of a sentence must provide sufficient information to guarantee its interpretation. It is also known that 'interpretation' is not a monolithic process since it encompasses the interpretation of relations of different types, all encoded in parallel in the syntax. For instance, the lexical item *everybody*, in a given structure, must be interpreted both as a quantifier over a proposition and as an argument of a predicate.

In the Principles & Parameters theory of syntax, a multistratal theory, each stratum represents purely and structurally one of these relations: D-structure is a pure representation of argument or θ-structure and LF is, ideally, a pure representation of logico-semantic relations. Thus, we posit D-structures where surface distant arguments are locally governed by their θ-assigning predicate, and we posit LF repesentations where quantifiers c-command their scope. But, in order to guarantee interpretability, these structural relations must be also recoverable at S-structure, which is the only point of contact between these abstract pure representations on the one hand, and PF and the audible surface form of sentences on the other. S-structure, then, must encode in some way or another all this information; in Chom-

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[83]An earlier version of this material was presented at the 16th GLOW Colloquium, Cambridge/London, April 6-9, 1990.

sky's words, it is 'something like the solution to a certain set of equations' (1988:3).
This view of grammar can be represented as in (204) (Chomsky 1981:17):

(204)
```
                    D-structure
                         |
                    S-structure
                     /      \
                   PF        LF
```

A given sentence is, therefore, a bundle of derivationally related levels of representation. D-structure, S-structure and LF are related transformationally through the rule Move-α and appropriate indexing. The nature of these representations and mappings is severely constrained by a number of subsystems and principles, like government theory, binding theory, and bounding theory. Of utmost importance is the Projection Principle put forth in Chomsky (1981):

> Representations at each syntactic level (i.e. LF, D- and S-structure) are
> projected from the lexicon, in that they observe the 'lexical' properties
> of lexical items.

The Projection Principle forces thematic structure and other lexical requirements to be retrievable at every stage of syntactic derivation, thus restricting the number of possible derivations at S-structure and LF.

The level of LF, as stated, is a pure representation of logico-semantic meaning and is the level that serves as an interface between syntax and logical-semantics. For instance, the sentences in (205),

(205)   a. Mary saw everybody.
         b. Mary saw John.

have identical surface syntactic configurations but their logico-semantic structures are crucially distinct. The syntactic objects of *see* in (205)a and (205)b are semantically very different items: while *John* is an individual appearing as the argument of *see'*, *everybody* is an operator acting as a function that takes *see'(mary,x)* as its argument:

(206)   a. see' (john, mary)
         b. $\forall x[\text{see}'(x, \text{mary})]$

These distinctions relevant for logico-semantic interpretation are structurally represented at LF. Even though (205)a and (205)b have identical representations at D-structure (the thematic structure of (205)a and (205)b is the same) and at S-structure, their LF structures are distinct:

(207)   a. LF: Everybody$_i$ Mary saw t$_i$.
         b. LF: Mary saw John.

The S-structure in (205)a above maps onto the LF structure in (207)a through the rule Move-α. This instance of Move-α is called Quantifier Raising (QR). Coindexing of the moved element and its trace guarantees the satisfaction of the Projection Principle. (207)a, then, structurally represents all the information needed by the semantic translation algorithms. LF may be viewed, then, as an intermediate stage in the mapping between surface syntax and abstract logico-semantic representation that facilitates the translation procedure between structure and logico-semantic meaning. Crucially, a single S-structure can be derivationally related to more than one LF representation, as in the case of sentences with more than one quantifier.[84]

The relations reflected in the levels of D-structure, S-structure, and LF, namely logico-semantic relations, θ-structure and Case requirements, however, do not exhaust the list of relations that must hold among sentence elements to guarantee the full interpretation of sentences. At least two other types of relations have important structural effects at S-structure and seem to be integral part of global sentence interpretation. One is the subject-predicate structure of the sentence, which takes one of the arguments of the verb and turns it into a 'special' element, a subject of a predication. The subject-predicate articulation is the main motivation behind Chomsky's Extended Projection Principle, which stipulates that sentences must have subjects. Rothstein 1985 and Heycock 1989 study the structural effects of this relation. The second type of relation is the subject-matter of this study: information packaging.

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[84]Some syntactic theories offer models without multiplicity of levels of representation (e.g. GPSG and derivations, Williams' LF-less P&P). Whether the phenomena described here using a multistratal notation (as indeed other analogous phenomena) are better described within a multistratal or a monostratal approach is left open as an empirical question.

6.1.2 Proposal

Adopting the view that S-structure is a sort of contact level between levels of pure representation (Chomsky 1988), it must be assumed that information packaging is represented at one such level of pure representation. Information packaging is represented as S-structure as well, in the same way quantificational elements and θ-relations are, to permit the interface with PF and the audible surface form of sentences.

Given the assumption that information packaging is independent of logico-semantic meaning, it must be concluded that the model of grammar sketched above is not sufficient to incorporate all the complexity of sentence interpretation. In what follows it is argued that informational relations are purely represented at the abstract level of INFORMATION STRUCTURE (henceforth IS), distinct from LF, which interfaces the informatics. In other words, IS serves the mediating role between surface configuration and informatics that LF serves between surface syntactic configuration and logical-semantics. The information-packaging instructions generated in the informatics are mapped onto the syntax at IS, which in turn maps onto S-structure along with all the other abstract levels of representation. And, vice versa, in the interpretation of information-packaging instructions, S-structure encoding is mapped onto a pure IS representation and this representation is, in turn, translated into an abstract entity in the informatics.

IS is directly derived from S-structure, parallel to LF and D-structure, by means of well-known mechanisms of grammar, and satisfies the Projection Principle and the other principles of UG. This proposal constitutes an important modification of the T-model of grammar and its derivatives (Chomsky & Lasnik 1977, Chomsky 1981, 1986). In the T-model, one single level of representation, LF, is available as an interface with the complex conceptual systems it presumably feeds. If 'interpretation' is not a monolithic process, the syntactic representation that serves as input to this interpretation cannot be monolithic either. It is our intent to show that a single level of LF is not sufficient to perform this interfacing task, and that the pure structural representation of propositional content and the pure structural representation of information must be carried out at different levels of abstraction. If this can be done successfully, there will be additional support for the autonomy

of logico-semantic meaning and information.

6.1.3 Focus in LF

There have been several proposals in the syntactic literature to determine what the exact locus of informational representation is, especially for the notion of focus. These proposals assume that informational notions are structurally represented either at LF or at a level of representation derived from LF, called LF′. Among the former there are Chomsky 1976, 1981, Huang 1982, Horvath 1986, and Rochemont 1986, and among the latter there are Brody 1981 and Huang 1984. There is a third group of works (cf. Koopman & Sportiche 1982, and Culicover & Rochemont 1983) that leave the question open.

Perhaps the most well-known proposal is the rule of Focus Interpretation or Focus Raising due to Chomsky 1976 and pursued in Brody 1981, Chomsky 1981, Huang 1982, Culicover & Rochemont 1983, and Rochemont 1986, inter alia. Under this view, a focus constituent is treated as quantificational and is raised at LF or LF′ to an A′-position adjoined to the root IP node, just like quantifiers do by means of Quantifier Raising.[85] The output of such a movement is what Culicover & Rochemont (1983) call F-structure (equivalent to either LF or LF′, as noted), where focus-presupposition relations are structurally laid out as in (208):

(208)   [FOCUS$_1$][$_{IP}$ ... t$_1$ ...]

The motivation for this rule is twofold: it is modeled after the overt rule of Focus Movement, shown in (209),

(209)   FIDO$_1$ they named it t$_1$.

and it accounts for the weak crossover effects (cf. Chomsky 1976, 1981) that focus seems to create, parallel with quantifiers and wh-words. Weak crossover is observable in the following paradigm:

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[85] May 1985:114 suggests that focus constituents adjoin to CP and not to IP, to account for some cases where focused elements are claimed to have scope over the wh-word (cf. Ch. 7).

(210) a. [His$_i$ mother saw John$_i$ yesterday]
        b. * [Who$_i$ [did his$_i$ mother see t$_i$ yesterday]]
        c. * [His$_i$ mother saw everyone$_i$ yesterday]
             [Everyone$_i$ [his$_i$ mother saw t$_i$ yesterday]]
        d. * [His$_i$ mother saw JOHN$_i$ yesterday]
             [JOHN$_i$ [his$_i$ mother saw t$_i$ yesterday]]

In sentence (210)a coreference, indicated by the indices, seems possible; however, in (210)b it is impossible, and in (210)c it is again impossible. If one assumes a wh-like movement of the quantifier in (210)c at an abstract level, as represented in the example, one can account for its ungrammaticality by means of the same principles invoked to explain (210)b, since they are structurally identical (cf. May 1985 for two main accounts). Consider now sentence (210)d. This sentence, in contrast with the grammatical (210)a, is apparently unacceptable. This pattern can again be explained if one assumes that the focused NP *John* in (210)d has undergone some wh-like raising operation at an abstract level of representation: the same principles that rule out (210)b and (210)c would rule out (210)d.[86] This evidence seems, at first blush, very strong. Unfortunately, there are three main problems for an analysis along these lines. First, the flimsiness of the data; second, the analysis of focus as quantificational; and third, the problematic nature of Focus Raising as a rule of grammar. Let us discuss them in this order.

Judgments on the grammaticality of weak crossover with focus are not very strong. In particular, it is not that clear that the difference in grammaticality between (210)a and (210)d, repeated here under (211), is clear cut:

(211) a. [His$_i$ mother saw John$_i$ yesterday]
        b. * [His$_i$ mother saw JOHN$_i$ yesterday]

Rochemont 1978 and Solan 1984 provide examples in which sentences of type (b) appear to be grammatical. The following example is from Rochemont 1978 (in Rooth 1985:71):

(212) a. A: Sally and the woman John loves are leaving the country today.
        b. B: I thought that the woman he loves had BETRAYED Sally.
        c. A: No—the woman he loves betrayed JOHN. Sally and she are
              the best of friends.

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[86] Huang 1982 offers some evidence for a Focus-Raising operation in Chinese as well. He argues certain irregularities can be captured if it is assumed that Focus-Raising applies at LF. His arguments will not be discussed here.

Rochemont's conclusion is that there are no crossover effects on the case of focus. And Solan suggests, given this and other data, that the rule of Focus Raising should be removed from sentential grammar, leaving the interpretation of focus to 'discourse'.

However, Rooth 1985 and Horvath 1986 argue that the evidence provided by Rochemont does not affect the existence of the crossover effect with focus. The reading that Rochemont's example has is the so-called 'free variable' reading, i.e. both variables refer to the same entity not because they are both bound by the same operator, but because one of them is free in reference and ends up referring to the same individual. In (212), at the time (c) is uttered, propositions of the form 'the woman he (John) loves betrayed y' are under discussion. The fact that *he* refers to 'John' is established independently by means of discourse anaphora, i.e., coreference between *he* and (the variable left by the focus-raised) *John* is just accidental but licit nevertheless.

One can construct, however, examples in which no such free variable reading seems to be available but are nevertheless grammatical. See (213), where the putatively illegal reading is not only possible but almost unavoidable:

(213)   [A teenage couple is found snorting coke. Her parents catch them redhanded. After yelling at the girl, her father says to the boy:]
F: And what am I supposed to do with you? Take you to the police?
[To which *the girl* replies:]
   a. G: Leave him alone. You deal with me
   b. G: and his parents will deal with HIM.

In this context no proposition of the form 'his (boyfriend's) parents will deal with y' is under discussion, but rather a proposition like 'y's parents deal with y', which is a bound reading. In other words, if *him* in (213)b is focus-raised at LF (or LF$'$), the configuration obtained will be a typical weak crossover configuration but the sentence is still grammatical. In (213)b the focus is a pronoun and not a full NP. This should not affect the argument, as Rooth points out. But compare (213)b with (214)b, which does indeed seem to be out due to the weak crossover effects:

(214)   a. You deal with me
         b. *and his parents will deal with JOHN.

The contrast between these two sentences is due to the pronoun vs. full NP distinction. An explanation of these facts will not be attempted here, but it seems clear

that, given the contrast at hand, the ungrammaticality of (214) cannot be due to the focal nature of the NP, but to some other reason probably related to the binding of nouns.[87]

Taking focus to be quantificational in nature is also problematic. Focus does not seem to have any quantificational force, at least in the way traditional quantifiers and wh-words do. Consider example (215), which has two interpretations (cf. Hirschbühler 1985(1979)): which is the exam that all students passed vs. for each student, which exam (possibly different) did s/he pass. If focus were quantificational, given a pair of sentences like (216)a-b,

(215)   Which exam did every student pass last year?

(216)   a. Every student passed the prelims last year.
         b. Every student passed the PRELIMS last year.

one would be lead to expect a duplicity of readings in (b) but a unique reading in (a). In other words, if focus were a quantifier of sorts there should be a scopal ambiguity in (216)b, parallel to the one found in (215). However, no such ambiguity seems to exist.[88]

It is true that there have been attempts to reduce focus to a quantifier of sorts, especially an exhaustiveness quantifier (cf. Szabolcsi 1981, 1983 and Svoboda & Materna 1987). So while (216)a would merely mean that all the students passed the prelims last year, (216)b would mean that all the students passed the prelims and no other exam. In Chapter 7, however, it will be shown that analyses of this sort are problematic. The exhaustiveness feeling one gets with foci is an artifact of their informational task. Jackendoff 1972 provides focus with a quantificational force of a different nature. For Jackendoff, the meaning of (216)b would be something like 'The prelims are an x such that every student passed x' in the wide-scope reading for focus and 'For every student the prelims are an x such that s/he passed x' in its narrow-scope reading. The only possible truth-conditional difference between these

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[87]The unstressed full NP in cases like *His lover BETRAYED John* behaves like pronouns (stressed or unstressed) and not like stressed full NPs with respect to these binding considerations, thus allowing a licit reading. The reason behind this behavior will not be pursued here.

[88]Horvath 1986:144 claims that a sentence like *Every man likes a BLONDE* exhibits a scope-ambiguity that she attributes to focus. The ambiguity between the specific and nonspecific readings of indefinite NPs, however, is an independent well-known fact unrelated to focus in any obvious way. The ambiguity in Horvath's sentence seems to be the result of this distinction.

two readings is whether all students passed the same prelims or whether each student passed possibly different prelims. While these two readings are indeed present in (216)b, they are also present in (216)a. Therefore, focus cannot be blamed for this 'ambiguity' (actually, this is just a case of vagueness).

Finally, with regard to the problematic nature of Focus Raising as a rule of grammar, different observations made by several authors must be taken into consideration. Koopman & Sportiche point out that Focus Raising is quite an 'exceptional' rule in that it does not obey the ECP and the Binding Theory. If Focus Raising is adopted, sentences like (217) (Koopman & Sportiche 1982; ex. 39),

(217)   Mary claims that SARAH should stay.

violate the ECP, since *Sarah* should raise and adjoin to the matrix IP. A way out of this problem is to force focus to adjoin to the lower clause, but this requires the existence of an additional principle banning the long movement. Another solution is to assume that focus representation is carried out at LF′ and that at LF′, unlike LF, the ECP does not apply (Brody 1981).

Solan 1984, following Chomsky 1981, points out that the putative rule of Focus Raising must yield its output at a level where the binding theory does not apply either, given examples like the following (Solan 1984:ex. 12),

(218)   a. John thought that Paul Drake was investigating HIM.
         b. for $x=$ him, John thought that Paul Drake was investigating x.

since the variable in the lower clause should be free, incorrectly ruling out John as an A-binder. Of course, if Focus Raising is an LF′ operation and the Binding Theory does not apply at LF′, the problem disappears again. One may wonder, however, what kinds of well-formedness conditions would apply at LF′, given that the two core modules that apply at LF—the ECP and the Binding Theory—are not available at that level.[89]

Also, a different kind of problem with the Focus Raising approach is more of a conceptual nature. Focus Raising seems to be elegant and economical in cases of 'narrow' focus, i.e. when most of the sentence is part of the ground. However, in cases of link-focus or all-focus structures, where most of the sentence is focal,

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[89]Kratzer 1990 discusses some apparent subjacency violations of some Focus Raising outputs. If her point is correct, subjacency should be added to the list of modules that do not apply at LF′.

the entire predicate or the entire sentence must be raised to the clause peripheral position, so that focus can take 'scope' (cf. Culicover & Rochemont 1983, Rochemont 1986, for details). In other words, in cases where the entire clause is focal one ends up with an LF representation where the original IP-slot is empty and the entire clause is adjoined to IP (from Rochemont 1986:34):

(219)
```
                    S
                  /   \
               S-i     S-i
             [+focus]    |
                         e
```

Even though such an operation is allowed by the grammar, it strikes us as very counterintuitive, especially when taking into account that link-focus sentences where the entire VP is focal and all-focus sentences are the unmarked case (cf. Lambrecht 1987).

The other motivation for Focus Raising is the existence of overt Focus Movement in English. Not much will be said concerning the validity of adopting this construction as the generalized abstract representation of focus. However, it must be pointed out that Focus Movement is actually not the unmarked way to represent focus in English. The unmarked and most common way to do so is to signal focus prosodically while leaving it in situ. Furthermore, Focus Movement is restricted to certain types of arguments and also to certain restricted 'scalar' contexts (cf. Ward 1985:137ff.). It is odd to take such a construction as basic and assume that it is generalized at an abstract level. Besides, as noted above, focus-preposing is absent from languages like Catalan.[90]

To conclude our review of Focus Raising, it must be pointed out that, while the abstract representation it yields reflects the focus-ground division appropriately, it does not contain a global representation of informational meaning with inclusion of the distinction between links and tails. The proposal in this chapter does not encompass a rule of focus-raising, despite the weak crossover data and the existence of focus preposing in English. We tried to show that the evidence used to marshall

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[90]It does not seem possible nor desirable to reduce English focus-preposing to a right dislocation of sorts, as was done in the case of Catalan. In fact, English Focus Movement is peculiar in that it seems to perform two informational tasks. This will be addressed below before closing this chapter. As for Spanish, it seems to be like English in this respect.
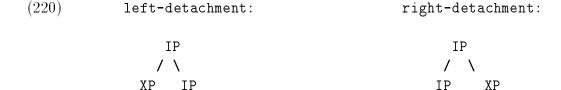
such a rule is inconclusive or unclear, and that Focus Raising itself is a problematic rule of grammar in several ways.

6.2   Information Structure (IS)

It will be proposed here that information packaging is purely represented at IS, which serves as an interface between S-structure and informatics. In this section the details of this proposal are discussed. The configuration of IS, the derivation procedure from S-structure, and its non-identity with the level of LF are described. The configuration of IS, just like the configuration of LF, is meant to be universal in coverage, although it is open to parameterization. In trying to determine the makeup of this abstract level, we will rely heavily on the overt syntactic structure of Catalan. The motivation for this is legitimate: if Catalan faithfully represents information packaging at the surface by syntactic means, it seems logical to assume that the configuration of IS—which is precisely the level of pure syntactic representation of information packaging—resembles very closely the surface syntactic configuration of Catalan. In fact, this is what has been done with respect to the abstract representation of wh-raising in languages without overt wh-movement.

6.2.1   Surface Representation in Catalan

The syntax of information packaging in Catalan was discussed in chapter 5. In this section some of the main aspects of that discussion will be recalled, so as to provide the immediate basis for our discussion of IS. In Catalan, all nonfocal elements in the sentence, i.e. the ground, are subject to right- and left-detachment to A$'$-position. Like topicalization in English, these syntactic operations are not triggered by the need to satisfy the θ-criterion, agreement requirements, the Case filter or any logico-semantic relations. The detached A$'$-phrases are moved from their D-structure A-positions, by means of the operation move-α. They also bind a pronominal clitic that attaches to V and is coindexed with the corresponding empty position. This configuration is represented in (220) (=(123) above):

(220)   left-detachment: right-detachment:

```
        IP                              IP
       / \                             / \
      XP   IP                         IP    XP
          / \                        / \
         /   \                      /   \
        - cl- t-                   - cl- t-
```

The directionality of the detachment depends on whether the nonfocal phrase is a link or not: phrases that are detached to the left are links and phrases that are detached to the right are tails. Therefore, these A′-movements in Catalan yield the surface configuration in (221) for information packaging in this language (=(191) above):

(221)   [IP link [IP [IP **focus**] tail]]

In other words, the focus of the sentence is all and only the overt nonclitic material in the core IP-slot

6.2.2   Derivation and Configuration

Let us now turn to the characterization of Information Structure (IS). As already mentioned, S-structure may be viewed as a contact level from which all the structural relations purely represented at the abstract levels must be retrievable somehow. How exactly these distinct abstract structures are conveyed by S-structure is a language-particular matter with wide crosslinguistic variation, which can be expressed in the form of a multivalued parameter. In Catalan it is the informational articulation of the sentence which is overwhelmingly reflected in the S-structure position of the major constituents, while θ-structure is represented at the surface by a combination of fully indexed clitics and null categories. Notice, for example, how in (222) the θ-positions governed by the θ-assigning predicate are empty positions, and how the arguments that bind these empty positions are located in adjoined positions according to their informational role:

(222)   [$_{IP}$ El petit$_1$ [$_{IP}$ [$_{IP}$ [$_{IP=F}$ (ja) l$_1$'hi$_2$ ha PORTAT t$_1$ t$_2$ t$_3$] ma mare$_3$]
       the small-one   *obj.obl* 3s-past-take   my mother
al metge$_2$.]]
to.the doctor
Approx.: 'The youngest she (already) TOOK to the doctor, my mother.'

This situation is analogous to the case of wh-quantification in English-type languages in the following sense. In a sentence like (223),

(223)   Who$_1$ did you see t$_1$?

the S-structure position of the wh-element reflects logico-semantic considerations and not thematic considerations. The θ-relations in (223) are recoverable thanks to the presence of the trace bound by the overt direct object wh-phrase. In fact, the LF representation of sentences like (223) is taken to be identical to their S-structure representation, since wh-quantification is appropriately represented already at S-structure. Therefore, the mapping function between (223) and its LF representation is taken to apply vacuously.

Exactly like in this case, and given that Catalan S-structure closely reflects informational structure, it will be assumed here that the mapping function between S-structure and IS in Catalan applies vacuously as well. Given a Catalan S-structure like (222), all that has to be done to obtain a 'pure' representation of information packaging is delete the pronominal clitics, which perform no informational task. So from (222), the IS representation in (224) is derived:

(224)   [$_{IP}$ el petit$_1$ [$_{IP}$ [$_{IP}$ [$_{IP=F}$ ha PORTAT t$_1$ t$_3$ t$_2$] ma mare$_2$] al metge$_3$]

The IS representation of this sentence matches exactly the abstract Catalan surface-structure configuration expressed in (221) above. Given this, the abstract configuration in (221) can be now viewed as an IS configuration as well:

(225)   IS Configuration:
       [$_{IP}$ link [$_{IP}$ [$_{IP}$ **focus**] tail]]

This IS configuration is then translated into the corresponding procedural instruction in the informational component and interpreted.

Now, let us describe in detail how the informational primitives described above are reflected in the IS representation proposed in this chapter. The three following features of this configuration are important (cf. § 4.3.1 above):

- First, the link(s) is sentence initial. This is correlated with its informational role as an address pointer. It c-commands the clause containing the oncoming information that hearers are instructed to retrieve and enter under the address denoted by such a link.

- Second, the focus is in the core IP slot; this reflects the conceptual argument that what is informative, the focus, is in some sense the actual informational reason for the clause to exist. The core IP slot is identified with the scope of the Φ operator. All nonfocal elements must move away from the scope of Φ to perform their anchoring task, and everything within the scope of Φ is taken as informative. Ground elements, i.e. detachments, only occur when a ground is necessary.

- Third, strictly speaking, the information of the sentence is not just the overt focus material in the core IP, but the overt material embedded in its sentential environment, i.e. everything under the scope of Φ. For instance, the focus in (224) is not just the verb *ha portat* 'took', but the entire frame *x took y to z*, where the value of the variables is determined by the ground (unless they are free). In other words *took* is not the informative part of the sentence by itself. It is only informative if interpreted in relation to the ground that accompanies it, *my mother ___ the youngest to the doctor*. Our configuration represents this relational nature of focus with no further stipulation.

Summarizing, the structural configuration at IS represents the informational relations of the sentence in a pure and disambiguated fashion. The focus is in the core IP, which represents the scope of Φ, and the ground anchoring material, including the sentence initial link, raises to both perform its anchoring task and bind the variables in the core IP.

6.2.3   IS $\neq$ LF

Having seen how IS may be derived from S-structure in Catalan and what kinds of relationships are purely represented at that level so that the input into the informational component is done appropriately, we shall now address what the relationship of IS is with the other levels of representation in the grammar, especially LF.

Non-identity

If the characterization proposed for IS is correct, it automatically follows that IS must be distinct from LF. To see this let us consider a simple example like (226):

(226)   [$_{IP}$ A la festa$_1$ [$_{IP=F}$ hi$_1$ vaig enviar   TOTHOM t$_1$]].
              to the party   *loc* 1s-past-send everybody
         'The party [$_F$ (I) sent EVERYBODY to].'

This example is a standard link-focus sentence. The focus is the V′ constituent in the lowest IP slot, and the link has been left-detached to an A′-position. The IS representation for (226) is (227), which is later translated into the informational instruction (228) in the informational component:

(227)   IS: [$_{IP}$ A la festa$_1$ [$_{IP=F}$ vaig enviar TOTHOM t$_1$]].

(228) Λx_1, x_1= party, [Φ [x_2 **sent everybody** to x_1]]

At IS the universal quantifier *tothom* must be within the core IP so that it is correctly interpreted as part of the focus of the sentence. *Tothom* is not ground material but part of the information of the sentence, i.e. a contribution to the hearer's knowledge-store. At LF, however, the quantifier must be in an A′-position binding a variable in A-position so that the relevant logico-semantic quantification is appropriately represented (as in (229)) and translated into the logico-semantic formula (230)

(229)   LF: [$_{IP}$ tothom$_2$ [$_{IP}$ a la festa$_1$ [$_{IP}$ hi$_1$ vaig enviar t$_2$ t$_1$]]]

(230) $\forall x_1$ [sent(x_1, party, I)]

The two representations, LF and IS must be obviously distinct. Notice that if (229) were taken to be both the IS and the LF for (226), i.e. if we were to accept that informational notions are interpreted at LF, it would be erroneously concluded that *tothom* 'everybody' is a link in this case, since it is detached to the left. If *tothom* were a link, however, it would be marked as such in the Catalan S-structure[91]:
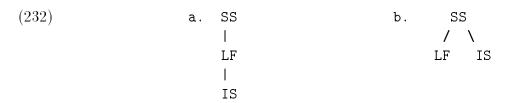
---

[91]Some sentences with quantifier links are less natural than others, causing raised eyebrows among some Catalan speakers. Sentences like *A tots els estudiants$_1$ els$_1$ donen un carnet t$_1$* 'To all students they give an ID' or *A tothom$_1$ no el$_1$ tracten t$_1$ igual* 'Everybody they don't treat the same' are extremely natural, some other sentences sound odder. Most sentences, however, are felicitous once the right context is construed, although in some cases it may require some sophistication.

(231)   (A) Tothom$_1$ el$_1$ vaig enviar t$_1$ a la festa.

Therefore, the level at which quantifiers raise and attach to IP, i.e. LF, must be distinct from the level at which links raise and attach to IP, i.e. IS.

IS directly derived from S-structure

Another alternative that has been considered in the literature is to have information packaging be represented at a level of LF′ derived from LF. If this is shown to be the case, our description of the mapping from Catalan S-structure to IS will have to be reformulated. It is very hard to gather empirical evidence to argue that one hypothesis in (232) is more correct than the other.

```
(232)              a.  SS                    b.     SS
                       |                          /  \
                       LF                        LF   IS
                       |
                       IS
```

However, there are conceptual arguments that suggest that a direct derivation of IS from S-structure is to be preferred over a derivation from LF. These arguments are based on the economy-of-derivation condition of Chomsky 1988.

The spirit of Chomsky's condition is to minimize derivation mappings. By a 'least effort' principle, if a given result can be achieved by a simple derivation and a complex one, only the former should be legitimate. For instance, a given movement configuration should not be posited if it has to be undone in the next derivation. Chomsky's example is the lowering of inflection to V at S-structure. This operation is 'costly', since at LF it has to be undone when V+inflection is raised to the original position of the inflection. He states that '[t]he result is essentially the same as would have been achieved with the shorter derivation that involves only raising in the overt syntax. Therefore, by a "least effort" condition, only the latter is permissible' (1988:9).[92]

Let us take, for example, sentence (226) above, repeated here as (233) for convenience:

---

[92]There are other cost-based reasons that might render an operation like inflection-lowering less costly than an apparently more 'effortless' alternative, as is the case in the English rule of affix-hopping. None of them, however, are relevant in the issue under discussion.

(233)   [$_{IP}$ A la festa$_1$ [$_{IP=F}$ hi$_1$ vaig enviar   TOTHOM t$_1$]].
              to the party   *loc* 1s-past-send everybody
         'The party [$_F$ (I) sent EVERYBODY to].'

The LF and IS representations for this sentence were shown in (229) and (227) above, respectively, and are shown again in (234). At LF the quantifier must c-command the clause; at IS it must not. If it is assumed that IS is derived from LF, mediating the mapping from S-structure to IS, one obtains the 2-step derivation in (234):

(234)   SS: [$_{IP}$ a la festa$_1$ [$_{IP=F}$ hi$_1$ vaig enviar TOTHOM t$_1$]]
        1 ↓
             LF: [$_{IP}$ tothom$_2$ [$_{IP}$ a la festa$_1$ [$_{IP}$ hi$_1$ vaig enviar t$_2$ t$_1$]]
        2 ↓
             IS: [$_{IP}$ a la festa$_1$ [$_{IP=F}$ vaig enviar TOTHOM t$_1$]]

Notice that under step 2 the configuration obtained with step 1 is undone. This is precisely the type of derivation that Chomsky 1988 describes as 'not permissible', all things being equal. The derivation that yields IS directly from S-structure, in contrast, is straightforward and maximally economical, as in (235):

(235)   SS: [$_{IP}$ a la festa$_1$ [$_{IP=F}$ hi$_1$ vaig enviar TOTHOM t$_1$]]
         IS: [$_{IP}$ a la festa$_1$ [$_{IP=F}$ vaig enviar TOTHOM t$_1$]]

Notice that, in this fashion, the use of a downgrading movement where the antecedent does not c-command its trace is also avoided. The derivation of LF from S-structure proceeds as above in the standard way, and it is done in parallel with the derivation of IS.

6.2.4   Extending IS to English

The question arises next whether the IS configuration in (225) is applicable to other languages. In principle, such an extension should be not only desirable but necessary. IS, as a level of pure representation of information packaging should be language-invariant, since presumably the interpretive informational component it feeds is constant across languages. Owing to this, it is argued that the structure in (225) is indeed applicable to other languages. This is illustrated with English. Of course, the possibility that this IS representation is subject to parametrization must be

entertained, much in the same way that the directionality of logical scope assignment might be subject to crosslinguistic variation.

It may be said that Catalan is to English with respect to IS nonfocal movement as English is to Chinese with respect to LF wh-movement. Since Huang 1982, it has been assumed that Chinese has at LF the wh-movement that English has at S-structure. The English vacuous derivation in (236) is paralleled in Chinese by the nonvacuous (237):

(236)   SS: Who do you like? → LF: Who do you like?

(237)   SS: ni   xihuan shei? → LF: shei$_1$ [ni xihuan t$_1$]
              you like   who
              'Who do you like?'

In analogy to the Chinese-English example, it is proposed here that the nonfocal detachments that Catalan has at S-structure, English has at the level of IS. In fact, English does have an overt subset of the IS movements Catalan has, namely topicalization. At IS, therefore, one would have to perform only the operations that are nonovert. Of course, the mapping between S-structure and IS in English is not as direct as in Catalan, but in some cases it is fairly straightforward, providing further support for our hypothesis.

The mapping between the two levels of representation is carried out by means of standard move-α operations, in particular, as in the case of Catalan overt syntax, left- and right-adjunction to IP. Let us consider a sentence like (238), where the link subject NP and the locative PP are nonfocal:

(238)   The boy [$_F$ kissed EVERYBODY] at the party.

If the subject is to be interpreted as a link, it must left-adjoin to IP at IS, just like overt topicalization. Such a proposal is unproblematic, and, in fact, there is some evidence to suggest that most subjects in English are already in a left-adjoined position at S-structure (cf. Kroch, Heycock & Santorini 1988). If this were correct, link subjects would not have to raise and adjoin at IS. The nonfocal PP is a tail, left in a destressed position in a sentence-final slot. As any tail material, the PP must be right-detached at IS. Such an operation is also unproblematic. It is proposed, then,

that (238) has the IS representation in (240), derived by the operations diagrammed in (239):

(239)

```
                         IP
                        /  \
                the boy-1    IP
                            /  \
                          IP    at-the-party-2
                 --------------|---------------
                |                             |
                - t-1  kissed everybody t-2 -
```

(240)   IS: [$_{IP}$ the boy$_1$ [$_{IP}$ [$_{IP=F}$ t$_1$ kissed EVERYBODY t$_2$] at the party$_2$]

Let us consider an example with a less straightforward derivation. Example (241) is the IS representation of a sentence where the focus is restricted to the sentence-final locative. In such an example, the V′ constituent may be interpreted as the tail:

(241)   a. SS: The boy kissed everybody [$_F$ at the PARTY].
         b. IS: [$_{IP}$ the boy$_1$ [$_{IP}$ [$_{IP}$ t$_1$ t$_2$ at the PARTY] [$_{V'}$ kissed everybody]$_2$]]

Such a derivation may seem surprising, since it is involves the movement of a V′ element, which also includes the V head. However, such operations involving the detachment of V^n are necessary to account for Catalan S-structures where the verbal head is right-detached.[93] In fact, a natural translation of (241)a into Catalan is the sentence in (242), where Catalan S-structure, as expected, matches one-to-one the IS representation posited for its English equivalent:[94]

(242)   El xiquet$_1$ [[$_{IP}$ t$_2$ t$_1$ a la FESTA] [$_{V'}$ va petonejar tothom]$_2$].
         'The boy kissed everybody [$_F$ at the PARTY]'.

---

[93]See § 5.2.4 for a mention of other analysis where movement of V^n to an adjoined clause-peripheral position is posited.

[94]This example is crucially different from (i), where both the subject *el xiquet* and the PP *a la festa* are links and therefore are left-detached. Notice that here the PP binds a clitic within the core IP:

(i). El xiquet$_1$ a la festa$_2$ [$_{IP=F}$ hi$_2$ va petonejar TOTHOM t$_1$ t$_2$]
     'At the party the boy kissed everybody.'

But beyond establishing a crosslinguistic generalization, is there any specific structural effect in English that would support the existence of IS-operations for this language, parallel to the ones Catalan has at S-structure? The answer seems to be yes, and the evidence comes from the data in (243) and (244):

(243) a. [$_{IP}$ El Pau$_1$ [$_{IP}$ [$_{IP=F}$ no l$_2$'ha MORT t$_2$ t$_1$] el jutge$_2$]].
       b. [$_{IP}$ Paul didn't KILL the judge].

(244) a. [$_{IP}$ El Pau$_1$ [$_{IP=F}$ no ha mort el JUTGE t$_1$]].
       b. [$_{IP}$ Paul [$_F$ didn't kill the JUDGE]].

This sentences illustrate a phenomenon affecting the scope of negation known as 'association with focus' (cf. Jackendoff 1972, Horn 1989).[95] In (243), for both Catalan and English, the direct object phrase *the judge* escapes negation somehow: the scope of negation does not seem to extend beyond the verb *kill*. In (244), in contrast, the entire VP sequence is negated. In other words, from (243) we understand that, even though Paul did not kill the judge, some other relation holds between them, but no such understanding arises from (244).

Notice, too, that the Catalan sentences—the (a) sentences—are not structurally alike. In (243)a, the phrase that escapes negation, *el jutge* 'the judge', is right-detached, as the presence of the clitic and the prosody show. But in (244)a *el jutge* remains in situ. Therefore, the difference in the scope of negation between (243)a and (244)a has a clear structural correlate. It appears that when a phrase is removed from the core IP by means of detachment it escapes the scope of negation as well.

The English equivalents of these sentences, (243)b and (244)b, however, while showing the same contrast with respect to the scope of negation, do not offer any overt structural contrast of the Catalan type. Therefore, there is no structural correlate to reflect the distinction between (243)b and (244)b with respect to scope of negation. Now, if English has an abstract right-detachment movement at IS like the one Catalan has at S-structure, yielding an IS representation like (245) for sentence (243)b,

(245) IS: [$_{IP}$ Paul$_1$ [$_{IP=F}$ t$_1$ didn't KILL t$_2$] the judge$_2$]

---

[95]Negation is actually only one of the logico-semantic operators reputedly affected by 'association with focus'. Scalar particles like *only* and *even* undergo association with focus as well (cf. § 7.2).

the scope-of-negation facts can be captured much in the same way they are captured in Catalan. Examples (243)b and (244)b, while identical at S-structure, are crucially different at IS, and the difference in interpretation is captured at that level. This constitutes important language-internal evidence for positing a rule of IS nonfocal detachment. The different configurations at the separate levels of representation for the English sentences (243)b and (244)b are displayed in (246) and (247), respectively:

(246)   a. SS: $[_{IP}$ Paul didn't KILL the judge].
            b. LF: ¬ [Paul killed the judge]
            c. IS: $[_{IP}$ Paul$_1$ $[_{IP}$ t$_1$ didn't kill t$_2$] the judge$_2$]

(247)   a. SS: $[_{IP}$ Paul $[_F$ didn't kill the JUDGE]].
            b. LF: ¬ [Paul killed the judge]
            c. IS: $[_{IP}$ Paul$_1$ $[_{IP}$ t$_1$ didn't kill the judge]

For the sake of exposition, the facts relevant to this argument have been simplified . In fact, what is going on in these examples of 'association with focus' has to do with negation only indirectly. From the previous discussion it may seem that it has been assumed that negation defines its logico-semantic scope at IS. This is obviously undesirable, if IS is to be a pure representation of information packaging. It is not the case, however, that negation defines its scope at IS. Actually, the different readings for negation are due to the interaction of a constant logico-semantic LF representation for both (243) and (244) (in (246)b and (247)b) and a variable informational IS structure, different for (243) and (244) (as in (246)c and (247)c, respectively). As different focus-ground structures interact indirectly with the same logico-semantic structures, different readings are derived (cf. § 7.3).

Alternatively, it could be claimed that the 'scope' of negation is directly represented at LF, i.e., that sentences (243) and (244) are truly different in their truth-conditions, and therefore, their LF representations must be different as well. This position, though, has been argued to be quite problematic by Gazdar 1979 and Horn 1989, among others. Furthermore, if negation were truly associated with the focal verb in (243), that is, if the direct object lay outside the LF scope of negation, the following sentence should be ungrammatical, but it is not:

(248)   Paul didn't KILL anybody, he just threatened some of us.

At LF the polarity item *anybody* must be included under the logical scope of nega-
tion, even though negation is still 'associated' with the verb. At IS, however, *anybody*
must be outside IP (the scope of Φ), since it is part of the ground 'Paul is in some
relation to someone'. The conclusion that (243) and (244) have an identical LF
representation but distinct IS representations is confirmed by this fact.

6.3   Overt Focus Movement

Once the existence of an IS rule of Focus Raising is rejected and the universal
configuration for IS proposed in this chapter accepted, the existence of overt Focus
Movement in English and Spanish is left unexplained. What is the IS representation
of sentence (249) (=(209))?

(249)   [$_{XP}$ FIDO$_1$ [$_{IP}$ they named it t$_1$.]]

Focus Movement preposes the focus of the sentence to a left-adjoined position and
is used as empirical 'stimulus' for the abstract rule of Focus Raising. If this overt
construction reflects a focus-ground relationship, it is indeed natural to assume
that the corresponding IS structure is identical to the S-structure configuration.
In our characterization of IS, however, the focus remains in situ dominated by the
lowest phrasal node, which represents the scope of Φ. The focus in (249), *Fido*,
is clearly outside the lowest IP node. This leads us to an apparent contradiction.
Furthermore, the arguments in Ch. 5 against the existence of focus-preposing in
Catalan were indirect arguments *for* the existence of such a rule in Spanish. This
section will try to reconcile the existence of overt Focus Movement in English and
Spanish with the universal IS configuration proposed in this chapter.

As noted above, there is more than one way to represent at the surface the
focus-ground relationship encoded in (249); sentence (250) is another way to do so:

(250)   They named it [$_F$ FIDO.]

The configuration in (250) is actually the unmarked way to represent such an infor-
mational split between *Fido* and *They named it x*, while (249) has a more marked
'feeling'. Is there a difference between (249) and (250), and if so, what is it? It could
be stated that (249) is nothing but a disambiguated variant of (250). In (250), in

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principle, both *Fido* and *named it Fido* could be the focus (although the 'narrow' focus reading is clearly favored), while in (249) the focus is unambiguously *Fido*. This, however, is not a very desirable approach in that ambiguity is an everyday fact of language that does not present any problem for communication. It seems unwarranted to argue that the reason behind Focus Movement is simply a disambiguating process.

Could it be then that there is a real informational difference between these sentences? Following the work of Ward 1985 on the pragmatics of preposing, it is argued that the answer to this question is yes. Ward suggests that in English the functions of preposing are two: *a*) marking the referent or denotation of the preposed constituent as the BLC (=backward looking center) of an utterance, and *b*) encoding the focus/open-proposition (i.e. focus-ground) structure plus signaling its salient status in the current discourse. Even though the details cannot be discussed here, the BLC is defined as that element which 'links up' the current sentence S_1 with the preceding discourse up to S_1.[96]

A link-focus sentence like (251) (Ward 1985:ex. 162),

(251)   Badminton$_1$ I played in high school t$_1$.

marks the focus-ground structure of the sentence (the information being here that x_1 played x_2 in high school, where x_1=I and x_2=badminton) but also marks 'badminton' as a BLC 'linking up' (251) to the previous discourse (in the terms of this study, badminton is a link that denotes an address in the hearer's knowledge-store to which the hearer is instructed to go). Both (251) and (249) involve a preposing and in Ward's analysis both have the same informational function of marking the preposed element as a BLC. The difference is that in (251) the BLC is part of the open-proposition or ground and in (249) the BLC is the focus of the sentence.

In other words, in Ward's approach, the same sentence element can be a focus and a BLC simultaneously, and such is the situation in the case of the overt Focus Movement in (249) or in Ward's example (252) (1985:ex. 207):

(252)   I think she was Japanese. No—KOREAN she was.

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[96]Ward's BLC is inspired in the early Centering notion of the same name, but differs somewhat from the meaning of BLC in current Centering work.

In our terms, this would mean that a given element may be both a focus and a link, but given the interpretation of these primitives provided in this study it seems impossible to have one element be both a link and the focus. It certainly cannot be the case that 'Korean' in (252) is both the address in the hearer's knowledge-store s/he is instructed to go to and the information to be entered there. In other words, the instruction encoded in (252) cannot be 'I am instructed to go to the address "Korean" and retrieve the information of the sentence by substituting **Korean** for the blank in *She was* ___ under the address "Korean" ' because the blank is already identified by means of the binding link. The sentence would be informationally useless.

Ward points out that the focal phrase in sentences with Focus Movement serves as a 'specification' of a scalar value in the scale evoked also by the focus. What the BLC *Korean* does in (252), in Ward's terms, is 'call up' a scale into the salient discourse and specify a value in that scale: it 'calls up' the scale '(Asian) nationalities' and specifies a value in that scale, namely, 'Korean'. This scale is marked as the BLC, and the specification as focus. This is clearly a dual task for the same constituent. Let us now try to translate Ward's analysis into an information-packaging instruction, taking into account this dual status of the preposed phrases in Focus Movement environments: 'I am instructed to go to the address "(Asian) nationalities" and retrieve the information of the sentence by substituting **Korean** for the blank in *She is (of)* ___ *nationality* under "(Asian) nationalities" '. In other words, given an address for Asian nationalities in the hearer's knowledge-store where relevant knowledge about those nationalities (e.g. its members, etc.) is listed, the hearer is instructed to substitute *Korean* for the blank with respect to the nationality of 'she' under that address. The scale is a link, and the specification is a focus. The address for 'Asian nationalities' in the hearer's knowledge-store could be partially represented, before and after the utterance of (252), as in (253):

(253) Before (252):   After (252):

addr.: Asian nationalities(x)	addr.: Asian nationalities(x)
Li is (Chinese $\subset x$) Naoki is (Japanese $\subset x$) 'She' is (___ $\subset x$)	Li is (Chinese $\subset x$) Naoki is (Japanese $\subset x$) 'She' is (Korean $\subset x$)

The point of interest in this section, however, is the representation of sentences like (252) at IS and how this representation might be reconciled with the IS configuration proposed in this chapter. The discussion so far has served to establish that a focus-preposed constituent has a dual status in that part of it 'calls up' a scale or set and part of it specifies a value on that scale, i.e., part of it acts as a link and part of it acts as focus. Therefore, at IS a constituent like *Korean* in (252) must be both in a left-adjoined A'-position to allow part of it to be interpreted as a link and in a position within the lowest IP to allow the other part of it to be interpreted as focus. The S-structure position of *Korean* is probably a reflection of its information-packaging force as a link. If the IS configuration of (252) is identical to its S-structure, as the traditional analysis in terms of Focus Raising assumes, the link 'side' of *Korean* is captured straightforwardly, but its role as focus is left unrepresented.

The Principles & Parameters framework has a device that will allow us to have *Korean* be both a link and a focus at IS: Reconstruction. Chomsky 1977 and van Riemsdijk & Williams 1986 discuss a rule of Reconstruction which is available to capture the interpretation of sentences like (254):

(254)   [Whose mother]$_1$ did you see t$_1$?

The question interpretation that must be obtained from (254) is 'for which x did you see x's mother?', but the fronted constituent in the actual overt sentence is not just x (*whose*) but x's *mother*, which in an LF representation would yield the wrong interpretation. In order to address this mismatch, and encouraged by some strong crossover effects, an application of the rule of Reconstruction is posited yielding the LF representation in (255),

(255)   Whose$_1$ did you see t$_1$ mother?

where part of the wh-phrase stays in [Spec, CP] and part of it is demoted to the clause internal position.

Analogously, the following IS representation for sentence (252) is proposed:

(256)   [t[+scale]$_1$ [[x_2 v_3KOREAN$_1$] was$_3$.]]

Notice that the informational 'meaning' of *Korean* is divided into two subelements: the scalar or set inference and the value-specification task. At IS the focus value of

the focus-preposed phrase is reconstructed and is placed back in the lowest IP. The trace in the left-adjoined A′-position, however, keeps the set understanding (represented by the [+scale] feature) and is interpreted as a link. In this way, the dual force of focus-preposed phrases is captured straightforwardly. As Ward 1985 indicates, only the set or scale evoked by the phrase is understood as being a BLC, i.e. a link, while its actual lexical content is understood as an informative specification of a value in that scale, i.e. a focus. This is exactly what the reconstructed representation in (256) achieves by splitting the focus-preposed phrase into two informationally distinct elements.

This use of Reconstruction not only allows us to capture Ward's insights with respect to focal preposing, but also provides a way to reconcile the existence of Focus Movement with the configuration of IS proposed above. Furthermore, it also reflects the fact that the 'apparent' focus-preposing of Catalan discussed above in § 5.2.4 is more common and less marked than English and Spanish Focus Movement. While the Catalan case is a plain focus-tail construction, the English and Spanish cases contain a complex informational understanding.[97]

6.4 The Structure of Grammar II

Let us conclude this chapter with some remarks on the structure of grammar. If a separate level of IS, derived directly from S-structure is, as argued, necessary in a complete model of grammar, the standard view of what grammar must consist of is severely affected. The standard model of grammar is the one in (257), the T-model (Chomsky & Lasnik 1977, Chomsky 1981, 1986), with D-structure associated with the lexicon, PF as an interface with phonetic articulation and perception, and LF as an interface with the interpretive component of language.

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[97]Catalan should also have a means to represent the complex informational understanding conveyed in English by means of Focus Movement. Probably, a subset of the Catalan 'apparent' focus-preposings do indeed have this dual link-focus force, especially the ones involving scalar and value-specification understandings. This, however, does not mean they have to be overt Focus Movements, since the overt syntax of Catalan, unlike the overt syntax of English, may reflect the force of the focal part of these dual phrases, leaving the link part to IS by means of an IS left-adjunction to IP of the scalar or set subelement. Making a strong claim with regard to this issue would require many additional considerations and will not be discussed any further.

(257)   The T-model:

```
                    DS
                    |
                    SS
                   /  \
                 PF    LF
```

Chomsky 1988 views S-structure as a 'contact' level between fundamental levels of representation: 'From this standpoint S-structure is a derived concept. For a specific language L, its properties are determined by those of the fundamental levels, and the condition that it be related to them by the appropriate principles' (1988:3). Each of the 'fundamental levels' is the structural interface with an autonomous linguistic component, and each sentence is a bundle of 'fundamental' abstract representations that must all be reflected somehow at S-structure to allow for the interface with the physical reality of an utterance.

A model of grammar that incorporates this view can be drawn as in (258).

(258)   DS
                              |
                    PF -- SS -- IS
                          . \
                          .   LF

The dotted line signals that further strata are probably needed to represent other notions, like, following Heycock 1990, subject-predicate structure. Each level of pure representation is related to S-structure by a different spoke, and S-structure is literally the hub, from where or to where all the information is passed. At S-structure all information must be recoverable, to be passed on to PF and the physical reality of the utterance, or vice versa.[98] Notice that under this model the role of contact level between levels of pure representation that Chomsky 1988 assigns to S-structure becomes even more plausible and better defined.

Sentence interpretation is a considerably complex process. The goal of this study is to argue that logico-semantic interpretation and informational interpretation must be distinguished and that the interpretation of both is crucial for global language understanding. This chapter, in particular, was intended to show that these distinct

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[98] The wheel imagery was pointed out to me by B. Santorini, p.c.

interpretive modules must be matched one-to-one by different levels of representation in the syntax. Each of these levels contains a pure representation of the 'meaning' relations relevant to the component it interfaces.

Chapter 7

Logical Semantics and Informatics

In Chapter 6 it was argued that the level of informational representation, IS, could not be the same level at which logico-semantic meaning, LF, is represented. This finding was taken to be consistent with the position that informatics and logical semantics are two separate linguistic components, and that IS and LF serve as separate interfaces with each one of them. In this chapter, further support will be provided for the discreteness of informatics and logical-semantics. It will be argued that any attempts to reduce information packaging to logical semantics are incorrect in some way or another, and that any interactions that exist between truth-conditional operators and informational operators can be accounted for as indirect interactions between autonomous components. This chapter will address the semantic analyses of 'association with focus' (Jackendoff 1972, Rooth 1985) (in § 7.2 and § 7.3), the claim that focus is not an informational notion but a truth-conditional exhaustiveness operator (Szabolcsi 1981, 1983, Svoboda & Materna 1987) (in § 7.1), the claim that focus affects quantifier interaction (e.g. Jones 1988) (in § 7.4), and the 'ability' of the ground, especially links, to escape the scope of prepositional operators like negation (Payne 1985, Horn 1989) (in § 7.3).[99]

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[99]Some of the material in § 7.1 and § 7.2 was presented at the 1989 Linguistic Society of America Meeting in Washington, D.C., December 27-30. The discussion in § 7.3 was the subject of a paper presented at the 16th Annual Meeting of the Berkeley Linguistics Society, February 17-19, 1990.

7.1 Focus and Exhaustiveness

It is not uncommon to find treatments that assume that focus has an implicit exhaustiveness property, even in the absence of overt exhaustiveness operators like *only*. This position has been taken to an extreme in the work of Szabolcsi 1981, 1983 and Svoboda & Materna 1987. It is argued by these authors that focus has nothing to do with the informational articulation of the sentence. Instead, they claim that focus is precisely an exhaustiveness operator. Svoboda & Materna, for example, equate (259)a (their ex. 17) to (259)b, and Szabolcsi (1981) would provide the translation in (259)c (which has been extrapolated from a parallel example):

(259) a. CHARLIE visited Prague.
       b. The only x that visited Prague is Charlie.
       c. For all x, x visited Prague iff $x =$ Charlie.

While it is true that a set-membership feeling for *Charlie* in (259) exists, it is not too intuitively appealing to suggest that this sentence truth-conditionally means that *Only Charlie visited Prague*. That would mean that in the latter sentence the presence of *only* would be totally redundant. This position, however, is hard to maintain. These facts will be discussed in a moment, but before some related work done on the relationship between exhaustiveness and it-clefts must be considered.

The issue of whether it-clefts entail, conventionally implicate, or conversationally implicate exhaustiveness has received some attention. Halvorsen 1978 claims that it-clefts conventionally implicate exhaustiveness. However both Horn 1981 and Atlas & Levinson 1981 attack that position. Conventional implicatures survive negation and yes-no questioning, but the putative exhaustiveness conventional implicature associated with it-clefts does not survive under such conditions. While it can be plausibly argued that (260)a conventionally implicates (261), it seems clear that (260)b and (260)c do not (they are, respectively, Horn's (1981) 4a, 4d, 5a, and 5b):

(260) a. It was a pizza that Mary ate.
       b. It wasn't a pizza that Mary ate.
       c. Was it a pizza that Mary ate?

(261) Mary ate nothing (within some contextually defined set) other than
       a pizza.

Given these and other considerations, Atlas & Levinson argue that it-clefts truth-conditionally entail exhaustiveness (basically, they posit a null *only* operator). Horn shows that the exhaustiveness 'feeling' cannot be truth-conditional either. If it-clefts entailed exhaustiveness, (262)b should be as felicitous as (262)a is (Horn's 11′ and 11c, respectively):

(262) a. I know Mary ate a pizza, but I've just discovered that it was only a pizza that she ate.
       b. # I know Mary ate a pizza, but I've just discovered that it was a pizza that she ate.

Horn concludes that the exhaustiveness 'feeling' that it-clefts emanate is instead a generalized conversational implicature not at all confined to it-clefts.

How is this finding relevant for our purposes here? As stated in § 5.3 above, it has been convincingly argued (e.g. Akmajian 1979(1970), Chomsky 1971, Prince 1978, 1986) that it-clefts are special focus-ground marking constructions in that the clefted element is always the focus of the sentence. Horn's arguments against truth-conditional exhaustiveness in clefts are, in fact, arguments against truth-conditional exhaustiveness of focus in general. As already pointed out by Horn, sentence (263), where *pizza* is the focus, also seems to convey an exhaustiveness 'suggestion'.

(263) Mary ate a PIZZA.

This 'suggestion', parallel to the exhaustiveness feeling obtained from *CHARLIE visited Prague*, must be ascribed to pragmatics as a generalized conversational implicature as well. Following Horn's lead, further arguments will be provided for the position that focus is not an *only*-type operator. If environments can be found where focus and *only* contrast, we will have further evidence for their non-identity.

First some evidence will be presented that focus is not equivalent to an exhaustiveness operator. It is clear that *only* and focus are not always interchangeable. One example is the contrast in (264):

(264) a. I met NOBODY at the party.
       b. *I met *only NOBODY* at the party.

Of course, (264)b is semantically anomalous because *only* and the phrase associated with it, *nobody*, are incompatible. And that is precisely the point: focus and *nobody*

are not incompatible. Therefore, focus and *only* must be nonidentical. While *nobody* may be the associated with the focus of the sentence, it may not be associated with *only*.

The contrast between focus and *only* need not yield ungrammaticality, as in (264), but may be a matter of infelicity in a given context. With respect to (265), it may be claimed, at first blush, that it is necessary that the speaker has never been to the Brazilian jungle for the sentence to be true,

(265)   I've been to the CITIES in Brazil.

but that this is not the case is evident from contextualizations like (266). Notice that (266)b, with an overt *only*, is indeed infelicitous:

(266)   a. I knew the Amazon quite well and I've also been to the CITIES in
            Brazil.
         b. # I knew the Amazon quite well and I've also *only* been to the
            CITIES in Brazil.

The exhaustiveness feeling obtained from the focus phrase *cities* in (265) must be then considered a conversational implicature. The evidence provided by (266) parallels the evidence provided by Horn 1981 with respect to it-clefts.

The claim that focused constituents truth-conditionally entail exhaustiveness leads to extreme positions. For instance, one is forced to claim that sentence (267)a, from Sgall, Hajičová & Panevová 1986:ex.18, entails that English is spoken nowhere other than the Shetlands.

(267)   a. English is spoken in the SHETLANDS.
         b. Is English spoken on the Faroer Islands or in the Shetlands?

This entailment is, of course, false. In fact, Sgall, Hajičová & Panevová claim that sentence (267)a is false unless used as a reply to a question like (267)b.[100] However, maintaining that (267)a is false runs counter to most definitions of truth.

7.2   Scalar Particles and Focus

A certain class of words, including items like *only*, *even*, and *also*, has been claimed to have an intimate tie with the FOCUS of the sentence. These items, known as scalar

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[100]This, of course, cannot be done in a two-valued logic.

particles, are sometimes also called 'focus adverbs' or 'focus inducers' (Karttunen & Peters 1979, Jacobs 1984, 1986) or 'focus-sensitive particles' (Kratzer 1989), and their intimate tie with focus has been named 'association with focus' (Jackendoff 1972, Rooth 1985). This section concentrates on the interaction of focus and *only*. While it is undeniable that a certain interaction exists between *only* and focus, we show that 'association with focus' is not an inherent logico-semantic property of this scalar particle. First, it will be shown that *only* need not be associated with focus in all of its occurrences, even though it tends to do so very often. And second, it will be suggested why it is that focus and *only* seem to go together most of the time.

7.2.1 *Only* and Association with Focus

Only is always semantically associated with some other constituent in the sentence. This semantic association, however, does not have to be necessarily reflected in the overt syntax in a continuous constituent. Thus, while *only*+XP forms a syntactic constituent in (268), it does not do so in (269) (the element semantically associated with *only* is italicized):

(268) a. I *only sprinkled salt in the stew.*
       b. I *only sprinkled* salt in the stew.
       c. I sprinkled *only salt* in the stew.
       d. I sprinkled salt *only in the stew.*

(269) a. I *only* sprinkled *salt* in the stew.
       b. I *only* sprinkled salt *in the stew.*

The association of *only* with different parts of the sentence yields different truth-conditional interpretations.

The constituent *only* is associated with has been called the 'scope' of *only* (Anderson 1972, Hoeksema 1989), and the 'focus' of *only* (Karttunen & Peters 1979, Jacobs 1982, 1984). Rooth 1985 suggests rejecting the term 'scope', since it is used differently elsewhere, and the term 'focus' will be avoided for obvious reasons. Therefore, the element semantically associated with *only* will be called ONLY'S PARTNER.

Jackendoff 1972 notices that *only*'s partner is generally intonationally prominent, i.e. it seems to be the focus of the sentence. He proposes a rule of 'association with focus', by means of which preverbal *only* is linked to the focus of the sentence to form

an intimate semantic tie between the two. Rooth 1985 takes up on this proposal and develops it further. For him, the truth-conditional interpretation of *only* requires its association with focus. The focus element provides a p-set, a set of relevant alternates within a given discourse, which represent the quantificational domain for *only*. Rooth's analysis will be discussed in detail in § 7.2.2. It is clear from this approach that *only*'s partner must be the focus of the sentence. This view is found in Hoeksema 1989 as well, who affirms that the 'scope' of 'focus adverbs'—his terms—is 'determined by intonational means, being restricted to a focus constituent' (1989:106)

Similarly, Jacobs 1984, 1986 argues that, if a scalar particle occurs in a sentence, the focus of that sentence must be the partner of the scalar particle. Remember that, as mentioned above, Jacobs refers to scalar particles as 'focus inducers'. He calls the focus in sentences with scalar particles 'bound focus' and the focus in sentences without scalar particles 'free focus'. Even though Jacobs is careful to point out that bound focus belongs to the domain of truth-conditional meaning and free focus to the domain of pragmatics (1986:fn.7), he also states 'that scalar particles are focus inducers in all of their occurrences' (1986:107). In other words, the focus of the sentence must be *only*'s partner if *only* is present.[101]

It is possible to show that *only* can occur without any association with focus, in other words, that *only*'s partner need not be the focus of the sentence. Take, for instance, example (270)a. At first blush, it may seem that the only way to utter this sentence is with prosodic prominence on *John*, contrary to what the small caps in the example indicates. Rooth (1985:128), for instance, claims that in *Only John loves Mary*, *John* is obligatorily focused. But (270)a is perfectly felicitous in a context like (270)b:

(270)   a. *Only John*'s been to the CITIES in Brazil.
          b. John and Mary know the Amazon quite well but *only John*'s been
             to the CITIES in Brazil.

In (270)b *only's* partner is nonfocal. The focus, *cities*, is totally independent of *only* and its partner.[102]

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[101]Jacobs' (1984, 1986) approach was briefly discussed in § 2.4.3 with respect to his definition of information packaging as illocutionary meaning.

[102]Sentence (b) above could be understood as a double-focus reading, where both *John* and *cities* are foci. This reading is still problematic for Rooth 1985, since association with both foci is

Also, it is well known that *only* may appear in the nonclefted part of it-clefts. Example (271)a is from Horn (1969:ex. 20a), and the sentence is equally acceptable with only the second *only* ((271)b or (271)c):

(271) a. It's *only JOHN* who eats *only rice.*
       b. It's JOHN who eats *only rice.*
       c. It's JOHN who *only* eats *rice*

Since, as mentioned above, the nonclefted part of it-clefts is part of the ground, in (271)b/(271)c *only* and its partner are nonfocal. *Only*'s partner is also clearly nonfocal in the response to the question in (272):

(272) a. What food would you *only* eat *if you had to?*
       b. LIVER, I would *only* eat *if I had to.*

The answer in (272) is an instance of focus-preposing or Focus Movement, a construction discussed above in Ch. 6 (cf. also Prince 1981, 1986, and Ward 1985). In focus-preposing, as the very name indicates, the focus of the sentence is dislocated to a sentence initial position. *Only* in (272)b is not associated with *liver.* The meaning of (272)b is that the speaker would not eat liver unless s/he had to. If *only* were associated with focus, its meaning would be different: if s/he had to, the speaker would eat exclusively liver and no other food.

Gapping is a construction that has also been argued to mark focus-ground relationships (see Kuno 1983, Prince 1986). It is traditionally recognized that the only nonelidable part of the sentence is the focus, since it represents the only addition of information in the current discourse. If there exist gapping constructions where *only* and its partner constitute the gapped material, there exists another environment in which *only* occurs in non-association with focus. Example (273)a is a typical example where *only*'s partner is the focus of the sentence. The second conjunct in (273)b is an acceptable continuation of (273)a. In (273)b, *only scratching* is part of the ground, and therefore it is gapped. Again, we witness an example where focus is not associated with *only* in any way.

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required. The meaning of (b) with a double-focus reading, according to Rooth is 'If a proposition of the form "x has been to y in Brazil" is true, then it is the proposition "John has been to the cities in Brazil" '. In our context this is clearly not the case, since Mary has been to the jungle in Brazil (cf. Section 7.2.2 below for greater detail on this). However, in case this example is unclear, the examples that follow in the text are all cases in which *only*'s partner is indubitably nonfocal, since it is clearly found in the ground segment of focus-ground marking constructions.

(273)   a. Mary *only SCRATCHED* the Mercedes.
        b. Mary *only SCRATCHED* the Mercedes, and John __ the BENTLEY.

Finally, evidence can also be found in other languages. In Catalan, right-detachment removes nonfocal material, the tail in particular, from the clause by means of detaching it to the right, while the focus is left in clause-final position (cf. Ch. 5). *Only*—or, in this case, its Catalan equivalent *només*—and its partner, however, can appear in the right-detachment slot, clearly unrelated to the focus of the sentence, as in (274)a. The sentence in (274)b is the corresponding canonical.

(274)   a. Ens   en$_1$ NODRIM, *només-d'arròs$_1$*.
          1p-refl obj 1p-feed   only of rice
          Approx.: '(We) LIVE only on rice.'
        b. Només ens nodrim d'arròs.

The focus in (274)a is on the verb, not on the right-dislocated direct object. Again, there is an *only* that occurs with no association with focus. In fact, a similar sentence can be constructed in English, as shown by (275)b, in a context like (275)a. The relevant construction in (275)b (underlined) is a 'topicalization', which preposes nonfocal link material:

(275)   a. When we were in China, we *only* lived *on rice*.
        b. Boy, I'm glad I wasn't there. I'm not finicky,
          but *only on rice* [$_F$ I couldn't LIVE].

It must be concluded, then, that *only*'s partner need not be the focus of the sentence, i.e. that association with focus is not a necessary condition for the interpretation of *only*.

7.2.2   Consequences for Rooth's Semantics of *Only*

Background

The fact that *only* is not necessarily associated with focus has obvious consequences for Rooth's (1985) analysis of the semantics of *only*. Rooth sets out to account for the truth-conditional difference between (276)a and (276)b (Rooth's 5a and 5b, Ch. 2). If John introduced Jim and Bill to Sue, (276)a is false, but (276)b might still be true.

(276)   a. John *only* introduced *BILL* to Sue.
         b. John *only* introduced Bill to *SUE*.

He notices that *only*'s partner is the focus of the sentence, i.e. that *only* must apparently be associated with the focus constituent, and argues that focus furnishes the selection of the domain of quantification to the semantics of *only*. Expanding on the older proposal in Jackendoff 1972, he proposes that focused constituents are assigned an extra denotation that generates a set of alternatives for this focus. This set of alternatives, the P-SET, is obtained by substituting the focus for a variable in the predicate structure. Thus, sentence (277)a generates, along with a normal denotation, the set of propositions in (277)b, where y is the variable substituted for the focus constituent and E stands for some contextually relevant set of individuals:

(277)   a. John introduced BILL to Sue.
         b. $\{$ˆ introduce$'$ $(y, \text{s})(\text{j}) \mid y \in \text{E}\}$

The p-set represented by (277)b is taken as the domain of quantification needed by the meaning of *only*; *only* marks only one of the alternatives as being the case. Sentence (278)a is, then, paraphrased as in (278)b (Rooth's 47, Ch. 2):

(278)   a. John *only* introduced *BILL* to Sue.
         b. If a proposition of the form 'John introduced x to Sue' is true,
            then it is the proposition 'John introduced Bill to Sue'.

In other words, the p-set (alternative propositions) is made available on independent grounds by focus, and *only* merely uses that p-set as a domain of exhaustiveness quantification.

Problems

Given the data presented in the previous section, Rooth's position regarding the involvement of focus in determining the p-set becomes less plausible. Consider sentence (271)c, repeated here as (279)a. *Only* requires a p-set of the relevant sort to determine its domain of quantification. For (279)a, it is (279)b, where E is, say, the set of starchy foods {*bread, rice, noodles*}:

(279)   a. It's JOHN who *only* eats *rice*.
         b. $\{$ˆ eat$'$ $(y)(\text{j}) \mid y \in \text{E}\}$
         c. $\{$ˆ eat$'$ $((\textit{only})\text{-r})(x) \mid x \in \text{E}\}$

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The problem here is that the p-set cannot be independently provided by focus, since *only*'s partner is not the focus in (279)a. The focus structure of (279)a would provide the p-set in (279)c, where E is the set of, say, housemates {*Rita, John, Margo*}, for which *only* has no relevance in this sentence. This is tantamount to saying that *only*'s partner must necessarily be assigned a second denotation that generates the p-set independent of whether it is focus or ground. In other words, *only* does not require association with focus to have access to the relevant p-set, since any constituent that ends up being *only*'s partner can generate such a p-set.

In fact, this is not surprising at all. It is well known that almost any term in a sentence can be understood as pertaining to (at least) one set of some kind. This property is by no means restricted to focus. This gives rise to the pervasive conversational and scalar implicatures that accompany almost every utterance (cf. Hirschberg 1985). Given a prosodically neutral sentence like (280)a, a number of different sets can be evoked:

(280)   a. The middle-income woman bought the average-sized pick-up.
         b. The middle-income WOMAN bought the average-sized pick-up

Significantly, the same is true if focus is narrowed down to a single constituent. If, for instance, *woman* is focused in (280)b, the p-sets for the other constituents do not disappear, provided that the context is such that the alternates are of some interest. See Rubinoff 1987 for some examples of scalar implicatures triggered by nonfocal constituents.

Assuming that Rooth's semantics for *only* are essentially right in arguing that a second denotation for *only*'s partner is needed, it must be concluded from the above that the availability of such second intensional translation is not due to the presence of a focus feature at the level of logico-semantic representation. It is, rather, a more general characteristic of any linguistic phrase uttered in the appropriate context. All, or most, constituents in a sentence may generate a p-set that *only* may use to determine its domain. In turn, this confirms that focus is not needed in accounting for the semantics of *only*. Finally, all of these suggest that, if the domain selection theory for *only* is to be maintained (as opposed to the 'scope' theory rejected by Rooth), a new way to establish the association between ad-VP *only* and its partner must be found.

7.2.3 But There's a Large Overlap

While it is clear, then, that the relationship of focus and *only* is not a necessary one, it is also obvious that there is a large number of cases—a vast majority one should say—in which *only*'s partner is the intonationally prominent element and indeed seems to be the focus of the sentence. In what follows, an account of such overlap will be sketched. It will be argued that the fact that *only*'s partner is usually the focus of the sentence in which it occurs (although, as noted, not necessarily so) follows from independent informational considerations.

As noted in Chs. 3 and 4, the only informational force of the ground is that of anchoring the informative part of the utterance, i.e. the focus, so that the hearer may retrieve the information of the sentence and enter it into her/his knowledge-store. As a pre-condition of the task it performs, the ground must be hearer-old: it must represent knowledge the speaker assumes hearers already have in their knowledge-store. But, at the same time, it must also be relevant to perform the task. If the speaker assumes the hearer can retrieve the information provided by the focus without the help of a ground, there is no ground present.

Let us see what the information packaging of sentence (276)a/(278)a, repeated here as (281), is:

(281)   John *only* introduced *BILL* to Sue.

This sentence encodes the following packaging instruction: 'I am instructed to go to address "John" and retrieve the information of the sentence by substituting *only Bill* for the blank in *he introduced __ to Sue*, which is already under "John" '. In other words, the speaker assumes that at the time of utterance the hearer knows about John's introducing, with Sue being the goal of such introducing, and that this introducing is being attended to somehow.

Now, consider the apparently semantically anomalous sentence in (282).

(282)   *John *only* introduced *Bill* to SUE.

This sentence is claimed to be unacceptable in the intended reading because *only* is not associated with focus. In other words, if the focus is on *Sue*, *Sue* must be interpreted as *only*'s partner. For the sake of the argument, however, we could ask ourselves what the information packaging of (282) would be. It would be along the

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lines of 'I'm instructed to go to address "John" and retrieve the information of the sentence by substituting *Sue* for the blank in *he introduced only Bill to* __, which is already under "John" '.

In other words, John's introducing only Bill—not just John's introducing Bill— must be known by the hearer (so the speaker assumes). But if *only* and its partner are not the informative part of the utterance and are, therefore, part of the ground, their informational force must consist of providing appropriate instructions for the entry of the information it provides. All of the ground must be necessary for this task, including the exhaustiveness operator. Exhaustiveness must be important for the ground's informational task. If, in contrast, the speaker assumes the information of the sentence will be entered appropriately without the help of the exhaustiveness modifier, it will not be included in the ground.

In principle, the state of affairs that the informational structure of (282) requires is not an impossible one. In fact, all the examples of non-association with focus introduced above represent such a state of affairs. The inclusion of exhaustiveness in the ground may indeed make a difference. However, contextual situations in which exhaustiveness is still relevant for anchoring the informative part while not being part of it are rare, and, therefore, so are utterances that reflect such a state of affairs. One such context, for instance, is the one in (283):

(283)   a. I know that
                  1. John introduced Bill and Barb to Ralph
                  2. John introduced Bill (but not Barb) to x
         b. I don't know that
                  3. $x =$ Sue
         c. So I ask Mary
                  Who did John *only* introduce *BILL* to?

A perfectly acceptable answer to (283)c in such a context—ratified by several native speakers of English—is precisely the putatively unacceptable string in (282) above, which is repeated here for convenience as (284). Notice that *SUE* here cannot be *only*'s partner, since John introduced Bill to Ralph too.

(284)   John *only* introduced *Bill* to SUE.

The contextual sophistication required for the felicity of this utterance, however, is considerably larger than the sophistication required for utterances like (281). So

much so, it may be suggested, that when we are presented with such a string we cling to the reading where the focus is *only*'s partner unless strong contextual pressure forces on us a reading where *only*'s partner is nonfocal. In particular, the prediction here is that sentence (284) would only be uttered in a situation in which the address for 'John' in the hearer's knowledge-store looked like (285),

(285)

addr: John(x)
introduce Barb to Ralph(x)   introduce Bill to Ralph(x)   introduce (only) Bill to __(x)

where exhaustiveness on 'Bill' is crucial for getting the informative focus to the right spot under the address 'John'.

This type of account, then, claims that there is no linguistic oddness whatsoever, of a logico-semantic or an informational sort, in sentences like (284). Their oddity is exclusively due to the fact that in the actual world one would seldom utter them, given that they require sophisticated contextual pre-conditions. This type of pragmatic oddity is what was called 'actual-world felicity' in § 2.4.1, and has been invoked by several authors in recent research (Kroch 1989, Searle 1989). It must be concluded from this that the different truth-conditions observed in these sentences are, in principle, completely independent of the location of focus in the sentence.

7.2.4 *Only*'s Partner in the Discourse History

If we look back into the discourse history previous to every utterance where *only* is in non-association with focus—let us call it U_t, it will be noticed that, in the majority of cases, *only*'s partner was the focus in some previous utterance U_{t-n}. See, as examples, (272), (273), (275), and (284). This fact is, of course, irrelevant for a static propositional semantics of the sort Rooth uses: that *only*'s nonfocal partner at U_t was a focus at U_{t-n} cannot be taken into account in the semantic representation of U_t. At U_t *only*'s partner is nonfocal and still provides a second intensional translation. Discourse history is of no use.

However, a dynamic approach to truth-value computation, à la Kamp (1981) for instance, which makes use of chunks of discourse larger than the proposition, might be able to utilize the fact that *only*'s nonfocal partner at U_t was a focus at U_{t-n}.

It could be argued, for instance, that in the question-answer pair in (283)-(284), repeated here as (286),

(286) a. Who did John *only* introduce *BILL* to?
       b. John *only* introduced *Bill* to SUE.

the p-set generated by the focus and used by *only* as a domain of exhaustive quantification in (286)a is 'frozen' and passed down somehow to (286)b, where it is still available as a domain of quantification for *only* by virtue of its partner having been a focus in the relevant discourse history.

Even if such an approach could be worked out, and leaving aside the problem of disallowing *only* to quantify over the p-set provided by the real focus in U_t, there are examples where there is no explicit mention of *only*'s nonfocal partner in the discourse history:

(287) [A last-minute guest arrives at host's house. The host has known
       the guest's family for years]
       A: I'm glad you could come for dinner. Had I known before,
          I wouldn't have made pig's feet.
       B: I love pig's feet. It's my SISTER who *only* eats *prime cuts*.

Obviously, such example is felicitous only in a context where the host knows that one of the guest's family members eats only prime cuts (although there is a mix-up with respect to exactly which person). Furthermore, exhaustiveness is indeed crucial in anchoring the focus in (287)B appropriately, since, presumably, the guest herself eats prime cuts too, i.e. *my sister* would not make any contribution to the hearer's knowledge-store—would not be informative—if construed with respect to just *eats prime cuts* instead of *eats only prime cuts*, since eating *only* prime cuts is the crucial issue here. Sentence (287)B is nevertheless a flawless example.

Why, then, do *only*'s nonfocal partners tend to be found in a U_t which follows a U_{t-n} in which they were focal? The answer is quite straightforward: most nonfocal elements found in a U_t were focal in a U_{t-n}, and that includes *only* and its partner. The ground must be hearer-old, but most hearer-old material has been, in the discourse history, discourse-new at one time. There are two ways in which a discourse element may enter the discourse: *a*) it may do it as part of the focus (if the element is hearer-new); this is the most common case, and this is why most partners of *only*, like any ground material, have been part of the focus at one point

or another in the discourse history; or *b*) it may do it as part of a sentence's ground (if the element is discourse-new but hearer-old, i.e. knowledge the speaker had before the discourse interaction is started). Given this, the prediction is that *only* phrases will be acceptable as part of a non-previously-mentioned ground when they represent discourse-new but hearer-old material and when exhaustiveness is important to anchor the focus appropriately. Example (287) satisfies both these requirements.

7.2.5 Conclusion

The approach sketched out in § 7.2.3 suggests that the tendency—not requirement— to associate *only* with focus is due to factors which are clearly nonlinguistic. Situations in which *only* and its partner are nonfocal require a large degree of contextual sophistication. Situations in which exhaustiveness is part of the focus require little contextual sophistication. As a consequence, due to the pragmatic unlikelihood of nonfocal exhaustiveness, we only accept *only*'s partner as nonfocal in presence of compelling contextual pressure.

Given that, in the appropriate context, cases of non-association with focus are perfectly acceptable, 'association with focus' should not be built into the semantics of *only*. The notion of p-set proposed by Rooth 1985, or a similar mechanism (cf. Kratzer 1989), and the domain selection theory for *only* seem to be helpful tools in accounting for *only* quantification. What has been shown here is that association with focus is not the right way to provide *only* with the correct domain of quantification, since *only*'s partner need not be the focus: the p-set generated by *only*'s partner second denotation, and therefore the second denotation itself, must be provided by *only*'s nonfocal partners as well. This conclusion supports the position that focus is a real information-packaging primitive that has no place in truth-conditional logico-semantic interpretation.

7.3 The Scope of Sentential Negation

Another case of 'association with focus' occurs with propositional operators like negation and the interrogative yes/no-operator. Jackendoff 1972 focuses on the role of focus in the alteration of the scope of negation. This fact had already been noticed by Frege and other philosophers, who had pointed out that ground

elements may escape the scope of negation. If these claims are correct, our position that informatics and semantics are distinct autonomous components will be proven wrong. If, however, the phenomenon can be derived from a indirect interaction between two types of 'meaning', logico-semantic and informational, the position held in this study will still be tenable.

7.3.1 The Facts

Apparent irregularities in the semantic scope of sentential negation have been noticed by many linguists and philosophers. A well-known problem is the existential force of most sentential subjects in negative statements. Many authors conclude from the presence of this existential force that the subject lies outside the scope of negation (e.g. Frege 1892, Strawson 1950, Kamp 1981). Another irregularity, noticed by Kraak 1966, Jackendoff 1972, Gabbay & Moravcsik 1978, Kuno 1980, Payne 1985, McGloin 1987, and Horn 1989, among others, is that, in certain contexts, some parts of the predicate do not seem to be affected by sentential negation either. It has been suggested that the scope of negation must exclude these 'nonnegated' constituents as well. A different approach to the first problem (e.g. Kempson 1975, Gazdar 1979, and Horn 1986), or to both (Horn 1989), however, maintains that sentential negation is indeed external and has scope over the entire subject-predicate structure, and that the existential force of subjects and the feeling that only part of the predicate is negated in certain sentences are better handled by a non-truth-conditional account. Similar observations are applicable to the yes/no question operator or Q-operator, as discussed in Kuno 1980, 1982.[103]

In this section, a unified account of these two phenomena is provided. Following Horn's externalist point of view, and using evidence from Catalan and English, it is argued that the readings where part of the sentence is felt as 'nonnegated' are the outcome of the interaction of logical-semantics and informatics, i.e. between the interpretation of propositional content and the interpretation of information-packaging instructions. In particular, it is proposed that information packaging and semantic meaning interact by means of partial cancellation, yielding the understandings where some part of the clause is felt to escape the scope of negation or

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[103]But see Horn (1989:472-73) for arguments that the Q-operator and negation are not analogous.

the Q-operator, without the need to resort to any additional constraints.

In what follows, the readings where part of the proposition is felt to lie outside the scope of negation or the Q-operator will be referred to as INFRAPROPOSITIONAL READINGS, and the elements that lie outside the scope of negation or the Q-operator as OUTSIDER TERMS. As noted, outsider terms may be either subjects or complements of V.

Subjects

The scopal relation between subject definite descriptions and sentential negation has been a matter of controversy for many years. A sentence like (288), in one of its 'readings',

(288)   Gomez Addams didn't sell his South American holdings.

seems to convey the understanding that Gomez Addams exists; in other words, that there is a Gomez Addams about whom a negative predicate is communicated. Some semantic theories incorporate this understanding in their formal semantic representation of negation by either arguing or assuming that negation is internal and does not have scope over the subject (Frege 1892, Strawson 1950, Kamp 1981, inter alia) or by arguing that the subject in (288) must be analyzed as an existential quantifier which gives rise to logical scope interactions with the negation operator (Russell 1905) (cf. Lukasiewicz 1922 for a different ambiguist approach), yielding the wide-scope reading of negation, where there is no existential claim for *Gomez*, and the infrapropositional reading, where there is.

In contrast, one may address the issue in a totally different fashion: let negation have scope over the entire predication, including the subject, at all times, and attribute the existential force of the subject NP in (288) to some non-truth-conditional property of this NP (cf. Kempson 1975, Gazdar 1979, Horn 1989, among others).[104] Horn (1989:§7.3.4), for example, argues that subjects tend to be felt as lying outside the scope of negation because they tend to be topics. Topics, being what the

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[104]There are two analyses of this wide-scope negation operator: an Aristotelian two-place subject-predicate operator, or a Fregean one-place propositional operator. This controversy, though important, will be overlooked in this paper. For our purposes here, a Fregean propositional operator will be adopted (but cf. Horn 1989 for compelling arguments for the Aristotelian two-place term operator, which he heralds as superior to its alternatives).

sentence is about (cf. Strawson 1964, Reinhart 1981) are not within the scope of 'assertion' and, therefore, are pragmatically understood as being outside the scope of negation as well. As noted in previous sections, existential force is one of the characteristics of links.

Complements of V

It is not subjects alone which appear to give rise to infrapropositional readings. Jackendoff 1972 notices that sometimes negation seems to apply to only part of the predicate (cf. also Gabbay & Moravcsik 1978). One such example is, for instance, the sentence in (289) (in Jackendoff 1972:255),

(289)   Max didn't kill the JUDGE with a hammer.

where negation is felt to affect only the direct object and not the entire VP or sentence, i.e., not only the subject *Max* but also the PP *with a hammer* behave like outsider terms. Jackendoff argues that this is an example of his rule of 'association with focus', a rule that somehow connects logical operators with the focus element in the sentence to establish an intimate tie between the two.[105]

Kuno 1980, 1982 notes similar restrictions for negation or the Q-operator in Japanese: their scope generally only extends to the focal verbal constituent that immediately precedes them. In fact, English, while distinct from Japanese in word order and directionality of scope, also shows parallel effects for both operators. Compare (289) with (290). Notice that in (290) only *judge* is understood as the 'aim' of the yes/no question.

(290)   Did Max kill the JUDGE with a hammer?

In most of the literature, it is clearly concluded or tacitly assumed that the semantics of sentences like (289) and (290) cannot include a sentential negation operator with scope over the entire proposition. When trying to define the logico-semantic scope of negation in these sentences, however, one encounters references to non-logico-semantic, informational notions like focus and theme. A clear example is Payne 1985, who does not seem to clearly endorse an exclusively logico-semantic approach to the

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[105]These data were discussed above in Ch. 6 with respect to their relevance for syntactic representation.

diversity of readings, and affirms, using Praguean terminology, that 'the contextually bound elements are removed from the scope of negation, and what is actually negated is the contextually free portion of the sentence' (1985:199). And it is again Horn (1989:515) who proposes that there should be no need to resort to multiple logico-semantic ambiguity to account for the VP infrapropositional readings: 'the negative element takes semantic scope over the entire predication, but [...] will be understood as associated with that rhematic constituent which receives the intonation peak'.

It is precisely this position, expressed by Payne and Horn with respect to VP outsider terms, that is developed in this paper in terms of the interaction of semantics and informatics, while applying it to all outsider terms: subjects and complements of V. The position is taken that sentential negation and the Q-operator have always semantic scope over the entire predication, with no exceptions, and the infrapropositional readings are derived from the different informational structures of the sentence and their different overlapping patterns with the invariable semantic structure. If it is possible to come up with an explanation for this scope-of-negation effects without resorting to including informational notions in the logico-semantic representation, our position will be strengthened. As a side benefit, the disadvantages and shortcomings of the internalist and ambiguist approaches discussed in detail in Horn 1989 to this infrapropositional readings will be avoided.

7.3.2 Deriving the Infrapropositional Readings

The argument will be based on examples from Catalan. In Catalan, as discussed in Ch. 5, the informational articulation of the sentence is structurally expressed in the syntax by means of right- or left-detachment of nonfocal constituents, yielding the configuration in (291):

(291)   [$_{IP}$ non-focus (link) [$_{IP}$ [$_{IP}$ **focus**] non-focus (tail)]]

This abstract configuration is instantiated in sentences like the ones in (292). The example in (292)a is a right-detachment and (292)b is a left-detachment. The sentences in (293) illustrate further combinations with an overt link subject:[106]

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[106] Notice that in these examples the null subject pronominal *pro* is placed in a preverbal position. It was argued above in Ch. 5 that the clause-internal position of subjects must be postverbal, but since nothing hinges on that fact in the following discussion, they have been placed in preverbal position for the sake of clarity.

(292)   a. [$_{XP}$ [$_{IP=F}$ hi$_i$ van obrir   BOTIGA,] a Londres$_i$.]
           loc 3p-past-open store   in London
        '[$_F$ (They) opened a STORE] in London.'

   b. [$_{XP}$ A Londres$_i$ [$_{IP=F}$ hi$_i$ van obrir   BOTIGA.]]
           in London   *loc* 3p-past-open store
        'In London [$_F$ (they) opened a STORE].'

(293)   a. [$_{XP}$ Els Lladró$_i$ [$_{IP=F}$ *pro$_i$* van obrir   botiga a LONDRES.]]
                                   3p-past-open store   in London
        'The Lladró Brothers [$_F$ opened a store in LONDON].'

   b. [$_{XP}$ Els Lladró$_i$ [$_{XP}$ [$_{IP=F}$ *pro$_i$* hi$_j$ van obrir   BOTIGA] a Londres$_j$.]]
                               loc 3p-past-open store   in London
        'The Lladró Brothers [$_F$ opened a STORE] in London.'

   c. [$_{XP}$ A Londres$_j$ [$_{XP}$ [$_{IP=F}$ *pro$_i$* hi$_j$ van obrir BOTIGA] els Lladró$_i$.]]
        'In London the Lladró Brothers [$_F$ opened a STORE].'

The informational interpretation of, say, sentence (293)b is the following: 'I am instructed to go to the address "the Lladró Brothers" and retrieve the information of the sentence by substituting **opened a store** for the blank *the Lladró Brothers __ London*, which is already under "the Lladró Brothers" '. This was represented with the informational instruction in (294):[107]

(294) $\Lambda np_1, np_1$ = L. Bros., λpp_2 [Φ [*yes*(np_1 **opened a store** pp_2)]] (in-L.)

Notice that this instruction includes a representation of the affirmation operator (*yes*), which is in complementary distribution with the interrogative Q- and the negation operators.

Representations for other informational readings—the list is not exhaustive—of the same logico-semantic proposition are displayed in (295). Sentence (295)a is an example of all-focus structure, (295)b an example of link-focus structure, and (295)c an example of link-focus-tail structure:[108]

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[107]In this section, the variables bound by the ground are typed for the sake of clarity.

[108]Sentence (a) is presented as an embedded sentence to improve its felicity. In matrix sentences where two or more complements of V are overt and nonclitic, postverbal subjects are somewhat marginal.

(295) a. (...quan) [$_F$ van obrir botiga a londres els LLADRÓ].
        '(...when) the L.B. opened a store in London.'
        Φ [*yes*(**L.B. opened a store in London**)]

       b. Els Lladró$_i$ *pro*$_i$ [$_F$ van obrir botiga a LONDRES]. (=(293)a)
        'The L.B. [$_F$ opened a store in LONDON].'
        $\Lambda np_1, np_1 =$ L.B., [Φ [*yes*(np_1 **opened a store in London**)]

       c. Els Lladró$_i$ [$_F$ *pro*$_i$ n$_j$'hi$_k$ van OBRIR], de botiga$_j$, a Londres$_k$.
        'The L.B. [$_F$ OPENED] a store in London.'
        $\Lambda np_1, np_1 =$ L.B., $\lambda np_2 \lambda pp_3$ [Φ[*yes*(np_1 **opened** np_2 pp_3)]](in-L)(st.)

7.3.3 The Negation and Q- Operators

Taking the above as background, we shall now try to derive the infrapropositional readings in negative and interrogative sentences. The semantic meaning of sentences (293) and (295) has remained constant, while different informational understandings have been established. In other words, the logico-semantic proposition

(296)   *yes*[open (store, in London, L. Bros.)]

is shared by all the sentences in (293) and (295). However, each of these sentences has a different informational representation, some of which have already been spelled out in the above examples. So far, there has been no conflict in the understandings derived from both types of meaning: the interaction between the two has null effects. This, however, is not always the case. To see this, let us extend the informational representations in (294) and (295) to their negative and interrogative counterparts, i.e., sentences where, instead of having a *yes* operator we have negation ($\sim$) or a Q-operator (Q).

Informational representations for the interrogatives are in (297) (*que* is the Catalan instantiation of the Q-morpheme):[109]

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[109]The English translations in the examples below are sort of marginal. English naturalness was sacrificed to obtain a more faithful rendering of the Catalan original. The English preposed phrase should not be read as a 'hanging topic' or full-fledged English left-dislocation—LD-2 in Prince's (1984) terms, but as an actual topicalization in a noninterrogative sentence.

(297)   a. Que [$_F$ van obrir botiga a londres els LLADRÓ](, pas)?
         'Did the L.B. open a store in London?'
         Φ [Q(**L.B. opened a store in London**)]
      b. Els Lladró$_i$ que [$_F$ *pro$_i$* van obrir botiga a LONDRES]?
         'The L.B. did they [$_F$ open a store in LONDON]?'
         $\Lambda np_1, np_1 =$ L.B., [Φ [Q(*np$_1$* **opened a store in London**)]]
      c. Els Lladró$_i$ que [$_F$ *pro$_i$* hi$_j$ van obrir BOTIGA], a Londres$_j$?
         'The L.B. did they [$_F$ open a STORE in London?]'
         $\Lambda np_1, np_1 =$ L.B., λpp_2 [Φ [Q(*np$_1$* **opened a store** *pp$_2$*)]] (in-L)
      d. Els Lladró$_i$ que [$_F$ *pro$_i$* n$_j$'hi$_k$ van OBRIR], de botiga$_j$, a Londres$_k$?
         'The L.B. did they [$_F$ OPEN] a store in London?'
         $\Lambda np_1, np_1 =$ L.B., $\lambda np_2 \lambda pp_3$ [Φ [Q(*np$_1$* **opened** *np$_2 pp_3$*)]] (in-L) (st.)

Sentences (297)a, (297)b, (297)c, and (297)d are informationally equivalent to sentences (295)a, (295)b, (293)b (=(294)), and (295)c, respectively. They encode the same information-packaging instruction (aside from the propositional operator[110]), which in Catalan is straightforwardly represented in the surface structure of the sentence. Each of the sentences in (297) shows the same detachment pattern as its affirmative counterpart in (293) and (295). At the same time, the sentences in (297) are all instantiations of the same logico-semantic proposition in (298):

(298) Q[open (store, in London, L. Bros.)]

While the sentences in (297) are all logico-semantically equivalent, they are, in contrast, informationally distinct from each other.

The same observations can be directly carried over to the negative sentences in (299):

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[110]It is unquestionable that the propositional operator is needed in the informational representation. Not only do we need to derive the infrapropositional readings discussed in this paper, but it is also necessary to informationally represent sentences where the affirmation/negation operator is the only focal element:

(i) She DID pass.
(ii) She had to pass, and pass she DID.

In these sentences the operator *yes* is the focus, and it must be represented as such in an informational instruction by positioning it within the scope of Φ. These sentences are discussed in detail in Ward 1985 and Prince 1986.

(299) a. neg-external reading:
     (...que) [$_F$ no van obrir botiga a londres els LLADRÓ].
     '(...that) [$_F$ the L.B. didn't open a store in London].'
     Φ [∼(L.B. opened a store in London)]
     b. neg-internal reading:
     Els Lladró$_i$ [$_F$ no *pro$_i$* van obrir botiga a LONDRES].
     'The L.B. [$_F$ didn't open a store in London].'
     $\Lambda np_1, np_1 =$ L.B., [**Φ [∼(np_1 opened a store in London)]**
     c. Els Lladró$_i$ [$_F$ no *pro$_i$* hi$_j$ van obrir BOTIGA], a Londres$_j$.
     'The L.B. [$_F$ didn't open a STORE] in London.'
     $\Lambda np_1, np_1 =$ L.B., λpp_2 [**Φ [∼(np_1 opened a store pp_2)]] (in-L)**
     d. Els Lladró$_i$ [$_F$ no *pro$_i$* n$_j$'hi$_k$ van OBRIR], de botiga$_j$, a Londres$_k$.
     'The L.B. [$_F$ didn't OPEN] a store in London.'
     $\Lambda np_1, np_1 =$ L.B., $\lambda np_2 \lambda pp_3$ [**Φ [∼(np_1 opened $np_2 pp_3$)]] (in-L) (st.)**

The four sentences in (299) are informationally distinct from each other. Each of them is informationally equivalent (except for the propositional operator) to the corresponding lettered sentences in (297). This is shown, again, by the Catalan surface structure. The logico-semantic structure of the sentences in (299), however, remains constant:

(300) ∼[open (store, in London, L. Bros.)]

This is precisely what Kempson 1975, Gazdar 1979, Horn 1989, and the other partisans of the externalist approach to sentential negation argue for. In what follows it will be shown how the infrapropositional readings can be derived without fiddling with the logical scope of negation, just as these authors propose. The readings in question are derived by exploiting the partial-overlap interaction between the logico-semantic and the informational representations of sentences like (297) and (299).

Note that the informational represensions for the sentences in (297) and (299) are motivated exclusively by the information packaging they convey, just as they were in the affirmative sentences in (294) and (295). Notice, incidentally, that it is precisely the outsider terms in this sentences which are detached to nonargument slots. Catalan clearly reflects structurally the fact that outsider terms must be nonfocal, as observed by some of the authors mentioned above.

A Unified Account

Let us consider, for example, sentence (299)b, where the outsider term is the subject. The information packaging this instruction expresses is as follows: 'I am instructed to go to the address "the Lladró Brothers" and then retrieve the information of the sentence by adding x_1 **not opened a store in London** under the address "the Lladró Brothers" '. The link *els germans Lladró* is the only ground here. The information-packaging instruction encoded in this sentence indicates that the speaker assumes hearers have an address 'the Lladró Bros.' in their knowledge-store. In other words, when processing the informational content of the sentence, hearers understand that the speaker is telling them that they already have the address 'the Lladró Bros.' in their knowledge-store, and furthermore that they must 'go to' it before entering the information of the sentence under it.

Given this, it must be concluded that, while (299)b semantically expresses that it is not the case that the Lladró Brothers opened a store in London, simultaneously it informationally expresses that 'the Lladró Brothers' are already in the hearer's knowledge-store and are relevant at this time, i.e. their existence in the hearer's knowledge-store is taken for granted. The subject *els Lladró*, while within the scope of negation in the semantics, remains outside the scope of Φ in the informatics, and, therefore, as Horn (1989:512) suggests, in some sense, outside the scope of negation as well. In other words, the speaker communicates to hearers that it is not the case that the Lladró Brothers opened a store in London, but, in parallel, it also lets them know that the Lladró Brothers should already be in their knowledge-store and that the information provided in the sentence is informative with respect to them. As a consequence, only the focal part of the sentence is understood as 'affected' by negation. This is how Horn's observation about the topichood—linkhood, in our terms—of most subjects is captured. In fact, Catalan postverbal subjects, crucially, are never understood as outsider terms.

Consider now (299)d, for instance: the ground can be described as being 'the Lladró Brothers stand in some relation to a store and to London'. The only informative part, the only actual addition to the hearer's knowledge-store at the time of utterance, is 'not opening'. Again, while the hearer semantically understands that it is not true that the Lladró Brothers opened a store in London, s/he informationally

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understands that some relation holds between them and a store and London (at least this is what the speaker is assuming the hearer knows). If both understandings are cancelled out, we obtain that the only element left to be negated de facto is *open*. The informational status of complement-of-V outsider terms, then, just like with their subject counterparts, causes them to be understood as nonnegated. This is represented in our informational instruction, where only negation and the verb are within the scope of focus.

The same applies to interrogative examples like (297). In (297)c, for instance, in the semantics, Q has scope over the entire proposition. But in the informational component, hearers gather that the fact that the Lladró Brothers stand in some relation with London constitutes the ground. The only nonground material is then 'opening a store', which is left as the only 'questionable' part of the utterance, and, therefore, understood as the aim of the yes/no question.

Notice that this account directly incorporates Jackendoff's 'association with focus' with no explicit stipulation of it. In fact, Jackendovian examples like the one in (289) are accounted for by our representation, as shown in (301) or its corresponding interrogative (302):

(301)   Max didn't kill the JUDGE with a hammer.
        $\Lambda np_1, np_1 = \text{M}, \lambda v_2 \lambda pp_3 \ [\ \Phi \ [\ \sim(np_1 v_2 \ \textbf{judge} \ pp_3) \ ]] \ (\text{w/ hammer}) \ (\text{kill})$

(302)   Did Max kill the JUDGE with a hammer?
        $\Lambda np_1, np_1 = \text{M}, \lambda v_2 \lambda pp_3 \ [\ \Phi \ [\ Q(np_1 v_2 \ \textbf{judge} \ pp_3) \ ]] \ (\text{w/ hammer}) \ (\text{kill})$

Again, the propositional operator takes wide logico-semantic scope in both examples, yielding the logico-semantic understandings that it is not the case that Max killed the judge with a hammer for (301) and that the speaker inquires whether or not it is the case that Max killed the judge with a hammer for (302). Both sentences, however, are informationally equivalent: the hearer is informed that *the judge* is an appropriate complement of the ground, where the ground consists of Max standing in a relevant relation with the act of killing with a hammer. Given this, the hearer is lead to understand *the judge* as the 'object' of negation or the aim of the yes/no question.

Crucially, the same treatment is given to subjects with existential force and to VP-internal outsider terms. There is no need to resort to two different sorts

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of explanation. The trick here is in placing the sentential operator (affirmation, negation, or Q) inside the scope of Φ. This move has null effects when the operator is affirmation, as desired, but important ones when the operator is negation or Q. In particular, it provides us with the infrapropositional readings, i.e. Jackendoff's association with focus, with no additional stipulation of such a rule.

Negation-in-Ground Cases

While this approach has been succesful in giving a unified account of the existence of outsider terms in negative and Q-operator sentences, it may seem unable to deal with sentences where sentential negation is clearly a part of the ground, i.e. where it is not 'associated with focus' in any of the ways discussed above. Such is the case in sentences like (303), where (303)b is a literal rendering into Catalan of (303)a (which is dialectally restricted in English):

(303)   a. My CAR, I haven't paid for yet.
           b. El COTXE, no he pagat encara.
           c. It's my CAR I haven't paid for yet.

In these examples 'not having paid for yet' is the vehicular ground which serves to anchor the focus *car*. Since there is no 'association with focus' it would be erroneous to try to give an affirmative ground to this sentence. In these sentences, then, negation should be outside the scope of Φ. The very trick that allows us to derive the infrapropositional readings, however, excludes these 'negation-in-ground' readings.

What needs to be done to be able to represent cases like (303) is abstract negation away from the clause, in the same way other tail elements in (303), like *pay*, would be abstracted by means of the lambda notation. This step does not seem problematic and would allow for a straightforward analysis of sentences like (303). The details of such an extension will not be pursued here.

7.3.4   Conclusion

The semantic analysis of sentential negation as an operator with scope over the entire proposition has encountered two major difficulties: the existential force of most subjects and the outsider-term nature of some predicate-internal phrases. It

has been concluded from this that in sentences with these irregularities we must abandon the idea of a wide-scope sentential operator.

It has been argued here that, to the contrary, these long-observed irregularities in the semantic scope of sentential negation need not be incorporated into the semantic representation of negative sentences, but rather, that they follow independently from the interaction of parallel but distinct simple semantic and informational representations. Our independently-motivated formal representation of information packaging, when applied to interrogative and negative sentences, duly captures the infrapropositional readings in question with no need of additional rules like 'association with focus'.

Finally, and more importantly, the inclusion of non-logico-semantic notions like focus in the semantic representation is rendered unnecessary. The existence of an interaction between information packaging and logico-semantic operators has been accounted for without requiring the presence of informational operators in the logico-semantic repesentation. Propositional operators are obviously present in the informatics but only for their value as information. Not only can it still be maintained that informatics and logical semantics are two separate components, but in arguing for this position, a more elegant and unified account of the existence of outsider terms and the infrapropositional readings that accompany them has been provided.

7.4 Other Effects on Logical Meaning

It is not uncommon to find examples in the literature where focus is invoked to account for some unexpected effects on logical meaning. These range from the claim that focus affects the interaction of quantificational operators and quantificational adverbs to the claim that focusing disallows coreference between sentence elements. This section contains a brief survey of two of these claims. The apparent weak crossover effect of focus on coreference was already discussed in Ch. 6.

7.4.1 Scope Interactions

Jones 1988 is an interesting study of wh/operator interactions. At one point, he discusses the lack of multiple construals in sentences like (304)b, in contrast to a sentence like (304)a:

(304)   a. What did everyone buy for Max?
         b. What did someone buy for Max?   (Jones 1988:ex. 27)

His argument is that the reading where the existential quantifier takes wide scope over the wh-element is structurally possible but pragmatically infelicitous, since it is totally redundant (approx. 'someone is someone and for this someone, what did they buy for Max'). However, he argues, 'as soon as we give semantic content to the existentially quantified NP, and stress it, then focus changes the possibilities' (1988:9). His example is (305),

(305)   What did the RICHEST person buy for Max? (Jones 1988:ex. 32b)

where a wide-scope understanding of the 'enriched' existential NP is possible. It seems, however, that the change in scope in (305) is due more to the addition of semantic content than the the fact that the quantificational NP might be a focus. Compare (305) with (306), where the assignment of focus on *someone* seems impossible in any context:

(306)   #What did SOMEONE buy for Max?

In a similar vein, May (1985:161) argues that *each* is an inherently focused quantifier. In May's theory focused elements have a peculiar quantificational force that makes them take scope over other quantificational elements. Thus, an example like (307),

(307)   Which girl kissed EACH of the boys?

may only mean something akin to *For each boy, which girl kissed him* and not the narrow-scope *Which is the girl that kissed all the boys?*. In contrast, (308), due to a condition on quantifier raising of objects, may only have the narrow-scope reading:

(308)   Which girl kissed each of the BOYS?

These intuitions do not seem to be too accurate. Consider example (309). Here the narrow-scope reading for the *each* phrase is incompatible with the normal pragmatic use of the verb *marry* used in the sentence, thus forcing a wide-scope reading. Notice that there is nothing odd about this sentence, contra May's predictions:

(309)   I'm so dumb! I forgot which girl married each of the BOYS again!

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Instead of the predicted *Which is the girl that married all the boys?* we get a favored reading *For each of the boys, which girl married him?*. Similarly, a sentence like (310),

(310)   I know teenagers like kissing each other, but this is too much...
         Say again, which girl kissed EACH of the boys?

allows a narrow-scope reading for EACH, despite claims that foci may only take wide-scope.

It seems that the intuitions behind these effects on scope are due to a multiplicity of things, including context, choice of predicate, etc. Focus, apparently, is appealed to here without much reason. The appeal to the effect of focus in these cases seems to lack a sound basis.

7.4.2   Adverbs of Quantification

More serious seems the apparently truth-conditional difference between sentences (311)a and (311)b, from Rooth (1985:ex. 2, Ch. 5):

(311)   a. MARY always took John to the movies.
         b. Mary always took JOHN to the movies.

As Rooth points out, if Mary ever took someone other than John to the movies (311)b is false but (311)a may still be true. And vice versa, if someone other than Mary took John to the movies (311)a is false, but (311)b may still be true. Rooth provides an analysis of this case of association with focus which suggests that the meaning of a sentence like (311)a is 'at every time interval where someone took John to the movies, Mary took John to the movies'. Focus, as in the case of *only*, provides a domain of quantification for the adverb, which in this way quantifies only over the occasions in which someone took John to the movies and no others.

Again, from our perspective, it should be desirable to avoid such direct inter-action between logico-semantic quantifiers and informational notions, and favor an indirect 'non-mingling' interaction between two separate components, each providing a different type of interpretation. Rooth is correct in recognizing the need for a domain of quantification for *always*, but it seems that domain must be provided independently of the focus. The argument here is parallel to the argument provided in the case of *only*. Let us assume the following situation:

(312)   a. I know that
             1. Susan sometimes takes John to the movies.
             2. x always takes John (and no one else) to the movies.
    b. I don't know that
             3. $x =$Mary
    c. So I ask John's mother
             Who always takes John to the movies?

An answer to this question is (313):

(313)   MARY always takes John to the movies.

Notice that (313) cannot mean 'at every time interval where someone takes John to the movies, Mary takes John to the movies' since Susan also takes John to the movies sometimes. Rather, it means 'at every time interval where Mary takes someone to the movies, Mary takes John to the movies'. The domain of quantification necessary for such an interpretation is not made available by the focus *Mary* but rather by the nonfocal *John*. Again, as in the case of *only*, it may be concluded that, if *always* may get a domain of quantification from nonfocal elements sometimes, it is incorrect to attribute the availability of such a domain to the presence of focus.[111]

7.5   Evaluation

This chapter has been devoted to the task of showing that all the putative evidence in support of including informational notions, especially focus, in the logico-semantic representation of sentences is inconclusive. It was shown that focus cannot be equated to a truth-conditional exhaustiveness operator, as suggested by Szabolcsi 1981, 1983 and Svoboda & Materna 1987. The cases of direct interaction presented in Jackendoff 1972, Gabbay & Moravcsik 1978, May 1985, Rooth 1985, McGloin 1987, and Jones 1988 have been explained or explained away in terms of information packaging and its indirect interaction with logico-semantic meaning as two parallel interpretive processes.

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[111]Rooth 1985 also provides a number of examples from Dretske 1972 where it is claimed that focus affects truth-conditions. Rooth himself states that in many of those examples the truth-conditional effects are not clear. In other cases, the apparent ambiguity is due to inherent vagueness of the logico-semantic elements of the sentence in total independence of the presence or absence of focus.

These findings confirm our proposal in that there is no evidence to suggest that the interpretation of information packaging and the interpretation of logical meaning must be carried out in the same interpretive component, in that it is possible to conceive of two parallel interpretive components without leaving any of the interactions discussed in this chapter unaccounted for. In most cases, the close cohabitation of both types of meaning does not cause any apparent effects in the global interpretation of sentences. In the presence of some logico-semantic operators, however, some indirect interactions as the ones described above may occur. The existence of important correlations between information packaging and referential status was shown to be an artifact of the way in which information is conveyed. It is safe to say that the correlations between focus and *only* or *always*, and the 'association with focus' phenomena around negation and interrogation are epiphenomenal in the exact same way.

Chapter 8

Conclusion

The informational articulation of the sentence, under one label or another, has long been identified as an important factor in the structure and interpretation of sentences. Psychological articulation, *progression*, communicative dynamism, aboutness, dominance, assertion and presupposition, and given/new information are all attempts to pin down the exact nature of this informational articulation. Even though theme, rheme, topic, comment, focus, and open-proposition have been under scrutiny for decades, there is little agreement on the role these notions play in a model of linguistic competence.

The main goal of this study was to identify the exact role played by the informational articulation of the sentence. To this end, the notion of information packaging (e.g. Chafe 1976, Prince 1986) was adapted and described as the structuring of the sentence into instructions with which the speaker directs the hearer to enter the information carried by the sentence into her/his knowledge-store. Information was defined as that part of the propositional content of a sentence that constitutes a contribution of knowledge to the hearer's knowledge-store. The encoding of information in sentence structure is needed to avoid redundancy in the update of the hearer's knowledge-store.

It has been shown that the component of language responsible for such encoding, informatics, is better thought of as an autonomous one, independent of logico-semantic meaning and other pragmatic understanding. The interpretation of information-packaging instructions is independent of the interpretation of the propositional content encoded in the sentence. Two sentences encoding different instructions may have the same propositional content and two sentences encoding different

propositions may have the same informational structure. On the other hand, following Reinhart 1982, Prince 1988c, and Välimaa-Blum 1988, among others, further evidence has been provided that the information packaging is not reducible to the marking of referential status. Although both mechanisms are concerned with the modification and update of the knowledge-store, their specific task is distinct: while referential-status marking is responsible for the creation and activation of file cards or addresses, information packaging is responsible for the actual update of the data under these addresses. The autonomy of informatics is indirectly supported by the fact that it has been possible to develop a coherent and comprehensive account of information packaging without resorting to external aid.

The existence of several cases of interaction between logico-semantic meaning and information packaging has also been shown not to be a problem for the autonomy-of-informatics hypothesis. Several of the putative interactions between focus and quantifiers have been shown to be due to other factors, and the interaction between focus and propositional operators like negation and interrogation have been accounted for in terms of an indirect 'non-mingling' interaction, i.e. without requiring the presence of informational notions in the logico-semantic representation.

The structure of the information-packaging instructions has been given a great deal of attention. Four different instructions have been identified. These instructions are composed by means of the combination of the informational primitives of the sentence. The primitives used in this study are adaptations of the traditional notions of focus, open-proposition or presupposition, topic or theme, and antitopic. They benefit from the insights of their predecessors while avoiding their shortcomings. The sentence was informationally divided into a focus and a ground, and the latter further divided into a link and a tail. These elements may yield the combinations all-focus, link-focus, link-focus-tail and focus-tail. The link is an address pointer: it instructs the hearer to go to a particular address in the hearer's knowledge-store. The focus encodes the information of the sentence to be entered under the address denoted by the link. Finally, the tail indicates how the information must be entered under a given address, namely, via a mere addition or via a substitution for a gap or an element previously there.

The definition of these notions in terms of entry into the knowledge-store removes some of their elusiveness and makes them, in principle, treatable from a

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computational viewpoint. Simultaneously, many of the intuitive and empirical observations already made around these notions—aboutness, contrast, poset condition on preposing, existential force of subjects, sentence-initialness of subjects—can be captured without further stipulation. Furthermore, the main problem in viewing the knowledge-store as a file, the redundancy in the entry of data, has been eliminated.

Further support for the particular representation of information-packaging instructions provided in this study comes from the encoding of these elements in the overt syntax, especially from Catalan. Since, unlike English, Catalan may not represent information packaging exclusively by means of prosody, Catalan surface syntax reflects information packaging closely. The notational device of removing the ground elements from the scope of Φ used in the representation of information packaging is matched one-to-one in Catalan by overt syntactic A′-adjunctions, with the result that the information of the sentence is the only element left within the core IP slot.

The syntax-informatics interface has also been addressed. Using a multistratal theory of syntax, it has been proposed that an abstract level of pure informational represention, IS, mediates the mapping between overt syntax and informatics. IS must contain all and only those elements that are relevant for informational interpretation. It has been shown that IS cannot be merged with LF, the level of logico-semantic meaning, and it has been suggested that IS is better viewed as derived directly from S-structure without the mediation of LF (as was the case with the level of LF′). If an additional level of representation is accepted, our traditional view of the structure of Grammar must be change. It seems that a single level of meaning representation is not suffucient to feed the complex conceptual structures it presumably feeds. It has been noted that, after the incorporation of IS into the model, the role of S-structure in the model is closer to the view of S-structure as a 'contact level' in Chomsky 1988.

Nevertheless, the main inspiration for this study has been the desire to gain insight into the role of pragmatics within the larger linguistic apparatus. Pragmatics, it was pointed out, does not denote a unified component of the linguistic apparatus, but a collection of bits and pieces. Informatics is one of these pieces. By trying to define the role of informatics, we contribute, much in the tradition of Gazdar 1979, to the enterprise of removing the 'wastebasket' tag from pragmatics.

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