Beyond Morphology

Interface Conditions on Word Formation

PETER ACKEMA AND AD NEELEMAN

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Oxford Studies in Theoretical Linguistics

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Contents

Abbreviations

The following is a list of abbreviations used throughout.

1	1st person	F_{nonlic}	nonlicensing function
2	2nd person	FP	functional projection
3	3rd person	IMP	imperative
ABL	ablative	INF	infinitive
ACC	accusative	MASC	masculine
Adv	adverb	NEG	negation
AFF	affix	NOM	nominative
Agr	agreement	NP	noun phrase
AO	aorist	PL	plural
AP	adjectival phrase	POSS	possessive
AUTOREF	autoreferential AFFIX	PP	prepositional phrase
AUX	auxiliary	PRENOM	prenominal
CL	clitic	PROG	progressive
COMP	complementizer	Prt	particle
COND	conditional	REDUP	reduplicative morpheme
CONTR	contrastive	REFL	reflexive
CP	complementizer phrase	SC	small clause
DECL	declensional affix	SG	singular
DEF	definite	SUBJ	subjunctive
DIM	diminutive	SUF	suffix
DP	determiner phrase	VP	verb phrase
FEM	feminine		
FIN	finite		
F_{lic}	licensing function		

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Parts of this work have been published before. Chapter 3 is a significantly revised version of Ackema and Neeleman 2001; Chapters 5 and 6 are slightly revised versions of Ackema and Neeleman 2002 and 2003, respectively.

Oxford Studies in Theoretical Linguistics

General Preface

The theoretical focus of this series is on the interfaces between subcomponents of the human grammatical system and the closely related area of the interfaces between the different subdisciplines of linguistics. The notion of 'interface' has become central in grammatical theory (for instance, in Chomsky's recent Minimalist Program) and in linguistic practice: work on the interfaces between syntax and semantics, syntax and morphology, phonology and phonetics, etc. has led to a deeper understanding of particular linguistic phenomena and of the architecture of the linguistic component of the mind/brain.

The series will cover interfaces between core components of grammar, including syntax/morphology, syntax/semantics, syntax/phonology, syntax/pragmatics, morphology/phonology, phonology/phonetics, phonetics/speech processing, semantics/pragmatics, intonation/discourse structure as well as issues in the way that the systems of grammar involving these interface areas are acquired and deployed in use (including language acquisition, language dysfunction, and language processing). It will demonstrate, we hope, that proper understandings of particular linguistic phenomena, languages, language groups, or inter-language variations all require reference to interfaces.

The series is open to work by linguists of all theoretical persuasions and schools of thought. A main requirement is that authors should write so as to be understood by colleagues in related subfields of linguistics and by scholars in cognate disciplines.

In this book Peter Ackema and Ad Neeleman argue that word formation is constrained not only by morphological principles, but also by the other subsystems of grammar that interact with morphology. They bring to bear a wealth of new data and analyses of well known but problematic phenomena concerning the interaction of word formation with syntax and phonology. The theory they develop is one in which principles of word formation are distributed across modules of the grammar, but which interact in tightly constrained ways.

Ik heb nog een goed idee-er
I have still a good idea-ER
'I have a still better idea'

Arthur Schoorlemmer (almost 4)

I

Morphology and Modularity

1.1 NONMORPHOLOGICAL CONSTRAINTS ON WORD FORMATION

This book is about word formation. Yet, it is not about morphology proper. That is, it does not aim to develop a theory of purely morphological phenomena, such as inheritance, affix ordering, or declension. Morphology by itself of course partly determines what is a possible word and what is not. However, even morphologically well-formed words may be ruled out as a result of the interaction of morphology with systems external to it. In this work we will focus on the constraints on word formation that follow from this type of interaction. These constraints will explain new data, but will also provide more satisfactory accounts of some data that have hitherto been treated in morphology proper.

A similar perspective can be found in much current research in syntax. The central question of syntactic theory is what is a possible sentence and what is not. It is increasingly recognized that the answer to this question does not only depend on the syntactic rule system itself, but also on conditions imposed by the interfaces with other modules (see Chomsky 1995, Reinhart 1995, and others). In fact, the present work also contributes to research in this domain, since we will argue that some apparently syntactic phenomena follow from the interaction between syntax, morphology, and phonology. Moreover, parts of the proposed theory generalize over phenomena traditionally classified as morphological and phenomena traditionally classified as syntactic.

The idea that the set of possible words is restricted by systems external to morphology proper is not a new one. For example, it has long been recognized that the class of possible hosts for an affix may be limited by phonological constraints. One case from Dutch is discussed by Booij (2002: 184–5). Booij argues that the obligatory contour principle disfavours the sequence CəC when the consonants are identical. As a consequence, suffixes beginning in əC often cannot attach to a stem that ends in C, even if that stem is of the right category:

(1) a. viez-[ə]rd   a′. *naar-[ə]rd
         dirty-ERD   *nasty*-ERD
         'dirty person'   'nasty person'

     b. viez-[ə]rik   b′. *naar-[ə]rik
         dirty-ERIK   *nasty*-ERIK
         'dirty person'   'nasty person'

     c. grond-[ə]g   c′. *berg-[ə]g
         ground-IG   *mountain*-IG
         'thorough'   'mountainous'

     d. sterv-[ə]ling   d′. *val-[ə]ling
         die-ELING   *fall*-ELING
         'mortal'   'fallen person'

Similarly, there are semantic limitations on the class of hosts an affix can combine with. The Dutch deverbal suffix *-ing*, for instance, derives action nouns, while deverbal *-sel* derives nouns that refer to the concrete result of an action. Consequently, attaching either suffix to a stative verb is impossible:

(2) a. kaap-ing   a′. *hoor-ing
         hijack-ING   *hear*-ING
         'hijack'   'the event of hearing'

     b. poog-ing   b′. *ken-ing
         try-ING   *know*-ING
         'attempt'   'the event of knowing'

     c. zaag-sel   c′. *weet-sel
         saw-SEL   *know*-SEL
         'sawdust'   'the result of knowing'

     d. bouw-sel   d′. *haat-sel
         build-SEL   *hate*-SEL
         'building'   'the result of hating'

Our exploration of the interfaces of morphology will primarily concentrate on its interaction with syntax and phonology. We will also touch upon the

role of the lexicon in defining possible words; semantics will only be mentioned in passing. As we will show, constraints imposed by morphology-external systems restrict compounding and inflection as well as derivation, but the effects of the various types of interaction are not the same for each type of word formation. It will be argued that certain forms of inflection, for example, are conditioned by interaction with the phonology in a way that derivation and compounding are not. On the other hand, we will argue that compounding is conditioned by interaction with the syntax in a way that inflection and derivation are not.

In this introductory chapter, we will briefly outline what place we think morphology has in the grammar, and in what ways we expect morphology to interact with other systems as a consequence.

1.2 THE PLACE OF MORPHOLOGY IN GRAMMAR

According to some theories, regularities in word formation are the result of language learners being able to make inductive generalizations over sets of lexical items. Such generalizations can be stated in terms of lexical redundancy rules (compare Jackendoff 1975 and Aronoff 1976) or captured in terms of a neural network (compare Rumelhart and McClelland 1986). This view proposes that morphology is a system that makes memorization of existing words more economical. According to other theories, morphology is a generative system that defines grammatical word structures (compare Allen 1978, and Di Sciullo and Williams 1987). Such a generative system does not directly link word formation to storage, although it does determine what new complex words can be added to the lexicon. The two views therefore differ with respect to the importance attached to possible but nonexisting words. As will be clear from section 1.1, we adopt the second view.

If there is a generative system for word structure, one may wonder how it relates to other components of the grammar. We assume that the modules of syntax, semantics, and phonology each contain a submodule that generates phrasal representations and a submodule that generates word-level representations. What is usually referred to as 'syntax' is, according to this model, a submodule of the syntax that we may call phrasal syntax. The syntax module also contains a distinct submodule that generates hierarchical structures for words, which we refer to as word syntax. In the same vein, we can distinguish phrasal phonology (prosodic phonology) from word phonology (lexical phonology), and phrasal semantics from word semantics (lexical semantics). The resulting model of grammar is illustrated in (3). It is largely identical to the one proposed by Jackendoff (1997: 113).

(3)   SEMANTICS   SYNTAX   PHONOLOGY

Phrasal Semantics	Phrasal Syntax	Phrasal Phonology
↓	↓	↓
Phrasal semantic structure	Phrasal syntactic structure	Phrasal phonological structure
INSERTION ↔	INSERTION ↔	INSERTION
Word semantic structure	Word syntactic structure	Word phonological structure
↑	↑	↑
Word Semantics	Word Syntax	Word Phonology
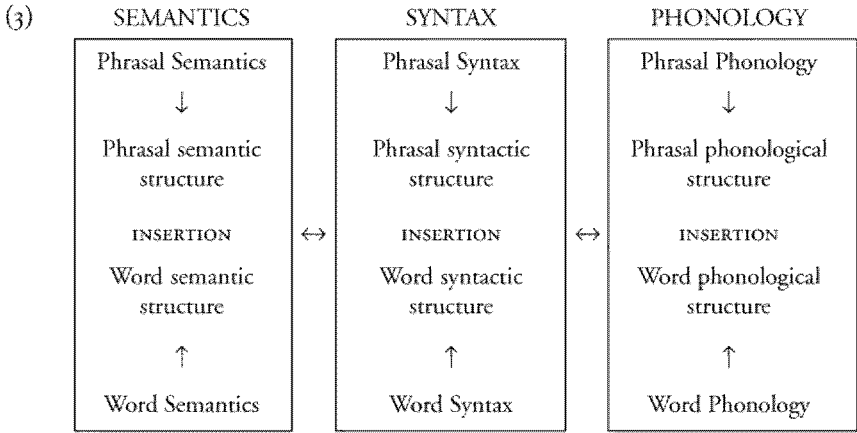
For ease of exposition, we will often use the terms *morphology* and *syntax* instead of the more precise, but less familiar, terms *word syntax* and *phrasal syntax*. The latter are used only to distinguish the submodules in question explicitly from the macromodule of syntax.

The idea that cognitive modules may contain submodules seems to be independently motivated. For example, vision and language are two different modules of the mind, but since the language faculty is itself fairly uncontroversially divided into at least a semantic, syntactic, and phonological module, some sort of recursive architecture of the mind must be admitted anyway. A similar recursiveness might exist internally to the module dealing with vision. This module has been argued to contain a submodule dealing with 'early vision', which itself contains submodules that compute motion, colour, and depth (Pylyshyn 1999). We are not in a position to evaluate such arguments, but at the very least they show that a recursive modular architecture is not something assumed specifically to deal with the place of morphology in grammar.

The model in (3) can be contrasted with one that has been adopted by some syntacticians. This alternative model claims that no submodules exist that deal specifically with word structure. Instead, word structure is the by-product of rules that operate in what we call phrasal syntax. On the assumption that a similar claim could be made for semantics and phonology, we arrive at the following model:

(4)

Phrasal Semantics	Phrasal Syntax	Phrasal Phonology
↓	↓	↓
Phrasal semantic structure ↔	Phrasal syntactic structure (including word syntactic structure) ↔	Phrasal phonological structure
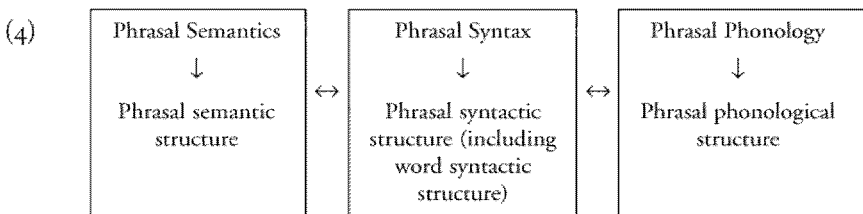
A comparison of the models in (3) and (4) immediately makes clear what the main argument for the latter is usually taken to be: it seems more economical. There would indeed be a strong argument against separating phrasal syntax and word syntax if properties of morphological complexes could be derived fully from independently motivated phrasal syntactic operations (such as head-to-head movement). Much interesting work is devoted to accomplishing exactly this (for recent discussion, see Josefsson 1998, Julien 2002, and Starke 2002). However, as Borer (1998: 157) notes, 'most researchers who have attempted to construct a model explicitly reducing [...] word formation to [phrasal] syntax have concluded that the task is impossible and quite possibly an undesirable one.' As far as we know, there is at the moment no explicit theory that completely does away with morphological principles and still accounts for the generalizations they are intended to capture. Instead, phrasal syntactic approaches to word formation usually assume some extra principles that specifically apply to those structures that qualify as morphological. Baker (1988), for example, assumes a morphological component as part of the phrasal syntax, on a par with other components, such as case theory, θ-theory, and so on.

In general, then, the difference between the two models does not lie in the assumption that there are morphological principles, which is shared, but rather in the assumption that morphological structures are generated independently of phrasal syntactic structures. This makes it difficult to decide between the two models. A choice cannot be made on the basis of contrasts between complex words and phrases, as these can be handled in either model. The issue cannot be decided on the basis of similarities between words and phrases either. Such similarities may be the result of morphological structures being derived in phrasal syntax (and hence subject to phrasal syntactic constraints), but given the proposed recursively modular architecture it is equally possible that there are principles that span two or more generative components. Let us discuss this last point in some more detail.

An argument sometimes made in favour of (4) is that word syntax and phrasal syntax share a number of properties. For example, as pointed out by Starke (2002), there is considerable overlap in the features manipulated by the two systems. In both, categorial features, case features, tense features and phi-features occur. Similarly, both components share the operation of merger, resulting in hierarchical structures that allow for thematic relations, relations of binding, and so on (this will be discussed in some detail in later chapters). Finally, there are systematic correspondences between word syntactic and phrasal syntactic structures. The best known of these are expressed by the mirror principle (Baker 1985), according to which the order of affixation in word syntax mirrors the order of application of corresponding operations in phrasal syntax, and by Cinque's (1999) functional sequence,

which governs the order of attachment of adverbs in phrasal syntax and of semantically related affixes in word syntax.

At first sight, such shared vocabulary and principles might suggest that the model in (3) is unecomonical: it would seem to require a systematic duplication of phrasal syntactic notions in word syntax. However, this argument is only valid if our claim was that morphology is a module of grammar on a par with semantics, phonology and syntax (the 'big' boxes in (3)). But our claim is that morphology is a set of submodules within these bigger modules. These submodules can have their own vocabulary and principles, but as a matter of course they also inherit the vocabulary and principles of the module in which they are contained. Therefore, much will be shared by the word-level and phrase-level submodules. For example, notions like *nominal, verbal, head, merge, c-command, argument, complement*, etc., belong to the big syntax module in (3), and hence are shared by phrasal syntax and word syntax. In contrast, notions like *EPP, wh-movement*, and *scrambling* exclusively belong to the phrasal syntactic submodule, while notions like *germanic* versus *latinate* and the features that encode declension classes restrict merger in word syntax, but not phrasal syntax.[1] Such a combination of more general and more specialized notions ties in naturally, we believe, with the model in (3). The question of how much vocabulary and how many principles are shared, and how much vocabulary and how many principles are particular to the submodules, is interesting in its own right, but it does not bear on the issue of whether the submodules generate their own representations (for further discussion, see Sproat 1985*a*, Lieber 1992, and Ackema 1999*a*).

The model in (3) also gives a handle on generalizations that seem to relate phrasal syntax to word syntax, such as Cinque's functional sequence and Baker's mirror principle. Since both phrasal syntax and word syntax generate hierarchical structures, both can be said to express scope. That is to say, if scope relations are the result of compositional interpretation of hierarchical structures, the rules of scope assignment in the semantic module will apply to both phrasal syntactic and word syntactic representations. The mirror principle follows from this in a straightforward way. For instance, when an applicative morpheme is attached higher than a passive morpheme, it will take scope over the passive morpheme and hence we derive the applicative of a passive. If the order of affixation is reversed, so is the scopal relation between the two, and we derive the passive of an applicative. (This argument presupposes that 'passive' and 'applicative' are rules that manipulate argument structure and that can be expressed in either word syntax or phrasal syntax; they are not specifically phrasal rules that trigger insertion of an affix;

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[1] These notions may in fact belong to word phonology, rather than word syntax. This does not really affect the argument; it merely transposes it to a different 'macromodule'.

see Grimshaw 1986, Di Sciullo and Williams 1987: 56–61, and Alsina 1999 for related discussion.)

Cinque's functional sequence can be accounted for in similar terms. This sequence expresses preferred scopal relations between adverbs and between affixes that encode notions like modality, aspect, and tense. Suppose that such preferences are stated in some way or other either in the macromodule of semantics or in the macromodule of syntax (for relevant discussion see Rice 2000 and Nilsen 2003). In that case, both word syntax and phrasal syntax will reflect them when multiple adverbs or affixes are attached. Thus, a modal affix will be attached outside an aspectual affix and a modal adverb will be attached outside an aspectual adverb. Notice that this is achieved without any duplication of principles anywhere in the grammar.

Another argument sometimes made in support of the model in (4) is that the mapping between (morpho)syntactic structures and semantics is more transparent if word structure is an instance of syntactic structure. This holds true in particular of structures involving thematic role assignment. Consider the following Southern Tiwa data (from Baker 1988: 77):

(5)   a.   Seuan-ide ti-mū-ban.
            man-SUF   I.SG-AO-*see*-PAST
            'I saw the/a man.'

      b.   Ti-seuan-mū-ban.
            I.SG.AO-*man-see*-PAST
            'I saw the/a man.'

The same thematic relation between the verb *ban* 'see' and the argument *seuan* 'man' holds in these examples, even though the two elements form a phrase in (5a) and a complex word in (5b). Given the model in (3), this implies that assignment of the verb's internal θ-role can take place in two distinct structures. If the model in (4) is adopted, however, (5b) is presumably derived from an underlying representation containing a VP identical to the one that occurs in (5a):

(6) $[_{VP} [_{NP} t_i] [_V$ Ti-seuan$_i$-mū-ban]].
      I.SG.AO-*man-see*-PAST
      'I saw the/a man.'

In this analysis, then, there is a unique configuration for internal θ-role assignment (one of syntactic complementation). The argument that this is more economical is explicitly made by Baker (1988).

This is a strong argument if all else is equal. However, it seems to us that there is a conceptual trade-off between the syntactic and morphological

accounts of word formation. In general, the price paid for a more transparent mapping to semantics and for the abolition of nonsyntactic word formation is a complication of the syntactic structures that must be assumed. The representation in (6) is more complex than the one in (7), in that it contains more structure and a movement operation absent in (7), and the complexity of the syntactic representation will increase in this way with every additional morpheme a word contains.

(7)   [$_{VP}$ [$_{V}$ Ti-seuan-mū-ban]].
        1.SG.AO-*man-see*-PAST
        'I saw the/a man.'

This increase in complexity potentially entails a more complex grammar, because triggers must be assumed for each movement, as well as licensing mechanisms for the additional heads and complements.

For affixed words, the trigger for incorporation is sometimes claimed to consist of the selectional demands of the affix (compare Ouhalla 1991, Lieber 1992). But if the selectional properties of an affix are satisfied through movement, a qualitative extension of the theory of grammar must be admitted. As is well known, standard cases of syntactic selection hold between chain roots (see Brody 1995 and Jackendoff 1997). The possibility of satisfying selectional requirements after movement hence significantly weakens restrictions on syntactic selection.[2]

Complications are also necessary with respect to the licensing of phrases whose head is assumed to incorporate. Take synthetic compounds like *truck driver*. The same thematic relation holds between *truck* and *drive* in this compound as in the associated NP *driver of a truck*, which implies a common underlying source on the model in (4). Why, then, must *truck* be licensed by *of* when it remains *in situ*, but not when it adjoins to a higher head? Baker (1988) proposes that incorporation of the head is in itself sufficient to license a complement in certain languages, but this is a qualitative extension of the theory that deals with the licensing of syntactic arguments.

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[2] One might try to avoid this problem by arguing that movement to an affix is not triggered by m-selectional requirements, but by some feature on the affix that needs to be checked. Since checking can involve heads of chains, no extension of syntactic theory seems required. However, all instances of feature checking known to us are supposed to have an instantiation in covert as well as in overt syntax (or an instantiation as feature movement, or AGREE without displacement), at least cross-linguistically. But there are no affixes that allow covert raising of their host: this is precisely why the stray affix filter is taken to be a surface structure condition. Thus, within Germanic there is variation with respect to movement of V to C or I, but in all Germanic languages V has to move to deverbal affixes like *-ion*, *-able*, *-er*, and *–ing*, if movement is taken to be the means by which derived words are formed.

The conclusion we draw from the above is that, as things stand, there is no reason to prefer one theory over the other. A decision between the models in (3) and (4) must be based on arguments other than the ones discussed above. In Chapter 2 we will consider what kind of arguments may be relevant, and argue that the model in (3) is more attractive.

1.3 INTRAMODULAR INTERACTION

The model in (3) implies that word syntax can interact with other systems in two ways. First, it can interact with phrasal syntax, with which it constitutes a macromodule. Next to such intramodular interaction, word syntax partakes in the interaction between the syntactic and phonological macromodules. In this section we will outline how intramodular interaction between word syntax and phrasal syntax may restrict what is a possible word. The possible effects of intermodular interaction are sketched in the next section.

We will argue in Chapter 3 that word syntax and phrasal syntax are in competition. If two elements are to form a complex category, they can in principle be combined in either submodule. However, it is the case, at least in the languages we will focus on, that syntactic combination blocks morphological combination if all else is equal. Morphological combination of elements must hence be triggered, something that can be done by information stored in the lexicon. Certain morphemes are lexically specified as requiring morphological merger: they are affixes. In other cases, it is the combination of morphemes that is thus specified, in which case that combination will be realized as a compound. A combination of morphemes will only be listed, however, if it has some unpredictable property, usually concerning its semantics.

The hypothesis that morphology and syntax compete in this way has the consequence that if the merger of two elements results in a predictable semantics, and neither of the elements is an affix, then merger will be syntactic rather than morphological. The first empirical result we obtain from this is that two free morphemes that cannot form a morphological complex independently can do so when embedded under an affix. This will account for the synthetic aspect of synthetic compounding, the fact that particle verbs seem to have properties in common with both words and phrases, and the morphological realization of syntactic idioms in certain circumstances. The second empirical result is that if a process of word formation does not involve affixation (root compounding) it is predicted to have unpredictable semantics, whereas if a process of word formation is semantically transparent, it must involve affixation.

It must be possible to integrate the structures generated by the morphological and syntactic submodules, given the obvious fact that sentences may contain complex words. Hence, besides competition, there is a second type of interaction between word syntax and phrasal syntax, usually referred to as insertion.

Chapter 4 deals with the nature of this interaction. We argue that insertion is a relation in which features are matched between nodes in independently generated representations. This hypothesis can be contrasted with the more common assumption that inserted material functions as a building block in the representation that hosts it. One difference between the two approaches is that in our view the 'inserted' material is not actually present in the host structure, whereas in the building block theory it must be. This has various consequences. Our theory predicts, for example, that structure and properties of inserted material are invisible in the host, while the alternative in principle allows rules that operate in the host structure to apply to parts of the inserted material.

A further difference is that feature matching can take place between any two nodes that have compatible features, with the consequence that insertion is not sensitive to the nature of the representations it connects. Hence, it is not only possible to insert morphological representations into syntactic ones, but also to do the reverse, or even to insert a representation into a representation of the same nature. By its very nature, the building block theory only allows insertion of 'smaller' representations into 'bigger' ones, so that phrasal recursion in words is ruled out. The proposed theory of insertion will also provide an analysis of the properties of parentheticals, syntactic idioms, and certain lexical integrity effects.

To summarize, word syntax and phrasal syntax are two independent submodules of a larger macromodule. Internally to this macromodule they interact in two ways: through competition and through insertion. It is important to note that the proposed model of grammar also disallows certain kinds of interaction between morphology and syntax. In particular, the separation of these two generative systems makes it impossible that syntax conditions the application of morphological rules, or that morphology conditions the application of syntactic rules. Morphology can of course influence the syntax (or vice versa), but it can only do so indirectly, through the features that are matched in the insertion process.

If syntax cannot directly influence morphology, certain kinds of logically possible conditions on morphological rules are correctly excluded. For example, there can be no rule for morphological headedness that states that compound verbs are right-headed when they occur in the C position of the clause, but left-headed when they occur *in situ*. Similarly, if morphology cannot directly influence syntax, we exclude such conditions as: 'the object is placed after the verb when the verb is underived, and before the verb when the verb is morphologically complex'. It is not clear how such interactions

can be excluded on principled grounds in a model like (4), where words and phrases are dealt with by a single generative system.

1.4 INTERMODULAR INTERACTION

The impossibility of one submodule conditioning rule application in another submodule, though supported by a wide range of data, faces some apparent counterexamples. First, there are several cases in which the form of a word seems to depend on its syntactic context. To give an example, in certain East-Netherlandic dialects, the affix that spells out the agreement features of the verb differs in form depending on the position the verb surfaces in (see van Haeringen 1958). In particular, in verb second clauses one paradigm is used when the verb precedes the subject, and another when the subject precedes the verb, as illustrated in (8). This, then, seems to be a case in which the verb's morphological form is conditioned by the syntax.

(8) a. Wij speul-t.
         we play-PL

     b. Dan speul-e wij.
         then play-PL *we*
         'Then we play.'

Second, there are cases in which syntax appears to be conditioned by morphology. As we have already suggested, it is possible to embed phrases in words. However, there are limitations on this. In general, if the phrase in question is derived by a suffix, it must be head-final. A striking example illustrating this comes from Quechua nominalized VPs (see Lefebvre and Muysken 1988). In Quechua, the verb can either precede or follow the object (see (9a,b)), but when the VP is nominalized, here with the suffix *-sqa*, only the latter order is possible (see (9c,d)).

(9) a. Xwan mikhu-n papa-ta.
         Juan eat-3 *potato*-ACC

     b. Xwan papa-ta mikhu-n.
         Juan potato-ACC *eat*-3
         'Juan eats potatoes.'

     c. *[[Xwan mikhu-n papa-ta] sqa-n-ta] yacha-ni.
         Juan eat-3 *potato*-ACC NOMINAL-ACC *know-I*

     d. [[Xwan papa-ta mikhu-n] sqa-n-ta] yacha-ni.
         Juan potato-ACC *eat*-3 NOMINAL-ACC *know-I*
         'I know that Juan eats potatoes.'

The model in (3) suggests a treatment of facts like those in (8) and (9) that does not involve morphological conditioning of syntax or syntactic conditioning of morphology. Next to intramodular interaction between word syntax and phrasal syntax, there is a second type of interaction in which both partake, namely between the macromodules of syntax and phonology. Data of the type just discussed receive a straightforward analysis in terms of such intermodular interaction. In fact, once we have developed the system of mapping between syntax and phonology, a number of additional phenomena will fall into place.

A core assumption behind the model in (3) is that syntactic representations do not contain any phonological information or vice versa, an idea often referred to as the separationist hypothesis (compare Marantz 1984, Sproat 1985a, Beard 1988, 1995, Anderson 1992, and Halle and Marantz 1993). This implies that the connection between syntactic and phonological representations must be established by a set of correspondence rules which associate specific syntactic objects with specific phonological objects.

Such mapping takes place at various levels. To begin with, it occurs at the phrasal level. Syntactic and phonological phrases are not isomorphic. Whereas phonological structures are nonrecursive and n-ary branching, syntactic structures are recursive and binary branching. Nevertheless, there are clear regularities with respect to which phonological structure can be associated with which syntactic structure. Some of these can be captured by alignment principles, which state that the edge of a particular syntactic domain coincides with the edge of a particular phonological domain (see Selkirk 1986, McCarthy and Prince 1993).

Another kind of mapping takes place at the level of lexical entries. For example, in a separationist view of grammar, the phonological form of the noun *book* is not present in syntax, whereas the syntactic features associated with this noun are not present in phonology. These two types of information must of course be related, something that is achieved by a lexical mapping rule that states that the phonological form /buk/ can correspond to a certain syntactic feature bundle. Put differently, lexical entries can be seen as minimal mapping rules (compare Jackendoff 1997, and Williams 2003).

The system of mappings just sketched allows an analysis of apparent syntactic conditioning of morphological rules. We will argue that the relevant data are due to PF rules that affect the feature content of terminals. These rules are sensitive to phonological domains, and since phonological domains are themselves mapped to syntactic structure, the apparent influence of syntax can be accounted for. This will be discussed in detail in Chapters 6 and 7.

Chapter 6 deals with cases in which the feature content or the phonological form of a terminal is reduced if a triggering element is present in the same phonological domain. Data include agreement weakening in Arabic,

cliticization in Celtic, and pro drop in Old French. Chapter 7 introduces the option of feature *checking* conditioned by phonological domains. It deals with phenomena like complementizer agreement and *that*-trace effects.

Before we turn to these issues, we will discuss the apparent morphological conditioning of syntax in examples like (9). In Chapter 5 it will be shown that the relevant data are due to restrictions on the mapping from syntactic terminals to their phonological counterparts. Such restrictions are not inherent to lexical mapping rules of the type that associate [buk] in phonology with an N node in syntax. These, after all, are idiosyncratic. But next to the mapping rules that make up lexical items, there are more general mapping principles, which do restrict possible correspondences. Perhaps the best known of these is the ban on crossing association lines, which disallows a syntactic structure [[A B] C] to be mapped to a phonological string /a/ /c/ /b/. We will show that the interplay of this principle with two other mapping principles restricts phrasal derivation in interesting ways. One thing that will follow is that phrasal affixation is only felicitous if the head of the phrase is adjacent to the affix, which accounts for (9). Some exceptions to this generalization will follow as well. In particular, no adjacency requirement obtains if either the affix or the head of the derived category fails to be spelled out, or if the affix is spelled out as a phonologically independent form. Data to be discussed include bracketing paradoxes, mixed categories, and the acquisition of synthetic compounds.

In conclusion, we will argue that word formation is affected both by intramodular interaction between word syntax and phrasal syntax, and by intermodular interaction between the syntactic and phonological macro-modules. The model in (3) also disallows certain types of interaction, which are indeed not attested.

1.5 COMPARISON WITH OTHER THEORIES

Let us briefly compare some of our theoretical assumptions with those made in other theories of word formation. Such theories diverge in their answers to the following questions:

(10)   a.   Do complex words have internal constituent structure?
          b.   If so, how are properties of this structure accounted for?
          c.   How do morphosyntactic representations relate to morpho-phonological ones?

In the above, we have presupposed a positive answer to the question in (10a) and suggested an initial answer to (10b): regularities in morphological (word

syntactic) structure are to be accounted for in terms of a specialized morphological submodule, in terms of overarching principles that character-ize the syntactic macromodule, and in terms of the interaction between the morphological (word syntactic) and syntactic (phrasal syntactic) submodules. We have also suggested an initial answer to (10c): these two systems are strictly separated and are associated by correspondence rules.

This combination of answers differs from what is assumed in other the-ories of morphology. Early generative approaches to word formation (see for instance Jackendoff 1975, and Aronoff 1976) assumed that, whereas phrases are generated by rewrite rules, there is no comparable system for complex words. All complex words are listed as such in the lexicon. Derivational relationships between words (that is, morphological regularities) are dealt with by lexical redundancy rules, which relate independent lexical items on the basis of shared phonological forms. The implicit assumption is that these forms appear in syntactic terminals.

Di Sciullo and Williams (1987) argue that morphology and syntax should be regarded as systems that generate constituent structures. Word formation is not a lexical process: like phrases, complex words may or may not be listed, depending on whether or not they have unpredictable properties. Di Sciullo and Williams further argue that the system that generates morphological structure is autonomous: it cannot be equated to the system that generates syntactic structure. Finally, they assume that both systems manipulate terminals that contain phonological information: morphemes in the case of morphology and words in the case of syntax.

Although this is not discussed explicitly, Baker's (1988) view of the map-ping between syntax and phonology is also based on the idea that terminal nodes contain phonological information. However, as already discussed above, he argues that many morphological complexes are built by syntactic head-to-head movement.

In contrast to all these approaches, the separationist hypothesis, advanced in its most radical form by Beard (1988, 1995), states that phonological forms are absent in morphosyntax. Beard also denies that syntactic terminals can have internal structure: they merely contain features. In his view, morpho-logical regularities are due to a set of post-syntactic spell-out rules, in conjunction with rules that manipulate syntactic feature bundles.

Finally, Halle and Marantz's (1993) model of distributed morphology is like that of Beard in that syntactic terminals do not contain phonological information. Unlike Beard, Halle and Marantz assume that words can have internal structure. In these respects, the model proposed here is closely related to distributed morphology. However, according to Halle and Marantz and others working in this framework, the structure of morpho-logical complexes is generated by the same system that generates the structure

(11)	Autonomous Morphology	Incorporation-style Morphology	Separationist Morphology	Distributed Morphology	Present Proposal
Question (10a)	Yes	Yes	No	Yes	Yes
Question (10b)	Through rules of an independent word syntactic module	Through rules of the phrasal syntactic module, including head-to-head movement, and through principles that specifically apply to morphological complexes	n/a	Through rules of the phrasal syntactic module, including head-to-head movement, and through principles that specifically apply to morphological complexes	Through rules of the word syntactic submodule, rules of the syntactic macromodule, and interaction between word syntax and phrasal syntax
Question (10c)	Through joint insertion of syntactic and phonological information	Through joint insertion of syntactic and phonological information	Through rules of feature manipulation and spell-out	Through rules of feature manipulation and spell-out	Through rules of feature manipulation and spell-out

of phrases. In particular, Halle and Marantz assume that the structure of complex words is generated by head-to-head movement, in line with Baker's (1988) analysis of incorporation phenomena. Regularities in word formation thus result from the syntactic operations that derive complex heads, adjustment rules that manipulate syntactic feature bundles and a set of spell-out rules that insert vocabulary items.

The table in (11) summarizes the answers that various theories of morphology give to the questions in (10). It demonstrates that the answers given by the various approaches are not package deals, but are instead relatively independent. For example, if one assumes that words have internal structure (in answer to (10a)) but do not contain phonological information (in answer to (10c)), then one need not necessarily adopt syntactic head movement as the principal means of word formation. Conversely, if a distinct generative system is held to be responsible for morphological regularities, then this does not imply traditional lexical insertion: the morphological rule system need not manipulate units containing phonological forms. In the course of the next six chapters, we hope to make clear the advantages of the combination of answers we propose.

2

Arguments for Word Syntax

2.1 SYNTACTIC VERSUS MORPHOLOGICAL ASSEMBLAGE OF COMPLEX HEADS

The main claim of this chapter is that syntax and morphology are independent generative systems. By this we mean that, in addition to the phrasal syntax, there exists a separate submodule which specifically deals with the assemblage of morphosyntactic structures. This view can be contrasted, on the one hand, with models of grammar in which morphosyntactic structures are the product of syntactic head-to-head movement and, on the other hand, with models that deny the existence of morphosyntactic structure altogether.

A fruitful discussion of the question of whether morphosyntactic structure exists partially relies on a more detailed exposition of the relation between morphosyntax and morphophonology, and we therefore postpone it to Chapter 5. For now, we simply assume that complex words have internal structure and focus on the issue of where and how this structure is formed.

According to theories based on independent components for morphology and syntax, such as those of Lieber (1980), Williams (1981a, b), Selkirk (1982), and Di Sciullo and Williams (1987), an XP headed by a complex word has a structure as in (1). The internal structure of the complex head is generated in morphology, while the structure dominating the syntactic terminal is, obviously, syntactic.

(1)

```
                    XP
         ┌──────────┴──────┐
       Spec               X′
                   ┌───────┴────────┐
                   X              Compl
                   ↑
                   X
              ┌────┴────┐
              Y         X
```
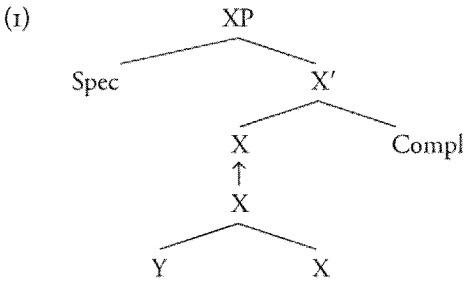
The upward arrow connecting the top node of the word and the syntactic terminal indicates that the word is 'inserted' in this particular position. The classical view of insertion assumes that it consists of an *en bloc* process that involves phonological forms as well morphosyntactic structure. This, however, is a separate issue. We will in fact argue later on, in Chapter 5, that insertion does not involve phonological material.

Theories of word formation based on syntactic movement, such as those of Roeper and Siegel (1978), Baker (1988), Roeper (1988), and Pollock (1989), do not merge the constituent parts of a complex word directly. Rather, the head X takes a YP as its syntactic complement and the head of this phrase moves and adjoins to X, as in (2). To be sure, head-to-head movement is not the only mechanism by which syntactic heads can be combined in a word. For example, given a separationist view on the syntax–phonology interface, it may be assumed that distinct syntactic heads can be spelled out as one word in phonology, under certain circumstances (in particular, under adjacency; see Bobaljik 1995, 2002 for discussion). This does not affect the argumentation in this chapter, since the question we will be concerned with most is whether parts of words head separate syntactic projections.

(2)

```
                    XP
         ┌──────────┴──────┐
       Spec               X′
                   ┌───────┴────────────┐
                   X                    YP
              ┌────┴────┐         ┌──────┴──────┐
             Yᵢ         X       Spec           Y′
                                         ┌──────┴──────┐
                                        tᵢ           Compl
```
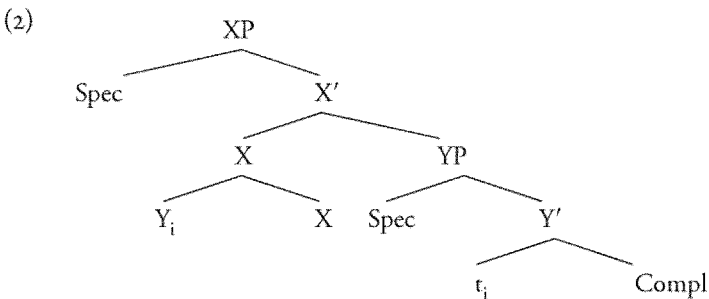
In Chapter 1 we have already shown that there is no reason to prefer one theory over the other on conceptual grounds. We will now present four arguments that, in our opinion, do distinguish between the two approaches. These all suggest that the structure of complex words is as in (1) rather than (2).

2.2 STRANDING

To begin with, the two theories make straightforward predictions about the material that can accompany a complex word. On the incorporation analysis, depicted in (2), the trace of the nonhead Y should license the same material as Y does in isolation. In contrast, Y in the structure in (1) does not project outside the Y–X complex and hence cannot license additional syntactic positions. The two theories thus make opposite predictions with respect to 'stranding'. In fact, we have already seen a case that illustrates the impossibility of stranding in English, namely the disappearance of the case-assigning preposition *of* in the formation of synthetic compounds like *truck driver*. But the phenomenon is much more general: we will argue that, despite some apparent counterexamples, stranding by the movements hypothesized for syntactic word formation does not occur at all (compare Neeleman 1994, Ackema 1995, Bresnan and Mchombo 1995, and others).

For simple nominal compounding in languages like English, the impossibility of such stranding is uncontroversial. Thus, the material present in the DP complement in (3a) must be omitted if a compound is formed, as in (3b).

(3) a. the centre [of [a [prosperous medieval [city [in Northern Italy]]]]]
     b. *the [city$_i$ centre] [of [a [prosperous medieval [t$_i$ [in Northern Italy]]]]]

Simple verbal and adjectival compounding display the same pattern:

(4) a.   to tend [to [a [luxurious [bar [in the West End]]]]]
     a′. *to [bar$_i$ tend] [to [a [luxurious [t$_i$ [in the West End]]]]]
     b.   made [by [the [strong [hand [of a blacksmith]]]]]
     b′. *[hand$_i$ made] [by [the [strong [t$_i$ [of a blacksmith]]]]]

Similarly, the vast majority of derivational affixes do not allow stranding in a language like English. We give some examples here:

(5) a. *[parent$_i$ hood] [(of) [a [responsible [t$_i$ [from Glasgow]]]]]
     b. *[dance$_i$ er] [slowly [t$_i$ [across the lawn]]]
     c. *[wash$_i$ able] [carefully [t$_i$ [by dipping repeatedly in hot water]]]
     d. *[hair$_i$ y] [beautiful [red [t$_i$ [with blonde highlights]]]]
     e. *[central$_i$ ize] [more [t$_i$ [to our arguments] [than we thought]]]
     f. *[en slave$_i$] [an [unhappy t$_i$ [to the king]]]

Just like the preposition *of* in a case like (3b), some of the material that must be omitted under word formation is obligatory if no incorporation

takes place. For example, singular non-mass NPs in English must be introduced by a determiner; yet this determiner cannot occur in (3b), (4a′,b′), and (5a). Similarly, verbs which obligatorily select certain arguments may remain without these in many compounds and derivations. The Dutch verb *proberen* 'try out' must take a subject and object in isolation, but these are omitted when it appears in a V–N compound or a deverbal derivation:

(6)   a.   dat   [*(de dichter) *(nieuwe ganzeveren) probeert]
           that   the poet   new   quills   out-tries
           'that the poet tries out new quills'

      b.   *Dit is het [probeer$_i$ papier] [[(door)
           This is the try-out   paper   (by)
           [de dichter]] [(van) [nieuwe ganzeveren t$_i$]]].
           the poet   (of)   new   quills
           'This is the paper on which the poet tries out new quills.'

      c.   *Deze bundel is een [probeer$_i$ sel] [[(door) [de dichter]]
           this   volume is a   try-out-SEL   (by)   the poet
           [(van) [een nieuwe ganzeveer t$_i$]]]
           (of)   a   new   quill
           'this volume is the product of the trying out by a poet of a new quill'

The absence of otherwise obligatory material indicates that the problem for the incorporation account is not just one of lack of evidence for the proposed structure. What is required is the effectual suspension of otherwise inviolable syntactic principles in cases of word formation by head-to-head movement. As we have argued in the previous chapter, this is true of case theory. The data above show that the same holds of parts of the theory of functional projection and of θ-theory. If well-known principles of syntax must be suspended to allow for syntactic word formation, the analysis seems to defeat itself.

The problem takes a different form if the functional part of syntactic trees is as large as suggested by Cinque (1999) and others. Suppose that all dependents of a head are generated externally to the first projection of that head, the root phrase or √P (see Marantz 1997). If we further assume that an affix takes √P, rather than a larger constituent, as its complement, the lack of stranding observed above is accounted for. However, this account makes vacuous the claim that word formation involves phrasal syntactic structure, since the portion of the tree that contains the √P and the projection of the affix is exclusively used for word formation. Since this portion of the tree is syntactically inert otherwise, the resulting theory is equivalent to the one

defended here, but only as the result of the stipulation that affixes, as opposed to any other selecting head, combine exclusively with √Ps.[1]

The type of stranding under discussion has been claimed to occur in certain cases of derivation. In particular, Fu, Roeper, and Borer (2001) maintain that it can be observed in English deverbal process nominalizations, while den Dikken (2003) develops a similar argument for de-adjectival nominalizations in Dutch. In both instances, the argument is based on contrasts in acceptability with respect to the material that can accompany a derived noun and a simplex noun. Some of the examples given by Fu *et al.* are quoted below, with their grammaticality judgements:[2]

(7)   a.   *[Kim's version of the event thoroughly] was a big help.
       a′. ?[Kim's explanation of the event thoroughly] was a big help.
       b.   *[Kim's accident suddenly] disqualified her.
       b′. ?[The occurrence of the accident suddenly] disqualified her.

The native speakers we have consulted find the contrasts in (7) quite subtle; in fact, they reject all examples as clearly ungrammatical. On the other hand, native speakers experience a very sharp contrast between (7a′,b′) and verbal projections that are the complement of a nominal free morpheme, as in (8a,b). This remains unexplained by the movement analysis, which after all assumes that, as in (8), a VP is present in (7a′,b′). The contrast does follow from the morphological account, given that adverbials do not normally combine felicitously with nominal projections.

(8)   a.   Kim's idea to explain the event thoroughly was a big mistake.
       b.   Kim's claim that the accident occurred suddenly disqualified her.

Moreover, the fact that (7a′,b′) are marginally better than (7a,b) does not require the assumption that the verbal base of a process nominalization is the moved head of a VP. It seems that DPs containing an adverbial improve marginally if the nominal head receives the kind of interpretation usually associated with verbs. This phenomenon can also be observed with underived nouns or nouns that do not have a verbal base. For example, in (9a) *Nobel prize* is interpreted as 'receiving the Nobel prize', while in (9b) *bankruptcy* is

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[1] There is, in fact, one difference. If affixes select √Ps, the morphological part of the tree is an integral part of the syntactic representation. In our model, the connection between syntactic and morphological structure is established through insertion. This might seem a purely formal difference, but the latter view can be shown to have empirical advantages (see Chapter 4).

[2] We will not discuss den Dikken's data, but the problems we will identify with respect to Fu *et al.*'s analysis carry over to his.

interpreted as 'being declared bankrupt'. The status of such examples is comparable to the parallel cases in (9a′,b′) which do involve deverbal nominals.

(9)   a.   ?[The physicist's Nobel prize so clearly undeservedly] surprised the academic world.
      a′. ?[The physicist's promotion so clearly undeservedly] surprised the academic world.
      b.   ?[John's bankruptcy so suddenly] dismayed us.
      b′. ?[John's application for a loan so suddenly] dismayed us.

Besides the alleged possibility of stranding, Fu *et al.* give a second argument for an underlying VP in process nominals. This argument is based on the observation that *do so* anaphora normally requires a VP antecedent in the linguistic context (Hankamer and Sag 1976). There seems to be a contrast between derived and simplex nominals in licensing this type of VP-anaphora:

(10) a.   *Kim's version of the event and Bill's doing so were surprising.
      a′. ?Kim's explanation of the event and Bill's doing so were surprising.
      b.   *Sue's trip to Easter Island surprised us and Amy's doing so annoyed us.
      b′. ?Sue's exploration of Easter Island was impressive and Amy's doing so was a real surprise.

Again, the native speakers we have consulted find this contrast slight and in fact simply reject examples like (10a′,b′). On the other hand, there is a very clear difference in acceptability between (10a′,b′) and (11a,b).

(11) a.   Kim explained the event well but Bill did so badly.
      b.   Sue explored Easter Island on Monday and Amy did so on Tuesday.

This by now familiar pattern is expected under the morphological approach to word formation, but unexpected under the syntactic approach. Furthermore, the slight contrast that seems to support the syntactic approach can be explained in different terms. If a noun can be assigned an interpretation usually associated with verbs, not only merger of adverbials but also *do so* anaphora improves slightly. Process nominals receive such an interpretation as a matter of course, but it is also available for underived nouns in appropriate contexts. The examples in (12a,b) do not seem any worse than those in (12a′,b′). The reason is that *balcony scene* and *Steinenbacker Gambit*

are interpreted as 'playing the balcony scene' and 'playing the Steinenbacker Gambit', respectively.

(12)   a.   ?John and Mary's unexpected balcony scene during dinner was as badly received as Bill and Sue's doing so during lunch.

      a′.   ?John and Mary's unexpected declamation of Sonnet no. 18 during dinner was as badly received as Bill and Sue's doing so during lunch.

      b.   ?Vladimir's Steinenbacker Gambit yesterday was not advisable, but Judith's doing so today seems a good idea.

      b′.   ?Vladimir's reaction with d5 yesterday was not advisable, but Judith's doing so today seems a good idea.

In conclusion, the data in English and comparable languages show that there is no phrasal complement out of which the nonhead of complex words is moved. This supports the idea that complex words are generated in an independent morphological submodule. One might think that the morphological approach to word formation is challenged by the apparent stranding of nominal modifiers and the like in languages with noun incorporation (see in particular Baker 1988 for arguments to this effect). But as Rosen (1989) has shown, the relevant phenomena are independent of the formation of an N–V compound. Hence, they cannot be taken as an argument for word formation through syntactic movement.

2.3 INHERITANCE

The obligatory omission of syntactic material is not the only fact that supports a morphological analysis of complex words. Consider subject names like *driver*. The two rival analyses make different predictions with respect to the way in which the internal argument of this derived noun is realized. According to the morphological analysis, *driver* is a complex noun, which, like any other noun, projects an NP in syntax. Its arguments should consequently be licensed through *of* insertion, just like other nominal arguments. This is, of course, correct:

(13)   [$_{NP}$ [$_N$ drive er] of a truck]

The syntactic analysis of *driver* would start out from a structure featuring a VP. Since case is available in the complement position of verbs, the argument

is incorrectly predicted to appear in the accusative:[3]

(14)   *[$_{NP}$ [$_N$ [$_V$ drive] er] [$_{VP}$ t$_V$ [$_{NP}$ a truck]]]

The syntactic approach could tackle this problem, as well as the absence of stranding, by assuming that incorporated heads lose the licensing capacities they have when not incorporated. Although such a statement would be empirically adequate, it begs the question why this loss of licensing capacities should obtain. This question is especially awkward since not all material in, say, a VP is licensed in the same way. If an incorporated verb loses its capability to case-mark, for instance, then arguments either must be licensed by *of* insertion or cannot appear at all, but the impossibility of stranding adverbials remains unexplained. One therefore has to assume a total loss of all licensing capacity in incorporated heads. This renders the claim that such heads project a full phrase prior to incorporation vacuous.

Similar objections hold of the related view that lexical heads do not have any licensing capacity to begin with. Suppose that licensing uniformly involves feature checking in functional projections (a claim consonant with the idea that lexical heads start out in a √P that is the smallest projection of a tree with an elaborate functional structure; see section 2.2). According to this view, a VP that is the complement to a nominal affix can contain *of* phrases licensed in the functional projections dominating the affix. Conversely, NPs may contain accusative arguments when they are the complement of a verbal affix, since the functional projections associated with that affix will license them.

The derivation of *driver of a truck* would then involve the following steps. The verb *drive* takes an *of* phrase as its complement in (15a). It then incorporates into the higher nominal affix, as in (15b). The *of* phrase is subsequently licensed by movement to an appropriate checking position in the extended nominal projection, as in (15c). Finally, *driver* undergoes successive head-to-head movement across the *of* phrase to derive the correct surface order, as in (15d). Alternatively, raising of the *of* phrase takes place after spell-out.

(15)   a.   [$_{FP1}$ F1 [$_{FP2}$ F2 [$_{NP}$ er [$_{VP}$ drive [$_{PP}$ of a truck]]]]]
         b.   [$_{FP1}$ F1 [$_{FP2}$ F2 [$_{NP}$ [$_N$ [$_V$ drive]$_i$ er] [$_{VP}$ t$_i$ [$_{PP}$ of a truck]]]]]
         c.   [$_{FP1}$ F1 [$_{FP2}$ [$_{PP}$ of a truck]$_j$ [$_{F2}$ [$_N$ [$_V$ drive]$_i$ er]$_k$ F2]
               [$_{NP}$ t$_k$ [$_{VP}$ t$_i$ t$_j$]]]]]
         d.   [$_{FP1}$ [$_{F1}$ [$_{F2}$ [$_N$ [$_V$ drive]$_i$ er]$_k$ F2]$_l$ F1] [$_{FP2}$ [$_{PP}$ of a truck]$_j$ t$_l$ [$_{NP}$ t$_k$ [$_{VP}$
               t$_i$ t$_j$]]]]]

---

[3] Inheritance of accusative arguments seems to occur in so-called mixed categories, such as the English gerund: *John's singing the Marseillaise drives us crazy.* We will argue in Chapter 5

Note that the availability of this derivation must be linked to the formation of a morphological complex in the nominal head position. There are simply no structures in which a noun licenses the complement of its verbal complement (or vice versa) if the higher head is a free morpheme (that is, when the lower head does not incorporate). If this assumption is made, the derivation in (15) yields the desired empirical results. It is equivalent to its morphological counterpart in that all licensing relations in the structure in (15d) are dependent on the nominal affix. This follows immediately in the morphological analysis, since the affix is the head of the morphological complex. However, the syntactic analysis in addition posits a more complex structure and a head movement operation for which, given the constellation of assumptions, no independent evidence can possibly be given. This becomes especially clear when we remove from (15d) all structure that is there for theory-internal reasons, but does not have empirical effects. The resulting structure, given in (16), is isomorphic to the structure directly generated in the morphological account.

(16) $[_{FPI} [_N [_V \text{drive}] \text{er}] [_{PP} \text{of a truck}]]$

Apart from argument licensing, there are other effects that the presence of a syntactic complement should have, but which are not attested. Consider the following example:

(17)   *A Rembrandt painting of himself

In a morphological analysis, this example is ruled out because *Rembrandt*, being part of a word, is not an accessible antecedent for the anaphor (see Chapter 4 for analysis). In a syntactic analysis, *Rembrandt* starts out as part of a complement clause in which it c-commands the anaphor, as in (18). Hence, there should be no problem with establishing a binding relation between the two.

(18)   ing $[_{vP} \text{Rembrandt } v [_{VP} \text{paint (of) himself}]]$

Again, what is required is some assumption that ensures that the effects of the proposed syntactic structure are covered up.

   We conclude that there is no reason to assume that the complement of a morphological complex like *driver* is generated as the complement of the nonhead. Instead, the *of* phrase is directly generated as the complement of the

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that such examples do, in fact, neither involve syntactic head movement of *sing* to *-ing*, nor inheritance of an accusative argument.

entire morphological complex. It is of course thematically related to the nonhead, given that it is interpreted as the internal argument of *drive*.

The phenomenon that arguments of the nonhead of a derived word are realized in the projection of that word is known as inheritance. As we will now argue, inheritance is even more problematic for the syntactic approach to word formation than the mere contrast between (13) and (14) suggests. This is because the affixal head of the complex word determines which of the arguments of its base are realized. As indicated by (13), words derived by *-er* usually inherit the internal argument of their verbal base (if there is one), but not the external one. Words derived by the adjectival suffix *-able* appear to inherit the internal argument of their verbal base and realize it as their subject (see (19a,a′)). These adjectives do not inherit the external argument of the base, however. This contrasts with verbs derived by *-ize*, which inherit the external argument of their adjectival base and realize it as an object (see (19b,b′)), but do not seem to inherit any internal arguments. Failure to inherit internal arguments can also be observed with deadjectival adverbs in *-ly* (see (19c,c′)) and denominal adjectives in *-less* (see (19d,d′)). Compounds, finally, do not inherit any arguments from their nonhead (Di Sciullo and Williams 1987; see (19e,e′)).

(19)   a.   Michael reads Shakespeare every Friday.
        a′. Shakespeare is still readable (*by everyone).
        b.   This area is industrial.
        b′. They industrialized this area.
        c.   Karl was proud of his nine sons.
        c′. Karl walked around proudly (*of his nine sons).
        d.   John has a terrible fear of dogs.
        d′. But his brother is fearless (*of dogs).
        e.   Siegfried whetted the sword on a stone.
        e′. A whetstone (*of a sword) (*by Siegfried).

The morphological approach to word formation makes available a natural account of the observation that the head of a complex word determines the pattern of inheritance. The crucial point is that the head and the nonhead are merged directly, and hence it is conceivable that the semantics of the resulting category, including its argument structure, is determined by a set of compositional rules. More especially, the head can be viewed as a functor that introduces an argument structure, which may be partly specified, but may also contain open slots into which arguments of the nonhead can be copied. In addition, the functor's specified arguments can bind an argument of the nonhead. Free morphemes are not functors, since otherwise they could not be free. Hence, there is no inheritance in compounds. It would take us too far

afield to discuss the theory of argument structure composition in any detail, but see Di Sciullo and Williams 1987, Booij and van Haaften 1988, Rappaport Hovav and Levin 1992, Josefsson 1998, Lieber and Baayen 1993, and Plag 1998 for some concrete proposals. To give an idea of the type of analysis we have in mind, let us sketch how argument structures are constructed in the examples given above.

The suffix *-er* typically binds the external argument of its verbal host and makes available an internal argument position into which the latter's internal role can be copied. This is illustrated in (20). The labels we assign to thematic roles are merely a convenient way of distinguishing them; no theoretical claims are intended by their usage. Binding of one θ-role by another is indicated by coindexation, while the open internal argument position in the suffix's argument structure is indicated by an unlabelled role. ('A' stands for Agent and 'Th' for Theme.)

(20)

$$N \; [\underline{R}_i \; (Th)]$$

$$V \; [\underline{A}_i \; Th] \qquad affix_N \; [\underline{R}_i \; (\theta)]$$

drive   *er*
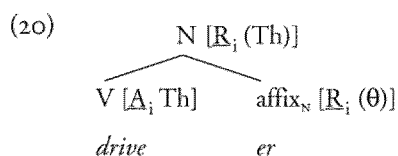
The argument structure of *-able* contains an external theme, which binds the internal role of its base. Hence the apparent externalization of this role. The suffix's argument structure is otherwise closed, in that it does not contain any other θ-roles. Consequently, inheritance of the external argument of the base is impossible (see (21a)). Verbalizing *-ize* differs from *-able* in two respects. First, it has an internal theme that binds the external role of the adjective it attaches to, leading to apparent internalization. Second, it has an external cause role (see (21b)).

(21)   a. $A \; [\underline{Th}_i]$ b. $V \; [\underline{C} \; Th_i]$

        $V \; [\underline{Ag} \; Th_i] \quad affix_A \; [\underline{Th}_i]$ $A \; [\underline{Th}_i] \quad affix_A \; [\underline{C} \; Th_i]$

        read   *able*   *industrial*   *ize*
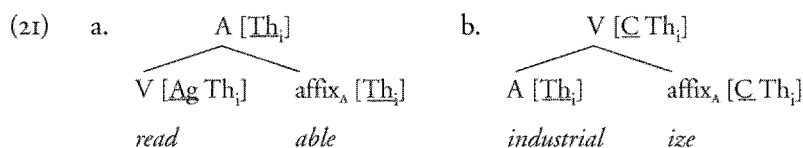
Adverbializing *-ly* and adjectivizing *-less* are alike in that they do not have unspecified θ-roles or θ-roles that bind an argument position in their host. As a result, adverbials and adjectives derived by these suffixes will not inherit thematic roles from the nonhead. As opposed to *-ly*, the argument structure of *-less* does contain an external θ-role, which is copied to the adjective it

heads (CE in (22b) stands for 'cause of emotion'):

(22) a.   Adv   b.   A [Th]
          ⌒   ⌒
    A [Th CE]   Adv   N [R CE]   affix$_A$ [Th]
     proud   *ly*   *fear*   *less*
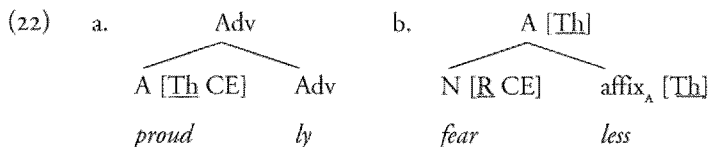
Finally, the head of a compound is a free morpheme, not a functor, and consequently it will not license the inheritance of any arguments:

(23)   N [R]
         ⌒
    V [A Th]   N [R]
     whet   *stone*
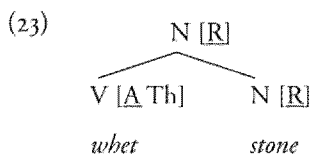
One might think that having to assume rules of inheritance puts the morphological approach at a disadvantage. Consider, however, what the alternative would have to be. The hypothesis underlying the syntactic approach is that the head of a complex word merges with the full syntactic projection of the nonhead. There is no need, then, for a semantic theory of inheritance: 'inherited' arguments are simply stranded arguments of the nonhead whose realization is somehow or other affected by the loss of licensing capacity of incorporated heads. This works well as long as all arguments of the nonhead are inherited. However, the variation in inheritance patterns illustrated above requires that a syntactic head can determine which arguments of the head of its complement are realized. For example, *-able* and *-ly* require suppression in their complement of the external and the internal argument, respectively, whereas in compound structures no argument at all may be realized in the complement.

   This kind of argument structure manipulation at a distance is unknown in syntax proper. To begin with, we know of no other examples in which a head selects for a complement whose head has particular thematic properties, say, a (simplex) causative verb that selects intransitives only. But even if this were allowed, it would not be sufficient, since what is required to capture the various patterns of inheritance is that the selecting head may suppress the realization of some or all of the roles of the selected head. Thus, the aforementioned causative verb would demand that the selected verb, if transitive, be stripped of its external role. Apart from being unattested, it is unclear how such manipulation could be accommodated without seriously weakening central assumptions about syntax: the higher head's influence is nonlocal. Moreover, the change in argument structure in

the lower head is unrelated to its lexical entry and will hence violate inclusiveness (see Chomsky 1995).

One way to deal with the problem just mentioned is to argue that there are independent processes which (i) change the argument structure of a head, and (ii) introduce a feature that can be selected by a higher head. One could, for instance, make use of such processes as passivization and middle formation. The idea would then be that such processes apply freely to the lower head, and that passive and middle VPs carry a feature that identifies them as such. The higher head can then select for a complement with this feature.

This approach would satisfy inclusiveness and keep selection local. However, the problem would remain that in syntax proper no instances of selection exclusively for a passive or middle complement seem to be attested. This casts doubt on the existence of a 'passive feature' or 'middle feature' represented on VP. This problem is more general. De-adjectival adverbials in *-ly* and denominal adjectives in *-less* illustrate that internal θ-roles can fail to be inherited (see (22a,b)). Even though optional nonassignment of internal roles is attested with adjectives and nouns, we are not aware of any languages that mark this morphologically, which would be expected if the process involved a selectable feature.

Compounds present an even more serious problem: they show that complete suppression of argument structure is possible, despite the fact that there is no independently motivated operation in English that has this capacity. The same point can be made for other languages. Dutch verbs prefixed with *ver-*, for instance, obligatorily select an internal argument (see (24a)). Nevertheless, such verbs can freely occur as the left-hand part of a compound and not take an object in this context (see (24b)).

(24)   a.   Derrick verhoort   *(de verdachte).
              Derrick interrogates   the suspect

        b.   De verhoorkamer   is aan het eind van de gang.
              the interrogate-room   is at   the end   of   the corridor
              'The interrogation room is at the end of the corridor.'

We conclude that the assumptions necessary to deal with inheritance in a syntactic approach to word formation are problematic in ways that their morphological counterparts are not. The problem is the same as that encountered earlier in connection with the licensing of complements to morphological complexes: the assumed higher head determines properties of the embedded structure in a way unknown in syntax proper. Additional assumptions can be made that allow such nonlocal downward influence, but since these lack independent motivation, this amounts to a qualitative

extension of syntactic theory. In other words, they undermine the premise of the approach; namely, that word formation is the result of syntactic operations that are necessary anyway.

2.4 SYNTACTIC VERSUS MORPHOLOGICAL COMPLEX HEADS

In the previous two sections we presented arguments supporting the view that word formation is dealt with by a distinct generative system. This does not imply, however, that syntax does not have means of forming complex X^o categories as well. Head-to-head movement as such is not excluded, nor is base generation of such categories, or formation through reanalysis (see Haegeman and van Riemsdijk 1986, van Riemsdijk 1998). If complex X^o categories can be generated by two systems, one might expect contrastive behaviour between the resulting heads. Complex heads derived in syntax must satisfy syntactic principles, while complex heads derived in morphology are subject to morphological conditions.

In contrast, syntactic theories of word formation acknowledge only a single means of generating complex heads. Although such theories can assume a morphological component that deals with the internal structure of X^o categories (see Chapter 1), this component cannot distinguish between two different types of complex head: all complex heads are generated in syntax and all are subject to whatever extra restrictions the morphological component imposes. Such theories therefore predict that complex heads will display unitary behaviour.

As we will show, there are various phenomena that distinguish syntactic and morphological complex heads, thereby confirming the two-systems approach. Note that this is not the type of argument that we argued in Chapter 1 to be invalid. We claimed there that differences and similarities between the principles governing phrases (XPs) and words (X^os) cannot provide evidence either for or against the existence of an independent generative system for morphology. What we will argue for here is that there are two qualitatively different types of complex X^os, something that the syntactic approach to word formation cannot easily accommodate.

The structures we will compare with complex words are verb clusters in Dutch (see (25a)), particle–verb and resultative–verb combinations (see (25b,b′)), and verb–clitic combinations in Romance (see (25c)). It would take us too far afield to argue here that these structures are indeed complex syntactic heads, but for relevant discussion see Evers 1975, 2003, Bierwisch 1990, and van Riemsdijk 1998 (for verb clusters), Johnson 1991, Neeleman

and Weerman 1993, and Neeleman and van de Koot 2002*b* (for particles and resultatives), and Rizzi 1978, Borer 1984, and Jaeggli 1986 (for clitics).

(25) a. dat Cecilia de kraanvogels [$_V$ kan [$_V$ zien vliegen]]
       that Cecilia the cranes   can   see fly
       'that Cecilia can see the cranes fly'

    b. dat Jan zijn moeder elke zondag [$_V$ op belt]
       that John his mother every Sunday   up calls
       'that John calls his mother every Sunday'

    b'. dat Jan de deur [$_V$ groen verft]
       that John the door   green paints
       'that John paints the door green'

    c. Il [$_V$ me [$_V$ les   a]] donné.
       he   me   them has given
       'He has given them to me.'

A first difference between syntactic and morphological complex $X°$ categories concerns the position of their heads (see Hoeksema 1992). Quite simply, the regularities with respect to headedness that can be observed in complex words in a particular language do not extend to complex syntactic heads, and vice versa. As has been argued in detail by Trommelen and Zonneveld (1986), Dutch morphology is subject to the right-hand head rule (compare Williams 1981*b*, Di Sciullo and Williams 1987).[4] Compounding provides a striking example (see (26)).

(26) a. [$_N$ rood$_A$ vuur$_N$]
       red   fire
       'disease by which wood turns red'

    b. [$_A$ vuur$_N$ rood$_A$]
       fire   red
       'extremely red'

In contrast, it will be obvious from the example in (25a) that verb clusters need not be right-headed. For particle verbs it can be argued that, with the possible exception of Yiddish, the position of the particle with respect to the verb is determined by the syntactic parameter dealing with the position of the head in VPs. Thus, in an OV language like Dutch, particle-verb constructions are right-headed (see (25b)). In VO-languages like English and Swedish, on the other hand, the verb precedes the particle (whereas English

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[4] Apparent counterexamples are discussed in Booij 1990 and Neeleman and Schipper 1992.

and Swedish morphology complies with the right-hand head rule) (see (27a,b)). Finally, in languages in which objects can either precede or follow the verb, such as Middle Dutch (see Gerritsen 1984, Weerman 1989), the same seems to be true of particles. Some examples are given in (27c,d) (from Neeleman and Weerman 1992).

(27)   a.   John [$_V$ sat$_V$ down$_P$] slowly.

     b.   Jag [$_V$ bryter$_V$ av$_P$] kvisten.
           I   break   off   the-branch

     c.   dat wi hem gheestelic sellen [$_V$ na$_P$ volgen$_V$]
           that we him spiritually will   after follow
           'that we will follow him spiritually'

     d.   Men ginc gene pesen [$_V$ trecken$_V$ in$_P$]
           one went those ropes   pull   in
           'One began to pull in those ropes'

The headedness of Romance clitic–verb combinations, too, deviates from the headedness of complex words in the relevant languages. Romance compounds are typically left-headed (see Selkirk 1982, Scalise 1984), whereas derivations are typically right-headed. This is illustrated for Italian in (28a,b). In contrast, the position of the head in Italian verb–clitic combinations depends on an altogether different factor: these combinations are usually right-headed when the verb is finite and left-headed when it does not carry tense or agreement, as (28c,d) shows.

(28)   a.   [$_N$ carta$_N$ regalo$_N$]
           paper   gift
           'wrapping paper for presents'

     b.   [$_N$ cart$_N$ ista$_N$]
           paper   ist
           'paper specialist'

     c.   [$_V$ li$_D$ amo$_V$]
           (I) them love

     d.   [$_V$ amar$_V$ li$_D$]
           to.love   them

A second difference between syntactic and morphological complex X°s concerns a restriction on the internal structure of their heads. There is strong evidence that particle–verb and resultative–verb combinations form complex predicates in Dutch: the argument structure of such complex heads is derived

from the argument structures of their constituent parts. As it turns out, complex predicate formation is nonrecursive. It is blocked when the head is a complex predicate itself (see Neeleman and van de Koot 2002*b* for an explanation of this 'complexity constraint'). This is illustrated by the data below. The example in (29c) shows that a particle verb cannot head a resultative complex predicate.

(29)   a. dat Jan en Piet [samen werken]
           that John and Pete together work
           'that John and Pete cooperate'

        b. dat Jan en Piet zich   [kapot werken]
           that John and Pete themselves to-pieces work
           'that John and Pete work themselves to death'

        c. *dat Jan en Piet zich   [kapot [samen werken]]
           that John and Pete themselves to-pieces together- work

Similarly, a particle verb cannot be the basis for formation of a particle–verb complex (see (30)). Resultatives block complex predicate formation in the same way, but we will not demonstrate this here.

(30)   a. dat Jan en Piet [samen werken]
           that John and Pete together- work

        b. dat Jan en Piet het voorstel [uit werken]
           that John and Pete the proposal out- work
           'that John and Pete develop the proposal'

        c. *dat Jan en Piet het voorstel [uit [samen werken]]
           that John and Pete the proposal out- together- work

In addition to particle verbs, Dutch has complex verbal heads which are uncontroversially derived by morphological processes. These fall into three groups: verbs derived by compounding, verbs derived by prefixation, and verbs derived by suffixation. As it turns out, none of these verbs is barred from occurring in the head position of a complex predicate:

(31)   a. dat Jan [stijl danst]
           that John style dances
           'that John is a ballroom dancer'

        a'. dat Jan zich [suf [stijl danst]]
           that John himself drowsy style dances
           'that John ballroom-dances so much that he becomes drowsy'

b. dat Jan de foto's   [ver groot]
    that John the pictures en   larges
    'that John enlarges the pictures'

b′. dat Jan de foto's   [uit [ver groot]]
    that John the pictures out en   larges
    'that John completely enlarges the picture'

c. dat Jan het gedicht [analyse eert]
    that John the poem   analysis izes
    'that John analyses the poem'

c′. dat Jan het gedicht [stuk   [analyse eert]]
    that John the poem   to-pieces analysis izes
    'that John analyses the poem so thoroughly that it no longer
    seems beautiful'

What these data show, then, is that there are two types of complex predicates. The syntactic ones are subject to the 'complexity constraint', whereas the internal structure of morphological complex predicates does not block further complex predicate formation in syntax.[5]

The third way in which syntactically and morphologically complex X°s differ has to do with the kind of elements that appear as nonheads. As is well known, functional elements cannot appear as the nonhead in compounds and derivations (although they can appear within the nonhead; see Hoeksema 1988). Thus, the left-hand part of a compound cannot be a pronoun, as (32) shows (compare Di Sciullo and Williams 1987). In contrast, syntactically complex heads may contain pronominal elements as nonhead, as is apparent from the Romance cliticization data given above.

(32)   *Mary is a real [him admirer].

A similar argument can be based on infinitives marked with *te* 'to'. These cannot function as the nonhead in Dutch morphological complexes (see (33a,b)), but they do appear as nonhead in verb clusters (see (33c,d)).[6]

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[5] Romance verb–clitic combinations, though syntactic, do not involve complex predicate formation and hence are not subject to the complexity constraint.

[6] The verbs in (33c) must form a cluster because *schijnen* does not allow extraposition of its complement. In Dutch, infinitival complements must either undergo extraposition or their head must adjoin to the selecting verb. The fact that the verbs in (33d) form a verb cluster is apparent from the so-called IPP effect (compare den Besten and Rutten 1989): the verb selected by the perfect auxiliary appears in infinitival rather than participial form, when it hosts an adjoined verb itself.

(33) a. [[(*te) staan] plaats]
          (to)   stand place
          'standing room'

      b. [[(*te) verstaan]   baar]
          (to)   understand able
          'audible'

      c. dat hij daar [schijnt te staan]
          that he there appears to stand
          'that he seems to stand there'

      d. dat hij haar [heeft [proberen te verstaan]]
          that he her has   try   to understand
          'that he has tried to understand her'

Conversely, the typical form in a which verbs appear in morphological complexes is their stem form (see (34a,b)).[7] In complex syntactic heads, verbs must be inflected and can never appear in the stem form (see (34c,d)).

(34) a. [[fonkel (*en)] nieuw]
          twinkle (INF) new
          'brand-new'

      b. [[lees (*en)] baar]
          read (INF) able

      c. dat hij de diamant [ziet [fonkel *(en)]]
          that he the diamond sees sparkle (INF)
          'that he sees the diamond sparkle'

      d. dat hij de krant   [wil [lees *(en)]]
          that he the newspaper wants read (INF)
          'that he wants to read the newspaper'

A final difference between syntactic and morphological complex heads is that constituent parts of complex words cannot be moved (an instance of lexical integrity; see section 2.6), whereas movement of parts of syntactic complex heads is unproblematic. To give an example, the left-hand part of a compound does not allow fronting to Spec-CP in Dutch (not even when

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[7] When the bare infinitive of a verb ends in *-n* rather than *-en*, this form may function as the left-hand part of a compound or derivation (as in (33a,b); see van Haeringen 1951, and de Haas and Trommelen 1993: 361–2). The cases that Booij (1994: 7) cites as involving infinitives ending in *-en* as nonhead in a compound all concern nominalized infinitives. Hence, the infinitive is embedded in a nonhead that is derived by zero affixation (see Chapter 5); it is not itself the nonhead.

phrasal), but resultatives and particles can be topicalized in appropriate contexts, namely when they receive a contrastive reading:

(35)   a.   Bernard heeft een mooie   [[oude munten] verzameling].
            Bernard has   a   beautiful   old   coins   collection
            'Bernard has a beautiful collection of old coins.'

       b.   *Marie heeft een prachtige postzegelcollectie, maar
            Mary has   a   beautiful stamp-collection,   but
            [oude munten]ᵢ heeft ze niet zo'n   beste [tᵢ verzameling].
            old   coins   has she not such-a good collection
            'Mary has a beautiful collection of stamps, but she does not have a very impressive collection of old coins.'

       c.   Angola voert veel   goederen in. Uitᵢ voertⱼ het
            Angola moves many goods   in. Out moves it
            alleen koffie [tᵢ tⱼ].
            only   coffee
            'Angola imports many goods. It only exports coffee.'

       d.   Jan verft altijd alles   rood. Blauwᵢ verftⱼ hij alleen
            John paints always everything red.   Blue   paints he only
            de deur [tᵢ tⱼ].
            the door
            'John always paints everything red. Only the door does he paint blue.'

There seems to be ample evidence, then, for the existence of two different types of complex X°s: one type is generated in morphology and the other in syntax.

The co-existence of syntactically and morphologically complex heads poses a challenge to the idea that both are derived in the same way, by head-to-head movement. We know of one account that deals with this issue. Rizzi and Roberts (1989) argue that head-to-head movement gives rise to a morphological complex in case the higher head selects for an incorporated element. If there is no selectional relation, the result is a syntactic complex. In Roberts 1991, this difference is expressed structurally: heads that select for an incorporated element are X⁻¹'s, which project an empty slot into which a head must move by substitution. Head-to-head movement that results in syntactic complexes is adjunction to X°, rather than substitution.

It is unclear whether this approach extends to compounds, which are morphological but in which the left-hand part is not selected by the head. More importantly, this theory in effect does assume a distinct morphological component, though as part of the phrasal syntax (compare Baker 1988;

see Chapter 1). In Roberts's proposal, the set of complex heads subject to the principles of morphology is defined as exactly those in which the head selects the nonhead. Moreover, exactly these same complex heads are opaque for further syntactic operations (for example, no excorporation is possible). This means that, in effect, a morphological component is proposed that deals exactly with those complex heads that do not yield straightforwardly to a syntactic analysis.

2.5 UNDERGENERATION BY THE MOVEMENT ACCOUNT

The two theories of word formation also diverge in the predictions they make with respect to the possible functions of nonheads of complex words. If the nonhead is adjoined to the head by movement, independently motivated restrictions on this operation should preclude incorporation of certain syntactic elements. In particular, subjects and adjuncts are islands for extraction (Huang 1982) and on standard assumptions neither are c-commanded by the verb. Incorporation of (the head of) such elements should hence be impossible (see Baker 1988 for discussion). In contrast, if morphological complexes are formed by direct merger in a separate submodule, there is no reason why such restrictions on interpretation should obtain.[8]

Consider in this light the free interpretation of nominal compounds (compare Allen 1978 and Carstairs-McCarthy 1992). A hypothetical example like *table bath* can have a range of possible interpretations, some of which are given in (36).

(36) a. a bath in the shape of a table
     b. a bath to put on a table
     c. a bath for washing tables
     d. a bath made out of tables
     e. a bath to use before sitting at a table

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[8] What we will discuss here is the interpretation of incorporated nouns themselves, not whether they can somehow be linked (with respect to their reference) to syntactic constituents of a particular type. It seems to be uncontroversial that incorporated nouns cannot be related to syntactic subjects or adjuncts, although, as we will see, they can be interpreted as subjects or adjuncts themselves. This distinction cannot be made in a syntactic approach to word formation, but it is inherent in the morphological approach. For an analysis of restrictions on the relations between incorporated nouns and syntactic constituents in a morphological approach, see Ackema 1999*a*.

It will be clear that the position of *table* in these paraphrases is not one which can be related to *bath* by movement. Thus, a syntactic analysis of examples like *table bath* is implausible, as is of course hardly controversial. There must be an independent means of forming nominal compounds—but that is precisely what the two-systems theory maintains for compounding in general.

The semantic freedom of compound structures in principle allows their left-hand part to function as an adjunct modifying the head, contrary to what the syntactic theory predicts. As Spencer (1995) notes, incorporation of adjuncts is freely allowed in Chukchi. An example is given below:

(37)   Mən-nəki-ure-qepl-uwicwen-mək.
        IPL.IMP-*night-long-ball-play*-IPL
        'Let's play ball for a long time at night.'

Similarly, it has been noted that Greek allows verbal compounds whose nonhead functions as a modifier (see Rivero 1992: 300):

(38)   To   fagitó   tha   sigo-vrási.
        the   food   will slowly-boil
        'The food will boil slowly.'

Dutch, too, has compound verbs with the relevant interpretation. Even incorporation of two adjuncts is possible, as the final example shows:

(39)   a. Jan [[snel wandel] t]   erg   graag.
            John   quick walk   3SG very happily
            'John likes to walk.'

        b. Zijn zus, daarentegen,   blijkt   nachtenlang
            his   sister on-the-other-hand turns.out nights-long
            te [[hand werk] en].
            to   hand work   INF
            'His sister, on the other hand, turns out to be doing needlework
            for nights on end.'

        c. Tenzij ze 's nachts aan het [[wind surf] en] is, natuurlijk.
            unless she at night   on   the   wind surf   INF *is*, *of course*
            'Unless, of course, she is windsurfing at night.'

        d. Hoewel [nacht [[wind surf] en]] erg   gevaarlijk is.
            although night   wind surf   INF *very dangerous is*
            'even though windsurfing at night is very dangerous.'

With respect to the incorporation of subjects, the situation is more complex. Subjects are plausibly defined as external arguments: the subject of a head X is located externally to XP (Williams 1980, Neeleman and van de Koot 2002*a*). The left-hand part of a compound is contained within the projection of the head. As Di Sciullo and Williams (1987) note, this implies that the subject of X cannot form a compound with X (see also Selkirk 1982). It seems, then, that the morphological and syntactic approaches make the same prediction in this domain. This prediction is correct as such; despite the fact that Dutch allows constructions without a syntactic subject argument (namely impersonal passives), the following examples are ungrammatical:

(40)   a.   *dat (er)   de hele   nacht [honde blaft]
             that (there) the whole night   dog-   barks
             'that dogs are barking all night'

       b.   *Op   de Olympische Spelen [meisjes zwemt] (het) hem
             during the Olympic   Games girls-   swims   (it)   him
             iets   te veel.
             somewhat too much
             'During the Olympic Games there is too much women's swimming for his taste.'

Interestingly, however, the morphological theory allows for incorporation of a subject under specific circumstances. As we have seen, Y in (41a) cannot be the subject of X, since it is contained in X's projection. The situation is different in (41b), where X combines with Z before Y is merged. Y is now located externally to X's maximal projection (which coincides with X). If Z is an affix that allows apparent internalization of the external role of its host (see section 2.3), this role can be assigned to Y.

(41)   a. $[_x$ Y X]
       b. $[_z$ Y $[_z$ X Z]]

Such structures do indeed occur. As has been pointed out by Williams (1984), Hoeksema (1984), and Beard (1995), data of this type are attested in various languages (contra Selkirk 1982). Some Dutch and English examples are given below:

(42)   a. $[_N$ honden $[_N$ ge$_N$ blaf$_V$]]
             dogs   GE   bark
             'barking by dogs'

    b. [$_N$ meisjes [$_N$ zwemmen$_V$ ∅$_N$]]
        girls   swim-ing
        'swimming by girls'

    c. [$_N$ student [$_N$ rioting$_V$ ∅$_N$]]
    d. [$_N$ visitor [$_N$ parking$_V$ ∅$_N$]]

In (42a), the verb *blaffen* 'bark' is nominalized by the prefix *ge-*, after which its external θ-role is satisfied by *honden* 'dogs'. A similar derivation gives rise to (42b): the infinitive is nominalized after which its external role is satisfied in a compound structure.[9] The English data in (42c,d) are parallel.

Let us consider to what extent the syntactic account can accommodate the examples in (42). The structure underlying such compounds must be as in (43). Given that the left-hand part of the compound is interpreted as the subject of the verb, it must start out in an NP that occupies the latter's subject position, say Spec-*v*P. The nominalizing affix takes *v*P as its complement.

(43)
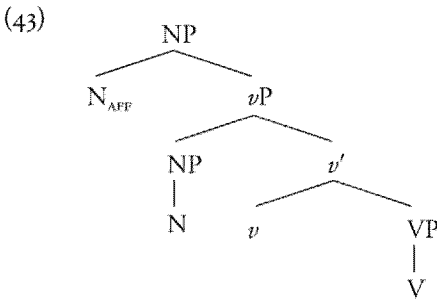
In order to derive the surface structure, the verb must incorporate into *v*, after which it is pied-piped by incorporation of *v* into the nominalizing affix. Subsequently, the head of the subject NP must adjoin to the nominal complex thus derived:

(44)

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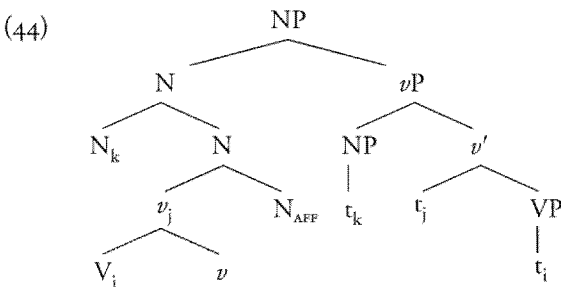
[9] There is some controversy over the nature of the nominalizing affix. We will argue in Chapter 5 that it is a zero morpheme, rather than the *-en* ending of the verb, but this is irrelevant here.

It seems to us that the structure in (44) should be ruled out. Subjects are generally islands, which would block the incorporation of the head of the subject into the nominal complex. (It has been argued that exceptionally case-marked subjects might be transparent for extraction (see Chomsky 1986a, and Baker 1988), although the data are far from clear (see Kuno 1973, and Kayne 1984). Nominal heads, however, do not license exceptional case marking, so the issue does not seem relevant here.)

Suppose, however, that despite this objection we allow for incorporation out of the subject in a structure like (43). In that case, there would be no way of blocking a derivation in which the incorporation out of the subject and the incorporation of the verb take place in that order, the reverse of the order in (44). This results in the structure in (45), which corresponds to the ungrammatical words in (46).[10]

(45)

```
                        NP
            ┌───────────┴───────────┐
            N                        vP
      ┌─────┴─────┐            ┌──────┴──────┐
     v_j          N          NP             v'
   ┌──┴──┐      ┌──┴──┐       │         ┌─────┴─────┐
  V_i    v   N_k   N_AFF     t_k       t_j          VP
                                                     │
                                                     t_i
```
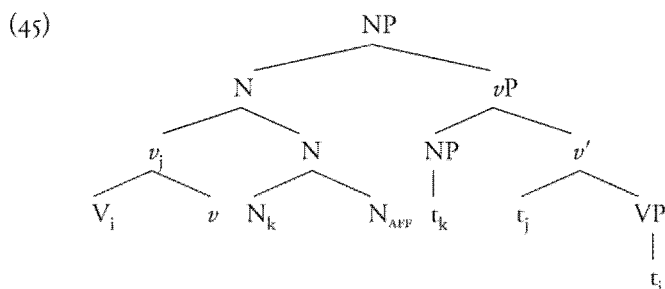
(46) a. *[blaf [ge honden]]
          bark GE *dogs*
          'barking of dogs'

      b. *[zwemmen [meisjes ⌀]]
          swim-   *girls*-ING
          'swimming by girls'

      c. *[rioting [student ⌀]]
      d. *[parking [visitor ⌀]]

One might counter this argument by arguing that the selectional requirement of the nominalizing affix must be met by its first sister—hence this must be a verb. This makes the ungrammaticality of the examples a coincidence, however. There could be a variant of the affix that c-selects for a vP but m-selects for a N. This points to a more fundamental weakness of the proposed account.

---

[10] Note that this does not constitute acyclic incorporation in the sense of Baker 1988, since the N-head of the subject does not c-command v and V. If the theory is extended such that (45) does qualify as acyclic incorporation, it is hard to see why (44) would not be ruled out as well, as a violation of the head movement constraint.

The point is that there are no affixes at all that take a syntactic complement of category XP but a morphological host of category Y, rather than X. This follows automatically if syntactic principles determine that only the head of the complement to the affix can be incorporated. In that case, m-selection only requires that there be some host for an affix (the stray affix filter). Once we allow incorporation out of other constituents than the complement, however, ruling out examples like those in (46) by m-selection requires a systematic duplication. The category of the host of an affix must by stipulation be identical to that of the syntactic complement of the affix, even when the (first) incorporated element is not the head of that complement.

We conclude that, as with adjuncts, the syntactic approach to word formation cannot account for the attested range of possibilities with respect to subject incorporation, whereas the morphological approach makes the correct predictions without complications.

2.6 LEXICAL INTEGRITY

The following example illustrates a general difference between the two approaches to word formation under discussion. Suppose an XP has a complex head. The morphological account then assumes the structure in (1), repeated here as (47a), which involves two representations that are generated independently and connected by insertion. In contrast, the syntactic account assumes the structure in (2), repeated here as (47b), in which there is a single representation (or derivation).

(47)   a.

        b.
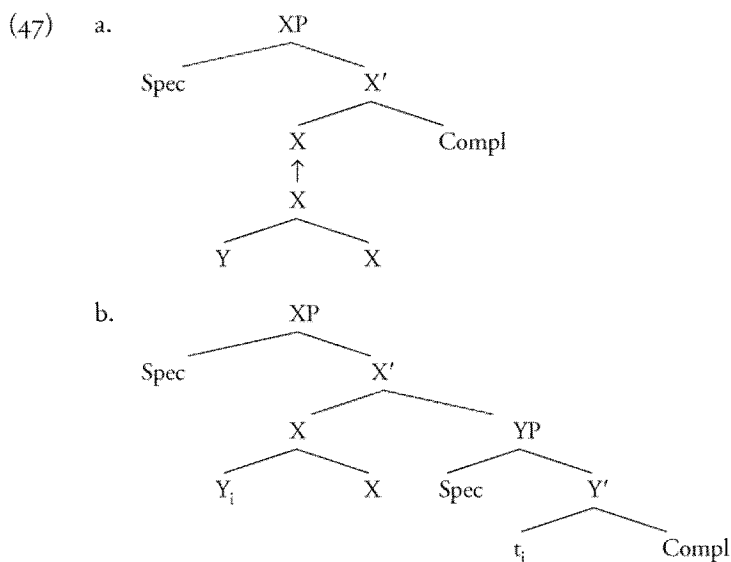
In general, connecting two independently generated representations through insertion has the effect that the inserted material is inaccessible to operations that apply in the representation that hosts it. This is shown by the behaviour of parentheticals, such as the adverbial clause in (48):

(48) Jan, althans dat denk ik, is een broer   van Piet.
      John, at-least that think I, is a   brother of   Pete
      'John, at least that is my impression, is Pete's brother.'

Traditionally, parentheticals are treated as if they are unconnected to the clause they occur in (see Haegeman 1988, amongst others). However, in Chapter 4 we will show that they are generated independently and integrated into the host structure through insertion. The structure of the left periphery of (48), for example, is as in (49).

(49)

```
              CP
        ┌──────┴──────┐
      DP      ↑        C′
              XP    ┌───┴───┐
                    C       IP
```
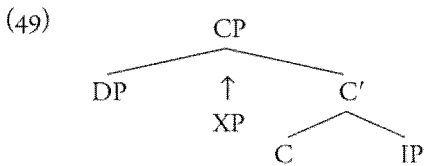
That material inserted in this way is indeed inaccessible to operations that apply in the host structure can be shown in various ways. For instance, the presence of a parenthetical after the first constituent of a clause does not lead to a violation of the verb-second constraint in languages like Dutch, as (48) illustrates. Moreover, as (50) shows, parentheticals are islands for movement.

(50) a. Je zag Jan, een broer   van Piet.
          you saw John, a   brother of   Pete

      b. *[Van wie]$_i$ zag je   Jan, een broer t$_i$?
          of   who saw you John, a   brother

According to the morphological theory of word formation, the relation between a complex word and the clause in which it is inserted is comparable to that between a parenthetical and its host clause. Since morphological and syntactic structures are generated independently, they can only be related through insertion. In particular, a morphological representation is inserted in a syntactic terminal. If so, we expect that, like parentheticals, complex words are inaccessible to operations that apply in the host structure. No such restriction follows from the syntactic theory of word formation. The structure of a complex word must form a single representation with the syntactic structure in which it occurs, since its left-hand part heads a syntactic chain.

Unless further assumptions are made, this predicts that complex words are transparent in syntax.

It is in fact a well-known observation that complex words are syntactically opaque, a phenomenon usually referred to as lexical integrity (see Chomsky 1970, Lapointe 1979, Di Sciullo and Williams 1987, Bresnan and Mchombo 1995). Like parentheticals, complex words are islands for extraction. The left-hand part of compounds, for example, cannot be topicalized or questioned, as (51a–c) illustrates (see also section 2.4). Note that the same type of movement can affect syntactic constituents in the same type of environment; see (51d–f).

(51) a. Hij zond mij een [huwelijks foto].
          he   sent   me   a   wedding   picture

      b. *Huwelijk(s)$_i$ zond hij mij een [t$_i$ foto].
          wedding   sent he   me   a   picture

      c. *Wat$_i$ zond hij mij een [t$_i$ foto]?
          what   sent he   me   a   picture
          'What kind of picture did he send me?'

      d. Hij zond mij een [foto van zijn huwelijk].
          he   sent   me   a   picture of his   wedding

      e. [Van zijn huwelijk]$_i$ zond hij mij een [foto t$_i$].
          of   his   wedding   sent he   me   a   picture

      f. Waarvan$_i$ zond hij mij een [foto t$_i$]?
          what-of   sent he   me   a   picture
          'What did he send me a picture of?'

In the same vein, head movement cannot target parts of words. Norwegian, for example, has N-to-D movement, as the data in (52a,b) (from Taraldsen 1990) show. However, such movement cannot strand the left-hand part of a nominal compound; witness (52c–e).

(52) a. [$_{NP}$ hans [$_{N'}$ bøker om syntaks]]
          his   books about syntax

      b. [$_{DP}$ [bøke]$_i$-ne [$_{NP}$ hans [$_{N'}$ t$_i$ om syntaks]]
          books-the   his   about syntax

      c. [$_{NP}$ hans [syntaks bøker]]
          his   syntax   books

      d. [$_{DP}$ [syntaks bøke]$_i$-ne [$_{NP}$ hans t$_i$]]
          syntax books-the   his

      e. *[$_{DP}$ [bøke]$_i$-ne [$_{NP}$ hans [syntaks t$_i$]]]
          books-the   his   syntax

Again, head movement can strand the nonhead of a syntactic complex predicate. This is shown by the separation of verbs and particles under verb second in Dutch, as discussed in section 2.4.

Other evidence for the syntactic opacity of complex words is implicit in the discussion in earlier sections. First, in section 2.4 it was shown that complex predicates may be headed by a morphologically, but not a syntactically, complex category. This can be explained if the structure of complex words is invisible in syntax. Second, data presented in section 2.3 show that parts of words cannot function as antecedents for word-external anaphors. This, too, can be understood as a result of the syntactic opacity of morphological structure.

Although the opacity of words does not follow from the syntactic theory of word formation, there are of course ways to capture the relevant data. For example, Baker (1988: 73) adopts a filter that rules out traces inside complex heads:

(53) $*[_{X^0} \ldots t \ldots]$

Obviously, this filter makes it impossible for movement to target parts of words. However, it does so by stipulation. The chances that the filter can be derived from more general principles are remote, because the syntactic approach to word formation is based on the idea that parts of words can head a syntactic chain. Hence, they must be visible to movement theory. Moreover, the approach does not explain why syntactic complex heads can contain traces. As shown in section 2.4, the head of a complex head formed by syntactic incorporation can be excorporated.

The reason why inserted material is inaccessible to operations in the host structure will be discussed in some detail in Chapter 4. In fact, our theory of insertion will predict certain exceptions to lexical integrity as traditionally understood. Although inserted material is invisible for its host, the reverse is not true: syntactic requirements of parts of both parentheticals and words may be satisfied by constituents in the host structure.

2.7 CONCLUDING REMARKS

In this chapter we have discussed two alternative views of word formation. According to one, complex words are formed by head-to-head movement in phrasal syntax; the other assumes that complex words are generated by an independent morphological system. We have considered four empirical domains in which the predictions of the latter theory are borne out, whereas the former theory needs additional stipulations to account for the data.

The relevant phenomena involve the impossibility of stranding syntactic material in word formation, the range of patterns of inheritance of argument structure and case, the co-existence of two different types of complex heads and the syntactic opacity of complex words.

In this comparison, we have not considered theories according to which some processes of word formation take place in the phrasal syntax and some in a separate morphological submodule. For example, it is a quite common assumption that inflection heads an independent syntactic phrase, while derivation and compounding are morphological. It seems to us that this is a conceptually unattractive position, since it requires an explanation of why some morphemes differ from others in their mode of combination. Such an explanation is unnecessary in both the uniform syntactic and the uniform morphological approach. The problem is worsened by the observation that the product of syntactic word formation resembles the product of morphological word formation in almost every respect.

Of course, there is one aspect in which inflection and derivation differ: in terms of the syntactic theory, inflection seems to systematically strand material in the underlying lexical projection; in terms of the morphological theory, it seems to allow full inheritance. Note, however, that neither the syntactic nor the morphological theory need to make additional statements to capture the data. Consider the morphological approach. Independently, affixes must be characterized with respect to the pattern of inheritance they allow, and inflectional affixes simply occupy one extreme on the scale. Moreover, inflection does not change category and consequently does not affect the way the arguments of its base are licensed. Similarly, the syntactic theory may characterize inflectional affixes as those that do not affect the licensing capacity of the head they combine with.

Unless there are very compelling reasons to assume two different ways of generating word structure, it seems that a uniform theory should be adopted. And given the evidence presented in this chapter, the theory that is empirically more adequate is uniformly morphological. We thus arrive at the following initial model of grammar, to be adjusted as we proceed:

(54)

SYNTAX		
Phrasal Syntax	←	Word Syntax
↓	INSERTION	↓
Phrasal syntactic structure		Word syntactic structure
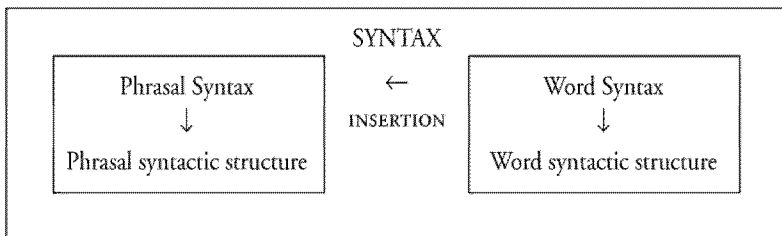
If there is a dedicated generative system for word formation, it follows that we must ask how it interacts with the system that generates phrases. In the next chapter we will identify a first type of interaction. Since two lexical items can be combined either morphologically or syntactically, the two generative systems can be seen as competitors. The effect of competition between morphological and syntactic generation of structures is that certain morphological structures are unexpectedly blocked.

3

Competition between Syntax and Morphology

3.1 COMPETITION AND BLOCKING

On the assumption that syntax and morphology are independent generative systems, the question arises which system will be used if two elements are to be merged. Suppose a head α is to be combined with a dependent β. Will the two form a morphological category $[_\alpha \beta \ \alpha]$, a syntactic phrase $[_{\alpha P} \alpha \ \beta P]$, or is this a matter of free choice? Our claim will be that the two systems compete and that, all else being equal, syntax takes precedence. In other words, we will argue that syntax can block morphological merger in certain circumstances (although we will suggest that this preference could be language-specific).

Any discussion of competition between syntax and morphology is complicated by effects related to the 'elsewhere' condition (compare Anderson 1968 and Kiparsky 1973). This condition states that a general rule is blocked where a more specific rule can apply. As discussed by Di Sciullo and Williams (1987), Andrews (1990), Poser (1992), Sells (1998), and others, there are cases in which the specific form is morphological, whereas the general form is syntactic, so that morphology blocks syntax. A well-known example is comparative formation in English. The morphological comparative -er has a limited distribution, as it only attaches to short adjectives. Consequently, where it can attach, it blocks syntactic comparative formation with *more* (*bigger* excludes *more big).

However, the effects of the elsewhere condition are not limited to morphology blocking syntax. Many familiar examples concern morphology-internal blocking effects, which occur, in particular, in inflectional paradigms: irregular forms like *went* block regular forms like **goed*. In addition, there may be cases in which the specific form is syntactic and the general form morphological. The English simple past, for instance, is morphological. Yet, in the perfect, it is blocked by a syntactic periphrastic construction, which is more specific as it roughly expresses past with present relevance. As pointed out by Williams (1997), there are also cases in which the elsewhere condition operates within syntax. For one thing, the minimal link condition (Chomsky 1995) can be seen as an instance of blocking. Because a lower landing site can attract a subset of the elements that a higher landing site can attract, it is, in this sense, more specific than the higher one. Consequently, movement to a higher landing site is blocked where movement to the lower landing site is possible.

In conclusion, the elsewhere condition is a general grammatical principle which states that specific forms block more general forms, but which does not have anything to say about the component in which the competing forms are generated. This is not what we are interested in here. Rather, what we wish to find out is whether syntax and morphology compete as such, apart from cases involving the elsewhere condition.

At first sight, it seems unlikely that there is such competition, given that related words and phrases freely co-occur. For instance, *driver of trucks* and *truck driver* realize the same head-complement relation, but neither one blocks the other. Nevertheless, in other examples the relevant type of competition is exactly what seems to occur. One could hypothesize, for instance, that the verbal compound **to truck-drive* is blocked by its syntactic counterpart *to drive trucks*. (Note that neither form is more specific than the other, so that the elsewhere principle does not apply.) The hypothesis that we are dealing with competition here seems to be confirmed, at least at first sight, by the observation that N–V compounds are possible when there is no syntactic V–NP combination with the same general semantics. An example is *to Chomsky-adjoin*, which exists in the absence of **to adjoin Chomsky* (on the intended meaning).

The problem, then, is how to develop an adequate theory of morpho-syntactic competition which distinguishes the two cases. We will spell out the theory we have in mind in section 3.2. Empirical evidence for it will be based on synthetic compounds (section 3.3), particle verbs (section 3.4), verbal idioms (section 3.5), and root compounds (section 3.6). In section 3.7 we will briefly discuss the issue of language variation with respect to morphological or syntactic realization of head-dependent combinations.

3.2 THE LOCUS OF MERGER

In addition to two structure-generating systems, the grammar must contain a lexicon, a module responsible for the storage of lexical items. We will argue that the relation between these three components can be characterized by the statements in (1).

(1)   a.   Syntax and morphology are independent generative systems.
      b.   The lexicon is a list of syntactic, morphological and phonological irregularities.
      c.   Syntactic generation of structures is unmarked with respect to morphological generation.
      d.   Complex lexical items can be underspecified in various ways; one type of underspecification concerns their locus of realization (that is, syntax or morphology).

We have presented evidence for (1a) in the previous chapter. The statement in (1b) is familiar from the literature—it goes back at least to Bloomfield 1933. It should be contrasted with theories in which morphology is part of the lexicon, in the sense that word formation rules take lexical items as their input and deliver a new lexical item. Arguments for a separation of lexicon and morphology have been given by various authors. Allen (1978), for example, argues that word formation proceeds on the basis of *possible* rather than *existing* words. She shows that the input to word formation rules need not be lexical. Di Sciullo and Williams (1987) strengthen the argument by pointing out that the lexicon contains more than the output of word formation rules: it also contains many syntactic objects (idiomatic structures; see also Jackendoff 1997). Finally, in the same way that storage of nonidiomatic phrases is redundant, so is storage of complex words with predictable properties (see also footnote 6). This implies that the output of a word formation rule need not be a lexical item.

The statements in (1c) and (1d) are probably more controversial. We will therefore discuss them in some detail. As mentioned in the introduction to this chapter, a head α and a dependent β can in principle be merged either in syntax or in morphology. In other words, either (2a) or (2b) can be generated. (We use X-bar notation in (2a), but no theoretical claims are intended by this.)

(2)   a.   ✓   αP
                 /\
                α   βP
                     |
                     β

      b.   αP
                  ⋮
                  α
                 /\
                β   α

Our claim is that, in the languages under discussion, merger in syntax is preferred over merger in morphology. In other words, all else being equal, (2a) blocks (2b) (✓ marks the winner in a competition).

As in any theory assuming competition, it must be defined when exactly two structures compete. Competition is restricted to structures in which α and β are merged. However, it is irrelevant whether α and β project prior to merger. Because a head and its (extended) projections share identifying features, such as category, competition does not distinguish between merger of the terminals α and β and merger of α with an (extended) projection of β. In the same vein, α may head a complex category, without this disqualifying the resulting structure as a competitor.

Merger of α and β is not quite enough for competition between syntax and morphology to obtain: the semantic relation between α and β must be identical in the syntactic and morphological structure. (The idea that semantics plays a key role in defining the set of competing structures is familiar from Reinhart 1995, Grimshaw 1997, Fox 2000, and others.) For example, if β is interpreted as α's internal argument in the syntactic structure but as an adjunct in the morphological one, there will be no blocking effect.

These specifications of the statement in (1c) are incorporated into the constraint in (3). We have formulated this constraint as one that in effect minimizes the morphological complexity of elements inserted in syntactic terminals, where the complexity of a morphological object increases with every projection of its head. Clause (i) specifies the formal conditions that must be met for competition to obtain, while clause (ii) contains the semantic condition mentioned above.

(3)   Let α_1 and α_2 be syntactic representations headed by α. α_1 blocks α_2 iff

  (i)   in α_1 (a projection of) α is merged with (a projection of) β in syntax, while in α_2 (a projection of) α is merged with (a projection of) β in morphology, and

  (ii) the semantic relation between α and β is identical in α_1 and α_2.

Note that, as this condition regulates the competition between syntax and morphology, it must have access to representations of both types, and can therefore neither be syntactic nor morphological itself. Rather it must be an overarching constraint of the type hinted at in Chapter 2. Given this, the notion 'head' that the constraint refers to should be read as 'extended head', where an extended head of a syntactic category is the head of the morphological complex inserted in the head position of that category (see Chapter 5).

Given (3), the representation in (2a) will indeed block (2b) as long as the semantic relation between α and β remains constant. As noted, the aim of the

condition is to minimize morphological complexity. Indeed, in (2b) the head of the inserted morphological object projects once, whereas in (2a) there is no morphological projection at all.

The implication of (3) is that morphological merger is only an option when there is no syntactic competitor. We can distinguish three different cases in which this situation obtains. First, morphological merger of α and β may result in a semantics that cannot be expressed by the result of syntactic merger of the two. We will show that this is the general rationale for the existence of root compounds. Second, either α or β may be an affix. Since affixes require morphological merger, there is simply no option of merging the two in syntax. The third possibility is perhaps the most surprising one and requires a little more discussion.

Suppose that a category-changing affix γ selects (a projection of) α as its complement, giving rise to a complex category $[\alpha\ \gamma]$. Suppose, moreover, that a particular semantic relation holds between α and β, as before. Such a relation can in principle be established in two structures. If γ allows inheritance of the relevant features of α, it is possible to merge these elements in morphology, after which the resulting category can merge with a projection of β in syntax (see (4a)). Alternatively, α can merge with β in morphology, giving rise to a complex word to which γ can attach (see (4b)).

(4)   a.

```
            γP
          /    \
         γ      βP
       /  \      |
      α    γ     β
```

b.

```
            γ
          /   \
         α     γ
             /   \
            β     α
```
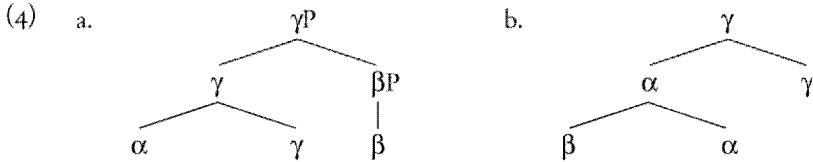
These two structures are not in competition. The reason is that only in (4b) are α and β merged. Since the affix γ is category-changing, β merges with a node labelled γ, rather than α, in (4a). Note that the morphological complexity of the two structures is identical, in that, in the morphological objects, the head γ projects once in both cases.

There is another structure that may seem to be a competitor for (4b). As we will argue in Chapters 4 and 5, syntactic phrases can be sometimes inserted in morphological terminals (compare compounds like *lost luggage department*). Hence, one might expect (4b) to be blocked by the structure in (5), where the affix γ combines with a syntactic projection of α.

(5)

```
            γ
          /   \
        αP     γ
       /  \
      α    βP
            |
            β
```
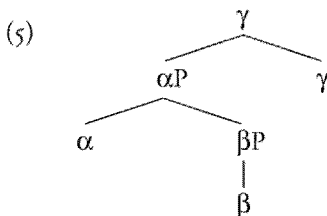
But notice that according to (3), competition only obtains between syntactic structures headed by the same category α. Whereas in (5) there is a syntactic category headed by α (namely αP), this is not the case in (4b): the node that results from merger of α and β occupies a morphological nonhead position and hence it will never be able to project into the syntax. Thus, competition is suspended in morphological nonhead positions, with the consequence that these may in principle contain both complex words and phrases. From the perspective of minimizing morphological complexity, this is not an unexpected result. According to the definition given above, (4b) and (5) are equally complex: the head γ projects once in both cases. The internal complexity of nonheads is irrelevant to the complexity of a morphological object. (We ignore the possibility of embedding phrases in words for now, but return to it towards the end of Chapter 4.)

A surprising conclusion can be drawn from the hypothesis that there is competition between the structures in (2), but not between the structures in (4a), (4b), and (5). There must be cases in which a head and a dependent cannot normally be merged morphologically, but nevertheless show up as a morphological complex when embedded under a category-changing affix. In sections 3.3–3.5 empirical evidence will be discussed that bears out this prediction.

This result crucially depends on the affix γ in (4) being the head of the complex category [α γ]. Suppose γ were a morphological nonhead, with the effect that it is category-neutral.[1] In that case, combining it with α would yield a projection of α. This category may subsequently merge with a projection of β in syntax, as in (6a). Given the constraint in (3), the resulting structure blocks the morphological alternative in (6b), in which α and β form a compound to which γ attaches.

(6) a. ✓   αP   b.   α

                    α   βP   α   γ

               α   γ   β   β   α
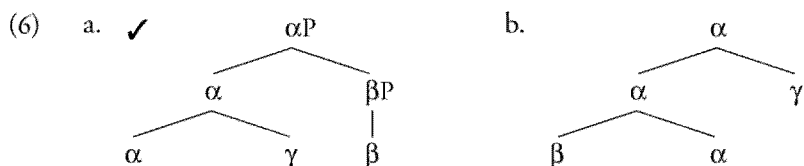
The crucial difference between the structures in (4a) and (6a) is that in (4a) a projection of β merges with γ, while in (6a) it merges with α. Hence, only the latter will enter into competition with other structures involving merger of α and β.

---

[1] Note that the reverse does not hold: a category-neutral affix can be the head of a morphological complex. An example is *-hood* in *parenthood*.

Let us finally turn to the statement in (1d). Recall that the lexicon is a list of syntactic and morphological irregularities, containing affixes, simplex words, and idiomatic expressions. The latter are combinations of simplex words and/or affixes that have some unpredictable property that must be listed, for instance a noncompositional semantics. Idioms can either be phrases (such as *kick the bucket*) or complex words (such as *blackbird*, which does not refer to just any black bird, or *transmission* when referring to a car part).

The existence of complex lexical items (that is, idiomatic expressions) gives rise to the following question: do such items uniformly receive a particular (syntactic or morphological) realization, or may their realization differ in different circumstances? Most theories implicitly assume uniform realization. However, lexical items can be underspecified in various ways. There is no reason, then, why a complex lexical item consisting of a head and a dependent could not be underspecified as to the component in which it is to be realized (see Groos 1989 and Ackerman and LeSourd 1997 for similar ideas).

If a complex lexical item $\alpha^\wedge\beta$ can indeed be underspecified with respect to its locus of merger, its parts may be merged either in syntax or in morphology. This implies that the realization of underspecified complex lexical items will be determined by the type of competition discussed above. The unmarked status of syntactic merger has the effect that α and β will usually combine in syntax. Under specific circumstances, however, it is still possible for α and β to be merged in morphology. We will argue that the idea of uniform realization of complex lexical items leads to a number of linguistic paradoxes that disappear once underspecification with respect to the locus of merger is allowed.

We will now present a first piece of evidence for the existence of competition between syntax and morphology.

3.3 SYNTHETIC COMPOUNDS

3.3.1 Two Possible Analyses

Synthetic compounding is characterized by the following observation by Bloomfield (1933: 232): 'the synthetic feature consists merely in the restriction that a phrase like *eat meat* is paralleled by compounds only when *-er* or *-ing* is at the same time added'. In other words, a verb and its internal argument can only be combined in a compound in the presence of certain affixes. We will argue in this section that this generalization follows from the idea that syntax and morphology are in competition in the sense of (3).

To begin with, it should be noted that the systematic ungrammaticality of N–V compounds in which the noun functions as the verb's internal

argument is unexpected and hence in need of explanation. The point is that, although cases like *to meat-eat* are impossible, N–V compounding as such is widely attested in English. Some examples are given below:

(7) to breast-feed   to hand-make   to baby-sit
     to play-act   to air-condition   to bar-tend
     to window-shop   to c-command   to pressure-clean
     to base-generate   to Chomsky-adjoin   to pan-fry
     to head-adjoin   to head-govern   to carbon-date
     to chain-smoke   to block-bust   to colour-code
     to sky-dive   to head-hunt   to computer-generate

The process is not unproductive, as is sometimes claimed. Indeed, according to Bauer (1983: 208), 'there are plenty of this type of verb being coined in current English'. Nevertheless, cases where the noun is an argument do not seem to occur. An anonymous reviewer mentions potential counterexamples like *to head-hunt*, *to stage-manage*, *to proofread*, *to housekeep*, and *to brainwash*. But in these cases the verb remains transitive: *they stage-managed the demonstration*, *they proofread the manuscript*, *our cottage is housekept by our-selves*, etc. Given that these monotransitive verbs can still take a syntactic internal argument, it is hard to see how the compound-internal noun could function as internal argument as well. If compounds of this type are factored out, few problematic cases remain. We are aware of two: *to bartend* coexists with *to tend bar*, and *to people-watch* coexists with *to watch people*.[2]

The issue, then, is why the interpretation of the noun in an N–V compound cannot be that of an internal argument, while such an interpretation is available in synthetic compounds (see also Shimamura 1986).

If structures are binary-branching, there are two possible analyses of synthetic compounds. The one in (8a) treats synthetic compounds as a special instance of N–N root compounds, the special feature being that the right-hand part is a deverbal noun which inherits the internal θ-role of its base (see Selkirk 1982, Di Sciullo and Williams 1987, and Booij 1988). The

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[2] This pattern is replicated in Dutch (Ackema 1999*b*), Swedish (Josefsson 1998), and most other Germanic languages. Danish has a construction which somewhat resembles N–V compounding with an argumental noun. Arguably, however, the relevant structure is syntactic in nature (see Asudeh and Mikkelsen 2000), comparable to so-called 'composition by jux-taposition' (see Mithun 1984 and Gerdts 1998). As far as we know, there is one case of genuine argumental N–V compounding in Germanic: Frisian has compounds of the relevant type, possibly as a result of a historical accident (see Dijk 1997). On the synchronic analysis of Frisian, we will have to remain silent.

analysis in (8b) treats synthetic compounds as nouns derived from N–V compounds (see Lieber 1983, Fabb 1984, and Sproat 1985*a*).

(8)　　a.　[$_N$ truck [$_N$ drive er]]
　　　　b.　[$_N$ [$_V$ truck drive] er]

The rationale behind the analysis in (8a) is that its ingredients are independently motivated. English freely allows N–N compounding (see (9a)), as well as the generation of simple subject names like *driver*. Such subject names crucially inherit the internal θ-role of the verb (see (9b)), which means that this role can be assigned to the noun with which the *-er* nominal is compounded. As a result, the analysis need not rely on a morphological operation that does not seem to occur independently (see (9c)).

(9)　　a.　[$_N$ city$_N$ centre$_N$]
　　　　b.　[$_{NP}$ [$_N$ drive er] of a truck]
　　　　c.　*to [$_V$ truck drive]

Despite its initial plausibility, the analysis in (8a) faces three serious problems. The first is that idiomatic interpretations that the combination of an internal argument and a verb may receive are often lost under inheritance, as (10a–c′) show ('#' indicates absence of the idiomatic reading). The loss of idiomatic readings under inheritance is not a peculiarity of derivations in *-er*, as shown by (10d) (which is due to an anonymous reviewer).

(10)　　a.　John always makes trouble.
　　　　a′.　#John is a maker of trouble.
　　　　b.　Someone I met wants to blow the whistle.
　　　　b′.　#But then, he is known to be a blower of whistles.
　　　　c.　This game usually breaks the ice at parties.
　　　　c′.　#This game is a great breaker of the ice.
　　　　d.　#The management were very concerned about the blowing of the whistle just before the shareholders' meeting.

In contrast, idiomatic interpretations are systematically available in synthetic compounds (there are some speakers that marginally allow examples like (10a′), but even for them there is a contrast with examples like (11a)):

(11)　　a.　John is a real troublemaker.
　　　　b.　The company didn't know who the whistle-blower was.
　　　　c.　This game is a great icebreaker at Christmas parties.

If synthetic compounding involves inheritance, the contrast between (10a′, b′, c′) and (11) remains unexplained. But if the analysis in (8b) is adopted, the data follow immediately. An idiomatic reading of α^β usually requires merger of (a projection of) β with (a projection of) α. In (11), N and V do indeed merge, as is true of V and a projection of N in (10a, b, c). In the examples in (10a′, b′, c′), however, a projection of N merges not with V but with a derived noun, ruling out the option of an idiomatic interpretation.

The second problem that the analysis in (8a) faces is that the argument against the alternative in (8b) based on the nonexistence of argumental N–V compounds is far from conclusive. This is shown by certain compounds in Dutch. With respect to the data in (7) to (11), Dutch mirrors English perfectly. However, Dutch has the further possibility of productive V–N compounding. As it turns out, N–V sequences in which N is the internal argument of V can be embedded as the left-hand part of a V–N compound. Some examples are given in (12).

(12)   a.   [$_N$ [$_V$ appel pluk] machine]
             apple pick   machine
             'machine for picking apples'

       b.   [$_N$ [$_V$ hout snij] kunst]
             wood cut   art
             'woodcutting'

       c.   [$_N$ [$_V$ aardappel schil] mesje]
             potato   peel   knife
             'potato peeler'

In this case, the alternative right-branching structure is a nonstarter. As discussed in the previous chapter, compounds do not allow inheritance of arguments of their nonheads:

(13)   a.   *[$_{NP}$ [$_N$ pluk machine] van appels]
             pick machine of   apples

       b.   *[$_{NP}$ [$_N$ snij kunst] van hout]
             cut art   of   wood

       c.   *[$_{NP}$ [$_N$ schil mesje] van aardappels]
             peel knife   of   potatoes

Hence, an analysis of compounds like *appel pluk machine* in terms of N–N compounding plus inheritance fails. The structures in (14) are ruled out on a par with (13).

(14)   a.   *[$_N$ appel [$_N$ pluk machine]]
            apple   pick machine

       b.   *[$_N$ hout [$_N$ snij kunst]]
            wood   cut art

       c.   *[$_N$ aardappel [$_N$ schil mesje]]
            potato   peel knife

Nevertheless, as in English, argumental N–V compounds cannot surface on their own in Dutch:

(15)   a.   *De boerenknecht [$_V$ appel plukt] de hele   dag.
            the farmhand   apple picks the entire day
            'The farmhand picks apples all day long.'

       b.   *Deze ambachtsman [$_V$ hout snijdt] heel wat   af.
            this artisan   wood cuts   quite a lot Prt
            'This artisan does quite a lot of wood cutting.'

       c.   *De dienstplichtige soldaten [aardappel schilden] alsof hun
            the drafted   soldiers potato   peeled   as-if their
            leven ervan   afhing.
            life   there-on depended
            'The conscripts were peeling potatoes as if their lives depended on it.'

We conclude that N–V compounds that do not occur independently are licensed by a further morphological process of compounding (see section 3.6 for further discussion). There is no reason to assume, then, that the same is not possible when a further morphological process of derivation takes place.[3]

   The final problem for the analysis in (8a) is that it offers no insight into the question why *driver of trucks* and *truck driver* coexist, whereas *to drive trucks* and *to truck-drive* do not. If there are N–V compounds in English, why should the noun not receive an argumental interpretation? A possible answer would be to deny the existence of N–V compounding altogether. This would seem to amount to simply denying the data, given examples as in (7).

---

[3] In English, there do not seem to be compounds like those in (12): *apple pick machine* is bad. Instead,we find examples like *apple picking machine*. However, it is a general property of English V–N compounds that they often require an *-ing* form of the verb, also when the verb is not a compound: *operate system*, *think cap*, *build block*, *live room*. There are V–N compounds with bare verbs, such as *swearword* and *rattlesnake*, but our impression is that this is less productive than compounding mediated by *-ing*.

However, following Marchand (1969), various authors have assigned such examples the special status of 'back formations'. In other words, N–V compounds are licensed by the prior existence of a more complex structure. For example, *to baby-sit* would be derived from *babysitter*.

It seems to us that, for back formation to make sense, it must involve the reanalysis of a compound structure as in (16a) to a structure as in (16b), after which the N–V compound in (16c) can be used. But this process presupposes the possibility of N–V compounding.

(16)   a. $[_{\text{N}}$ baby $[_{\text{N}}$ sit er$]] \rightarrow$
          b. $[_{\text{N}}$ $[_{\text{V}}$ baby sit$]$ er$] \rightarrow$
          c. to $[_{\text{V}}$ baby sit$]$

It is hard to maintain that N–V compounds derived by back formation have a different grammatical status than other compounds. Consider first language acquisition. A child learning English does not know how *to baby-sit* was coined. It simply finds a structure in the input which is best analysed as an N–V compound. The word does not come with the warning that it is a back formation.

Most importantly, however, an account in terms of back formation begs the question why the noun in N–V compounds cannot be interpreted as an argument of the verb. There is no reason why back formation from argumental synthetic compounds like *truck driver* should be impossible:

(17)   a. $[_{\text{N}}$ truck $[_{\text{N}}$ drive er$]] \rightarrow$
          b. $[_{\text{N}}$ $[_{\text{V}}$ truck drive$]$ er$] \rightarrow$
          c. *to $[_{\text{V}}$ truck drive$]$

3.3.2 Competition and Synthetic Compounding

The conclusion we draw from the discussion in section 3.3.1 is that N–V compounding is allowed in English (and various other languages), but not if the noun is interpreted as the internal argument of the verb. The exception to this rule is when the N–V compound is embedded under particular derivational affixes. The notion of competition introduced in section 3.2 accounts for this unexpected situation, as we will now argue.

Suppose that the verb *drive* is to be combined with an internal argument (headed by) *truck*. The grammar has two generative systems available to do so. It can either produce the syntactic structure in (18a) or the morphological one in (18b). (In (18a), the precise structure of *truck*'s extended projection is immaterial; we use a bare plural for convenience only.)

(18)   a. ✓   VP   b.   V
              ╱╲   ╱╲
           V   NP   N   V
           | | | |
         drive   N   truck   drive
                   |
                 trucks
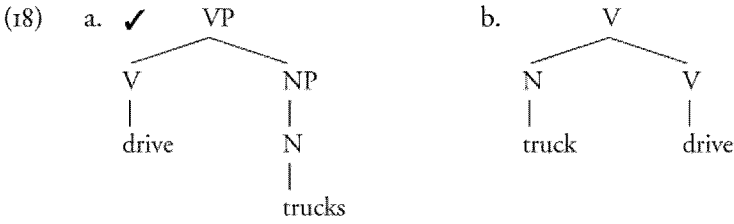
The semantic relation between V and N is the same in both cases: *truck* is the internal argument of *drive*. Therefore, competition applies and, by (3), morphological merger as in (18b) is blocked by syntactic merger as in (18a).

If the semantic relation between noun and verb in a compound cannot be expressed through syntactic merger of projections of these categories, there will be no blocking effect. Indeed, a syntactic combination of V and NP cannot encode the meaning of existing N–V compounds, such as those in (7). More material must be present. To give an example, *to code colours* does not mean the same as *to colour-code*. The meaning of the latter can only be approached in syntax by adding a preposition, as in *to code with colours*. However, *to colour-code* and *to code with colours* are not in competition. Competition only arises if (extended projections of) the same categories merge in syntax and morphology, while in (19a) and (19b) projections of different categories merge (see section 3.6 for further discussion).

(19)   a.   VP   b.   V
               ╱╲   ╱╲
            V   PP   N   V
            | ╱╲ | |
          code   P   NP   colour   code
                  | |
                with   N
                           |
                        colours
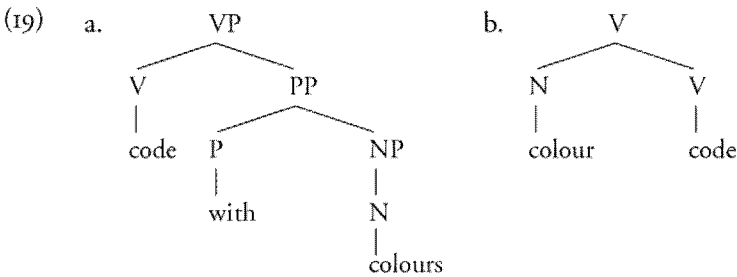
Consider now the situation in which the combination of *drive* and *truck* is embedded under an affix like *-er*. As we have argued in section 3.2, competition is suspended in morphological nonhead positions: these may in principle contain both complex words and complex phrases. Hence, *drive* and *truck* may form a compound in the structure at hand, as in (20b). A potential competitor for this structure is one in which *-er* combines with *drive*, after which the resulting noun takes an *of*-phrase that receives the internal θ-role inherited from the verb. This structure is given in (20a).

(20) a.
```
                NP                          b.              N
        ┌───────┴───────┐                          ┌────────┴────────┐
        N              FP_N                         V                 N
    ┌───┴───┐       ┌───┴───┐                   ┌───┴───┐             │
    V       N       F       NP                  N       V            er
    │       │       │       │                   │       │
  drive    er      of     trucks              truck   drive
```
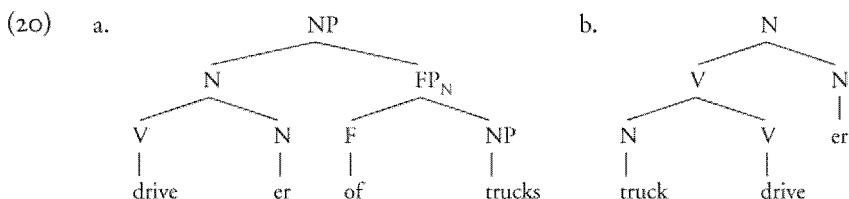
At first sight one might think that the presence of the preposition *of* in (20a) is sufficient to prevent competition, on a par with (19). However, as is well known, a PP headed by *of* has a status different from PPs headed by semantically contentful prepositions (see Chomsky 1981, Emonds 1985), and *of* is hence best analysed as a functional head (see Neeleman 1997). If the PP in (20a) is indeed an extended projection of the noun, the presence of the preposition does not affect competition.

Nevertheless, (20a) and (20b) do not compete. Only in (20b) does *truck* merge with the verb *drive*. In (20a), *truck*'s extended projection does not merge with the verb, but rather with a derived noun. The trees parallel those in (4a) and (4b), respectively. The theory thus predicts that, because they fail to compete, synthetic compounds like *truck driver* can coexist with complex NPs like *driver of trucks*.

In conclusion, affixes that head the word they derive have the effect of preventing competition. As explained in section 3.2, affixes that do not function as morphological heads, at least with respect to category and other identifying features, are different in this respect. The structures in (6) are in competition, because (projections of) the same categories merge. We therefore expect that inflectional affixes will not license morphological merger of *drive* and *truck*. Indeed, argumental N–V compounds are impossible even when inflected:

(21)   *Mary truck-drives all day long.

The structure of the putative verb in (21) is given in (22b). The competing structure in (22a) is one in which the inflectional suffix is attached to *drive*, followed by syntactic merger with an extended projection of *truck*. Since in the two structures (projections of) the same categories merge, the structures are in competition and the syntactic variant blocks its morphological counterpart.

(22) a. ✔
```
                VP                          b.                   V
        ┌───────┴───────┐                          ┌────────────┴────────┐
        V              NP                           V                     I
    ┌───┴───┐          │                        ┌───┴───┐                 │
    V       I          N                        N       V                 s
    │       │          │                        │       │
  drive     s        trucks                    truck   drive
```
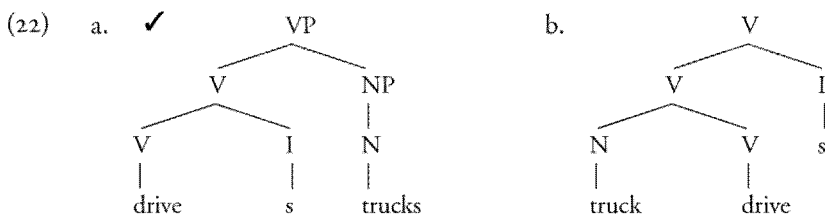
The same should hold for other nonhead affixes. A good example is the prefix *re-*, which does not license synthetic compounding: (23a) blocks (23b).

(23)   a.   Mary re-paints the wall every year.
        b.   *Mary re-wall-paints every year.

A similar explanation can be given for equivalent data from other languages. In Dutch, both compounds and VPs are right-headed. Nevertheless, it can be shown that whenever the noun in an N–V combination is interpreted as the internal argument of the verb, the two have been combined in syntax. N–V combinations such as *koffie-drinken* 'to coffee-drink' may behave as complex verbal heads, but they are, without exception, separable through head movement of the verb (cf. *Jan dronk gisteren koffie* 'John drank yesterday coffee' versus **Jan koffie-dronk gisteren* 'John coffee-drank yesterday'). N–V combinations that parallel the English cases in (7), on the other hand, behave as indivisible units (cf. **Jan adjungeert zijn topics altijd Chomsky* 'John adjoins his topics always Chomsky' versus *Jan Chomsky-adjungeert zijn topics altijd* 'John Chomsky-adjoins his topics always'). (For more data see Ackema 1999*b*, where this generalization is derived from different assumptions.)

Our analysis extends to denominal synthetic compounds. We will again use Dutch to illustrate this. Dutch has a productive process of A–N and Q–N compounding. Some examples are given in (24).

(24)   a.   zoet-hout   b.   acht-baan
             sweet-wood   *eight-track*
             'liquorice'   'roller coaster'
             speciaal-zaak   drie-klank
             special-shop   *three tone*
             'specialist shop'   'tierce'
             zwart-boek   tien-kamp
             black-book   *ten-fight*
             'black book'   'decathlon'
             bruin-vis   zeven-sprong
             brown-fish   *seven-sprout*
             'porpoise'   'seven-forked road'

None of these cases has the same compositional semantics as the syntactic combination of a noun and a prenominal AP or QP. A *zwartboek*, for example, cannot mean 'a black book', nor can *achtbaan* mean 'eight tracks'. So, like argumental N–V compounds, A–N and Q–N compounds with a transparent meaning do not occur independently (compare Booij 2002). They are blocked

by their syntactic counterparts. However, they can be embedded under an affix that heads the word it derives. Examples are given in (25).

(25) a. lang-haar-ig   b. drie-wiel-er
          long-hair-y   *three-wheel-er*
          'with long hair'   'tricycle'
          donker-huid-ig   twee-mast-er
          dark-skin-y   *two-mast-er*
          'with dark skin'   'two-master' (a kind of ship)
          dik-buik-ig   vijf-week-elijks
          fat-belly-y   *five-week-ly*
          'pot-bellied'   'five-weekly'
          blauw-oog-ig   twaalf-pond-er
          blue-eye-y   *twelve-pound-er*
          'blue-eyed'   'bullet of twelve pounds'

The affix selects for a morphological object, so in this case A and N are combined in a compound. This is allowed since there is no syntactic alternative in which the same categories are merged. That we are really dealing with embedded compounds is clear from the absence of inflectional elements on A and/or N. These would be obligatory in the corresponding syntactic phrase. For example, the declensional schwa in *een dikke buik* 'a fat-DECL belly' is absent in *dik-buik-ig*. Similarly, the obligatory plural ending of the noun when it follows a numeral (other than *one*) in syntax is absent in the cases in (25b). Furthermore, in the cases in which the suffix is not stress-attracting, the stress pattern shows that a compound is embedded, not a phrase. Thus, in *drie-wiel-er* stress falls on *drie*, rather than *wiel*; nominal compounds have leftmost stress, while phrases have stress on the right (as in *drie wielen* 'three wheels').

The nominal cases further parallel the verbal ones in that affixes which do not head the word they derive do not license semantically transparent A–N compounding. Plural inflection, for example, cannot give rise to forms like (26a). These are blocked again by their syntactic counterparts, such as the one in (26b).

(26) a. *Zij heeft mooie   bláuwogen.
          she has beautiful blue-eye-s
      b. Zij heeft mooie   blauwe   ógen.
          she has beautiful blue-DECL eye-s

To summarize, when projections of the same categories merge, syntactic merger blocks morphological merger. Morphological merger is allowed when there is no syntactic competitor. As a result, affixation can have the effect of licensing morphological structures that do not occur in isolation.
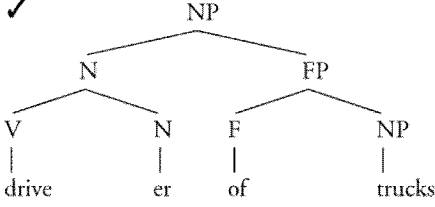
3.3.3 An Apparent Paradox
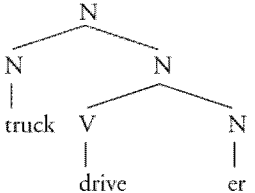
Analyses that assign synthetic compounds a left-branching structure face a particular challenge to do with inheritance. Lieber (1983) argues that there is no cross-categorial inheritance of argument structure, and hence *truck driver* must have the representation in (8b), repeated here as (27b). The representation in (27a) is ruled out, on the relevant reading, since it would require such inheritance. But if *-er* does not allow inheritance, (27c) should be ungrammatical as well, as pointed out by Botha (1981), amongst others.

(27)   a.   [$_N$ truck [$_N$ drive er]]
       b.   [$_N$ [$_V$ truck drive] er]
       c.   [$_{NP}$ [$_N$ drive er] of trucks]

If deverbal nouns in *-er* do inherit the internal θ-role of their base, as Sproat (1985) suggests, the opposite problem arises. Although (27c) is ruled in, it seems no longer possible to exclude the representation in (27a). That is to say, the analysis is forced to admit as one possible structure for synthetic compounds the one it aims to reject. As far as we are aware, the literature does not offer a solution for this puzzle.

   This is exactly the type of problem that morphosyntactic competition is intended to address. As argued above, (27c) is not in competition with (27b) because (projections of) different categories merge. But (27c) does compete with (27a), as will be clear from the more detailed representations in (28). In both (28a) and (28b) (an extended projection of) *truck* merges with the derived noun *driver*. In accordance with (3), the syntactic merger in (28a) blocks the morphological merger in (28b).

(28)   a.   ✔

```
                          NP
              _____
             N                        FP
          _____              _____
         V        N            F            NP
         |        |            |            |
       drive      er           of         trucks
```

       b.

```
                N
          _____
         N             N
         |         _____
       truck      V         N
                  |         |
                drive       er
```

So, our theory does not only allow structures like (27b) for synthetic com-
pounds, but also rules out the alternative in (27a) on principled grounds. (In
section 3.6, we will argue that the structure in (28b) exists if the semantic
relation between *truck* and *driver* is noncompositional.)

The above line of argumentation also provides some insight into the data
in (29). As Williams (2003) points out, a synthetic compound can contain both
a goal and a theme argument, but their order is fixed. Some speakers find (29a)
marginal on a goal reading of *army* (someone specialized in supplying guns to
the army), but even for those speakers there is a sharp contrast with (29b).

(29)   a.   ?army gun supplier
        b.   *gun army supplier

The ungrammaticality of (29b) can be seen as a consequence of competition,
once we adopt a well-known condition on morphological selection, namely
that selector and selectee must be sisters (multiple or nonlocal selection in the
projection of a single head is impossible). This restriction makes it impossible
for both arguments of *supply* to be contained in the verbal compound
selected by *-er*, as in (30a). Rather, one argument must be inherited by the
derived noun and subsequently realized in an N–N compound. This gives
rise to the two representations in (30b) and (30c).

(30)   a.   *[$_N$ [$_V$ army [$_V$ gun supply]] er]
        b.   ?[$_N$ army [$_N$ [$_V$ gun supply] er]]
        c.   *[$_N$ gun [$_N$ [$_V$ army supply] er]]

Indeed, both the goal and the theme argument can at least marginally be
inherited by the relevant derived nouns, as shown in (31). However, when the
goal is inherited, it is realized in a PP headed by the lexical preposition *to*,
while an inherited theme will be licensed by the functional preposition *of*.
This implies that the structures in (30b) and (31a) are not in competition:
they involve merger of (extended projections of) different categories. There
is competition between (30c) and (31b), however, with the effect that the
compound structure is blocked by its syntactic counterpart.

(31)   a.   ?[[$_N$ [$_V$ gun supply] er] [$_{PP}$ to the army]]
        b.   ?[[$_N$ [$_V$ army supply] er] [$_{FP}$ of guns]]

This line of argumentation extends to pairs like ?*night gun supplier* (someone
specialized in supplying guns at night) and *gun night supplier*, the latter of
which is blocked by ?*night supplier of guns*. Since such pairs involve an
argument and an adjunct, rather than two arguments, they show that an

alternative account of the data in (29) based on a thematic hierarchy (as proposed in Williams 2003 for instance) is insufficiently general. The analysis also has consequences for the interpretation of root compounds, something to be addressed in section 3.6.

To sum up, analyses that assign synthetic compounds a left-branching structure face an apparent paradox that dissolves if morphosyntactic competition is assumed. The solution provided by such competition receives some empirical confirmation from synthetic compounds containing multiple internal arguments, or an argument and an adjunct.

3.4 PARTICLE VERBS

3.4.1 Uniform Realization

Dutch particle verbs give rise to a paradox that is reflected by the term used for them in the traditional literature, namely 'separable compounds'. On the one hand, particle verbs must be classified as morphological constructs. The main argument for this in the literature is that they appear productively as hosts for derivational affixes. Some examples are given in (32).[4]

(32)   a.   opmerkelijk   b.   toelaatbaar
            up-notice-able   *to-let-able*
            'remarkable'   'admissible'

       c.   tussenvoegsel   d.   schoonmaker
            between-join-SEL   *clean-make-er*
            'parenthetical'   'cleaner'

On the other hand, the verb and the particle, in contrast to verbal compounds, can be separated by the syntactic rule of verb second, suggesting that they are generated in syntax. We demonstrate this for the particle–verb combination in (32a):

(33)   De   onderzoeker merkte dit   feit   niet [op t].
       the   researcher   noticed this fact   not   up
       'The researcher did not notice this fact.'

---

[4] In Chapters 4 and 5 we will discuss the circumstances under which syntactic objects can be inserted in morphological representations. The theory would in principle allow embedding of head-final syntactic constituents in derived words. It is unlikely, however, that we are dealing with embedded VPs in cases like (32) since the particle verb cannot be accompanied by other material indicating the presence of a VP. For example, no adverbs can be inserted (compare *dit is een hier tussenvoegsel* 'this is a here-between-join-SEL' (this is something that can be inserted here)).

We will argue that this paradox arises as a consequence of the assumption that lexical items must be realized uniformly, either in syntax or in morphology. Once this assumption is abandoned, the problem disappears. Before discussing why this is so, we will first consider why analyses assuming uniform syntactic or uniform morphological realization of particle verbs fail.[5]

Consider first the difficulties that arise when particle verbs are taken to be uniformly generated in syntax. Such analyses assume that the verb and the particle are inserted as separate heads. The verb heads a VP and the particle is usually taken to head a small clause complement (see, for example, den Dikken 1995):

(34)   dat   Jan [[$_{SC}$ boeken uit] geeft]
        that John   books   out gives
        'that John publishes books'

Although the verb and the particle originate in different positions, they can be combined into a complex verbal head by a process of head-to-head adjunction (see also Chapter 2):

(35)   dat Jan [[$_{SC}$ boeken t$_{Prt}$] [uit geeft]]
        that John   books   out gives

Since the complex head is created in syntax, it seems reasonable to assume that its internal structure is accessible to syntactic rules like verb second, and hence that excorporation of the verb is allowed:

(36)   Jan geeft [[$_{SC}$ boeken t$_{Prt}$] [$_V$ uit t$_V$]].
        John gives   books   out

To account for the data in (32), one could argue that further processes of word formation can take place in syntax after the particle incorporates into the verb. The verb-particle complex could, for instance, move to the affix -*er*,

---

[5] There is, in fact, a third type of uniform analysis, according to which particle verbs are in between syntax and morphology. In terms of X-bar theory, they are neither X°s nor X's, but belong to a level in between these two (see Booij 1990 and Model 1991; comparable ideas can be found in Sadler and Arnold 1994, Abeillé and Goddard 2000, Kageyama 2001, and Toivonen 2001). Proposals along these lines, while interesting, go against one of the core assumptions underlying our approach, namely that morphology and syntax are distinct generative systems. We would not want to assume a third generative system specifically for particle verbs (and comparable structures) unless there is no other way to account for the data.

giving rise to the noun *uitgever* 'publisher':

(37)   [$_{NP}$ [$_N$ [$_V$ uit geef] er] [$_{VP}$ [$_{SC}$ ... t$_{Prt}$] t$_V$]]
        out   give er

This analysis gives rise to various problems. For a start, many particle verbs
are unergative, not transitive. Yet, these verbs show the same behaviour with
respect to verb second and further word formation as other particle verbs. An
example is *samen-werken* 'together-work' (cooperate), in which *samen*
'together' behaves like a particle in all respects:

(38)   a.   dat Jan en   Piet samenwerken
             that John and Pete together-work
             'that John and Pete cooperate'

        b.   Jan en   Piet werken samen.
             John and Pete work   together

        c.   samenwerking
             together-work-ing
             'cooperation'

If particles head a small clause complement, this small clause should have a
subject, and hence particle verbs should always be transitive or unaccusative.
Since no independent source position for particles like *samen* can be motiv-
ated, the most straightforward analysis would be to say that they are base-
generated as adjuncts to the verb. But if that is the case, and if they behave
just like other particles, there is no reason to assume an underlying small
clause in examples like (34) either. (See Neeleman and Weerman 1993 for
further argumentation to this effect.)

More relevant here, however, are difficulties to do with the solution which
has been proposed for the paradox posed by particle verbs. As already argued in
the previous chapter, the theory that word formation is a syntactic process of
head-to-head movement faces the problem that evidence for the required
underlying structures is absent. Since the suggested analysis of *uitgever* depends
on this theory, it inherits its problems. In particular, it incorrectly predicts that
material that can (or must) be present in VPs containing a particle, can (or
must) also be present in related derivational structures. However, derivations
as in (39b) are systematically ruled out, even though structures like (39a) exist.

(39)   a.   dat Jan [$_{VP}$ al   jaren [$_{VP}$ [$_{SC}$ prachtige boeken t$_{Prt}$]
             that John   for years   beautiful   books
             [$_V$ uit geeft]]]
             out   gives
             'that John has been publishing beautiful books for years'

b. *Jan is een [$_{NP}$ [$_N$ [$_V$ uit geef] er] [$_{VP}$ al jaren [$_{VP}$ [$_{SC}$
   John is a   out give er   for years
   prachtige boeken t$_{Prt}$] t$_V$]]].
   beautiful books
   'For years John has been a publisher of beautiful books.'

It seems, then, that if a particle and a verb jointly appear within a larger word, they form a unit generated in morphology and not in syntax. Consequently, the only way in which the 'uniform realization' hypothesis can be maintained is by assuming that particle verbs are always realized in morphology, as verbal compounds. The fact that they can be separated by verb second then indicates that the principle of lexical integrity must be abandoned with respect to movement.

Although there are ways of making words transparent for excorporation of the head (see Neeleman and Weerman 1993 and Ackema 1999*a*), this is not sufficient. There are cases in which the particle (the nonhead) is fronted (see Hoeksema 1991). In general, particles cannot be moved to Spec-CP, presumably because their idiomatic status makes it impossible to focus them. Hoeksema observes, however, that if a particle can be contrasted with another particle, it can be fronted. An example is given in (40).

(40) Angola voert veel goederen in; uit voert het alleen koffie t$_{Prt}$.
      Angola moves many goods   in; out moves it only   coffee
      'Angola imports many goods; it only exports coffee.'

In contrast, extraction out of clearly morphological objects, and certainly extraction of nonheads, is disallowed (see Chapters 2 and 4). In other words, if the particle verb in (40) were a morphological unit, it would be unique in this respect.

The exceptional status particle verbs must have under a uniform morphological analysis can be demonstrated in another way. As discussed in the previous chapter, there are two types of complex heads: morphological and syntactic ones. Particle-verbs in isolation behave like syntactic complex heads. This is shown by their behaviour with respect to the complexity constraint. Recall that this constraint rules out complex predicates that have a syntactically complex head. There is strong evidence that Dutch has a syntactic process of complex predicate formation by which resultative expressions are base-adjoined to the verb (see Neeleman and Weerman 1993). This process is blocked when the verb has already merged with a resultative (as shown in (41a)), but also when a particle is present: (41b) is ungrammatical (irrespective of the order of particle and resultative).

(41)　　a.　*dat Jan de aardappelen [stuk　　[gaar kookt]]
　　　　　　that John the potatoes　　　to-pieces done boils
　　　　　　'that John overcooks the potatoes'

　　　　b.　*dat Jan en Piet zich　　　[kapot　[samen werken]]
　　　　　　that John and Pete themselves to-pieces together- work
　　　　　　'that John and Pete cooperate themselves to death'

The complexity constraint also correctly rules out verbs taking two particles:

(42)　　a.　dat Jan en Piet [samen werken]
　　　　　　that John and Pete together- work

　　　　b.　dat Jan en Piet het voorstel [uit werken]
　　　　　　that John and Pete the proposal out- work
　　　　　　'that John and Pete develop the proposal'

　　　　c.　*dat Jan en Piet het voorstel [uit [samen werken]]
　　　　　　that John and Pete the proposal out- together- work

Recall, furthermore, that morphological complexity is not relevant for the complexity constraint. Thus, morphologically complex verbs, such as compounds and derivations, can head a syntactic complex predicate:

(43)　　a.　dat Jan zich　　[suf　[stijl danst]]
　　　　　　that John himself drowsy style dances

　　　　b.　dat Jan de foto's　[uit [ver groot]]
　　　　　　that John the pictures out en　larges
　　　　　　'that John completely enlarges the pictures'

　　　　c.　dat Jan het gedicht [stuk　[analyse eert]]
　　　　　　that John the poem　to-pieces analysis izes

An obvious account of these data would be to say that the complexity constraint holds without exception, but that the internal structure of words is not visible to syntactic conditions. This, however, leads to the conclusion that particle verbs are not words, at least not when they occur in isolation (that is, without an affix), as their internal structure must be visible in order to account for the data in (41) and (42). Such a conclusion is at odds with the claim that particle verbs are uniformly generated in morphology. If this claim is maintained, then, the complexity constraint must be amended.

　　We conclude that analyses based on uniform realization of particle verbs, either in syntax or morphology, fail to satisfactorily account for the data. Therefore, the assumption of uniform realization must be abandoned (see

Groos 1989 and Ackerman and LeSourd 1997 for related discussion). Let us therefore consider how an analysis of particle verbs based on the model sketched in section 3.2 fares when confronted with the above data.

3.4.2 Nonuniform Realization

Given the assumption that the locus of merger is not listed for particle verbs, verb and particle can in principle be combined either in syntax, as in (44a), or in morphology, as in (44b). Hence they are subject to the type of competition discussed in section 3.2. (The syntactic and morphological structures are almost identical in this case, but they will have different properties due to the generalizations that characterize syntax and morphology.)

(44)   a. ✔   V   b.   V
              ╱ ╲   ╱ ╲
          PrtP   V   Prt   V
            │
          Prt
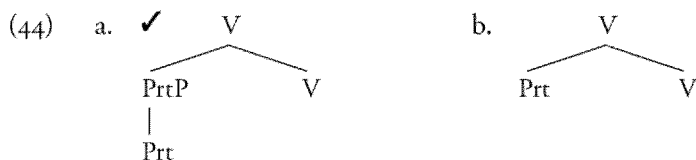
Given that (3) favours syntactic realization, (44a) will block (44b). The result is that the particle and the verb form a complex predicate of the type required independently for resultative constructions. Of course, structures generated in syntax are accessible to syntactic operations, and therefore the particle and the verb can be separated by verb second, as in (33), and by topicalization of the particle, as in (40). Moreover, the syntactic status of underived particle verbs explains why they are subject to the complexity constraint. Note that (44b) cannot exist next to (44a). If syntactic realization did not block morphological realization, the morphological alternant should freely head complex predicates, thus circumventing violations of the complexity constraint. That would leave (41b) and (42c) unexplained.

If a derivational affix takes the verb-particle combination as its complement, this combination can be a morphological object, as there is no competition with a syntactic alternant. Verb and particle can therefore form a compound, as in (45), which gives the structure of *uitgever* 'out-giver-er' (publisher).

(45)   N
                      ╱   ╲
                  V   N
               ╱ ╲   │
           Prt   V   er
            │   │
           uit   geef
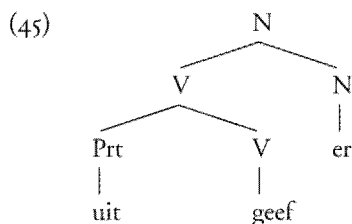
Apart from the considerations in footnote 4, it is difficult to show conclusively that morphologically embedded particle–verb combinations in Dutch are compounds rather than syntactic complex predicates. Both compounds and verbal phrases are head-final in this language. However, striking evidence for the morphological nature of derived particle verbs, and for the syntactic nature of underived ones, comes from Swedish. This language is like Dutch in that its morphology is generally right-headed (see Josefsson 1998 and references cited there), but differs from Dutch in that syntactic dependents of the verb typically follow it.

Hence, the position of the particle with respect to the verb indicates whether verb and particle are merged in syntax or morphology. As expected, if a particle verb appears in isolation, the particle follows the verb. This is shown by examples like (46) (from Gunlög Josefsson, personal communication, and Holmes and Hinchliffe 1994; see section 3.6 for further discussion).

(46)   stiga upp   'rise'
        transportera bort   'transport away'
        trubba av   'blunt'
        hyra ut   'hire out'
        gå vilse   'get lost'

However, if the particle verb is selected as host by an affix and hence occurs within a larger word, the order between particle and verb is reversed:

(47)   upstigning   'ascent' (of an aeroplane)
        borttransportering   'sending away'
        avtrubbning   'blunting'
        uthyrare   'landlord'
        vilsegången   'lost'

This shows that particle verbs are realized morphologically when selected by an affix.

Our analysis of derived particle verbs thus parallels our proposal for synthetic compounding. We can complete the parallel, if we can show that, as with verb–argument combinations, affixes that do not head the word they derive do not license morphological realization of verb–particle combinations. Recall that, with such affixes, there is competition between a structure in which the affix attaches to a verbal compound and a structure in which the affix attaches to the verb, followed by syntactic merger. This is because, if the affix is a nonhead, (projections of) the same lexical items merge. In the case of particle verbs, the competing structures are given in (48a) and (48b),

respectively (using an inflectional affix as the nonhead in question). It is predicted, then, that (48a) will block (48b).

(48) a. ✓   V   b.   V
          ╱ ╲   ╱ ╲
       PrtP   V   V   I
        │   ╱ ╲   ╱ ╲
       Prt   V   I   Prt   V
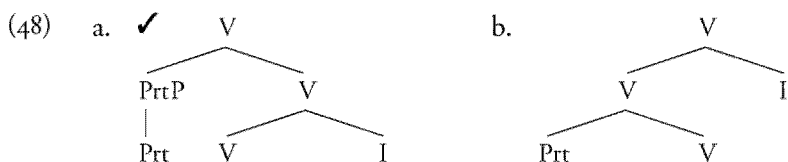
It can be shown that (48b) indeed does not occur. If inflection would license verbal compounding on a par with derivational affixes like *-er*, particle verbs could be moved as a unit under verb second. However, separation is obligatory:

(49)   *De onderzoeker [op merkte] dit feit niet t.
         the researcher   up noticed this fact not
        'The researcher did not notice this fact.'

In the same vein, the structure in (48b) would allow particle verbs to head complex predicates. As noted above, this is impossible.

In the next section we will strengthen the argument for competition, using clearly syntactic idioms which, in the presence of a derivational affix, are nevertheless realized morphologically.

3.5 VERBAL IDIOMS

If the analysis in the previous section is correct, complex lexical items consisting of a verb and a particle must be underspecified with respect to their locus of realization. This does not mean that all complex lexical items must be underspecified in this way—there are exclusively syntactic idioms and exclusively morphological ones. However, underspecification is crucial if there is to be competition between syntax and morphology. We will therefore start this section by considering underspecification (or the lack thereof) in more detail. Then we will illustrate its consequences for verbal idioms.

Research into the form of lexical entries is guided by the assumption that lexical storage should be kept to a minimum. As a research strategy, it is assumed that knowledge that can be represented by rule should not be duplicated by lexical stipulations. Attempts have been made, for example, to avoid listing categorial selectional properties by deriving them from semantic selectional properties where possible (see Grimshaw 1981 and Pesetsky 1982).

It follows from this research strategy that only idioms, simplex words and affixes will be taken to be listed.[6] Words like *re-attach*, which have a completely transparent semantics, will not be in the lexicon as such (although *re-* and *attach* must of course be listed). On the same grounds there is no need to store the phrase *attach (something) again*.

A more interesting consequence of the strategy of lexicon minimization concerns the information stored in a lexical entry. It is well known that the structural properties of at least some complex lexical items (that is, idioms) can be predicted on the basis of the pertinent grammar. The position of the verb in *pull someone's leg*, for example, is a consequence of the VO character of English. Similarly, the linear order in *beef-eater* follows the right-hand head rule of English morphology. This suggests that, as long as an idiom adheres to syntactic or morphological well-formedness conditions, its internal structure need not be specified in the lexicon.

The minimum that each complex lexical item must contain is a specification of the grammatical relation between its parts. This hypothesis goes back to work on verbal idioms by Bresnan (1982) and Coopmans and Everaert (1988). In the examples at hand, the crucial relation is one of internal θ-role assignment. In *beef-eater* the internal θ-role of *eat* is assigned to *beef*. Similarly, the DP headed by *leg* receives the internal θ-role of *pull* in *pull someone's leg*. So, the representation of the relevant lexical items is roughly as in (50), where the brackets indicate junctures unspecified for type (syntactic or morphological) or ordering (head-first or head-last).[7]

(50) a. ⟨⟨eat beef$_i$⟩ er⟩
          (R, THEME$_i$); semantics: member-of-the-Royal-Guard (R)

      b. ⟨pull leg$_i$⟩
          (AGENT, THEME$_i$); semantics: tease (AGENT)

---

[6] This is orthogonal to the conclusion drawn by Baayen *et al.* (2002) and others that frequently used rule-governed complex words are stored in order to minimize computational load. (The same may be true of frequently used phrases, cf. Jackendoff 1997.) Although such forms may be stored with their (regular) semantics, this does not imply that they are stored with a complex structure. For all intents and purposes, such words function as simplexes. This is corroborated by the fact that frequently used compounds sometimes receive noncompound stress. Thus, inhabitants of Utrecht speak of the *domplèin* 'dom-square' (the name of the square next to the Dom tower in Utrecht), while strangers will ask for the *dómplein*, with stress on the left-hand part, as in compounds.

[7] The representation in (50b) does not yet express that in *Mary pulled John's leg* John is interpreted as the object of teasing. Various idioms show that a possessor of the idiom's theme argument can be interpreted as the internal argument of the idiomatic predicate, 'tease' in the case at hand. (Compare also *John broke Mary's heart*, *The cat got Bill's tongue*, etc.) A rule to this effect may be added to the lexical entries of the individual idioms, or perhaps a general interpretive rule can be formulated. For what follows, this is immaterial.

As will be clear, the complex lexical items in (50) must contain an instruction concerning their interpretation. Similarly, it must be determined whether they are to be realized in syntax or morphology, an issue to which we will turn shortly. Once this is arranged, however, their internal structures need not be given. These follow from the principles that govern the realization of head–argument combinations in morphology and syntax.

The simplest way of determining the locus of realization of a complex lexical item is by specifying it, using a diacritic 's' for syntactic and 'm' for morphological realization. Simple as this may be, it is not always the most economical solution. If one of the two ways of realizing a complex lexical item is unmarked with respect to the other, only the marked option needs to be accompanied by a diacritic. Idioms that lack the relevant diacritic could in principle be realized either syntactically or morphologically. Confronted with this choice, however, the system will opt for the default realization. Thus, the amount of information stored in the lexicon can be further reduced.

This strategy ties in naturally with our claim that syntactic merger blocks morphological merger where both can apply. If so, only morphological idioms need to be marked as such. For example, the lexical entry for *beefeater* must mention all three morphemes of which it consists, since the thematic relation between *beef* and *eat* is only interpreted idiomatically in the context of *-er*. Given that idiomatic arguments cannot be inherited (see section 3.3), and that affixes require a morphological object as host, (50a) suffices to ensure morphological merger of the verb and noun. (The information that *-er* derives a morphological object can be stored by using a diacritic m, as in ⟨m V er⟩.)

If an idiom is underspecified with respect to its locus of realization, morphosyntactic competition will have the effect that it will usually be realized syntactically. However, underspecification with respect to locus of realization can have the effect that certain idioms normally considered syntactic show up as morphological objects in particular contexts.

A survey of words derived by suffixation in Dutch verifies the existence of such underspecification. There are several syntactic idioms in Dutch that may be realized morphologically in the presence of a derivational suffix. A first example is *iemands hart breken* 'to break someone's heart', which clearly is a syntactic idiom, but which nevertheless can be part of the synthetic compound *hartenbreker* 'heart breaker':[8]

(51)   a.   dat hij Marie's *hart* vaak heeft *gebroken*
             that he Mary's heart often has   broken

---

[8] The morpheme *-en-* that shows up in *hartenbreker* is a linking morpheme, not the plural.

    b. Hij is een echte *hartenbreker.*
         he is a   real   heart breaker

Like particle verbs, these data give rise to a paradox in traditional theories of morphology. On the one hand, the idiom in (51a) is clearly syntactic in nature. A specifier can accompany the noun and the verb can undergo verb second in main clauses. On the other hand, the idiom can appear within a word derived by attachment of a suffix. However, whereas particle verbs could be analysed in various ways (at least at first sight), the only plausible analysis of the data in (51) seems to be one in terms of nonuniform realization and lexical underspecification.

    As far as we know, the existence of pairs like in (51) has not been discussed before. Before presenting the argument, we will therefore give a more complete overview of the data. The examples given below are extracted from Nieuwborg's (1969) *Retrograde woordenboek.* What we have searched for are synthetic compounds that end in the deverbal affixes *-er*, *-end*, and *-ing* and that seem to be derived from syntactic idioms. We have used van Dale's (1984) dictionary to check whether the relevant syntactic idioms exist. For each of the affixes, some examples are given below:

(52)   a. dat Jan iedereen *stroop om   de mond smeert*
            that John everyone syrup around the mouth smears
            'John flatters everyone'

    a′. Zo'n *stroopsmeerder* wekt altijd afkeer.
          such a syrup-smearer causes always disgust
          'Such a flatterer is disgusting.'

    b. dat die mededeling grote *onrust* heeft *gezaaid*
         that that announcement big unrest has   sown
         'that that announcement has caused much anxiety'

    b′. Hij heeft met Piet een *onrustzaaier* in dienst   genomen.
         he has   with Pete a   unrest-sower in employment taken
         'In Pete, he has employed a troublemaker.'

    c. dat Karel over deze brigade *het bevel voert*
        that Karel over this brigade the order leads
        'that Karel commands this brigade'

    c′. Karel is de *bevelvoerder* over deze brigade.
        Karel is the order-leader over this brigade
        'Karel is the commander of this brigade.'

    d. dat hij voor Picasso *de weg bereidde*
        that he for   Picasso the road prepared
        'that he paved the way for Picasso'

d'. Hij was *wegbereider* voor Picasso.
he was road-preparer for Picasso
'he was someone who paved the way for Picasso.'

(53) a. dat deze voorstelling iedereen *de adem* heeft *benomen*
that this performance everyone the breath has taken
'that this performance took everyone's breath away'

a'. De voorstelling was *adembenemend.*
the performance was breath-taking

b. dat Jan zich altijd over alles *het hoofd breekt*
that John himself always about everything the head breaks
'that John always worries about everything.'

b'. Dat was werkelijk een *hoofdbrekend* karwei.
that was really a head-breaking job
'That really was a tough job.'

c. dat de uitslag van die wedstrijd veel *opzien* heeft
that the result of that match lots-of up-looking has
gebaard
given-birth-to
'that the result of that match was very surprising'

c'. De uitslag was *opzienbarend*
the outcome was up-looking-give-birth-to-ing
'The result was surprising'

d. dat haar kwaliteiten uiteindelijk *de doorslag* hebben *gegeven*
that her qualities eventually the through-hit have given
'That her qualities eventually tipped the balance'

d'. Haar kwaliteiten waren *doorslaggevend.*
her qualities were through-hit-giving
'Her qualities tipped the balance.'

(54) a. dat die lui altijd ergens *de hand mee lichten*
that such people always something the hand with lift
'that such people always ignore some regulation'

a'. Zo'n *handlichting* moet consequenties hebben.
such a hand-lifting must consequences have
'Ignoring regulations in this way must have consequences.'

b. Laten wij elkander *de hand reiken.*
let we each-other the hand reach
'Reach out and touch.'

b'. Zijn *handreiking*   had weinig resultaat.
   his   hand-reaching had few   results
   'His concession had few results.'

c. dat de bestuursleden   enige harde *woorden wisselden*
   that the members-of-the-board some harsh words   exchanged

c'. Ik vond die *woordenwisseling* nogal gênant
    I found that words-exchanging rather embarrassing
    'I found that argument rather embarrassing'

d. dat dit gerecht *de tong   streelt*
   that this dish   the tongue strokes
   'that this dish is delicious'

d'. Dat was een ware *tongstreling.*
    that was a   real tongue-stroking
    'that was really delicious.'

Although the paradox these data give rise to is comparable to the one caused by particle verbs, at least one of the alternative analyses proposed for particle verbs cannot be extended to this case. In view of the material indicating a full-blown syntactic structure in every first example, it seems impossible to maintain that the idioms in (51) through (54) are uniformly realized in morphology. If one wants to hold on to uniform realization of lexical items, the only option seems to be that, if the idiom shows up word-internally, this is the result of head-to-head movement. Thus, the word *hartenbreker* could be derived as follows:

(55)   [$_{NP}$ [$_N$ [$_V$ harten$_N$ breek$_V$] er$_N$] [$_{VP}$ t$_V$ [$_{NP}$] t$_V$]]
        heart   break   er

In the previous chapter and in section 3.4, we have already considered to what extent head-to-head movement explains properties of particle verbs and (non-idiomatic) synthetic compounds. The problems this analysis faces are therefore familiar.

For a start, the incorporation analysis fails to explain why idioms are stripped of all material that can appear in syntactic projections when they appear as part of a word. If a full-fledged syntactic structure is present, there is no reason why such material cannot be stranded by the two head movements in (55). Nevertheless the example in (56), based on (51a), is ungrammatical.

(56)   *Hij is een [$_{NP}$ [$_N$ [$_V$ harten breek] er] [$_{VP}$ vaak [$_{NP}$
        he is a   heart breaker   often
        Marie's en Sue's t$_N$] t$_V$]].
        Marie's and Sue's

As in the case of particle verbs and non-idiomatic synthetic compounds, material that is obligatorily present in syntax (like determiners) must sometimes be omitted.

Even if problems of this type could be solved, it would have to be stipulated that of the two operations needed to derive *hartenbreker* in (55), the incorporation of the noun into the verb is impossible unless the resulting complex verb moves on to a derivational suffix. At least, verbal compounds like *hartenbreken 'to heart-break', *adembenemen 'to breath-take', and *handlichten 'to hand-lift' do not exist.

As it turns out, then, neither uniform morphological nor uniform syntactic realization of the idioms under discussion leads to a plausible analysis of the alternation found in (51) through (54). This alternation follows naturally, however, from the model proposed here. Suppose that the idiom *iemand's hart breken* is stored in the lexicon without being specified for syntactic or morphological realization:

(57) ⟨breek hart$_i$⟩
      (AGENT, THEME$_i$); semantics: hurt-in-love (A)

Unless morphological merger is triggered by the presence of an affix in the representation, this idiom must be realized in syntax, given that this is the preferred option. Consequently, the verb will project a VP which contains a DP headed by the noun *hart* and, like other VPs and DPs, these projections allow insertion of further material, as illustrated by (51a). Crucially, in the absence of a derivational affix a morphological realization of the idiom is excluded, which accounts for the absence of the compound *hartenbreken 'to heart-break'.

However, a derivational affix, say *-er*, must combine with its host in morphology. This implies that the idiom in (51b) can now be realized as a verbal compound, as there is no syntactic competitor that could prevent morphological merger of *hart* and *breek*. Hence, generation of idiomatic synthetic compounds like *hartenbreker* is possible. Since the idiom is now realized internally to a complex word, it is predicted that the material that usually accompanies it in syntax must be omitted. This accounts for the ungrammaticality of 'stranding' in examples like (56).

So, once the assumption that complex lexical items are realized uniformly is abandoned, a simple account of the alternation in (51) through (54) can be given. This account runs parallel to the one given for particle verbs. It thus also supports the following aspects of the model defended here: (i) syntax and morphology are alternative modes of generating structure, (ii) syntactic merger is unmarked with respect to merger in morphology in the languages under discussion, and (iii) complex lexical items can be underspecified with respect to their locus of realization.

3.6 ROOT COMPOUNDS

Although syntactic merger is preferred over morphological merger, at least in the languages discussed here, this does not mean that there is no morphology. We have discussed one circumstance under which morphological merger is licensed, namely when an affix is present. An affix is stored in the lexicon with a specification that it must derive a word. For instance, the relevant part of the lexical entry for *-er* is as in (58), where the relevant specification is indicated with the diacritic M. Given this entry, there simply cannot be a syntactic competitor when *-er* is present.

(58) $\langle_M \_\_ er_N\rangle$

Given that affixes are listed in this way, it should also be possible to specify a complex lexical item $\alpha^\wedge\beta$ as morphological:

(59) $\langle_M \ \alpha \ \beta\rangle$

This is what gives the option of root compounding. Although in a root compound neither the head nor the nonhead requires morphological realization, the whole must be specified as morphological if it is to survive competition with a potential syntactic counterpart. If so, an unexpected prediction is made: the semantics of root compounds is necessarily indeterminate. Let us consider why.

The starting point of the previous section was that lexical storage is minimized. Information is only stored if not fully determined by rule.[9] This means that lexical items are either simplex or idiomatic. Conversely, complex structures with compositional semantics are not listed. Now, if an item is listed, it can be listed with a specification of its locus of merger. An affix such as *-er* is listed by virtue of it being simplex, and since it is listed it can be listed as being a morphological object. Similarly, a simplex free morpheme is listed, but without an M specification. (One could give it an s specification, but this is superfluous under the assumption of morphosyntactic competition.)

If the combination of two free morphemes is to be listed as morphological, as in (59), there must be a reason to list that particular combination in the first place. Given that we are not dealing with a simplex lexical item, it must be the combination itself that has an unpredictable semantics. This means

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[9] Note that it is possible to add items to the lexicon, which implies that new forms with an indeterminate meaning (interpretable in context) can be coined by a speaker. For the speaker these forms are, at least temporarily, part of his lexicon; for the hearer, they function as proposals for new lexical items.

root compounds can only exist by virtue of having a noncompositional semantics. If a combination of two free morphemes has a compositional semantics, it cannot be stored, so that it cannot be stored as being morphological either. In that case, competition determines that the combination is realized syntactically.

Indeed, it has often been observed that the semantic relation between the members of a root compound in English (and many other languages) is unpredictable (see for instance Preuss 1962/63, Carstairs-McCarthy 1992, and Williams 2003). The general right-headedness of morphological constructs ensures that the 'IS A' relation holds between the compound and its right-hand member. Moreover, both members of the compound typically have the same semantics that they have in isolation. But other than that, the meaning of the compound seems arbitrary. As Williams (2003: 9) puts it: 'Although there are quite narrow rules for pronouncing compounds, it would seem we can be no more precise about how to determine their meaning than to say, "Find some semantic relation that can hold between the two elements." This is the general understanding of what have been called root compounds.' To illustrate this, we repeat the examples of English N–V compounds given in section 3.3.1:[10]

(60)   to breast-feed   to hand-make   to baby-sit
       to play-act   to air-condition   to bar-tend
       to window-shop   to c-command   to pressure-clean
       to base-generate   to Chomsky-adjoin   to pan-fry
       to head-adjoin   to head-govern   to carbon-date
       to chain-smoke   to block-bust   to colour-code
       to sky-dive   to head-hunt   to computer-generate

It is clear that the semantics of each of these compounds must be stored, as it does not adhere to any generalization concerning these forms (other than the 'IS A' relation). *To Chomsky-adjoin*, for example, means "to adjoin in a

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[10] An anonymous reviewer remarks that the productivity of root compounding may be unexpected if it is true that their meanings are noncompositional. The reviewer further notes that novel compounds like *iguana bowl* are interpretable *in context*. This, however, does not imply that they have a compositional semantics. Precisely the fact that a context is needed to determine an interpretation, out of many possible ones, is indicative of noncompositionality. The interpretation of *Californians like sushi* is fixed even if no context is given. In contrast, simplex nonsense words can only be interpreted in context. Note that, if a proper context is given, simplex nonsense words are not harder to interpret than root compounds (*this is a gloop*, while pointing at some object, is perfectly intelligible). Our take on the situation, then, is that the productivity of root compounds calls into question the assumption that there is a straightforward connection between productivity and compositionality.

certain way proposed by Chomsky", but *to head-adjoin* does not have a meaning parallel to this; it means 'to adjoin to a head'. In turn, *to head-govern* does not have an interpretation of this type, but means 'to govern in the capacity of a head', and so on. (Only a negative generalization can be formulated: the noun cannot be interpreted as the internal argument of the verb. This transparent semantic relation does not license storage and hence morphology loses out to syntax under competition.)

Note that this line of reasoning complements rather than replaces the analysis in section 3.3.2, according to which *to code with colours* fails to compete with *to colour-code* because a preposition is obligatorily present in the former structure. Storage of *to colour-code* as a morphological object is necessary to prevent competition with *to code colours* with regard to the relevant idiomatic reading (compare the discussion of syntactic idioms in the previous section). The analysis in section 3.3.2 is necessary to block competition with the syntactic paraphrase *to code with colours*.

The above argumentation also applies to nominal root compounds. We have already shown that A–N and Q–N compounds in Dutch cannot have the same semantics as a noun combined with a modifying AP or QP in syntax (see (24)). To repeat one example, the semantic relation between *zwart* 'black' and *boek* 'book' in the compound *zwartboek* 'black book' is not the simple modifier–head relation that we find in *een zwart boek* 'a black book'. Rather, the compound has the noncompositional meaning 'book of complaints or accusations'.

V–N compounds, too, must have a noncompositional semantics, as in *kookboek* 'cookbook', *goocheldoos* 'conjure box' (box with material for conjuring tricks), *visseizoen* 'fish-season' (period in which fishing is allowed), etc. Interestingly, the semantic relation between verb and noun in V–N compounds can be one which is systematically excluded for N–V compounds. The combination of a noun and a verbal extended projection in syntax gives rise to a relative construction or a construction in which the noun takes a complement clause.[11] However, such constructions cannot possibly get an interpretation in which the head noun is regarded as the internal argument of the embedded verb. Consequently, amongst the noncompositional meanings that V–N compounds may have is one in which the noun is interpreted as the

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[11] A relative clause will never be in competition with a morphological structure. The semantic relation with its antecedent is one of identification with the relative operator, for which there is no equivalent in morphology. As far as complement clauses are concerned, it seems correct that there are no V–N compounds in which V is interpreted as the complement of the noun (for instance, there is no Dutch compound *regenfeit* 'rain-fact' that expresses the same as 'the fact that it rains': **het regenfeit betekent nog niet dat we thuis blijven* 'the rain-fact does not mean that we will stay at home'). This indicates that V–N compounding is indeed restricted by competition with syntax as well.

internal argument of the verb (see Hoeksema 1984 and others). Some Dutch examples are given in (61).

(61)   drinkyoghurt   ophaalbrug   perssinaasappel
       drink-yoghurt   *draw-bridge*   *squeeze-orange*
       'drinkable yoghurt' 'drawbridge'   'orange for squeezing'
       rookworst   uitleenexemplaar leesboek
       smoke-sausage   *lend-copy*   *read-book*
       'smoked sausage'   'lending copy'   'light reading'

N–N compounds, too, have a meaning that must be stored, as we have already discussed in Chapter 2 in connection with newly-coined cases like *table bath*. This has the implication that a word like *truck driver* can actually have the structure in (8a), which we rejected earlier for synthetic compounds. However, if *truck driver* has the structure of an N–N root compound (with a complex deverbal head), it must have a noncompositional meaning in which N is not the argument of V (compare the discussion in section 3.3.3). This accounts for Lieber's (1983) observation that, in addition to its interpretation as a synthetic compound, the string *truck driver* can get a range of other, unpredictable interpretations. For example, at least for us, *truck driver* can refer to a hypothetical person who likes driving a tiny car in the back of a gigantic truck.

So, compounds are licensed either by being embedded under an affix, in which case they can have a transparent semantics (synthetic compounds), or by being listed as such, but listing in turn requires noncompositional semantics (root compounds). There is, in fact, a third option. A listed compound can have a left-hand part which is itself a compound. The embedded compound can have transparent semantics, because the listing of the complete compound licenses the structure in which it is embedded, while competition is suspended in morphological nonhead positions. We predict, then, that compositionally interpreted noun–verb, adjective–noun, and numeral-noun compounds may occur inside larger compounds. Evidence shows that this prediction is correct. The examples given earlier in (12) illustrate this for N–V compounds; in (62) we give some compounds that contain semantically transparent A–N and Q–N compounds (see also Booij 2002: 150).

(62)   kort-hoorn-koe   twee-baans-weg
       short-horn-cow   *two-lanes-road*
       'breed of cow with short horns' 'dual carriageway'

lang-poot-mug	drie-maands-papier
long-leg-mosquito	*three-month-paper*
'daddy longlegs'	'type of bond with a term of three months'
lang-gat-boormachine	drie-kamer-flat
long-hole-drill	*three-room-flat*
'drill designed to make long holes'	'apartment with three rooms'

The function of listing as a trigger for morphological realization can be further demonstrated when we return to verb–particle constructions in Swedish. In section 3.4 we derived the generalization that the particle follows the verb in the absence of an affix (verb and particle are merged in syntax), whereas the particle precedes the verb when an affix is present (verb and particle are merged in morphology). A qualification is in order, however: there are also cases in which the particle precedes the verb when no further affixation takes place. This shows that simple compounding of particle and verb is possible after all. Given the above, compounding of this type should only occur if the resulting word has a (partially) unpredictable meaning, which licenses listing. This prediction appears to be correct. With regard to Swedish verb-particle combinations, Holmes and Hinchliffe (1994: 321) remark that 'the separated form has a literal meaning [. . .], whereas the corresponding integrated form has a figurative meaning'. Examples are given below:

(63) a. Jag bryter av kvisten.
        I break off the-branch

    a'. Jag avbryter samtalet.
        I off-break the-conversation
        'I interrupt the conversation.'

    b. Han strök under ordet.
        he lined under the-word
        'He underlined the word.'

    b'. Han underströk ordets betydelse.
        he under-lined the-word's meaning
        'He emphasized the word's meaning.'

    c. Bordsbenet gick av.
        the-table-leg broke off

    c'. Statsministern avgick.
        the-prime-minister off-broke
        'The Prime Minister resigned.'

Note, finally, that there can be reasons for listing a complex form other than unpredictable semantics. More specifically, it appears that some compounded particle verbs in Swedish have the same meaning as their syntactic counterparts. However, as observed by Holmes and Hinchliffe (1994: 320), these 'are reserved almost solely for official documents and more formal usage' and are not used in the spoken language. Under the plausible assumption that specialized, formal expressions must be listed, the fact that these forms are compounds further corroborates the idea that being listed is a prerequisite for root compound formation.

To summarize, the assumption that morphology loses out to syntax when the two compete explains why the semantics of root compounds cannot possibly be transparent. However, whereas compounds must be listed as a whole, affixes are listed individually as being elements that derive morphological categories (compare (58)). This means that the combination of an affix and its host *can* be semantically transparent. Indeed, in the languages under discussion, morphological operations which lead to predictable changes in meaning are always instantiated by affixation, never by compounding. For example, diminutive formation in Dutch is expressed by the suffix *-tje*, repetition of action is expressed by the prefix *her-*, and causativization is expressed by the suffix *-iseer*.[12] None of these processes can be expressed by compounding in Dutch (or in the other languages under discussion). The same point can be made on the basis of inflectional morphology, which is semantically fully transparent, and which never takes the form of compounding.

3.7 POLYSYNTHETIC LANGUAGES

One may wonder why syntactic merger should take precedence over morphological merger where there is competition. This may simply be something that is determined by Universal Grammar. However, it would be a rather unexpected fact in view of one of the themes of this book, namely that the relation between syntax and morphology is symmetrical. As we will see, there is no asymmetrical relation between them with regard to interactions other than competition. If the two are in principle equivalent with respect to competition as well, the preference for syntax in Dutch and English must be a parametric feature of these languages. What one would expect, then, is the existence of languages in which morphological merger is preferred over

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[12] We are claiming that if a morphological process is semantically transparent, it must be expressed by affixation. This does not imply that every single form derived by affixation must be semantically transparent. Like other expressions, derived words can be listed with a particular, non-predictable meaning (cf. *transmission*).

syntactic merger (that is, languages that aim to minimize syntactic com-
plexity in the sense that syntactic heads should project as few times as pos-
sible). Although we will not work this out in any detail, we think that this
option might indeed exist: it gives a reasonable initial characterization of
polysynthetic languages.

The intuition is hardly novel. That polysynthetic languages employ
morphology to do what English does in syntax is part of most descriptions of
what it means to be polysynthetic. The following general description of what
makes Yimas polysynthetic (from Foley (1997: 356)) comes very close to
saying that morphology wins out over syntax in a competition over the
expression of semantic relations: 'The language has a battery of devices
available which allow the complex semantic ideas represented by a clause in
English to telescope into a word-level realization in Yimas. The word level is
the target, if you like, of Yimas grammar, so that semantic concepts strongly
tend toward morphological realization.'

Thus, in languages which specify morphology as the preferred locus of
merger, the structure in (64b) will block the structure in (64a), all else being
equal (these structures are repeated from (2)).

(64)   a.   αP   b. ✔   α
            ╱‾‾‾‾‾‾╲   ╱‾‾‾‾‾‾╲
           α   βP   β   α
                      │
                      β
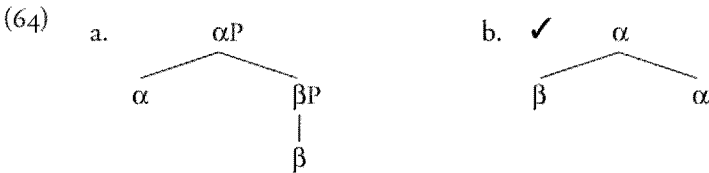
In connection with this, consider Jelinek's (2003) pronominal argument
parameter. Jelinek argues that in languages like Navajo and Lummi argu-
ments of the verb must be realized as affixes or clitics on the verb, rather than
as independent syntactic constituents. As Baker (1996) discusses, the argu-
ment can also take the form of an incorporated noun. This state of
affairs follows if there is indeed a 'competition parameter', and if in
the languages in question morphological realization of arguments blocks
syntactic realization.[13]

The idea would be voided if the pronominal arguments are themselves
specified as requiring morphological realization (in our terms, by a diacritic M).
It is, of course, reasonable to say that the pronominal arguments in

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[13] For this to work, a slightly more liberal interpretation of the competitor set is required.
The lexical instantiations of α and β in (64) (as affixes/clitics or as full nouns) need not be
constant in the syntactic and morphological competitors; it is enough for competition to take
place that the referential properties of the morphemes involved are kept constant. This does
not affect the way competition works in languages like English.

polysynthetic languages are affixes, but it does not explain why this is consistently the case. It is rather unsatisfactory to say that such a fundamental property of the languages in question is a lexical coincidence. As in Jelinek's and Baker's accounts, the notion of competition implies that there is a macroparametric distinction between 'morphologically inclined' and 'syntactically inclined' languages.

The above does not imply that languages like Navajo and Lummi have no syntax. After all, languages that opt for the syntactic setting of the competition parameter also have morphology. Indeed, the pronominal arguments can be doubled by a syntactic NP. The relation between the two is comparable to the relation by which a pronoun is related to dislocated material in languages like Greek and Italian. Thus, like dislocated NPs, the NPs in the languages under discussion cannot be quantificational, are islands for extraction, and cannot be anaphoric (compare Baker 1996, and Jelinek 2003). In these languages then, the generation of syntactic structure is possible because the dislocation relation has no morphological counterpart, and hence there is no competition. In the same vein, there is no WH-movement in morphology, with the consequence that questions will be formed syntactically.[14]

One difference between the suggested competition parameter and the pronominal argument parameter would be that the former has consequences beyond the realization of arguments. Adjuncts, too, should be merged in morphology when possible. Indeed, some concepts typically expressed by adverbials in English must be expressed morphologically in polysynthetic languages like Yimas. Foley (1997) mentions that time adverbials like 'yesterday' and 'tomorrow', for example, are part of the morphological verbal complex. This is illustrated in (65) for *kiak* 'tomorrow'. (Realization of adjuncts as incorporated nouns is possible as well, as Spencer 1995 argues for Chukchi; compare Chapter 2.)

(65)   Tpwi   i-kay-a-pan-kiak.
        sago.X.PL   X.PL.O-1PL.A-DEF-*pound*-NEAR.FUTURE
        'We will pound sago tomorrow.'

---

[14] The suggested approach to polysynthesis raises a question about the morphological realization of subjects. In Chapter 2, we argued that it is impossible to assign the external θ-role of the head of a compound to the nonhead—because the role must be assigned external to the head's projection. In fact, this observation can be extended to polysynthetic languages, as noun incorporation can involve objects, but not subjects (see Baker 1988). On the other hand, it is apparently possible for the verb to assign an external θ-role to one of its pronominal affixes. The contrastive behaviour of incorporated nouns and pronominal affixes can be accounted for, we believe, by the assumption that incorporated nouns must be adjacent to the verb, while pronominal affixes may occupy a higher slot. At an observational level, this assumption appears to be correct. Other than this, we will have to leave the issue unresolved.

The semantic relation between 'tomorrow' and the rest of the verbal complex in (65) is one of transparent modification. Moreover, the inflectional affixes that are present are not morphological heads. This means that there is no trigger for morphology of the type required in English. Morphology must then be the preferred option in Yimas.

3.8 CONCLUDING REMARKS

By way of a short summary of this chapter we give an extended version of the model of grammar argued for in Chapter 2:

(66)

LEXICON
↓   ↓

SYNTAX		
Phrasal Syntax	←	Word Syntax
↓	INSERTION	↓
Phrasal syntactic structure		Word syntactic structure
C O M P E T I T I O N		
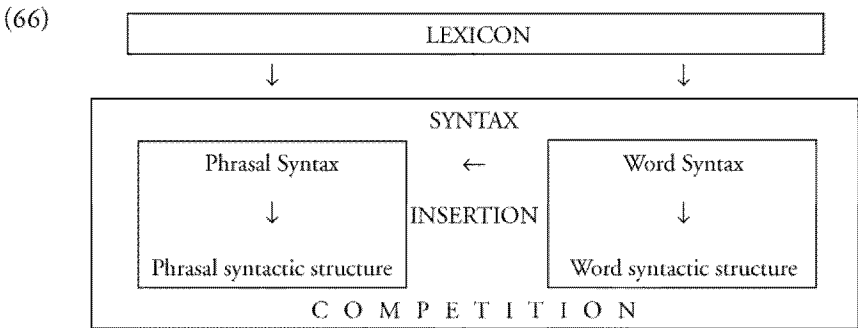
In the previous chapter we argued that syntax and morphology are two independent generative systems. In this chapter we further argued that one way in which they interact is through competition. In English (and many other languages), there is a preference to combine lexical items syntactically; morphological merger must be triggered. The trigger is related to information stored in the lexicon. Lexical items (listed elements) can be marked as requiring morphological realization. Such items can either be simplex (affixes) or complex idioms (compounds). This, in conjunction with the assumption that complex lexical items not marked as morphological are underspecified with respect to their locus of merger, solves a number of puzzles. These include the structure of synthetic compounds, the paradoxical behaviour of particle verbs, and the occurrence of phrasal idioms as compounds in larger words.

The next chapter focuses on the other type of interaction between syntax and morphology indicated in (66): insertion.

4

Generalized Insertion

4.1 THE NATURE OF INSERTION

It is uncontroversial that syntactic representations can contain morphological representations. If the latter are generated by a system independent from syntax, as argued in Chapter 2, it is necessary to assume an operation of insertion. The upward arrow in (1), for example, indicates that a morphological structure is inserted in the head position of a syntactic tree.

(1)
```
              XP
        _____|_____
      Spec          X′
              _____|_____
             X             Compl
             ↑
             X
         ____|____
        Y        X
```
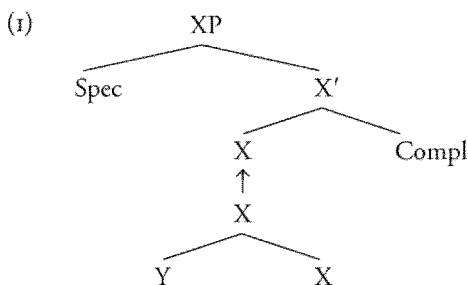
In this chapter we will discuss the properties of insertion. We will argue for the following claims.

1. Insertion is an irreducible relation of feature matching between the top node of one representation and a node in a different representation.
2. Insertion is unselective. It is not sensitive to the nature of the representations it connects; in addition to insertion of morphological

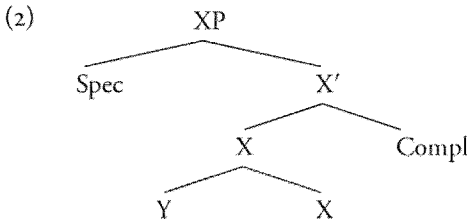representations in syntactic ones, there can be insertion of syntactic representations in morphological ones and also of representations in representations of the same type. In the same vein, insertion can take place in nonterminal, as well as terminal, nodes.

3. Insertion is conditioned by inclusiveness (Chomsky 1995) and the requirement that the nodes it relates have matching properties. It will follow that the host structure must be well formed independent of insertion, while grammatical requirements imposed by inserted material can sometimes be satisfied by material in the host structure.

Before discussing these claims, we first want to mention a view of insertion we reject. According to this view, insertion is simply the use of morphological objects as building blocks in the syntactic representations. Thus, instead of (1), insertion would give rise to the tree in (2).

(2)

```
              XP
        _____|_____
       |             |
      Spec           X'
                _____|_____
               |             |
               X            Compl
            ___|___
           |       |
           Y       X
```
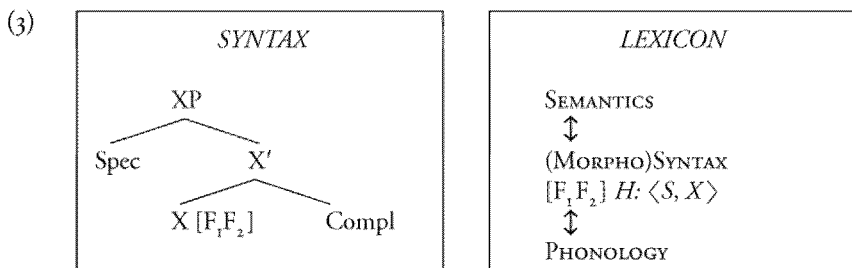
This approach assumes that the top-node of a morphological representation is identical to a terminal in a syntactic tree, something usually expressed by saying that both are $X^°$-categories. Although the building-block theory at first sight seems plausible enough, we will argue that it cannot account for certain phenomena that follow from the approach presented below. For example, it is designed to restrict insertion to morphological objects. Hence, insertion of syntactic objects in both morphological and syntactic representations cannot be explained in terms of the same mechanism.

4.2 RESTRICTIONS ON INSERTION

Let us begin by explaining how we think insertion works in general. Our central claim will be that insertion is a relation of feature matching between two nodes in different representations. It is not a process by which some node is taken from one module, imported into another module and used there as an object for merger. In other words, insertion is not literally insertion. This conclusion is inescapable when we consider what is traditionally known as lexical insertion.

It is common to speak of lexical insertion in terms of taking an element from the lexicon and using it as a terminal node in the syntactic representation. This can only be a metaphor for what is going on, however, since it does not make sense to say that a syntactic terminal actually contains a lexical entry. Similarly, a lexical item cannot be taken 'from the lexicon' when it is inserted, since that would lead to the absurd conclusion that the item is not in the lexicon any longer after insertion. If anything, a syntactic terminal contains a copy of a lexical item, or, more precisely, it contains information that can be matched against information in a lexical entry.

What we assume, then, is that lexical insertion is a relation of feature matching between a syntactic terminal and the (morpho)syntactic information in a lexical entry, as in (3), where *H:* $\langle S, X \rangle$ indicates that the host against which the relevant features are matched is a node X in syntax. (Phonological and semantic information in a lexical entry is matched against information in the phonological and semantic modules, respectively; see Chapter 5 for discussion.) This view of lexical insertion is similar to the one explicitly argued for by Jackendoff (1997), and implicitly assumed by many theories. For example, in Chomsky 1995 and subsequent work there must be a matching relation between lexical entries and the elements of the numeration (that is, the syntactic nodes that are the input to merger). The numeration cannot literally consist of lexical entries, for reasons comparable to those outlined above.

(3)

SYNTAX	LEXICON

XP
⟋⟍
Spec   X′
     ⟋⟍
  X [F_1F_2]   Compl
	SEMANTICS
	↕
	(MORPHO)SYNTAX
	[F_1F_2] *H:* $\langle S, X \rangle$
	↕
	PHONOLOGY

Below we will indicate insertion relations between two nodes by an upward arrow from the node inserted to the node in the host structure; a case of lexical insertion as in (3) thus is represented as in (4). It should be kept in mind, however, that this does not mean that there is insertion in the literal sense of the word. Crucially, the 'inserted' material is not present in the host structure at all.

(4)   X [F_1 F_2]
   ↑
       X [F_1 F_2]
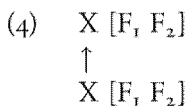
Lexical insertion can not only relate lexical entries to syntactic terminals but also to morphological ones. For instance, the lexicon contains an entry mentioning the morphosyntactic properties of an affix like -*er*, and these can be matched against the features of an independently generated morphological terminal.

If insertion in the relevant sense is necessary anyway to deal with the relation between terminal nodes and lexical entries, it may as well be used to relate nodes in other, independently generated representations. One instantiation of this, perhaps the one that springs to mind most readily, is the relation between a syntactic terminal node and the top node of a complex morphological object. Such objects are inserted in syntactic terminals in the sense that their features are matched with those in the terminal. However, it is neither necessary nor desirable to say that the morphological object is present in the syntax.

One might think that this type of insertion is a subcase of lexical insertion. The traditional assumption that morphological objects are listed would make it possible to maintain that insertion of simplex words and insertion of complex words both involve a relation between the lexicon and the syntax. However, not all morphological objects are listed, including those that have a transparent, compositional semantics (see Chapter 3 for discussion and references). This means that, at least for such words, insertion consists of establishing a relation between a syntactic terminal and the top node of a morphological representation. Just as lexical insertion involves feature matching, so does what we may call morphological insertion:

(5)

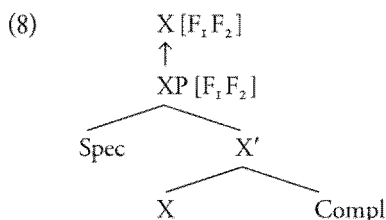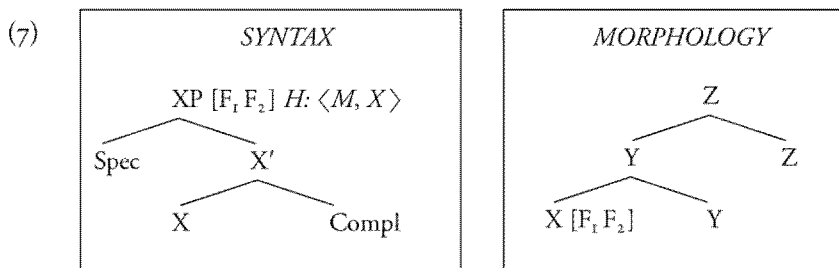| SYNTAX	MORPHOLOGY
XP Spec X′ X [F₁F₂] Compl	X [F₁F₂] H: ⟨S, X⟩ Y X Z Y
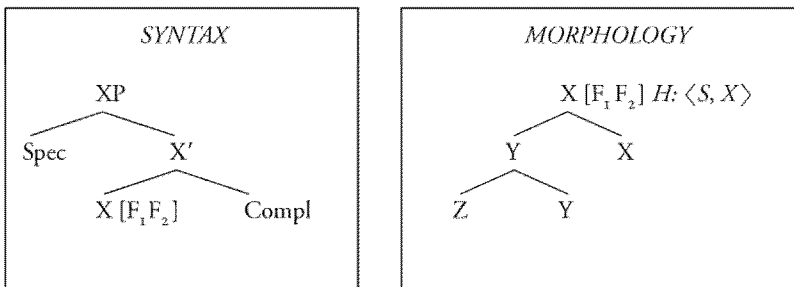
(As before, we assume that only morphosyntactic information is matched with the syntactic terminal, while phonological and semantic information is inserted separately in the appropriate modules; see Chapter 5.) We will usually represent morphological insertion by an upward arrow, as in (6), but this should not be taken to mean that the morphological representation is present in syntax.

(6)

$$X [F_1 F_2]$$
$$\uparrow$$
$$X [F_1 F_2]$$

```
        X [F₁ F₂]
       /        \
      Y           X
     /  \
    Z    Y
```
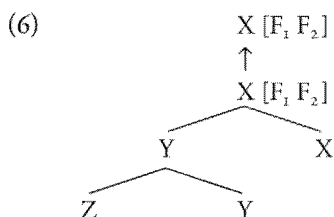
So far, we have suggested that insertion can relate a syntactic terminal to either a lexical entry or the top node of a morphological representation. Similarly, it can relate a lexical entry to a morphological terminal. Given the nonselective nature of the operation, we also expect that it can connect the top node of a syntactic representation to a morphological terminal. A stipulation would have to be added to exclude this. Insertion of this type would lead to the occurrence of a phrase in a word. We will argue that this possibility is a positive property of the theory.

It is sometimes argued that insertion of phrases in words is excluded by a condition that heads only adjoin to heads while phrases only adjoin to phrases (see Chomsky 1986*a* and Baker 1988). Notice, however, that if such a condition is to rule out the occurrence of phrases in words, inserted material must be literally present in the structure with which it is associated; it must be a building block. In our proposal, however, insertion is matching across representations, and hence the inserted material is *not* present in the host representation. Consequently, the condition just mentioned cannot rule out the occurrence of phrases in words.

Insertion of a syntactic representation in a morphological terminal takes the form of (7), henceforth represented as in (8).

(7)

SYNTAX	MORPHOLOGY

SYNTAX:
$$XP [F_1 F_2] \; H: \langle M, X \rangle$$
```
        XP [F₁ F₂]  H: ⟨M, X⟩
       /          \
     Spec          X'
                  /   \
                 X     Compl
```

MORPHOLOGY:
```
            Z
          /   \
         Y      Z
       /   \
  X [F₁ F₂]  Y
```

(8)

$$X [F_1 F_2]$$
$$\uparrow$$
$$XP [F_1 F_2]$$

```
        XP [F₁ F₂]
       /          \
     Spec          X'
                  /   \
                 X     Compl
```

If insertion is indeed indifferent to the nature of the representations it connects, a surprising option presents itself. Representations of the same nature can be inserted in one another. If insertion targets a terminal, on a par with the cases discussed so far, this type of insertion would not yield new empirical results. If the features of the top node of a syntactic representation, say a VP, are matched with those of a syntactic terminal, say a V, the result would be largely indistinguishable from a single representation in which VP is extended by projection. The only difference is that the VP would be an island in the case of insertion (see below), but given the coexistence of regular projection, this would not have observable empirical consequences.

However, nothing we have said so far implies that insertion should target terminals. It is at least a theoretical possibility that a syntactic representation is connected through insertion to a nonterminal node in an independently generated syntactic representation. Again, we will argue that this is a positive property of the theory: it will provide an account of parentheticals. In other words, insertion of YP in XP in (9) has the effect that YP is a parenthetical in XP, a relation henceforth represented as in (10).
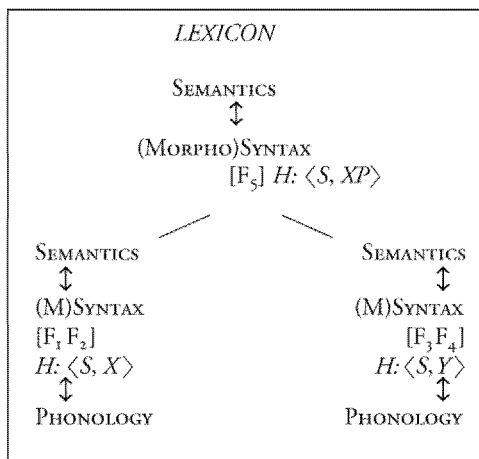
(9)

$$\boxed{\begin{array}{c} \textit{SYNTAX} \\[2mm] \boxed{\begin{array}{c} \text{Representation 1} \\[2mm] \text{XP } [\text{F}_1\,\text{F}_2] \\ \diagup\quad\diagdown \\ \text{Spec}\qquad \text{X}' \\ \diagup\quad\diagdown \\ \text{X}\qquad \text{Compl} \end{array}} \quad \boxed{\begin{array}{c} \text{Representation 2} \\[2mm] \text{YP } [\text{F}_1\,\text{F}_2]\ \textit{H: } \langle RI, XP\rangle \\ \diagup\quad\diagdown \\ \text{Spec}\qquad \text{Y}' \\ \diagup\quad\diagdown \\ \text{Y}\qquad \text{Compl} \end{array}} \end{array}}$$

(10)

$$\begin{array}{c} \text{XP } [\text{F}_1\,\text{F}_2] \\ \diagup\qquad\diagdown \\ \text{Spec}\quad \uparrow\quad \text{X}' \\ \text{YP } [\text{F}_1\,\text{F}_2] \\ \diagup\quad\diagdown \\ \text{Spec}\qquad \text{Y}' \\ \diagup\quad\diagdown \\ \text{Y}\qquad \text{Compl} \end{array}$$
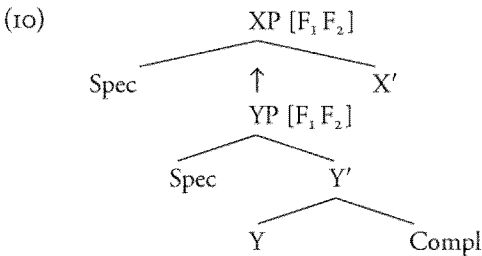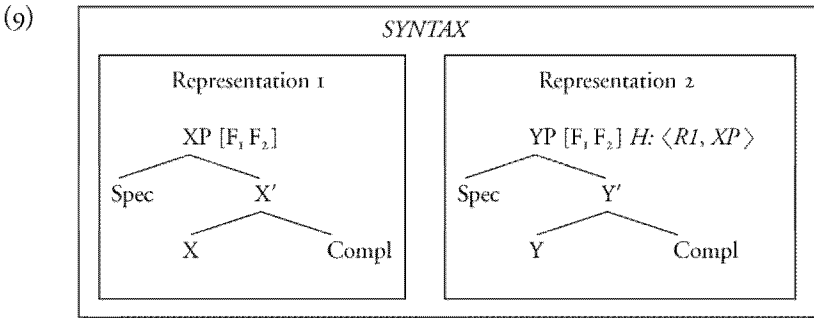
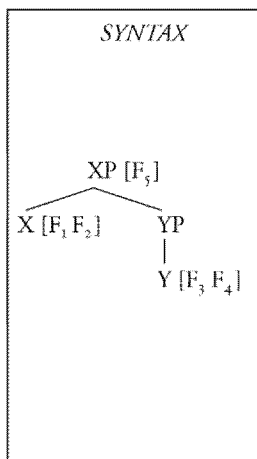There is an important difference between insertion in terminal and nonterminal nodes. This has to do with the way in which features in nodes are licensed. Following Chomsky (1995), we adopt a principle of inclusiveness that states that all features of a node must ultimately be related to lexical entries. Terminals can only meet this principle through insertion. This

implies that satisfaction of inclusiveness ultimately relies on lexical insertion, because if a terminal's features are licensed by insertion of a complex representation, the terminals in the inserted representation must of course meet inclusiveness as well. For nonterminals, the situation is different. Their features are typically copied from their daughters, and in fact the version of inclusiveness we will formulate below states that in many cases this is the only option. The implication is that, although the features of the parenthetical are matched against those of the node in which it is inserted, at least a substantial subset of the features in the host node must be licensed independently of parenthetical insertion.

Matching of features in nonterminal nodes is not only necessary for parentheticals, but also for certain types of lexical insertion. As we have discussed in the previous chapter, idioms and compounds are stored as complex lexical items. When such a complex lexical item is inserted, it requires that the features of its parts are associated with terminal nodes, but it may also require that a feature of the complex lexical item as a whole is matched with a feature of a nonterminal node:

(11)

SYNTAX	LEXICON

SYNTAX:

XP [F_5]

X [$F_1 F_2$]   YP

Y [$F_3 F_4$]

LEXICON:

SEMANTICS
$\updownarrow$
(MORPHO)SYNTAX
[F_5] H: $\langle S, XP \rangle$

SEMANTICS   SEMANTICS
$\updownarrow$ $\updownarrow$
(M)SYNTAX   (M)SYNTAX
[$F_1 F_2$]   [$F_3 F_4$]
H: $\langle S, X \rangle$ H: $\langle S, Y \rangle$
$\updownarrow$ $\updownarrow$
PHONOLOGY   PHONOLOGY

The nonterminal in (11) is syntactic in nature, but simultaneous insertion in morphological terminal and nonterminal nodes is possible as well. In that case, the complex lexical item will carry the diacritic M, which requires that the representation that realizes it be morphological. (Compare the discussion of root compounds in Chapter 3.)

Simultaneous insertion in both terminal and nonterminal nodes will only occur in idiomatic structures if there is a syntactic feature present in the nonterminal that cannot be traced back to any of the terminals. For many idioms, the properties that make it an idiom are semantic, rather than

syntactic (recall that most idioms conform to the syntax of the language). Hence, the association with a complex object must take place through insertion in the semantic representation. There are some idioms, however, which have unexpected syntactic properties, and these do require simultaneous insertion as in (11).

Of course, as in the case of parentheticals, the introduction of features in nonterminal nodes through insertion will be severely limited by inclusiveness. We will show, however, that insertion as in (11) occurs in exactly the circumstances allowed by this principle.

The remainder of this chapter is organized as follows. In section 4.3, we will argue that insertion of syntactic representations in syntactic nonterminal nodes explains several characteristics of parentheticals. In section 4.4, we will turn to insertion of complex morphological categories in syntactic terminals. We will argue that this operation explains lexical integrity effects, but also accounts for exceptions to this principle, as traditionally understood. Section 4.5 discusses insertion of syntactic phrases in morphological representations. Section 4.6 concludes the chapter.

4.3 INSERTION OF SYNTACTIC REPRESENTATIONS IN SYNTACTIC REPRESENTATIONS

4.3.1 Parentheticals

There are, roughly, two types of analysis of parentheticals.[1] According to the first type, a parenthetical is integrated in the host structure, that is, it is dominated by a node of the representation in which it occurs (see Ross 1973, Emonds 1979, and McCawley 1982). According to the second type of analysis, the parenthetical is not structurally integrated into the host. Rather, it is generated separately, and the two are only related by a process of linearization by which the parenthetical is spelled out between substrings that spell out the host (see Haegeman 1988). A variant of this view is the multidimensional

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[1] Various types of construction have been claimed to be parenthetical in nature, but not all of these will be discussed here. All potential parentheticals share a particular intonation, but they may have very different syntactic properties. Consequently, it is unlikely that they should yield to a uniform analysis. For example, following Reinhart (1983), Corver and Thiersch (2002) argue that clausal parentheticals can be subject-oriented or speaker-oriented, and that the two are structurally very different. In fact, a subject-oriented parenthetical is plausibly analysed as the main clause (that is, it is not a genuine parenthetical at all). Such constructions will not be regarded here.

analysis proposed by Espinal (1991), in which linearization is argued to be syntactic.

Neither of these approaches is entirely satisfactory. If the parenthetical is structurally integrated in the host representation, it is essentially an adjunct (as explicitly argued by Corver and Thiersch 2002). Hence, the syntactic relations that can be established between a parenthetical or its subparts and the structure in which it appears are expected to be identical to those that hold between an adjunct and the structure in which it is contained. This prediction is incorrect: in many respects parentheticals seem to be invisible for operations that apply in the host structure. For example, adverbs can be moved, but parentheticals cannot. They cannot be questioned (as shown by (12b′)), nor can they be the focus of a cleft sentence (as shown by (13b′), where the parenthetical is a moved empty operator); the examples below are adapted from Espinal 1991.

(12)   a.   John explained the problem honestly.
       a′. How honestly did John explain the problem?
       b.   Beth is, honestly, my worst neighbour.
       b′. *How honestly is Beth your worst neighbour?

(13)   a.   John deliberately misled Mary.
       a′. It was deliberately that John misled Mary.
       b.   John, confidentially, misled Mary.
       b′. *It was confidentially that John misled Mary.

Similarly, in verb second languages like Dutch, where the finite verb must occur after the first constituent in main clauses, adjuncts can count as first constituents (see (14a)), while the verb second constraint is violated if both an adverb and another constituent precede the verb (see (14b)). In contrast, parentheticals are invisible with respect to both satisfaction and violation of the verb second constraint (see (14c–d); see also Espinal 1991).

(14)   a.   Snel   kocht Jan   een verdacht boek.
            quickly bought John a   suspect   book
            'John quickly bought a suspect book.'

       b.   *Jan snel   kocht een verdacht boek.
            John quickly bought a   suspect   book

       c.   *Zo heb ik gehoord bezit   Jan   een verdacht boek.
            so have I heard   possesses John a   suspect   book
            'John possesses a suspect book, so I have heard.'

       d.   Jan, zo heb ik gehoord, bezit   een verdacht boek.
            John, so have I heard,   possesses a   suspect   book

Because of data like this, analyses in which a parenthetical is not structurally integrated in the host structure seem attractive. However, they suffer from the opposite problem, because they predict that there can be no syntactic relation at all between (material in) the parenthetical and (material in) the host. This is not correct either, as shown by data from Neeleman and van de Koot 1998. For example, parentheticals can be secondary predicates that take a DP in the host structure for subject, as in (15a). This is not just a matter of interpretation, since the usual c-command restriction on predication holds (see (15b)). In the same vein, parentheticals can contain parasitic gaps that are licensed by A'-movement in the host clause, as in (16a).[2] Again, this cannot be a matter of interpretation only, since the usual anti-c-command restriction holds: the parasitic gap cannot be c-commanded by the trace of the movement that licenses it (see (16b)).

(15)   a.   Jan,   naakt en   dronken, stond weer op de deur te bonken.
            John, naked and drunk,   stood again on the door to bang
            'John, naked and drunk, was banging on the door again.'

       b.   *Met Jan,   naakt en   dronken, valt niet te praten.
            with John, naked and drunk,   falls not to speak
            'When he is naked and drunk it is impossible to talk to John.'

(16)   a.   [Welk boek]$_i$ zei Jan [dat je,   althans zonder e$_i$ te lezen,
            which book   said John that you, at least without to read,
            t$_i$ niet moet veroordelen].
            not   must condemn
            'Which book did John say that you should not condemn without reading it.'

---

[2] Haegeman (1988) argues that this is impossible, quoting (ia) as an example. This account of the ungrammaticality of (ia) relies on the assumption that contrastive *while*-clauses are uniformly parentheticals. However, at least in Dutch, a nontemporal *terwijl*-clause can be used to satisfy the verb second constraint (see (ib)). If such clauses can be adjuncts in Dutch, we see no reason why they could not be adjuncts in English. This suggests that it is the internal syntax of contrastive *while*-clauses that blocks the licensing of parasitic gaps. Temporal *while*-clauses are different in this respect. Indeed, these can contain a parasitic gap, also when used as a parenthetical (see (ic)).

(i)   a.   *This is a subject which$_i$ John studied t$_i$ in Cambridge, while his son was studying e$_i$ in Oxford.

       b.   Terwijl Joke het antwoord onmiddellijk wist begreep   ik de vraag   niet eens.
            while   Joke the answer   immediately knew understood I the question not even
            'Whereas Joke knew the answer directly, I did not even understand the question.'

       c.   This is the document which$_i$, while he was copying e$_i$, John managed to memorize t$_i$.

b.   *[Welk boek]ᵢ maakt tᵢ [dat je,   althans zonder eᵢ te lezen,
     which book makes   that you, at least without to read,
     de bibliotheek niet wilt   verlaten].
     the library   not want leave
     'Which book is such that you do not want to leave the library
     without reading it.'

The generalization that seems to capture the data is that a parenthetical
cannot affect the syntax of the host clause, but grammatical requirements
imposed by material in the parenthetical can be satisfied by elements in the
host clause. As we will argue, the theory of insertion as feature matching
makes available a plausible account of this generalization. Since we are
dealing with feature matching, inclusiveness, the condition that determines
which features a node may contain, will be crucial in the discussion.

4.3.2 Inclusiveness

Our view of inclusiveness is based on Neeleman and van de Koot 2002*b*.
Informally, what inclusiveness does is guarantee the predictability of the content
of nodes. More specifically, the properties of a node may either be motivated
by the properties of its daughters, or by matching against a lexical item. This
holds not only for features that determine what a node is (such as categorial or
negative features) but also for selectional requirements. If a node asks for a
particular element in its environment, this is encoded by what Neeleman and
van de Koot call a function. Different types of grammatical relations are
established by different functions. We can distinguish at least thematic func-
tions, functions mediating movement, functions mediating binding relations,
and functions involved in the licensing of negative polarity items.

Suppose, for example, that in the structure in (17) the terminal V selects an
object and a VP-external subject. This implies that V must have two thematic
functions (θ-roles). In the terminal the presence of these functions can
only be licensed through insertion. Neeleman and van de Koot argue that
inclusiveness dictates that the only way the functions in V can be satisfied is
by upward copying, followed by downward function application. In other
words, the two functions are first copied to the node that dominates verb and
object (say, VP). In this node, one of the functions is satisfied by the object.
The unsatisfied second thematic function is copied upward again, until it is
present in a node that immediately dominates a suitably specified DP (the
subject). It is satisfied there, by another instance of downward function
application. (Satisfied functions are marked by a '#'.)[3]

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[3] The system as sketched here is somewhat reminiscent of the way argument structure
satisfaction works in HPSG; for a comparison see Neeleman and van de Koot 2002*b*.

(17) $\alpha\,(\theta_{\#})$

     DP   VP$\,(\theta\,\theta_{\#})$

           V$\,(\theta\,\theta)$ DP
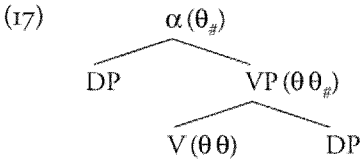
The functions that encode grammatical dependencies can be divided into two classes: licensing and nonlicensing functions. An argument, for example, can only be combined with a predicate if it is assigned a θ-role. Similarly, moved elements must be dominated by a node containing a movement function (introduced by a trace). We can therefore classify thematic functions and movement functions as having a licensing capacity. The situation is different with the functions introduced by anaphors and negative polarity items. The elements that satisfy these functions (the antecedents of anaphors and the negative operator) are not licensed by these functions. That is, they can appear in an otherwise identical syntactic representation without satisfying such a function. This bifurcation has a range of effects we cannot discuss here, including the island status of adjuncts and the impossibility of raising to θ-positions.

Recall that we hypothesize that parentheticals represent insertion of a syntactic representation in a nonterminal node of another syntactic representation. This immediately accounts for why parentheticals are invisible in certain respects. As explained above, inserted material is not present in the host structure, but merely related to it through matching. Hence, a parenthetical is not a constituent of its host. It is therefore not taken into account when the verb second constraint is evaluated (see (14)). Similarly, a parenthetical cannot function as the argument of a head in the host structure, as noted by Espinal (1991). A Dutch example illustrating this is given below:

(18)   *Gisteren bereidde Delia, althans een voortreffelijke maaltijd.
         yesterday prepared Delia, at least an excellent meal

The ungrammaticality of (18) follows from the assumption that a thematic function is satisfied if it immediately dominates a syntactic argument. The parenthetical is not dominated by its host node and hence cannot satisfy such a function here represented by F_{lic}:

(19)   *   XP $[F_{lic\#}]$

   X $[F_{lic}]$ ↑   ...
           ZP
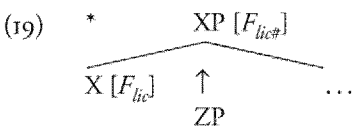
Let us now consider to what extent functions can be inherited from parentheticals. Inclusiveness states that properties of nodes must be recoverable

either through copying of information from the nodes they immediately dominate or through insertion. It follows that properties of terminals must be licensed by insertion. On the standard assumption that insertion is limited to terminals, the properties of nonterminals can only be licensed through copying. However, once we allow insertion in nonterminals, the question arises as to which properties of a nonterminal can or must be licensed by copying and which by insertion. We propose that the contrast between licensing and nonlicensing functions is crucial:[4]

(20)   *Inclusiveness*
    a. Properties of a node must be recoverable either from
        properties of the nodes it immediately dominates or
        through insertion.
    b. A licensing function in a nonterminal node cannot be
   recovered through insertion.

The intuition expressed by (20b) is that a representation must be structurally well formed independently of the possibility of insertion in nonterminals. The only functions that can affect the structure of a tree are licensing functions. Hence, these functions cannot be recovered through insertion in a nonterminal, as in (21).

(21)   *   XP $[F_{lic}]$
      _____
   X   ↑   YP
                ZP $[F_{lic}]$
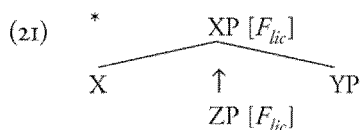
Whereas (21) is ungrammatical, there are several parenthetical structures that do not violate inclusiveness. For example, it is possible that a parenthetical does not contain any unsatisfied functions, and hence that it contains no information that requires matching against properties of the host node. In this case, there will be no grammatical relation between the parenthetical and the representation in which it occurs.

The second possibility is that the parenthetical contains an unsatisfied nonlicensing function. In this case, an unsatisfied nonlicensing function in the host node can be recovered through matching, without violating inclusiveness (see (22)). This possibility is discussed in section 4.3.3.

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[4] Not only functions, but also features could in principle be recovered through insertion in nonterminal nodes. We abstract away from this possibility here. It seems to us that this possibility should be excluded by a further strengthening of (20b), but we will ignore this issue here.

(22)   XP $[F_{nonlic}]$
            _____
        X   ↑   YP
                  ZP $[F_{nonlic}]$
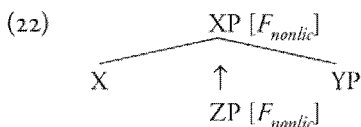
The third option is that the parenthetical contains an unsatisfied licensing function that is matched with an unsatisfied licensing function in the host node, which itself is recoverable through copying from a daughter of the host node (see (23)). The effects of this type of matching are discussed in section 4.3.4. (Of course, nonlicensing functions can be matched against a copied function as well.)

(23)   XP $[F_{lic}]$
            _____
        X   ↑   YP $[F_{lic}]$
                  ZP $[F_{lic}]$
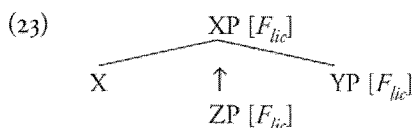
4.3.3 Matching with a Nonlicensing Function

We have distinguished two types of nonlicensing functions: those that mediate binding and negative polarity, respectively. The structure in (22) therefore has two instantiations. First, a parenthetical can contain an element that introduces a binding function. This function is copied to the top node of the parenthetical and matched against a similar function in the host node. Since it is a nonlicensing function it need not be independently recoverable through copying from a daughter node. In the host representation, the function can be copied upward until it immediately dominates a suitable antecedent and is satisfied. Thus, the prediction is that an anaphor in a parenthetical can have an antecedent in the host. This is correct, as (24a) shows. Note that *zichzelf* cannot be used logophorically in Dutch and that, as expected, the usual c-command and locality conditions on binding apply to anaphors in parentheticals. To be more precise, the node in the host representation in which the binding function is introduced must be c-commanded by, and in the same local domain as, the anaphor's antecedent:

(24)   a.   dat Jan$_i$, althans volgens   zichzelf$_i$, geweldig is.
              that John, at least according-to himself, wonderful is
              'that John is wonderful, at least in his own eyes.'

        b.   *dat Jan's$_i$ vader, althans volgens   zichzelf$_i$, geweldig is.
              that John's father, at least according-to himself, wonderful is

        c.   *Piet$_i$ zei dat Jan, althans volgens   zichzelf$_i$, geweldig is.
              Pete said that John, at least according-to himself, wonderful is

Similarly, it should be possible for a parenthetical to contain a negative polarity item associated with a suitable operator in the host structure. This prediction, too, is borne out, as (25a) shows. The c-command condition on negative polarity item licensing is observed, as is the requirement that there be no intervening operator between the polarity item and the negative operator (see Ladusaw 1996 and references cited there):

(25) a. Niemand beweerde dat Jan, tijdens welk feestje dan ook,
          no one   claimed   that John, during any   party   whatsoever,
          dronken is   geweest.
          drunk   has been
          'No one claimed that John was drunk, at any party whatsoever.'

      b. *Een man [die niemand kende] beweerde dat Jan,
          a   man that no one   knew   claimed   that John,
          tijdens welk feestje dan ook,   dronken is   geweest.
          during any   party   whatsoever, drunk   has been

      c. ?*Niemand beweerde dat elke man, tijdens welk feestje
          No one   claimed   that each man, during any   party
          dan ook,   dronken is   geweest.
          whatsoever, drunk   has been

4.3.4 Matching with a Licensing Function

We now turn to the possibility that an unsatisfied licensing function is matched against function in the host node, which itself is present in the host node as a result of copying from a daughter. This option explains the data in (15) and (16). In (15a), the parenthetical is predicative and its external thematic function is matched with the external thematic function present in the host node. Since this function is satisfied by the subject, the parenthetical is interpreted as a secondary predicate associated with the same DP. In the same vein, the external θ-role of a parenthetical can be matched with an internal role copied to the host node. (In addition to its object-oriented reading, the parenthetical in (26) also allows a subject-oriented reading which is irrelevant here.)

(26) Marie ontmoette Jan gisteren, dronken als altijd, in een
      Mary met   John yesterday, drunk   as always, in an
      Amsterdams café.
      Amsterdam   bar
      'Mary met John, who was, as always, drunk, in a bar in Amsterdam yesterday.'

In (16a), the parenthetical contains an empty element (a trace) that introduces a movement function. This function is copied onto the top node of the parenthetical where it can be matched with a movement function in the node that is the target of insertion. The latter is itself copied from a trace in the host representation. Consequently, the antecedent of the trace in the host will also function as the antecedent of the trace in the parenthetical, with the effect that parentheticals can contain a parasitic gap.

The examples in (15a) and (16a) are grammatical, because matching of the licensing function can parasitize on a function copied independently to the host node of the parenthetical. Hence, if there is no such copying, insertion of a parenthetical with thematic function or movement function should be impossible.[5] We predict, therefore, that parentheticals cannot function as primary predicates and that they are islands for extraction. That this is correct is shown by the data in (27) and (28). In (27a) a parenthetical is used as a resultative in an otherwise intransitive construction. Although resultatives can have a transitivizing effect, (27a) is ungrammatical. In (27b) an attempt is made to use a parenthetical as the predicate in a copula construction.

(27)   a.   *dat Jan   zijn schoenen, althans tamelijk scheef,   liep
            that John his shoes,   at least rather   crooked, walked
            'that John wore down his shoes on one side, at least to some extent'

       b.   *Jan, naakt en   dronken, was gisteren.
            John, naked and drunk,   was yesterday

In (28), an element that is usually easily extractable, namely a d-linked argument, cannot escape a parenthetical island. The example in (28b) is in sharp contrast with parasitic extraction as in (16a).

(28)   a.   Jan   zei [dat je,   althans zonder dat boek te lezen,
            John said that you, at least without that book to read,
            die   schrijver niet moet veroordelen].
            that writer   not must condemn
   'John said that you should not condemn that writer without at least reading that book.'

---

[5] There might be one exception to this. Satisfied licensing functions are like nonlicensing functions in that they cannot affect the form of a tree—precisely because they are satisfied. This opens up the possibility that an unsatisfied licensing function in a parenthetical can be matched against a satisfied licensing function in the host node, even if the latter is not recoverable through copying. (If so, in (20b) *unsatisfied* should be added before *licensing function.*) It is

b. *[Welk boek]ᵢ zei Jan [dat je, althans zonder tᵢ te lezen,
   which book said John that you, at least without to read,
   die schrijver niet moet veroordelen]?
   that writer not must condemn
   'Which book is such that you should not condemn that author
   without reading it, according to John?'

In fact, not only extraction from, but also extraction of, a parenthetical is
impossible:

(29) a. Ik wil, althans zonder mijn broertje, niet op vakantie.
       *I want, at least without my brother-*DIM, *not on holiday*
       'I do not want to go on holiday, at least not without my little
       brother.'

   b. *Je, althans zonder wie, wil niet op vakantie.
      you at least without who want not on holiday

   b′. *Althans zonder wie wil je niet op vakantie?
       at least without who want you not on holiday
       'You do not want to go on holiday, at least not without who?'

The ungrammaticality of extraction of parentheticals follows as well. We
need to distinguish two cases. It could be that the trace occupies a regular
adjunct position in the host, while its antecedent is parenthetical (this would
give rise to an example like (29b)). Conversely, the trace could be a par-
enthetical, while its antecedent is a regular wh-operator in the specifier of the
host CP (which would give rise to something like (29b′)). Both structures are
ruled out. The first is impossible for the same reason that parentheticals
cannot be arguments of a head in the host (see (18) above): the parenthetical
is not dominated by the node to which it is related by insertion, and hence it
cannot satisfy a function in that node (M in (30) stands for a movement
function):

(30)   *   CP [$M_\#$]
        ⎯⎯⎯⎯⎯⎯⎯⎯
      ...   ↑   C′ [M]
               PP
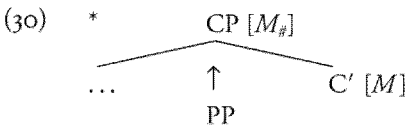
unclear to us whether this should be allowed, but note that it may account for the possibility
that a parenthetical may predicate over an adjunct in the host representation (that is, an element
that does not receive a θ-role in the host), as in *It seemed that last week, interminable like any
working week in the fall, Joseph was a little depressed.*

The second possibility is ruled out for the same reason that extraction from a parenthetical is ruled out. Matching of the unsatisfied licensing function of the parenthetical (the trace) to the host node requires that this host node contains such a function as well. Since the latter function is not independently licensed by properties of the daughters of the host node, inclusiveness is violated:

(31)   *   VP $[M]$

   V   ↑   ...
            t $[M]$
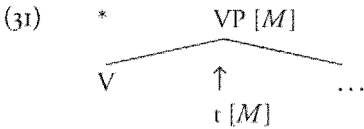
4.3.5 Idioms

Now that we have discussed insertion in nonterminal nodes in connection to parentheticals, it is useful to briefly turn to the case of idioms, which may also involve insertion in nonterminal nodes. The difference with parentheticals is twofold. First, idioms involve lexical insertion rather than insertion of one syntactic representation in another. Second, syntactic idioms involve simultaneous insertion in a nonterminal and terminal nodes, rather than insertion in a nonterminal node only (see (11)). We therefore predict certain parallels and certain differences between syntactic idioms and parentheticals.

   The differences arise from the insertion of the individual parts of idioms in terminal nodes, which implies that these parts, as well as the idiom as a whole, are visible in the larger syntactic representation. Thus, in contrast to parentheticals, idioms or their parts can in principle be moved. This is demonstrably true. Verbal idioms in Dutch, for example, consistently allow the verb to undergo verb second:

(32)   a.   dat André vorige week de plaat poetste
               that André last   week the plate polished
               'that André cleared off last week'

         b.   Gisteren poetste Marco ook al   de plaat t$_V$.
               yesterday polished Marco too already the plate
               'Yesterday, Marco cleared off as well.'

This is not to say that idiom chunks necessarily undergo all kinds of movement. As argued by Ruwet (1991) and Nunberg *et al.* (1994), the degree to which an idiom is noncompositional determines the degree to which its parts are movable. For example, subjects of passives are typically interpreted as topics, and hence an idiom chunk that lacks any independent interpretation

cannot occur as the subject of a passive. Thus, the object of the idiom in (32) cannot be A-moved:

(33)   *De plaat werd daarna   door Benny t$_{DP}$ gepoetst.
         the plate was   thereafter by   Benny   polished

The visibility of idioms in the larger representation also explains another difference with parentheticals: idioms can function as primary predicates. This is illustrated by the examples in (32) as well (for example, in (32a) *André* is the subject of the idiomatic VP).

The parallels between idioms and parentheticals concern the effects of insertion in a nonterminal node. Since in the case of idioms this insertion accounts for the idiomatic properties of the structure, we expect that these properties can concern nonlicensing functions, but not licensing functions. Licensing functions must be recoverable through copying from daughter nodes, but inserted material does not qualify as such. More precisely, we predict that there are idioms whose idiomatic property is that they are anaphors or negative polarity items, but not idioms whose idiomatic property is that they carry a movement function or a thematic role not motivated by their parts.

Starting with the latter, it seems to us that such idioms are indeed absent. An idiom never licenses a wh-phrase in the larger structure if it does not contain a trace. Thus, there is no idiom consisting of a verb and an object which requires the presence of a wh-operator. To give an idea of what this would look like, imagine that there is an idiom *chop the wood* that means 'work oneself to exhaustion on X', where X must obligatorily be questioned, as in (34). The nonoccurrence of idioms like this is in need of an explanation, since sometimes parts of idioms can be questioned and sometimes movement is required internally to an idiom (see Ruwet 1991, van Gestel 1995, and others).

(34)   *What does Nigella chop the wood.

Similarly, idioms do not have unexpected thematic roles. Thus, the arity of a verbal idiom equals the arity of the verb minus the number of idiomatically interpreted arguments. For example, there is no idiom *stroke the porcupine* that means 'say something painful to X':

(35)   *Zoilo stroked the porcupine Claudia.

In contrast to the nonexistence of idioms like (34) and (35), idioms can very well be complex anaphors or negative polarity items, even if their parts do

not introduce a binding or polarity function. In many languages, complex anaphors do not contain a part that is a simplex anaphor, and hence we must assume that in such cases it is an idiomatic property of the complex expression as a whole that it introduces a binding function. An example is English *each other*, which is anaphoric, despite the fact that neither *each* nor *other* are. A further example is given in (36). Here, the idiomatic anaphor is *number one*: the only allowed interpretation is that Bill said that John always takes care of John; it cannot mean that John always takes care of Bill (or any third party).

(36)   Bill said that John always takes care of number one.

In the same vein, there are many complex expressions that do not contain a negative polarity item, but that nevertheless are NPIs as a whole. Two examples are given in (37) (see Hoeksema 1998 for further discussion):

(37)   a.   No one/*John lifted a finger.
        b.   No one/*John moved a muscle.

We see, then, that the effects of insertion in nonterminals, as they follow from inclusiveness, are further corroborated by a comparison of idioms and parentheticals.

4.4 INSERTION OF MORPHOLOGICAL REPRESENTATIONS IN SYNTACTIC REPRESENTATIONS

4.4.1 Complex Words

The behaviour of parentheticals is a first illustration of the workings of insertion as envisaged here. If insertion is indeed a relation of feature matching that is not sensitive to the nature of the representations it connects, as claimed in section 4.1, the same relation can hold between complex words and syntactic terminals. In other words, the features in the top node of a complex word are matched against those in a syntactic terminal, but the complex word itself is not present in the syntax. In this section we will discuss some consequences of this approach to morphological insertion.

In general, we expect certain parallels between complex words and parentheticals, because both involve insertion in a syntactic host node. For example, the 'invisibility' of parentheticals should carry over to complex

words. We will argue that this explains those effects of the so-called lexical integrity principle that appear to be empirically correct. At the same time, there will be differences between parentheticals and complex words, because the latter are inserted in terminals while the former are inserted in nonterminals. These differences will not have to be stipulated, but follow from the way inclusiveness discriminates between information in terminals and non-terminals. One such difference concerns categorial features. The categorial features of a parenthetical need not be matched against those of the node in which it is inserted. This is because the categorial features of the latter are independently licensed by projection from one of its daughters. In contrast, categorial features of terminals can only be licensed through insertion. Consequently, matching of the categorial features of the inserted element is required when insertion targets a terminal.

The most straightforward reason to assume that the internal structure of complex words is invisible in the syntactic host representation is that principles operative in the host are insensitive to this structure. One example of this was discussed in Chapter 2. The 'complexity constraint', which states that the head of a complex predicate cannot itself be complex, is not violated if the head of a complex predicate is a morphologically complex word. As a second example, consider the adjacency condition that holds in Dutch between certain degree words and the head of the phrase they modify. Thus, the degree words *heel* 'very' and *te* 'too' must be adjacent to the adjective that heads their complement (see Chapter 7 for more discussion):
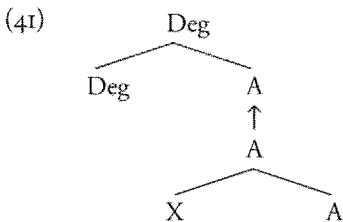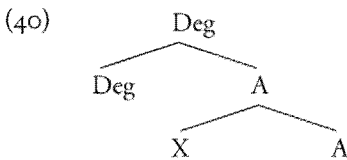
(38) a. op Johanna heel trots
          on Johanna very proud
          'very proud of Johanna'

     a'. *heel op Johanna trots
          very on Johanna proud

     b. mij al te bekend
          me all too familiar
          'all too familiar for me'

     b'. *al te mij bekend
          all too me familiar

Again, this condition is not violated if the adjective in question is separated from the degree word by morphological material:

(39) a. heel vrouw- vriendelijk
          very woman- friendly
          'very non-male-chauvinist'

b. al te milieu-   bewust
    all too environment- conscious
    'all too conscious of the environment'

One could argue that the adjacency condition demands that the degree
expression be adjacent to an adjective, but this amounts to building into it
the invisibility of morphological structure. This is because morphological
merger is said to derive an adjective (an A°), while syntactic merger is said to
derive an adjectival phrase (an AP). In other words, bar levels are used to
distinguish morphologically complex from syntactically complex categories.
The point becomes clearer if we assume bare phrase structure, as in this
theory there is no formal distinction between the two types of nodes.
Therefore, if morphological structure is visible in syntax, both the examples
in (38a′,b′) and (39) have the structure in (40). However, if morphological
structures are absent in syntax, the examples in (39) have a different structure,
namely that in (41).

(40)

```
              Deg
          _____
         Deg        A
                _____
               X        A
```

(41)

```
              Deg
          _____
         Deg        A
                    ↑
                    A
                _____
               X        A
```
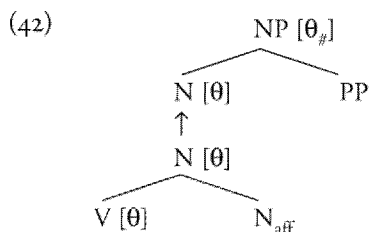
We will now discuss the consequences that inclusiveness and other syntactic
principles have on feature matching between a terminal node and the top node
of a morphological complex. We will first consider matching of licensing
functions (section 4.4.2) and then matching of nonlicensing functions
(section 4.4.3).

4.4.2 Matching with a Licensing Function

In section 4.3 we argued that inclusiveness only allows matching of a licensing
function in a parenthetical with a similar function in the host node if the

function in question is independently licensed in that node through copying. This is because parentheticals are inserted in nonterminals. Complex morphological objects, however, are inserted in terminal nodes, which by their very nature can only acquire properties through insertion. This means that in principle it is fully compatible with inclusiveness for a licensing function in the top node of a complex word to be matched with a similar function in a syntactic terminal.

For one type of licensing function, this is clearly correct. The thematic properties of a terminal can be motivated by matching them with those of a complex word. As we have seen in Chapter 2, even nonheads can sometimes introduce a thematic function that is satisfied externally to the word, a phenomenon known as inheritance. To briefly repeat one example, in *driver of trucks* the syntactic complement receives a θ-role that originates in the verb *drive*. This is illustrated in (42) (where we abstract away from other thematic information).

(42)

```
                NP [θ_#]
           _____
          /                   \
       N [θ]                   PP
         ↑
       N [θ]
     _____
    /             \
  V [θ]           N_aff
```

However, in the case of insertion in terminals, another bifurcation in the set of functions is relevant. In addition to their licensing or nonlicensing nature, functions can be classified as being either identificational or nonidentificational. A function is identificational if its satisfaction implies that the antecedent and the terminal in which the function originates are equated in certain respects. For example, satisfaction of a binding function (a nonlicensing function) has the effect that the antecedent and the terminal share a single reference (or co-vary in reference in the case of binding by a quantified expression). The same holds for a movement function (a licensing function). Moved DPs and their traces also share a single reference (or co-vary in reference when a quantified expression is moved). By extension, we can say that other moved categories are identified with their traces, although the term 'reference' is not necessarily applicable to, say, APs.

These functions can be contrasted with nonidentificational functions, which do not lead to equation of the element that satisfies them with the terminal that introduces them. Consider thematic functions (which are licensing functions): if a DP satisfies a thematic function introduced by a verb, the reference of the verb and the DP are in no way being identified

with one another. What is being identified instead is a semantic role of the
verb and the referent of the DP. Similarly, the element that satisfies the
function introduced by a negative polarity item (a nonlicensing function) is
not equated with that negative polarity item.

Thus, functions can be classified as in the table in (43).

(43)

Type of function	*Identificational*	*Nonidentificational*
Licensing	Movement	Thematic
Nonlicensing	Binding	Negative polarity

Whereas, as just noted, the distinction between licensing and nonlicensing
functions has no effects for insertion in terminal nodes, the distinction
between identificational and nonidentificational ones does. In particular, it is
impossible for a part of a word to introduce an identificational function,
which is matched with a similar function in a syntactic terminal and then
satisfied by an antecedent in the host representation. In this respect, the
situation is different for nonidentificational functions: as we have just seen,
a thematic function can be copied from a nonhead to the top node of a word,
and then matched to a function in the syntactic terminal.

Consider how this difference arises. When we are dealing with an iden-
tificational function, the terminal is identified with the element that satisfies
the function. At the same time, the terminal is identified with the material
that is inserted in it, because insertion is feature matching. By transitivity, the
antecedent is therefore interpreted as equalling all the material inserted in the
terminal. It cannot be equated to only a part of the inserted material. This
result, which is illustrated in (44), is easily obtained, but important in its
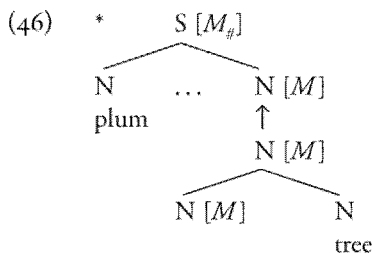consequences.

(44)   * $\alpha\,[F_{\#}]$

γ ... $\alpha\,[F]$
                          $\uparrow$
                   $\beta\,[F]$

            $\delta\,[F]$ β
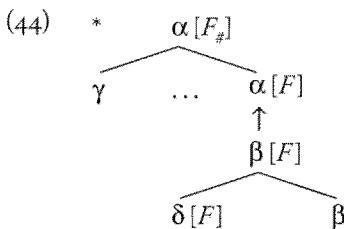
If F is an identificational function, the element that satisfies it, γ, is equated
with the terminal that introduces it, α (recall that inserted material is not
present in the host). By insertion, this terminal is equated with the top node
of the morphological complex β. This means that, even though F is
ultimately introduced by δ, identification of γ with δ is impossible. Thus, γ

can actually never be interpreted as satisfying an identificational function introduced by δ.

It follows that, in contrast to thematic functions, movement functions cannot be introduced by part of a word and then be satisfied by an antecedent in the syntactic host representation. Therefore, movement out of words is impossible, something that is well established (see also Chapter 2). (The islandhood of words is one of the core observations that underlie the notion of lexical integrity.) Consider the example in (45).

(45)   *[Plum]$_i$ is this a [$_N$ t$_i$ tree].

This structure is ruled out, as it is an instance of the one in (44):

(46)   *   S [$M_{\#}$]
```
        ┌─────────┐
        N    ...    N [M]
        plum        ↑
                   N [M]
              ┌──────────┐
            N [M]        N
                        tree
```

In the syntactic representation, a terminal containing a movement function *M* is interpreted as a trace. In (46) this function is satisfied by *plum*, with the effect that the trace must be interpreted as identical to this expression. At the same time, the terminal is equated with the material inserted in it through feature matching. This means it must be interpreted as N-*tree*. Clearly, this is a contradiction. (Similar reasoning applies if we try to excorporate the head noun: the syntactic terminal would then be equated both with *tree* and with *plum*-N, again a contradiction.)

As noted, this result is a rather straight forward consequence of the nature of movement functions in conjunction with the general claim that inserted material is not present in the host representation. In contrast, theories of insertion that treat inserted morphological objects as building blocks in the syntactic representation need a stipulation to rule out representations like (47).

(47)   *   S [$M_{\#}$]
```
        ┌─────────┐
        N    ...    N [M]
        plum    ┌──────────┐
              N [M]        N
                          tree
```
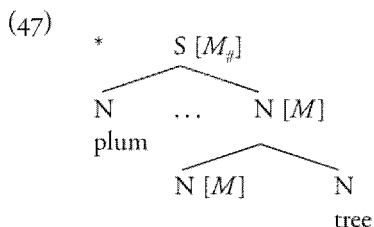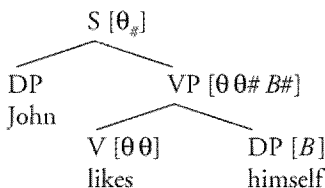
Since (47) is a single representation, there is a terminal that can be equated to *plum* without this leading to any contradiction, namely the sister of *tree*. To rule this out, it must specifically be stated that words are islands (in the form of a lexical integrity principle). Alternatively, the islandhood of words could be made to follow from independent locality principles. However, the studies that we are aware of which attempt to do so all still crucially refer to the morphological nature of the context of extraction in cases like (46)/(47). (For example, Lieber (1992) assumes that X°s are barriers, while Ackema (1999*a*) argues that traces in particular configurations require government by a morphological rather than a syntactic head.) The assumption that inserted material is not present in the host is more general; it also applies to other instances of insertion, such as that of parentheticals and that of phrases in words, as discussed in section 4.5 below.

4.4.3 Matching with a Nonlicensing Function

As noted, inclusiveness does not distinguish between licensing and non-licensing functions where insertion in terminals is concerned. There is a crucial distinction between identificational and nonidentificational functions, however. Given the reasoning in the previous subsection, we expect that it is impossible for a part of a complex word to introduce an identificational nonlicensing function (that is, a binding function) unless either the entire word is interpreted as an anaphor or the function is satisfied within the word itself. What should be impossible is for a syntactic antecedent to be equated to only part of a word through binding.

To see whether this is correct, we must first be a bit more precise about how binding works. Various authors have argued that binding is closely related to thematic structure (see Grimshaw 1990, Reinhart and Reuland 1993, and Williams 1994). Following this basic insight, Neeleman and van de Koot (2002*b*) argue that binding functions are satisfied by unsatisfied thematic functions. The apparent relation between an anaphor and a DP is an effect of assignment of the relevant θ-role. Thus, *John likes himself* can be represented as follows (where *B* represents the binding function):

(48)

```
              S [θ_#]
           ╱         ╲
        DP            VP [θ θ# B#]
        John        ╱        ╲
               V [θ θ]       DP [B]
               likes         himself
```
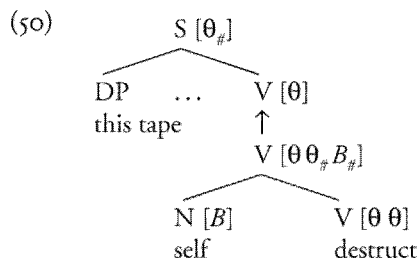
The identificational nature of the binding function has the effect that the interpretation of the terminal that introduces it and that of the thematic function that satisfies it are linked. In turn, the verb's semantic role (the experiencer in the case of *like*) is identified with the DP that satisfies the relevant thematic function (that is, the subject in (48)). Therefore, by transitivity, the DP that satisfies the thematic function is identified with the terminal that introduces the binding function.

Given that the semantic antecedent of a binding function thus receives the same reference as the syntactic terminal in which the binding function originates, and given that this terminal's features must match those of the material inserted in it, it is impossible for this antecedent to receive the same interpretation as only a part of the inserted material. Put more simply, binding into words is impossible. As in the case of movement, this is in fact a well-known claim (see Postal 1969, and Bresnan and Mchombo 1995).

However, it has also been argued that there are sub-lexical anaphors, in particular the morpheme *self*, as discussed in Sproat 1985*a* and Lieber 1992. One may wonder whether this morpheme can be bound by an element external to the word, as seems to be the case in examples like (49).

(49)   a.   [This tape]$_i$ will self$_i$-destruct in twenty seconds.
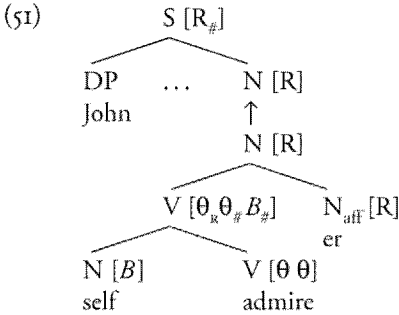   b.   John$_i$ is a self$_i$-admirer.

If anaphoric elements are bound by DPs, this conclusion seems unavoidable. But under the assumption that the binding function is satisfied by a thematic role, another account suggests itself. In both (49a) and (49b), *self* is attached to a predicative category, and hence the function it introduces can be satisfied within the morphological representation, namely by the external θ-roles of *destruct* and *admire*. Since in (49a), this θ-role is matched with the θ-role assigned to *this tape* in the syntactic representation, it seems that the interpretation of *self* is related to the interpretation of the subject, but this is only indirectly so. The following tree illustrates this:

(50)
```
              S [θ_#]
         ┌───────────┐
    DP   ...      V [θ]
  this tape        ↑
               V [θ θ_# B_#]
            ┌──────────┐
        N [B]        V [θ θ]
        self         destruct
```

The case of *self-admirer* in (49b) is slightly different. Here, an N–V compound containing *self* is embedded under a derivational affix. The external

role that satisfies the function introduced by *self* is not inherited by the noun, but controlled by the R-role of the affix, which is itself matched to the θ-role assigned to *John*:

(51)
$$
\begin{array}{c}
\text{S } [R_{\#}] \\
\end{array}
$$

DP   ...   N [R]
John   ↑
                N [R]

V [θ$_R$θ$_\#$B$_\#$]   N$_{aff}$[R]
                            er
N [*B*]   V [θ θ]
self   admire

The argument for the existence of N–V compounds like *self-admire* has been given in the previous chapter. There, we argued that they cannot surface as such, due to morphosyntactic competition, but they can occur as the complement to a category-changing affix. The verb *self-destruct* is an isolated case in English. We speculate that its morphological realization is licensed by a lexical specification of the form *destruct* as morphological (as opposed to the more general form *destroy*). In other languages, anaphors that appear in words may be affixes. This implies that structures comparable to English *self-destruct* may be the norm rather than the exception in reflexive contexts, as affixes require morphological realization as a matter of course. A potential example is provided by the Chichewa reflexive marker *-dzi-* (from Mchombo 1993):[6]

(52)   Mkângo u-na-dzí-súpula.
         3-*lion*   3SM-PAST-REFL-*bruise*
         'The lion bruised itself.'

The reflexive marker is a prefix and hence requires morphological realization. We would analyse it as the internal argument of 'bruise'. It introduces

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[6] Mchombo (1993) analyses the Chichewa reflexive marker as an incorporated syntactic element, while he treats the reciprocal marker as a morphological valency-changing morpheme, an analysis not dissimilar to what we suggest for the reflexive. Although we cannot go into this issue in any detail, we would be inclined to analyse both the reciprocal and the reflexive as morphological. This means that the contrasts between the reciprocal and the reflexive that underpin Mchombo's argument must receive an alternative explanation. It seems to us that such an alternative might be based on the different prosodic status of prefixes and suffixes in Bantu (the reflexive marker is a prefix, while the reciprocal is a suffix). Of course, if this approach fails, the reciprocal would still serve to illustrate the general point made in the main text.

a binding function, which is satisfied by the external θ-role of this verb. The apparent binding across a word boundary is a result of θ-role assignment to 'the lion'.

The system of insertion and the notion of identificational function rule out the possibility that an anaphor contained in a morphological object is linked to a DP that is not an argument of the predicate to which the anaphor is attached (see also Di Sciullo and Williams 1987). An ungrammatical structure of this type is given below.

(53)   *   S [θ$_\#$]
              ⟋‾‾‾‾‾‾‾‾⟍
        DP   VP [θ θ$_\#$ B$_\#$]
                    ⟋‾‾‾‾‾‾‾‾⟍
              V [θ θ]   X [B]
                              ↑
                            X [B]
                        ⟋‾‾‾‾‾⟍
                    N [B]   X
                    self
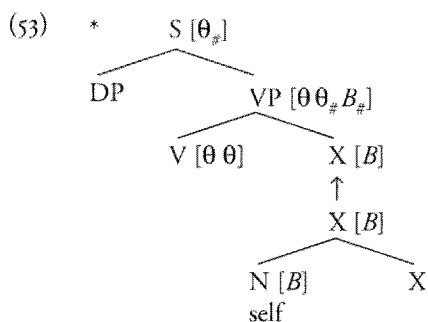
Indeed, we do not know of any case in which a morphological anaphor is associated with a DP that is not a co-argument. A survey of English and Dutch dictionaries shows that words starting with *self* or *zelf* 'self' fall into various categories. *Self* may itself be an argument (as in *self-destruct*) or adjunct (as in *self-adhesive*), and the θ-role that satisfies the binding function may be assigned externally to the word (as in *self-destruct*) or not be assigned at all, because it fails to be inherited (as in *self-examination procedure*).[7] But in all cases the binding function introduced by *self* is satisfied by a θ-role of the predicate to which it is attached. The category predicted to be absent is indeed not attested. Consider the example in (54).

(54)   When he attended group therapy, John usually experienced self-hate.

Here *self* is necessarily associated with the external argument of *hate*. The argument may be understood as identical to the external argument of *experience* (in which case John felt that he hated himself), but this is not necessary (in which case John may have felt that members of the group hated themselves). What is impossible is for *self* to be associated with John if the external argument of *hate* refers to other people. So, (54) cannot mean that John usually felt that members of the therapy group hated him.

---

[7] Thus, in *Sigmund's self-examination procedure*, Sigmund is not necessarily understood as examining himself; we may be talking about a psychoanalytic procedure developed by him.

The ungrammaticality of structures like (53) does not follow from the principles of binding theory, because this theory does not in general require co-argumenthood of an anaphor and the antecedent DP associated with it. For example, in exceptional case-marking constructions, such as *Miranda expects* [*herself to win*], the anaphor is an argument of the embedded clause, while the DP associated with it is the matrix subject. Association with a non-coargument is allowed, because the anaphor introduces a binding function that cannot be satisfied by the external θ-role of the embedded predicate. This θ-role is assigned to the anaphor itself, and hence not a possible binder. The binding function is consequently copied upward into the matrix clause, where it is satisfied by the external θ-role of the main verb (see Neeleman and van de Koot (2002*b*) for discussion).

One could of course argue, as Di Sciullo and Williams (1987) do, that morphology and syntax involve different types of binding, the former based on argument structure, the latter based on syntactic configuration. This is unnecessary, however, in the view of insertion developed here. (53) is not impossible because of binding theory, but because the syntactic terminal X must on the one hand be identified with the DP subject and on the other hand with the entire morphological object inserted in it. By transitivity the DP subject must therefore be identified with the entire morphological object. At the same time, we are trying to establish an interpretation in which the *self*-part of the morphological construct is interpreted as referring to the subject. These two requirements are contradictory.

In contrast to binding functions, the functions involved in the licensing of negative polarity items are not identificational. This implies that such functions can originate in a morpheme that is embedded in a word, and nevertheless be matched with an identical function in a syntactic terminal (after copying to the top node of the word). Since this function will be satisfied by a syntactic operator, we predict that there can be morphological negative polarity items licensed by elements in the syntactic representation. Just such a case is presented by Postma (1999). Postma shows that Middle Dutch has a verbal prefix *ghe-* that can be distinguished from a homophonous participial marker and derivational affix. This prefix derives verbs that can only appear in the contexts that license negative polarity items (see (55a,b)). All these verbs have a counterpart without *ghe-*, which does not require such a context (see (55a′,b′). We may conclude therefore that it is the prefix that introduces the relevant function.[8]

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[8] Postma argues that *ghe-* is a syntactic clitic, rather than a prefix. His arguments are that (i) *ghe-* prefixation is productive, (ii) *ghe-* requires a particular syntactic environment (characterized by modality and negation), and (iii) *ghe-* can appear on modal auxiliaries as well as main verbs. It is well established that the observations under (i) and (ii) do not bear on the morphological or syntactic status of an element (see, for instance, Di Sciullo and Williams 1987). The

(55) a. Nu en   can ic langher niet gheswighen.
      now NEG *can I longer   not* GHE-*be.silent*
      'I can no longer be silent now.'

   a'. Dies   zwijghics   nochtan.
       therefore am.silent-I-about.this nevertheless
       'Therefore I will nevertheless be silent about this.'

   b. Van eenen goeden boom en   kan niet
      from a   good   tree NEG *can not*
      dan   goede vruchten ghecomen.
      than good fruit   GHE-*come*
      'From a good tree can only come good fruit.'

   b'. die beste die te hove zijn commen hier
       the best   that to court are come   here
       'the most prominent lords who have come to this court'[9]

The relevant structure is given in (56), which should be contrasted with (53) (*N* represents the negative polarity function). The difference in the acceptability of these structures has its source in the different nature of binding and negative polarity functions. In contrast to the former, the latter do not require that the element that satisfies them be identified with the syntactic terminal in which they originate (and hence to all the inserted material in this terminal).

(56)
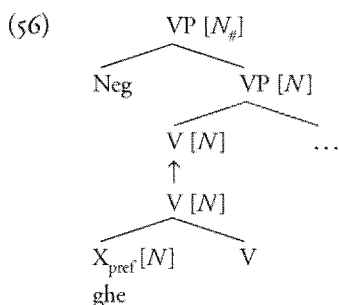
argument in (iii) is more interesting, but does not require a syntactic analysis. It is based on the co-occurrence of *ghemach sien* 'GHE-may see' and *mach ghesien* 'may GHE-see'. According to Postma this involves movement of *ghe-* from 'see' to 'may'. However, it is unclear to us what would exclude an analysis in which *ghe-* can be base-generated on modals. The sole argument against this is that only modals allow attachment of *ghe-* in the present tense. Postma therefore assumes that *ghe-* was initially attached to an infinitival main verb in such cases. However, we do not need to stipulate that *ghe-* has a selectional restriction that prevents attachment to present tense main verbs, since a main verb in the present tense does not provide the modal context required by *ghe-*, whereas a modal obviously does. Note that a main verb in the past tense can be assigned a modal reading (for instance as an irrealis), and in this reading allows attachment of *ghe-*.

[9] (55a) is taken from Postma (1999: 311); (55a') is from Lulofs (1983: 73); (55b) is from Postma (1999: 315); and (55b') from Lulofs (1983: 72).

4.4.4 The Invisibility of Inserted Material Revisited

We started this section with some arguments for the invisibility of inserted material, based on the observation that certain sentences that should be ungrammatical if inserted material were visible are in fact grammatical. Our account of the islandhood of words with respect to movement and binding can be interpreted as a second type of argument for this invisibility; in this case certain sentences that should be grammatical if inserted material were visible are in fact ungrammatical.

The argument can be further illustrated by comparing the situation discussed in sections 4.4.2–4.4.3 with respect to identificational functions with a similar situation that can arise within a syntactic representation, which does not lead to ungrammaticality. Consider the case of A'-movement of a constituent containing an anaphor, as in (57).

(57) [Uit   zichzelf$_i$]$_j$ zal [de baas]$_i$ zijn secretaris t$_j$ niet gauw
       out-of himself   will the boss   his secretary   not easily
       bedanken.
       thank
       'The boss will not thank his secretary spontaneously that easily.'

The example illustrates the well-known fact that A'-movement reconstructs for anaphoric binding, as the anaphor can be bound by an element c-commanding the trace but not the anaphor. There is a parallel between this example and the impossible structures that involve movement out of or binding into a word. Recall what the problem was with the latter. Because movement functions and binding functions are identificational, the relevant syntactic terminal must be equated to the element satisfying the function. At the same time, it must be interpreted as equal to the inserted material. Hence, the antecedent must be equated with the inserted material, but this equality does not hold when only part of that material is moved or bound.

A similar problem arises in (57). Given the view on grammatical dependencies adopted here, reconstruction implies that the binding function that is copied to the top of the moved PP is matched with a similar function in the trace as a result of the general matching process that the movement function imposes on the trace and its antecedent. Thus, two identificational functions are present in the trace, a movement function and a binding function. Given their nature, this would seem to lead to the conclusion that the trace must be identified with both the moved PP and with the antecedent of the anaphor— a contradiction. The situation is illustrated in (58) (where we abstract away from irrelevant details).

(58)

$$
\begin{array}{c}
\text{CP } [M_{\#}] \\[-0.5em]
\end{array}
$$

```
(58)                    CP [M_#]
               ┌──────────┴──────────┐
           PP [B]               IP [θ_#, M]
         ┌────┴────┐          ┌──────┴──────┐
         P      DP [B]       DP          VP [θ, M, B_#]
                                       ┌──────┴──────┐
                                   t [M, B]        V [θ]
```
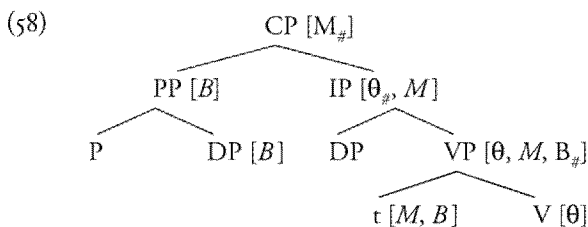
There is no real problem, however, with a trace that contains both a movement and a binding function, if we allow interpretation of the trace on the basis of one function to take priority over interpretation on the basis of the other. In particular, if the movement function takes priority and the trace is consequently interpreted as identical to the PP, a noncontradictory reading can be arrived at, because the binding function can then be related to a terminal in this moved PP. After all, matching under movement has the result that the binding function in the trace is matched with that in the PP.

If inserted material were visible in the host representation, the problem with structures like (44) could be solved in a similar way. We could say that interpretation of the syntactic terminal on the basis of insertion has priority over interpretation on the basis of the binding or movement function. Hence, those functions could be interpreted as related to a terminal within the inserted material, precisely the situation that should be ruled out. On the other hand, if inserted material is not visible in the host, no such difficulties arise, because interpretation on the basis of material that is not visible cannot take priority.

4.4.5 Summary

We have argued that parentheticals and complex words are related to the syntactic structure in which they occur in fundamentally the same way. The representation of these elements is not a building block of the host representation. It is, in fact, not present in this representation at all. Rather, two representations can be connected by a general process of feature matching that we have referred to as 'insertion' for want of a better name. The general effect of insertion is invisibility. Indeed, both parentheticals and complex words are invisible to operations that apply in the host structure.

A different matter is that elements from the host structure can sometimes satisfy selectional requirements imposed by inserted material. The type of selectional requirements thus satisfied differ for parentheticals and complex words. These differences follow on the one hand from the different nature of the various syntactic functions and on the other hand from the way inclusiveness discriminates between insertion in terminal and nonterminal nodes.

As a result, parentheticals cannot introduce licensing functions, unless these are independently motivated in the host node through copying from a daughter. In contrast, parts of complex words cannot introduce identificational functions that are satisfied in syntax. This is summarized in the tables below. (The asterisks signify that the relation in question cannot hold between an element in a parenthetical or word, and an element in the host representation.)

(59)

Parenthetical	*Identificational*	*Nonidentificational*
Licensing	*Movement	*Thematic
Nonlicensing	Binding	Negative polarity

(60)

Part of complex word	*Identificational*	*Nonidentificational*
Licensing	*Movement	Thematic
Nonlicensing	*Binding	Negative polarity

The syntactic invisibility of complex words and the ban on introduction of an identificational function by a part of a word explains the main generalizations that underlie lexical integrity without having to assume a lexical integrity principle. The theory also accounts for precisely those instances in which it is possible to associate a part of a word with a syntactic constituent.

4.5 INSERTION OF SYNTACTIC REPRESENTATIONS IN MORPHOLOGICAL REPRESENTATIONS

We now turn to a third type of insertion, that of syntactic representations in morphological terminals. As noted in section 4.2, such insertion should be possible if insertion is insensitive to the nature of the representations it connects. We claimed there that there is no asymmetry between syntax and morphology: they are parallel systems that interact through feature matching (and competition).

It is sometimes argued that a principle of lexical integrity has the effect that phrases are excluded from appearing as parts of words. On a formulation of lexical integrity as stating that the principles of syntax do not have access to the internal structure of words, phrases cannot be generated as parts of words (see for instance Bresnan and Mchombo 1995).

We agree that morphology cannot generate phrases, since this is by definition the realm of syntax. But this is not enough to exclude phrases from appearing in words: given that morphological objects can be inserted in syntactic terminals, there is no *a priori* reason why syntactic objects could not be inserted in morphological terminals, which would still allow morphological objects to contain phrases. To actually rule this out, an additional assumption is necessary, namely that insertion is asymmetric: words can be inserted in phrases, but not the other way around.

One might argue that this assumption follows from the building block theory of insertion, as it seems self-evident that 'smaller' units (such as words) may function as building blocks of 'bigger' units (such as phrases), but not the other way around. This presupposes a workable notion of 'bigger' and 'smaller' that is independent of whether a structure is morphological or syntactic. The only such notion that is available are bar levels. We could say that elements of the XP level may not appear under the X^o level (compare Chomsky 1986*a* and Baker 1988). Apart from the question of whether bar levels exist, the attempted reduction of the asymmetry of insertion to X-bar theory is not convincing, for the simple reason that X-bar theory in general does not forbid 'bigger units' to appear in 'smaller' ones. An XP complement is defined as immediately dominated by an X'-node.

We therefore fail to see that the supposed impossibility of phrasal embedding in words follows in any way from lexical integrity or the view that syntax and morphology are independent generative systems. It is merely a stipulated property of insertion in certain theories. (Conversely, this also means that if we find phrases in words, this is not an argument against syntax and morphology being independent.)

In contrast, we claim that insertion is perfectly symmetric. Other than the restrictions imposed by the notion of feature matching and inclusiveness, it is free to connect representations of arbitrary nature. Making insertion directional is not necessary in our view. The data show that insertion of phrases in words is indeed freely allowed, at least in some languages. The left-hand part of nominal compounds in particular can be phrasal in the Germanic languages (see also Botha 1981, Lieber 1983, Booij 2002). We give some English examples in (61a) below, mostly resulting from a ten-minute survey of the *Guardian* newspaper of 5 January 2002; Dutch examples are given in (61b). The first few examples in (61a) are structured as in (62), the others differ only in the category of the phrases involved.[10]

---

[10] An anonymous reviewer remarks that phrasal compounding sometimes involves 'pseudo-phrases that aren't allowed in the syntax'. We would analyse such cases as involving telegraphic speech: the pseudo-phrase is a well-formed syntactic expression with certain material omitted. Telegraphic speech occurs independently of the issue at hand; for example, in newspaper headlines (see Stowell 1991 for discussion).

(61)   a.   [[white water] rafting]; [[white van] man]; [[red letter]
              day]; [[lost luggage] department]; [[sit on the sidelines]
              Euro policy]; [[either way] offences]; [[not guilty] plea];
              [[animal to human] [transplant experiments]]; [[one to one]
              peg]; [[fixed rate] market]; [[root and branch] reform];
              [[full year] results]; [[low price] bitters]; [[no music] policy]
              and [[no smoking] areas]; [[go anywhere at any time] access];
              [[bragging about himself] calligraphy], [[building block]
              theory]

        b.   [[waarom leven wij?] probleem] (*why live we problem*);
              [[donkere bomen] bos] (*dark trees forest*); [[blijf van mijn lijf]
              huis] (*stay-away from my body home*); [[oud papier] handel]
              (*old paper trade*); [[uit je bol] muziek] (*out-of your head music*);
              [[hoestend publiek] syndroom] (*coughing audience syndrome*);
              [[hete lucht] ballon] (*hot air balloon*); [[ijs met slagroom]
              fobie] (*ice-cream with whipped-cream phobia*); [[bijna klaar]
              gevoel] (*almost ready feeling*).

(62)

```
                    N
              ┌─────┴─────┐
              N           N
              ↑
             NP
          ┌───┴───┐
         AP       N
```
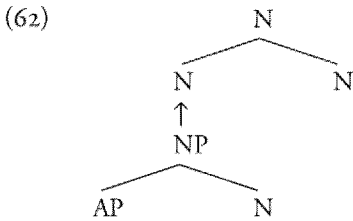
The possibility of phrasal embedding is not restricted to the nonhead pos-
ition of words. (63) gives some Dutch examples of compounds that seem to
be headed by a phrase. This observation appears to further disqualify the
building block theory of insertion. It is unlikely that phrases can project
words. In X-bar theoretical terms this would require a type of projection
that involves a decrease in bar level. Data like these can only be accom-
modated by a theory that allows for insertion of phrases in morphological
terminals.

(63)   [namaak [mobiele telefoon]] (*imitation mobile phone*); [rot [luie
        stoel]] (*rotten comfy chair*); [ex [aanstormend talent]]
        (*ex up-and-coming talent*); zo'n [zenuwen [elektrische viool]]
        (*such-a nerves electric violin* 'the type of electric violin that gets
        on your nerves'); dat [kanker [Juinense accent]] (*that cancer Juinen
        accent* 'that bloody Juinen accent'); [wereld [rode wijn]]
        (*world red wine* 'superb red wine')

Some of the examples in (63) may appear to involve phrases preceded by an adjectival modifier, but this is arguably not so, since in the relevant cases stress is leftmost, as is typical of compounds, and the initial element is systematically uninflected. Conversely, the phrasal heads themselves cannot be analysed as compounds, since the adjective they contain can be inflected and they have phrasal rather than compound stress. For example, the stress pattern of *námaak mobiele telefòon* 'imitation mobile telephone' is as indicated, with secondary stress on the final noun. The only possible analysis therefore is as in (64).

(64)

```
            N
        ⌒⌒⌒⌒
    X          N
               ↑
              NP
          ⌒⌒⌒⌒
       AP        N
```
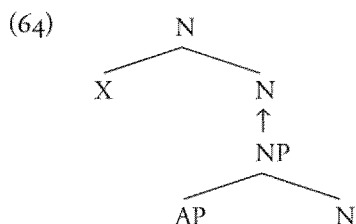
Given our reasoning in the previous sections, we predict that phrases embedded in words are invisible to processes in the morphological representation. Moreover, we expect that they cannot motivate an identificational function in the terminal in which they are inserted, while matching of nonidentificational functions should be unproblematic. Unfortunately, we are unable to construct examples that can be used to test these predictions and will therefore leave the matter open.[11]

As argued, the data in (61) and (63) do not bear on the issue of lexical integrity or the independence of syntax and morphology. Nevertheless, some

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[11] In earlier work, we have argued that there is binding in examples like (ia). If so, this would contradict the theory developed here, since an identificational function introduced by an anaphor within an inserted phrase is satisfied by an antecedent in the syntactic representation that hosts the word. We now think that this claim was mistaken in view of examples like (ib), which cannot possibly involve binding by an antecedent in the matrix clause.

(i) a. Harry heeft een [[bewondering voor zichzelf] achtig] gevoel.
       Harry has   an admiration   for himself like   feeling
       'Harry has a feeling resembling admiration for himself.'

    b. Zo'n   [[bewondering voor zichzelf] achtig] gevoel maakt
       such-an admiration   for himself like   feeling makes
       niemand sympathieker.
       no one sympathetic-er
       'Such a feeling resembling admiration for oneself makes no one any more sympathetic.'

authors have tried to deny that phrasal embedding in words is allowed, because they see a conflict between lexical integrity and such embedding. For instance, it has been suggested by Bresnan and Mchombo (1995) that all relevant examples in English involve lexicalized phrases. On the further assumption that lexicalized phrases are stored as a whole or have no internal structure at all, principles of syntax need not apply to them. According to Bresnan and Mchombo, this has the effect that the relevant examples do not violate lexical integrity.

For Dutch, this claim clearly cannot hold (see also Booij 2002: 146). Literally any phrase can appear in a compound (we have simply made up most of the examples in (61b)). We suspect that the same is, in fact, true of English. Several of the examples in (61a), brought up by our ten-minute survey, contain phrases which are unlikely to be listed, such as *animal to human*, *bragging about himself*, or *go anywhere at any time*. These are syntactically and semantically completely regular, and are not fixed expressions. Indeed, Bauer (1983: 164) notes that 'examples of root compounds formed on phrasal bases abound' (see also Carroll 1979). Some of Bauer's examples involving clearly unlisted phrases are given in (65).

(65) a. [[what do you think?] movement]
      b. [[don't tell me what to do] look]
      c. a blended historical-political [[only ninety miles from our shores] approach] to language
      d. Mr [[Purple People] Eater]

Note that the fact that the phrases inside compounds need not be listed is compatible with the theory of root compounding developed in Chapter 3. That theory requires that the compound as a whole be listed, but any constituents it contains need not be listed themselves (see the discussion of the examples in (62) in that chapter).

Another proposal to deal with the alleged problem that phrasal embedding in compounds poses for lexical integrity is made by Wiese (1996). His analysis resembles ours in an important respect, since the core idea is that we are dealing with a different, nonmorphological type of representation that is inserted in the nonhead position of a compound. So, it is indeed not the case that morphology is responsible for generating the phrases that appear in words. However, although the inserted representation is of a different nature, this different nature may not be syntactic according to Wiese (for reasons that are not entirely clear to us). Instead of being syntactic, the inserted material is supposed to be a quotation. Thus, the first example in (61a) would receive an analysis as in (66) (which may be contrasted with our analysis in (62)).

(66)

```
              N
           /     \
         N         N
         |
       'NP'
      /     \
    AP        N
```
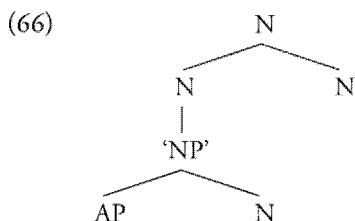
Wiese's arguments for the supposed quotational character of phrases embedded in words is that they can belong to a different code. For example, a German word may contain an English phrase (or vice versa); see (67a–b). Similarly, the lefthand part of a compound may be realized, not phonologically, but as a gesture. For instance, after hearing a lecture by a big-eared public figure, a journalist may make the remark in (67c) to a colleague (compare also McCawley 1988).

(67)   a.   die [['no future'] Jugend]
            the no   future   youth

       b.   the [['keine Zukunft'] youth]
             the no   future   youth

       c.   That was a typical [[⟨*gesture for someone with big ears*⟩] statement].

In our view, neither argument shows what it is intended to. With respect to the first it should be noted that code-switching is not restricted to the context at hand, but is frequently attested within syntax as well. For example, a DP in one language may occupy the subject position of a predicate in another language. One of the present authors actually produced the following a couple of hours before writing this (where *the neighbours* is English, while the rest of the sentence is Dutch):

(68)   The neighbours zullen wel   weer flink   gaan boren vandaag.
      the neighbours will probably again heavily go   drill   today
      'I'm afraid the neighbours will be drilling heavily again today.'

To us, it does not make sense to say that *the neighbours* is a quotation in any sense. More in general, code-switching is not a matter of continually quoting one language in sentences belonging to another. (As to the nature of the representations involved in code-switching, see Myers-Scotton 1993 for discussion.)

The same argument can be made with respect to gestures. The use of these as the lefthand part of compounds is merely a subcase of the general possibility of realizing certain syntactic constituents as gestures. This, too, is

possible within syntax proper. In the context given before for (67c), the journalist could also utter (partly utter, that is) the following sentence:

(69)   [⟨*gesture for someone with big ears*⟩] does not seem to like modern architecture.

The nonverbal gesture must be represented syntactically, as it satisfies such syntactic principles as the EPP and the θ-criterion. If it were not represented syntactically, the example would be severely ungrammatical. Note that it is again very unlikely that we are dealing with a quotation, since the journalist may well be coining the gesture on the spot. What the use of nonverbal gestures in both syntax and morphology shows instead is that the realization of syntactic or morphological constituents is not necessarily phonological (hardly a surprising observation in view of the existence of signed languages).

A general objection to an approach like Wiese's is that it would seem to be hard to falsify. The claim that phrases can only appear in words if quoted is testable only if there are independent grounds on which it can be decided whether a phrase is quoted or not (after all, anything can be quoted). To us, it seems that in none of the examples in (61a) the phrase involved is quoted. In what sense, for example, is *white water* in *white-water rafting* associated with an earlier utterance (while *water* in *water supply* is not)? Of course, one may claim that all examples do involve quotations, but then the notion of quotation is rendered vacuous.

In conclusion, insertion is free to associate nodes with matching features, and hence nothing rules out the possibility that features in the top node of a syntactic representation, for instance categorial features, are matched against the features of a morphological terminal. Our assessment of the data is that this type of insertion does indeed occur productively.[12]

This is not to say that phrasal embedding in words is always possible. To give an example, it has been observed by Hoeksema (1988) that, whereas nominal compounds may contain NPs as nonhead, DPs typically cannot function as such:

(70)   a.   an [$_N$ [$_{NP}$ old boys] network]
       b.   *a [$_N$ [$_{DP}$ the old boys] network]

As observed by Hoeksema, there appears to be a generalization that functional elements cannot head the lefthand part of a compound. We have no

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[12] In this respect it is interesting to note that children acquiring English freely accept phrasal compounding. As shown by Alegre and Gordon (1996), children can interpret *red rats eater* as 'someone who eats red rats'. The conclusion they draw from this is that '[p]erhaps children do not need to figure out that syntactic recursion is allowed in compounding if they never entertain the possibility that such processes might be prohibited in the first place.'

explanation to offer for contrasts as in (70), but speculate that they may be related to differences in possible semantics of words and phrases. In general, the semantics of words is more restricted than that of phrases, which implies that there may be phrases whose semantics cannot be integrated in a word.

Another restriction has to do with a difference between compounding and derivation. In general, phrasal derivation seems to be much more restricted than phrasal compounding. The following is clearly impossible:

(71)   *[[guitar with a wah-wah pedal] ist]
        'someone who plays a guitar with a wah-wah pedal'

On the other hand, phrasal derivation is not excluded across the board. Bauer (1983: 70) provides the following example with the suffix -*ish*:

(72)   I feel particularly [[sit around and do nothing] ish] today.

The question, then, is why derivation should differ from compounding in sometimes rejecting phrases as input, and what distinguishes possible and impossible cases of phrasal derivation. In the next chapter we will provide an answer to these questions.

4.6 CONCLUDING REMARKS

When a structure α is inserted in a structure β, α is often regarded as a building block in the operations of merger that create β. According to this view, inserted elements must be 'smaller' than the host representation and they must appear as terminal nodes. Insertion must also involve matching of the inserted material with a lexical entry. We have argued that matching is all there is to insertion: features on the top node of one representation are matched with those in a node in another representation.[13] In other words, the inserted representation is not a building block in the host structure—it is not

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[13] It may seem artificial to restrict insertion to the top node of the complex targeted by insertion, given that the relation is so free otherwise. If we allow for insertion of nonroot nodes, the theory developed here could perhaps be extended to structures dubbed *grafts* by van Riemsdijk (2000, 2001). Van Riemsdijk argues, convincingly in our view, that the analysis of transparent free relatives must involve two separate syntactic representations that share a constituent. In an example like *he carried what the crew took to be gasoline* the two representations are *he carried gasoline*₁ and *what the crew took to be gasoline*₂. The sharing of the underlined constituent need not be seen as a novel linguistic relation; instead it can consist of

present there at all. The process of insertion is hence not sensitive to the nature of the representations it connects, nor to whether the host node is a terminal or not. Not only can lexical items be inserted in syntactic terminals, but it is also possible to match a complex word with a syntactic terminal, a complex syntactic category with a morphological terminal and a complex syntactic category with a nonterminal in a different syntactic category. The model in (73) incorporates this view (the arrows external to the syntactic and morphological submodules indicate possible relations of insertion).

(73)

LEXICON

$$\downarrow \qquad\qquad\qquad\qquad\qquad \downarrow$$

SYNTAX

Phrasal Syntax		Word Syntax
$\downarrow$	$\leftrightarrow$	$\downarrow$
phrasal syntactic structure		word syntactic structure

$$\curvearrowright \qquad\quad \text{I N S E R T I O N} \qquad\quad \curvearrowright$$
$$\text{C O M P E T I T I O N}$$
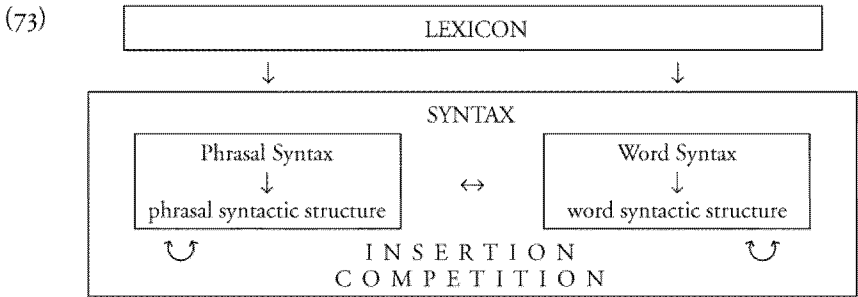
The possibility of insertion of a syntactic representation in a nonterminal of another syntactic representation accounts for the properties of parentheticals. Although inserted material is not present in the host, it can impose syntactic requirements on the host. Which requirements can cross parenthetical boundaries is, we have argued, determined by the condition that the antecedent must be licensed independently in the host. This is not a problem for antecedents of anaphors and NPIs, but arguments and heads of movement chains can only be related to an element in a parenthetical if a predicate or trace is present in the host as well.

Insertion of morphological representations in syntactic terminals explains the generalizations that underlie lexical integrity, in as far as these generalizations are correct. Since insertion is in terminals in this case, we expect that words differ from parentheticals in that any requirement can cross word boundaries. However, some requirements cannot originate in part of a complex morphological object, because their satisfaction leads to identification of the relevant antecedent with the syntactic terminal that hosts the inserted material. Requirements that are identificational in this sense encode movement and binding. In contrast, parts of words can be predicates or negative polarity items, since these are not identificational in the relevant sense.

the insertion of a nonroot node (*gasoline$_2$*) in a syntactic terminal (*gasoline$_1$*). This line of analysis carries over to the 'far from' construction: *a far from simple matter* consists of *far from simple$_1$* and *a simple$_2$ matter*, connected by insertion of *simple$_1$* in *simple$_2$*.

Finally, insertion of syntactic representations in morphological terminals is attested as well. This shows that 'larger' units can be inserted in 'smaller' ones, as predicted if insertion is simply a matching operation.[14]

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[14] There should in fact be a fourth type of insertion, namely of morphological representations in morphological nodes, giving rise to the morphological equivalent of parentheticals. A possible candidate is so-called expletive insertion, which gives rise to forms like *un-fucking-believable* (see McCarthy 1982 for discussion).

5

Distributed Selection

5.1 INTRODUCTION

In much work on word formation, morphophonological properties of morphemes are strictly separated from their semantic and morphosyntactic properties. A morpheme is not a unit taken from the lexicon and combined with other morphemes as a whole. Rather, its semantic and morphosyntactic features are inserted in the semantic and morphosyntactic components respectively, while only the morphophonological component contains its overt form. The three representations thus formed must of course be related, something which is achieved by a set of mapping principles. A range of proposals along these lines can be found in Sproat 1985*a*, Anderson 1992, Halle and Marantz 1993, Beard 1995, and Jackendoff 1997, amongst others. We will refer to models of this type as representationally modular (borrowing a term from Jackendoff).[1]

In this chapter we explore the consequences of the separation of morphosyntax and morphophonology for morphological selection. It is traditionally assumed that affixes select for an X° of a particular category (abstracting away from semantics). For example, the affix *-able* selects a V°, while the affix *-ize* selects an N° (or A°). Notice that such statements mention two different properties of the selected element. One is its category, the other

[1] There are precursors of this view in structuralist grammar, see for instance Hockett 1954. Also, as Jack Hoeksema (personal communication) points out, Montague grammar (see Montague 1973) can be regarded as a model of this type. We may also note that the notion of mapping rule is rather more common in other generative paradigms, in particular Lexical-Functional Grammar (see Bresnan 2000).

its bar-level. The former type of selection varies per affix, but the latter type holds of all affixes—indeed, it partially defines the notion 'affix' as commonly understood. Given that the two types of selection are qualitatively different, it would be desirable to distinguish them formally.

Representational modularity implies that there is no such thing as the selectional requirements of 'an' affix, since affixes are not monolithic entities, but rather the combination of morphosyntactic and morphophonological properties. This means that a distinction must be made between what the morphosyntactic part of the affix selects in the morphosyntactic representation and what its morphophonological part selects in the morphophonological representation. We propose that selection for category is associated with the morphosyntactic part of an affix, while the selection for bar-level is a by-product of its morphophonology. The morphophonological part of an affix is a dependent category, which, much like a simple clitic in the sense of Zwicky 1977, requires a base to form a phonological word with. In other words, morphological selection does not exist as such. It is the combination of two types of independently motivated selection: categorial selection in the morphosyntactic component and what one might call phonological selection in the morphophonology.

This view fits in well with the theory of insertion outlined in the previous chapter. The features of phrases apparently embedded in words are matched against those of a morphological terminal, but the phrases themselves are not present in the morphological representation. The head of a word can therefore not select for the bar-level of the inserted material: it cannot 'see' this material to begin with. However, the inserted material does, of course, play a role in the phonological realization of the word; hence the mapping principles that connect morphosyntax and morphophonology must have access to it. It is not surprising, then, that these principles can impose demands that have the effect that phrasal embedding is ruled out under certain circumstances.

The idea that selectional requirements must be distributed across components is familiar from selection at the sentence level. The separation between the syntactic and the semantic component assumed in most models of grammar makes it possible to distinguish between the syntactic and semantic selectional requirements of a head. As Grimshaw (1979) has shown, it is desirable that this distinction be made. For example, both *ask* and *wonder* select for an interrogative complement in the semantics, but *wonder* in addition selects for a CP in syntax. Hence the contrast between *John asked the time* and **John wondered the time*.

The purpose of this chapter is to argue that the separation of morphosyntactic and morphophonological selection is not only conceptually desirable, but has a number of empirical advantages as well. In particular, it explains under which circumstances constituents larger than heads (that is, phrasal

constituents) can be parts of words. For example, the morphophonological part of certain exceptional affixes can be shown to be a phonological word in its own right. Exactly such affixes are expected not to impose morphophonological selectional requirements, with the consequence that they may attach to phrases (or, more precisely, to a terminal in which a phrase is inserted). In the same vein, representational modularity allows certain affixes not to have a morphophonological part at all (zero derivation). In that case, too, no morphophonological requirements will be imposed, with the consequence that phrasal derivation is allowed.

Before we turn to the empirical advantages of distributed selection in sections 5.4 through 5.9, we need to clarify the details of the model that underlies the analysis. The nature of the morphosyntactic and morphophonological components is discussed in section 5.2, while the mapping principles that relate the two are the topic of section 5.3. Section 5.10 concludes the chapter.

5.2 MORPHOLOGY IN A MODULAR GRAMMAR

Theories that adopt representational modularity assume that phonology, semantics and syntax are independent generative systems associated by mapping principles. In other words, a sentence has a semantic, syntactic and phonological representation, whose well-formedness is determined by conditions particular to the respective components. In addition, grammaticality requires successful association of these representations. At the sentence level, then, the model of grammar we assume (following Jackendoff 1997) is as below (where ' $\leftrightarrow$ ' indicates mapping relations).

(1)   Semantics   Syntax   Phonology
       $\downarrow$ $\downarrow$ $\downarrow$
       Semantic structure $\leftrightarrow$ Syntactic Structure $\leftrightarrow$ Phonological structure
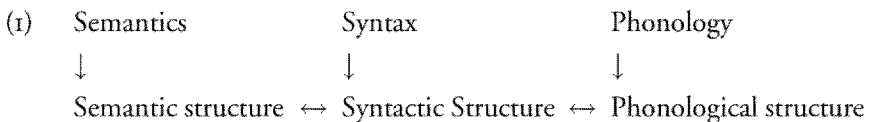
The motivation for an independent semantic component is not immediately relevant for the argumentation in this chapter. The evidence for a separation of syntactic and phonological structure is straightforward: phonological representations are not isomorphic to syntactic representations, and phonological and syntactic primitives are members of disjoint sets. A simple example illustrating this, borrowed from Jackendoff (1997: 26), is given in (2). In syntax, *a big house* is a DP that consists of a determiner and a complex NP complement. In phonology, it consists of two phonological words, the first of which is formed by the determiner and the adjective. So, both constituency and labels differ.

(2)   a. [$_{DP}$ a [$_{NP}$ [$_{AP}$ big] house]]
       b. [$_\phi$ [$_\omega$ a big] [$_\omega$ house]]

There does not seem to be a plausible continuation of the syntactic derivation that connects (2a) and (2b)—familiar syntactic derivations operate under informational monotonicity: by hypothesis they can add, but not destroy or change structure and labels (see also the discussion of inclusiveness in Chapter 4). The implication is that (2a) and (2b) are generated separately and associated by mapping principles. Indeed, this is the predominant view in the literature on the syntax–phonology interface (see Selkirk 1984, 1986, Nespor and Vogel 1986, Inkelas and Zec 1990, amongst others).

How does morphology fit into this picture? Let us begin by observing that it is not a component on a par with syntax, phonology, and semantics. A sentence has a syntactic, phonological, and semantic representation, but not a separate morphological one. Rather, morphosyntactic representations are matched, through insertion, to terminals in phrasal syntactic representations. Similarly, morphophonological representations are embedded in prosodic structures (although we have nothing to say about the exact nature of this embedding). It seems, then, that the situation at word level mirrors the situation at sentence level in that there are independent generative systems which define well-formed morphosyntactic, morphophonological and lexical-semantic representations. As is the case at the sentence level, these are associated by mapping principles. The model of grammar in (1) should hence be extended as in (3), following Jackendoff 1997 and Ackema 1999*a*.

(3)   SEMANTICS   SYNTAX   PHONOLOGY

Phrasal Semantics	Phrasal Syntax	Phrasal Phonology
↓	↓	↓
Phrasal semantic structure	Phrasal syntactic structure	Phrasal phonological structure
INSERTION ↔	INSERTION ↔	INSERTION
Word semantic structure	Word syntactic structure	Word phonological structure
↑	↑	↑
Word Semantics	Word Syntax	Word Phonology
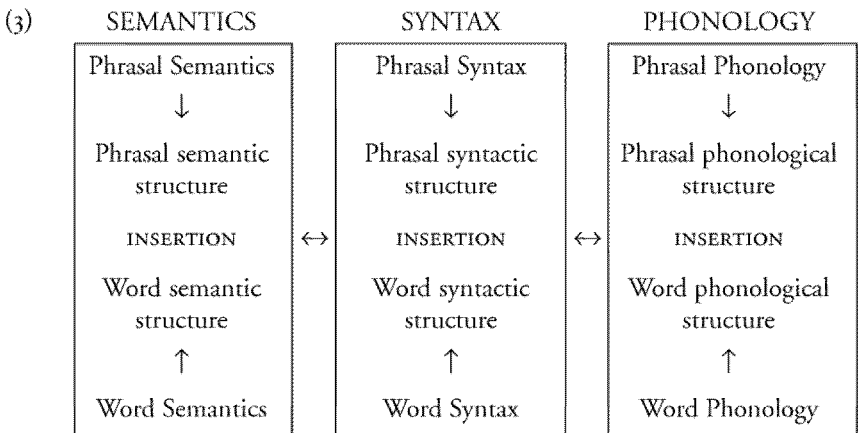
We have assumed throughout that the morphosyntax manipulates hierarchical representations, containing distinct structural positions for the morphosyntactic part of affixes and other morphemes. We will refer to affixal constituent parts of morphosyntactic representations as AFFIXes, to be

distinguished from /affix/es, which represent the overt form of an affix as inserted in the morphophonology. This notation will be generalized to other morphemes where relevant.

In case there is a one-to-one, left-to-right mapping of AFFIXes to /affix/es, the model sketched above is empirically indistinguishable from models assuming joint insertion of morphophonological and morphosyntactic (and lexical-semantic) material. However, differences arise in circumstances in which the mapping is not regular. Consider combinations of causative and applicative morphology. Presumably, the morphosyntactic structures of a causative applicative and an applicative causative are distinct, with the causative affix c-commanding the applicative affix in the former, while being c-commanded by the applicative affix in the latter.[2] Linear order will reflect this if there is one-to-one, left-to-right mapping (see (4a,a′) and (5a,a′)). The result by necessity obtains in models assuming joint insertion (see (4b) and (5b)).

(4)   a.   [[V APPLICATIVE] CAUSATIVE] ↔
       a′.   [[/v/-/applicative/]-/causative/]
       b.   [[⟨V,/v/⟩⟨APPLICATIVE, /applicative/⟩]
             ⟨CAUSATIVE, /causative/⟩]

(5)   a.   [[V CAUSATIVE] APPLICATIVE] ↔
       a′.   [[/v/-/causative/]-/applicative/]
       b.   [[⟨V, /v/⟩⟨CAUSATIVE, /causative/⟩]
             ⟨APPLICATIVE, /applicative/⟩]

The advantage of representational modularity is that it can handle cases in which mapping is not one-to-one and left-to-right, while maintaining the appropriate syntactic structures. An example is provided by Chimwi:ni (see Abasheikh 1978 and Hyman 2003). Postverbal morphology is templatic in this language. Crucially, the template refers to the /affix/es that spell out applicative and causative, not to the AFFIXes representing these categories in morphosyntax. In particular, the template requires that the causative /affix/ precedes the applicative /affix/. This does not affect the mapping of applicative causatives, but it has the consequence that a causative applicative surfaces as in (6b′). Hyman discusses evidence, based on the passive, that the syntactic representation must nevertheless be as in (6b). Such data cannot be

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[2] Note that c-command is a structural configuration that is defined over any hierarchical structure in the syntactic macromodule (see (3)). Thus it is not a notion that is particular to phrasal syntax, but plays a role in word syntax as well. More specifically, it determines scopal relations in words in much the same way that it does in phrases.

handled by the traditional hypothesis of joint insertion. (For similar cases from Quechua, see Muysken 1988.)

(6) a. *Template*: /causative/ - /applicative/
     b. [[V APPLICATIVE] CAUSATIVE] ↔
     b′. [[/v/-/causative/]-/applicative/]

The assumption that morphosyntactic representations are generated by merger of morphosyntactic constituents is in contrast with two major alternative approaches. Both of these in fact deny the existence of specifically morphosyntactic structure, but in different ways. According to the first, the internal structure of morphologically complex heads is derived by syntactic head-to-head movement (modulo possible post-syntactic readjustment rules). Our reasons for not adopting this view were given in Chapter 2.

The second alternative approach is represented by Beard's (1995) Lexeme-Morpheme Base Morphology (and to a more limited extent also by Anderson's (1992) A-Morphous Morphology). In this theory, there is no such thing as a complex head in morphosyntax. Rather, where other theories assume complex structures, Beard assumes rules which add features to a base. Such rules violate the principle of inclusiveness (see Chapter 4). In fact, the kind of rule needed to add a feature to a stem in the absence of an AFFIX is exactly what inclusiveness is intended to rule out. This is not necessarily a counterargument, but one cannot give up on inclusiveness without developing an alternative restrictive view of what licenses features of words. Simply denying that inclusiveness holds gives rise to an overgenerating syntax (both with regards to phrases and complex words), since it is tantamount to denying there should be a connection between the properties of a phrase or word and those of the material that it contains.

More directly problematic, perhaps, are the difficulties this model faces in regulating the order of /affix/es. This order should in principle be random as long as all features present in morphosyntax have their proper morpho-phonological consequence. However, in the normal case, /affix/ ordering corresponds to the order in which morphosyntactic operations apply (the mirror principle; see Baker 1985 and Grimshaw 1986). Beard addresses this issue by assuming that morphosyntactic operations result in layered feature bundles, rather than in unordered sets of features. This is a reasonable assumption, but it negates the basic premise of the model, since it reintroduces morphosyntactic structure. A layer in a feature bundle can be equated to an AFFIX position. Similar remarks apply to Stump's (1997) proposal that affixes are linearized by virtue of the position of the rule which introduces them in a sequence of rule functions.

Let us now turn to the principles that regulate the mapping between morphosyntactic and morphophonological structures.

5.3 MAPPING

5.3.1 Idiosyncratic Mapping Rules

A distinction can be made between idiosyncratic mapping rules and more general mapping principles. Idiosyncratic mapping rules are the counterpart in representationally modular models of traditional lexical items. The verb *read*, for example, is represented in the lexicon by the following (simplified) mapping:

(7) $\lambda y \, \lambda x \, [\text{READ} \, (x, y)] \ \leftrightarrow \ [\langle +V, -N\rangle, (\underline{\theta}_x, \theta_y)] \ \leftrightarrow \ /\text{ri:d}/$

Similarly, an affix like agentive *-er* is a lexical mapping between a semantic, a syntactic, and a phonological representation. The specific content of PRED in the semantics in (8) is supplied by the lexical conceptual structure of the verb that *-er* combines with (see Jackendoff 1990*a* for a formalization). Given that PRED requires specification, a form of morphosemantic selection results. In addition, the morphosyntactic AFFIX imposes morphosyntactic selectional requirements (it selects for a verbal category), while the morphophonological /affix/ needs a base to form a phonological word with:[3]

(8) $\lambda x \, [x \, | \, \text{PRED} \, (x)] \ \leftrightarrow \ [\langle -V, +N\rangle, (\underline{R}_x)] \leftrightarrow \ /{-}\text{ər}/$
$+[\langle +V, -N\rangle \underline{\quad}] \qquad +[_{\omega} \, /y/ \underline{\quad}]$

Given that we deal mainly with the mapping between morphosyntax and morphophonology in this chapter, we will not explicitly distinguish the morphosyntax and morphosemantics of a word or affix in much that follows. For example, in the interests of presentation we will refer to the PLURAL rather than 'the AFFIX associated with the semantics of plurality'.

The idiosyncratic mapping rules that constitute lexical items need not consist of one-to-one mappings. For example, in cases of phonologically

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[3] Since class-1 and class-2 affixes display different morphophonological behaviour, we may distinguish them phonologically. However, this does not require that they are attached at different levels in the morphosyntax, which would require selection for some sort of bar level after all. The relative order of the two types of affixes does not warrant such a distinction in attachment level either. There are productive examples of orders with a class-1 affix outside a class-2 affix, such as nouns of the form A#*ize*+*ation* (see Aronoff and Sridhar 1983). Instead, the ordering of affixes (at least in English) seems partially templatic in the sense that certain affixes impose restrictions on the particular affixes which they can follow (see Fabb 1988).

conditioned allomorphy, a rule associates a single AFFIX with two or more alternative phonological realizations (two or more /affix/es), whose distribution is sensitive to context. Similarly, in cases of homonymy, we do not need to assume several distinct /affix/es: two or more AFFIXes can be associated with the same phonological form (see Beard 1988).[4]

An idiosyncratic mapping rule also need not mention a single morphosyntactic terminal; it can also apply to combinations of (morpho)syntactic material. For example, next to the mapping rules that associate TOOTH with /tooth/ and PLURAL with /z/, there is a mapping rule which relates [TOOTH PLURAL] to /teeth/. This rule can be formulated as follows, where P(X) stands for the phonological realization of a (morpho)syntactic entity X:

(9)   If   PLURAL selects (a category headed by) TOOTH,
      then P(TOOTH, PLURAL) = /teeth/.

Since this mapping rule is more specific than the one that only mentions PLURAL, the elsewhere principle states that the latter is blocked where the former can apply, ruling out *[/tooth/ /z/]. Note that this does not mean that the lexicon contains multiple morphosyntactic morphemes that represent plurality (there is only one plural AFFIX).

The type of mapping rule in (9) can be extended to cases of idiosyncratic zero morphology. For example, the fact that the plural of *sheep* is identical to the singular can be stated using the rule in (10):

(10) If   PLURAL selects (a category headed by) SHEEP,
      then P(SHEEP, PLURAL) = P(SHEEP).

5.3.2 General Mapping Rules

Let us now turn to the more general mapping principles relevant for affixation. To begin with, there seems to be a principle that disfavours 'crossing correspondences' between morphosyntactic and morphophonological structures (see Marantz 1984 and Sproat 1985*a*). This constraint can be formulated as below (compare Sproat 1985*a*: 82). Note that without it we

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[4] We certainly do not claim that the existence of synonymy and homonymy as such is an argument for representational modularity, since all theories can deal with these phenomena. In fact, there is a strong tendency for overt forms to be linked to a single concept (von Humboldt's principle), presumably as a result of acquisitional strategies. Thus, although *-ist* and *-er* are both nominalizing affixes that derive names of persons, they have different semantics and c-selectional properties. Hence, in our terms, /ist/ and /er/ correspond to two different AFFIXes. The type of evidence we will provide in favour of representational modularity is not based on synonymy or homonymy.

would expect massive violation of the mirror principle. Random affix ordering would be the norm.

(11)   *Linear Correspondence*
        If   X is structurally external to Y,
                X is phonologically realized as /x/, and
                Y is phonologically realized as /y/
        then /x/ is linearly external to /y/.

Although we assume that in general mapping principles cannot be violated, languages may sanction violations in particular subdomains of word forma-tion. In fact, we have already seen an example which does not comply with (11). In Chimwi:ni, a morphophonological template overrules the ordering that would follow from linear correspondence (see (6)). This does not imply that the whole of Chimwi:ni morphology will fail to comply with (11): violations are restricted to those affixes specifically mentioned by the template.

    Moreover, violation of mapping principles does not occur without a trigger in those subdomains that allow it: a mapping principle can only be violated if forced by conflicting demands. For example, Hyman (2001) observes that where there is a conflict between the order imposed by (11) and the templatic order, certain Bantu languages allow both. However, if there is no conflict, only one order is allowed. This shows that violation of mapping principles must be triggered.

    Linear correspondence favours a particular ordering of /affix/es. Another, potentially conflicting, mapping principle states which host an /affix/ can attach to. So far, we have implicitly assumed that any host with which the /affix/ can form a phonological word will do. In reality, however, an /affix/ usually combines with the phonological correspondent of (the head of) the category that the AFFIX combines with. This condition, formulated in (12), is equivalent to Sadock's (1991) strong constructional integrity.

(12)   *Input Correspondence*
        If   an AFFIX selects (a category headed by) X,
                the AFFIX is phonologically realized as /affix/, and
                X is phonologically realized as /x/,
        then /affix/ takes /x/ as its host.

If the AFFIX selects a simplex category X, the effect of input correspondence is trivial: /x/ and the /affix/ form a phonological word. In case the AFFIX selects a more complex structure, (12) demands that the corresponding /affix/ forms a phonological word with the phonological realization of the head of that structure, rather than with the correspondent of anything else. In other

words, input correspondence favours a mapping of the left-branching morphosyntactic structure in (13a) onto the right-branching morphophonological structure in (13b).

(13)   a. $[[_x \text{ Y X}] \text{ AFFIX}] \leftrightarrow$
        b. $[[/y/ \ [/x/ \ /\text{affix}/]]$

Mappings of the type in (13) provide an alternative to what Hoeksema (1984) characterizes as 'head operations', morphosyntactic operations which affect the properties of a complex category by (apparently) applying to its head.

The effects of input correspondence become particularly clear when we consider cases in which it conflicts with linear correspondence. An example is provided by structures in which a complex left-headed category is selected by an AFFIX that is spelled out by a /suffix/ (see (14a)). For such structures, linear correspondence would favour mapping to (14b), whereas input correspondence would favour mapping to (14b').

(14)   a. $[[_x \text{ X Y}] \text{ AFFIX}] \leftrightarrow$
        b. $[/x/ \ [/y/ \ /\text{affix}/]]$
        b'. $[[/x/ \ /\text{affix}/] \ /y/]$

This means that in general morphosyntactic representations like (14a) cannot be successfully mapped onto a morphophonological form. Consider, for example, the case of left-headed Italian compounds. Some examples are given in (15).

(15)   a.   carta regalo
              paper gift
              'wrapping paper for presents'

        b.   carta carbone
              paper carbon
              'carbon paper'

These compounds resist further word formation with most, if not all, derivational suffixes. Although *carta* can be derived by *-iere*, *-aio*, and *-ista* (see (16)), the forms in (17) and (18) are all ungrammatical (Vieri Samek-Lodovici, personal communication).

(16)   a.   cart-iere
              'paper seller'

        b.   cart-aio
              'paper worker'

        c.   cart-ista
              'paper specialist'

(17)   a.   *carta regal-iere
        a′. *cart-iere regalo
        b.   *carta regal-aio
        b′. *cart-aio regalo
        c.   ??carta regal-ista
        c′. *cart-ista regalo

(18)   a.   ??carta carbon-iere
        a′. *cart-iere carbone
        b.   ??carta carbon-aio
        b′. *cart-aio carbone
        c.   ?carta carbon-ista
        c′. *cart-iste carbone

As already mentioned, languages may have subdomains of word formation in which the effects of one or more mapping principles can be suppressed. In the case of Italian, this is true of the plural (and perhaps also the diminutive). A morphosyntactic structure $[[_N \text{ N X}] \text{ PLURAL}]$ is mapped onto a morphophonological representation at the cost of violating a mapping principle. There is a clear preference to sacrifice linear correspondence, rather than input correspondence:

(19)   a.   cart-e regalo
             *paper-*PL *gift*
             'pieces of paper for wrapping presents'

        a′. *carta regal-i
             *paper gift-*PL

        b.   cart-e carbone
             *paper-*PL *carbon*
             'carbon papers'

        b′. *carta carbon-i
             *paper carbon-*PL

This preference is language-specific. As Scalise (1988) notes, Somali has left-headed compounds which are inflected on the second constituent (the nonhead).

We have claimed that even in those subdomains of word formation that allow violation of mapping principles, such violation does not occur without a trigger. With respect to pluralization of compounds, for example, we know of no languages in which a right-headed compound is marked for plural by a suffix on the left-hand constituent (the nonhead), a situation which would

involve gratuitous violations of both input correspondence and linear correspondence. Compare Scalise's (1988) typological schema for inflected compounds:

(20)   a.   head to the right; inflection to the right (occurs in English, Italian and Somali)
      b.   head to the left; inflection to the left (occurs in Italian)
      c.   head to the left; inflection to the right (occurs in Somali)

The missing option is indeed 'head to the right; inflection to the left'.

On at least one interpretation of linear correspondence and input correspondence, it seems that the input in (14a) can in fact be mapped without violating either. Suppose that the AFFIX is spelled out twice, both on the head and linearly external to the phonological correspondent of the left-headed compound:

(21)   a. $[[_x X Y] \text{AFFIX}] \leftrightarrow$
      b. $[[/x/ \ /\text{affix}/] \ [/y/ \ /\text{affix}/]]$

If the mapping principles in (11) and (12) require that *some* spell-out of the AFFIX occupies the relevant position in the morphophonology, (21) satisfies both of them. Indeed, such double realizations occur. Scalise (1988) gives the example in (22a,b); similarly, *carta carbone* marginally allows (22c) as a plural.

(22)   a.   mezza notte
         middle night
         'the middle of the night'

      b.   mezz-e nott-i
         middle-PL *night*-PL

      c.   ?cart-e carbon-i
         paper-PL *carbon*-PL

However, given that the pattern in (22) is not the only one attested, there must also be a mapping principle that is violated by multiple phonological realization of a single AFFIX. This is stated in (23) (which is equivalent to Noyer's (1993) uniqueness principle):

(23)   *Quantitative correspondence*
      No element in the morphosyntax is spelled out more than once.

Quantitative correspondence is independently motivated by the simple fact that, in the absence of conflicting requirements, AFFIXes are not normally spelled out more than once. Thus, [/read/ /able/ /able/] does not exist alongside [/read/ /able/].[5]

5.3.3 Predictions

Given that the mapping principles all refer to the phonological realization of elements in the morphosyntax, it will matter a great deal whether the elements in question do in fact have a phonological realization. If either an AFFIX or the head of the category it selects does not, all mapping principles discussed so far are vacuously satisfied. Consider first the case in which the head X of the selected category fails to be spelled out (it is a zero morpheme). Obviously, the /affix/ cannot form a phonological word with the nonexistent correspondent of this head. This does not mean that input correspondence is violated. Since the structural description of the rule in (12) states, as one condition, that 'X is phonologically realized as /x/', the condition is satisfied vacuously by the mapping in (24).

(24)   a.   [[ₓ Y X] AFFIX] ↔
        b.   [/y/ /affix/]

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[5] As a reviewer points out, the principle in (23) might have to be restricted to principal exponents in the case of inflection, given the existence of multiple exponence. Multiple exponence involves one /affix/ that realizes a feature F (the principle exponent of F) and another /affix/ that realizes another feature, but whose shape is also dependent on the presence and value of F. However, it is not always clear whether we need to assume that the second affix realizes F as well, or that we are dealing with a case of context-sensitive allomorphy triggered by the presence of the first affix.

In addition to multiple exponence, there are some other apparent counterexamples to quantitative correspondence. In Afrikaans, for example, there are double diminutives, such as *boon-tjie-tjie* (bean-DIM-DIM). Arguably, however, such examples involve two AFFIXes. Whereas a form with a single diminutive means 'little N', doubling leads to a different meaning, namely 'very little N' (that is, 'little little N'). In other cases, such as Dutch *kind-er-en* (child-ER-PLR 'children'), what is historically a plural marker has been reanalysed as part of an allomorph of the stem. Hence, *kinder* is not a plural form, something that is corroborated by its occurrence in a derivation like *kinder-lijk* 'child-like'—the suffix *-lijk* does not normally combine with plural nouns. Indeed, *kinderlijk* means 'like a child', not 'like children'. Finally, a reviewer points out the case of double plural marking in Breton discussed by Stump (2001). An example is *bag-où-ig-où* 'boat-PLR-DIM-PLR'. Such examples can possibly be analysed as a genuine violation of (23) motivated by a conflict with the other mapping principles, on a par with the analysis of forms like *cleaner upper* discussed in section 5.6 below. This explanation will only succeed if the diminutive suffix does not count as the head of *bag-ig* 'boat-DIM'.

Indeed, zero-derived words are themselves productively derivable (contra Myers 1984). For example, Don (1993) presents strong evidence that the Dutch verb stem *deel* 'divide' is derived from the noun *deel* 'part' by zero affixation.[6] Just like any other verb, *deel$_v$* can be input to further derivation by overt deverbal affixes, giving rise to such forms as *deelbaar* 'divisible', *deler* 'divisor/divider', *deling* 'division', etc. The relevant mapping is given below for *deelbaar*:

(25) a. $[[_v [_N \text{DEEL}] \text{AFFIX}_V] \text{BAAR}]$ ↔
      b. [[/deel/ /baar/]]

Note that even if the assumed direction of conversion is incorrect, and the noun is derived from the verb, the same argument obtains: the noun, too, can be derived (compare *gedeelte*, 'GE-part-TE' (part), *antideeltje* 'ANTI-part-DIM' (anti-particle)).

In cases like (24), the phonological correspondent of the AFFIX forms a phonological word with the correspondent of the nonhead Y. Given that Y is the nonhead, special lexical mapping rules that normally affect the spell-out of the combination Y-AFFIX do not apply. After all, such rules are conditioned by the AFFIX selecting a category headed by Y. For example, it can be argued that exocentric compounds such as *sabre-tooth* are really derived by zero affixation (see Kiparsky 1982 and Sproat 1988). In that case, the structural description of the rule in (9) does not obtain if this noun is pluralized. The reason is that PLURAL selects a category headed by AFFIX$_N$ rather than TOOTH:

(26) a. $[[_N [_N \text{SABRE TOOTH}] \text{AFFIX}_N] \text{PLURAL}]$ ↔
      b. [[/sabre/ /tooths/]]
      b'. *[[/sabre/ /teeth/]]

The case in (26) can be contrasted with endocentric compounds headed by TOOTH. If the plural AFFIX selects such a compound, (9)'s structural

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[6] The situation in Dutch is that there are regular and irregular verbs, and neuter and non-neuter nouns. Conversion pairs of nouns and verbs never involve an irregular verb and a neuter noun. Don explains this by assuming that conversion is directional. N-to-V conversion derives regular verbs, while V-to-N conversion derives non-neuter nouns. Note that such directionality effects are incompatible with analyses of conversion which do not involve derivation at all, but rather assume category-neutral stems which can be inserted in verbal or nominal inflectional contexts (compare Myers 1984, Marantz 1997, Josefsson 1998, and Borer 2003).

description *is* met and hence the rule will apply:[7]

(27)   a.   [[BUCK TOOTH] PLURAL] ↔
        b.   *[[/buck/ /tooths/]]
        b′. [[/buck/ /teeth/]]

Let us next consider the case in which it is not the head of a complex category selected by an AFFIX, but the AFFIX itself that is not overtly realized. Again, linear correspondence and input correspondence are vacuously satisfied with respect to this AFFIX. The prediction is that in such circumstances the position of the head of the selected category is irrelevant: it may follow or precede other overtly realized material. Both mappings in (28) satisfy all three mapping principles. In this respect, then, zero affixes impose fewer restrictions on their host category than overt affixes.

(28)   a.   [[$_x$ Y X] AFFIX] ↔
        a′. [/y/ /x/]
        b.   [[$_x$ X Y] AFFIX] ↔
        b′. [/x/ /y/]

A similar situation arises if the AFFIX is overtly realized as a phonologically independent element, rather than an /affix/. The point is that input correspondence states with what host an /affix/ should form a phonological word. It has nothing to say if an AFFIX is realized as a /word/ itself. As a consequence, both mappings in (29) satisfy all mapping principles.

(29)   a.   [[$_x$ Y X] AFFIX] ↔
        a′. [[/y/ /x/] /word/]
        b.   [[$_x$ X Y] AFFIX] ↔
        b′. [[/x/ /y/] /word/]

The remainder of this chapter explores the effects of the above view of the relation between morphosyntax and morphophonology for the distribution of phrases below the word level. Section 5.4 begins by discussing cases like (28) and (29) where the affix combines with a syntactic maximal projection. In section 5.5, we argue that the acquisition of English synthetic compounds involves a similar structure in its earliest stages. In later stages, it involves

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[7] An apparent counterexample is *tenderfoot*, whose plural can be *tenderfeet* as well as the expected *tenderfoots* (see Anderson 1992). What seems to be the case, then, is that all compounds showing unexpected regular inflection are exocentric, but a few apparently exocentric compounds (also) allow inheritance of irregular inflection. We suggest that *tenderfoot*, for the relevant subset of speakers, is endocentric (not zero-derived), with the head of the compound receiving an exceptional *pars pro toto* reading. Such a reading is also available for simplex words, and hence independently motivated (compare *all hands on deck!*).

violation of mapping principles in a particular subdomain of English word formation, which is discussed in more detail for the adult stage in section 5.6. Section 5.7 deals with cases in which an overtly realized AFFIX is attached to a phrase which is itself zero derived, resulting in structures comparable to (25). Section 5.8 discusses cases of phrasal derivation which are grammatical because the /affix/ and the phonological realization of the head of the phrase are adjacent. In section 5.9, it is shown that so-called mixed categories are just another instantiation of the constructions dealt with in sections 5.4 and 5.8.

5.4 AFFIXES THAT AREN'T

5.4.1 Phrases Embedded in Words

As noted in the previous chapter, it is not only possible to insert morpho-syntactic structures in phrasal syntactic structures, but also to do the opposite: phrasal syntactic structures can be inserted in morphosyntactic ones. We argued there that phrases productively appear as the nonhead of compounds. The following Dutch examples demonstrate this:

(30) a. een [$_N$[$_{NP}$ ijs   met slagroom]   fobie]
          an   ice cream with whipped cream phobia
          'an abhorrence of ice cream with cream'

      b. een [$_N$ [$_{CP}$ doe dat   nou niet] houding]
          a   do   that now not   attitude
          'a discouraging attitude'

      c. Ik prefereer [$_N$ [$_{PP}$ uit   je   bol] muziek].
          I prefer   out-of your head music
          'I prefer music that thrills.'

Given the option of incorporating a phrase into a compound, we might also expect phrases to show up as the nonhead in derived words. As noted above, the head of a word cannot see the material inserted in its sister, and hence in principle nothing blocks insertion of a phrase in the terminal that forms this sister:

(31)

X
    Y   AFFIX$_x$
    ↑
    ZP
...   Z   ...
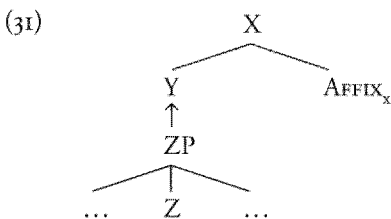
We will show that this option is indeed frequently attested. Nevertheless, there are various restrictions on this type of phrasal derivation that follow from the principles that regulate the mapping to morphophonology, as outlined in the previous section. These principles differ from morphosyntax proper in that they have access to both the morphosyntactic representation and the phrase inserted into it, if only to guarantee that the morphological terminal is spelled out as the phrase inserted in it. We therefore assume that when the mapping principles apply to a structure like (31), the morpho-syntactic representation and the representation of the inserted material are considered at the same time. Thus, the mapping of the AFFIX in (31) to its overt counterpart can depend on properties of the internal structure of ZP, such as the position of its head. The notions of selection and head as mentioned by input correspondence in (12) must therefore be understood in an extended sense. To be precise, we may define extended selection and extended head as follows.

(32)   a.   *Extended selection* (e-selection)
            α e-selects β iff (i) α selects β or (ii) α selects γ and β is inserted in γ.

       b.   *Extended head* (e-head)
            α is the e-head of β iff (i) α is the head of β or (ii) α is the head of γ and γ is inserted in β.

For 'head' and 'select' in (12), one should read 'e-head' and 'e-select'. However, for ease of exposition we will keep using the more common terms 'head' and 'select' when discussing mapping. Thus, we will speak, somewhat sloppily but economically, of 'the phrase selected by an AFFIX' and the head of that phrase, instead of 'the phrase inserted in the morphological terminal selected by the AFFIX' and its head.

Let us now consider how the mapping principles restrict phrasal affixation. We expect this to be problematic if the AFFIX corresponds to a /suffix/ and if the phrase is not head-final (or if the phrase is not head-initial and the AFFIX corresponds to a /prefix/). Consider (33a), where the AFFIX has a correspondent /suffix/. Input correspondence requires that this /suffix/ be combined with the correspondent of X, as in (33b). This, however, is only possible at the cost of violating linear correspondence, which favours (33c). Realizing the /suffix/ both adjacent to /x/ and at the right edge of the phrase, as in (33d), avoids this problem but in turn violates quantitative correspondence.

(33)   a.   [$_{xp}$ ... X YP] AFFIX
       b.   /x/ /affix/ /yp/

    c.   /x/ /yp/ /affix/
    d.   /x//affix/ /yp/ /affix/

Indeed, overt suffixation in Dutch normally cannot target a non-head-final phrase:

(34)   a.   [$_\text{N}$ [$_\text{N}$ BLOEM] IST]
           flower ist
           'florist'

    a'. [/bloem/ /ist/]
    b.   [$_\text{N}$ [$_\text{NP}$ BLOEM UIT AALSMEER] IST]
           flower from Aalsmeer ist

    b'. */bloem//uit/ [/aalsmeer/ /ist/]
    b''. *[/bloem//ist/] /uit//aalsmeer/^{8}
    b'''. *[/bloem//ist/] /uit/ [/aalsmeer//ist/]

The prediction that phrasal affixation should be possible if the phrase *is* head-final will be explored in sections 5.8 and 5.9. First we consider cases of such affixation in which no mapping principle is violated because the AFFIX does not correspond to an /affix/ and cases in which violation of the mapping principles is idiosyncratically condoned in certain subdomains of word formation.

5.4.2 AFFIXes Corresponding to /Word/s

As noted, an AFFIX may have a phonological counterpart which happens not to have selectional properties: although it spells out an AFFIX, it is not an /affix/, but a word-like element.[9] Arguably, this is the case for the Dutch suffixes -*achtig* 'like' and -*loos* 'less'. These seem to have selectional properties in syntax, given that they cannot occur as free forms:

(35)   a.   Vind jij dat groen? *Nou, hooguit achtig.
           Find you this green? Well, at-best like
           'Do you think that is green? Well, somewhat like it at best.'

    b.   Staat er   een panfluit op deze CD? *Nee, hij is
           Are there pan pipes   on this CD? No,   it is
           godzijdank loos.
           mercifully   less.
           'Are there pan pipes on this CD? No, thank God, there aren't any.'

---

    [8] Of course, *bloemist uit Aalsmeer* 'florist from Aalsmeer' is fine, but it refers to someone from Aalsmeer who sells flowers, rather than to someone who sells flowers from Aalsmeer.
    [9] The reverse, a syntactically free form that corresponds to an /affix/ also occurs. Simple clitics can be analysed along these lines. Moreover, Andrew Spencer (personal communication)

On the other hand, van Beurden (1987: 24) notes that 'words derived by
-*achtig* and -*loos* share characteristics with compounds rather than affixed
structures'. In particular, (*a*) -*achtig* and -*loos* are not stress-attracting, in
contrast to the other adjectival suffixes in Dutch (see van Beurden 1987 and
de Haas and Trommelen 1993: 312–14); (*b*) they do not trigger resyllabifica-
tion like other adjectival suffixes do, with the consequence that they feed
final devoicing of their host (see Booij 1977); and (*c*) like the right-hand part
of compounds, but unlike suffixes, they allow a preceding diminutive or a
linking *s* (see van Beurden 1987: 25). Some examples are given in (36).[10]

(36)   *Stress shift with adjectival suffixes, but not with* -achtig *and* -loos
    a.   víjand   vijándig   víjandachtig
         enemy   *enemy-y*   *enemy-like*
         'enemy'   'hostile'   'enemy-like'
         hártstocht   hartstóchtelijk   hártstochtsloos
         passion   *passion-ate*   *passion-less*

points out that the final morpheme in *postman*, typically pronounced without a full vowel, may
qualify as such. (See also footnote 12.)

[10] The distinction between -*achtig* and -*loos* and the other adjectival suffixes is not the same
as that between cohering and noncohering affixes in the sense of Booij 2002. Cohering affixes
form a closer prosodic unit with their host than noncohering ones. In particular, the former, as
opposed to the latter, cannot be independent syllables and hence resyllabify with their host.
Our proposal entails that within the group of noncohering affixes, there is another bifurcation.
Some noncohering affixes are independent phonological words (-*achtig* and -*loos*), while others
form a phonological word with their host. Examples of the latter type are adjectival -*baar* and
nominal -*dom*. Although Booij assumes that all noncohering affixes are independent phonolog-
ical words, the behaviour of -*achtig* and -*loos* is different from the other ones. First, like the other
adjectival suffixes -*baar* attracts stress. In this it differs from -*achtig* and -*loos*, and from heads in
compound structures. Thus, the examples in (i) form a minimal pair, which is unexpected if the
suffix -*baar* in (ia) forms an independent phonological word in the same way that the free
noun *baar* 'stretcher' does in (ib). Similarly, whereas -*achtig* and -*loos* can be preceded by an
unambiguous linking phoneme (see footnote 11), the other noncohering suffixes cannot (see (ii)).

    (i)   a.   [[uit kláp] baar]
                out fold able
                'collapsible'

           b.   [[úit klap] baar]
                out fold stretcher
                'stretcher that can be folded out'

    (ii)   a.   [hertog(*-s) dom]
                duke(-s)dom
                'duchy'

           b.   [werk(*-e) baar]
                work(-ᴇ) able

Resyllabification with adjectival suffixes, but not with -achtig and -loos

b. [$_\sigma$ rood]　[$_\sigma$ roo] [$_\sigma$ dig]　[$_\sigma$ rood] [$_\sigma$ ach] [$_\sigma$ tig]
　red　　　*red-y*　　　　*red-like*

　[$_\sigma$ vlees]　[$_\sigma$ vlee] [$_\sigma$ sig]　[$_\sigma$ vlees] [$_\sigma$ loos]
　meat　　　*meat-y*　　　　*meat-less*

Final devoicing before -achtig and -loos, but not before other adjectival suffixes

c. roo[t]　　ro[d]ig　　roo[t]achtig
　red　　*red-y*　　*red-like*
　vlee[s]　　vle[z]ig　　vlee[s]loos
　meat　　*meat-y*　　*meat-less*

Diminutive forms possible before -achtig and -loos, but not before other adjectival suffixes

d. vogeltjes　　　*vogeltjes-ig　　　vogeltjes-achtig
　bird-DIM-PL　　*bird*-DIM-PL-*y*　　*bird*-DIM-PL-*like*
　koekjes　　　　*koekjes-elijk　　　koekjes-loos
　cookie-DIM-PL　*cookie*-DIM-PL-*y*　*cookie*-DIM-PL-*less*

Linking s possible before -achtig and -loos, but not before other adjectival suffixes[11]

e. toon　　　　*twaalftoon-s-ig　　twaalftoon-s-achtig
　tone　　　*twelve-tone*-S-*y*　　*twelve-tone*-S-*like*
　hartstocht　*hartstocht-s-elijk　hartstocht-s-loos
　passion　　*passion*-S-*ate*　　*passion*-S-*less*

If *-achtig* and *-loos* are indeed to be characterized as /word/s rather than /affix/es, it follows from our view of m-selection that these suffixes can attach to non-head-final phrases without violating any of the mapping principles introduced in section 5.3. In particular, input correspondence is satisfied vacuously. Its structural description mentions an /affix/—hence, if we are not dealing with an /affix/, the condition does not apply.[12] This prediction is borne out, as (37) shows. (As before, the phrases used are not head-final.)

[11] Note that often it is unclear whether one is dealing with a linking phoneme or a plural. However, in the examples given here *s* cannot be a plural: the plurals of *toon* and *hartstocht* are formed with *-en*.

[12] English possessive *-s* also attaches to phrases, despite obviously being an /affix/ (compare *The king of England's head*). This can be explained if *-s* does not spell out an AFFIX, but a syntactically free form (on a par with the possessive pronoun in Dutch examples like *de buurman z'n book* 'the neighbour his book' (the neighbour's book)). This is comparable to Zwicky's (1977) analysis. In the proposed analysis, input correspondence does not come into play, and hence the /affix/ is free to attach to the /word/ that happens to be left-adjacent to it.

(37)   a.   zo'n [$_A$ [$_{CP}$ waar   gaat dat heen] achtig] gevoel
            such a   where goes that to   like   feeling
            'a somewhat worried feeling'

       b.   een [$_A$ [$_{PP}$ uit   je   bol] achtig] gevoel
            a   out-of your head like   feeling
            'a rather euphoric feeling'

       c.   een [$_A$ [$_{NP}$ ijs   met slagroom]   loos] bestaan
            a   ice cream with whipped-cream less   existence
            'a life without ice cream with cream'

       d.   een [$_A$ [$_{NP}$ dames met schoothondjes] loze] omgeving
            *a   ladies with lap-dog-*DIM-PL *less   environment*
            'an environment without ladies with little lap dogs'

So, Dutch adjectival suffixation provides a first illustration of the usefulness
of distributed selection: attachment of an AFFIX to a phrase will not lead to
violations of mapping principles (in particular input correspondence) if its
phonological counterpart does not have selectional properties, for instance
because it is a /word/ rather than an /affix/.[13]

5.4.3 AFFIXes that are Not Spelled Out

This conclusion extends to cases in which an AFFIX does not have a phono-
logical correspondent. It is predicted that attaching 'zero' affixes to phrases is
unproblematic, since an /affix/ must be present if phonological selectional
requirements (possibly leading to problems with mapping) are to be imposed.
One phenomenon that bears out this prediction involves the semantic opera-
tion through which an expression becomes a name for itself. We will refer to
this operation as 'autoreference'. As the following Dutch examples show,
almost any syntactic phrase can be turned into an autoreferential expression:

(38)   a.   Het 'wat is er   nou weer aan de hand' dat altijd
            the what is there now again on the hand that always
            uit   zijn kantoor schalt werkt op m'n zenuwen.
            from his office   sounds works on my nerves
            'The "now what?" that can always be heard coming from his
            office irritates me.'

---

[13] The pattern observed for suffixation can be replicated for prefixation. Some prefixes are
phonologically independent elements, and may consequently attach to phrases, even if they
are separated from the head of the phrase by other material. A Dutch example is *ex-* (as in *ex
aanstormend talent* 'ex up-and-coming talent'). Other prefixes (such as verbal *be-*, *ver-* and *ont-*)
are phonologically integrated, and those do not attach to phrases.

    b.   Men kon   het 'drie bossen tulpen voor een tientje' al
         one could the three bunches tulips for   a   tenner already
         van   verre horen.
         from afar hear
         'One could hear the "three bunches of tulips for a tenner" from afar.'

Autoreferential expressions are not marked as such by an /affix/. However, there is a strong case for analysing the operation that derives them as the attachment of an AFFIX (compare Kruisinga 1932). The point is that auto-reference changes the semantic and syntactic properties of the input phrase in a systematic way. First, whereas the embedded phrase may denote a question or proposition, the derived expression is referential. On a compositional view of semantics, this change in semantics must be encoded structurally. Second, autoreferential expressions in Dutch uniformly take the neuter determiner *het*, even if the embedded phrase would usually select the non-neuter determiner (see (39)). This change in gender can be attributed to the abstract autoreferential head, which apparently is neuter.

(39)   a.   De/*het   publicist is zeer populair.
          the-NON-NEUTER/*the*-NEUTER *publicist is very popular*

        b.   Het/*de   'publicist' op pagina 3 zou
          the-NEUTER/*the*-NON-NEUTER *publicist on page   3 would*
          ik liever vervangen door 'auteur'.
          I rather replace   by   author
          'I would rather replace the "publicist" on page 3 by "author".'

Third, Pinker (1998) observes that idiosyncratic spell-out rules, such as those for the plural of *tooth* (see section 5.3), cannot apply to words that are used autoreferentially. Instead, the regular spell-out rule for plural must be used (see (40)). This is because the autoreferential AFFIX destroys the context for application of the special rule: PLURAL does not attach to a category headed by TOOTH, but rather to one headed by this AFFIX. Hence, the analysis mimics that of *sabre-tooths* (compare (26)).

(40)   a.   Your teeth/*tooths look fine to me.
        b.   There are too many 'tooth's/*'teeth' in this chapter.

Fourth, the operation involves a change in syntactic status, both with respect to category and level of projection. Its input may be a syntactic phrase of any category, but its output consistently shows the distribution of a nominal head, as the example in (41) shows.

(41)   a.   [$_{DP}$ Dat [$_{NP}$ eeuwige [$_{N'}$ [$_N$ [$_{CP}$ wat   is er   nou weer
              that   eternal   what is there now again
              aan de hand] ø] van Jan]]] werkt op m'n zenuwen.
              on   the hand   of John   works on my   nerves
              'John's eternal "now what?" irritates me.'

        b.   [$_{DP}$ Dat [$_{NP}$ eeuwige [$_{N'}$ [$_N$ hoestje]   van Jan]]] werkt op
                  *that   eternal   cough-*DIM *of John   works on*
              m'n zenuwen.
              my   nerves
              'John's eternal cough irritates me.'

As opposed to syntactic complementation, the morphological operations of
compounding and affixation derive heads. However, compounding never
involves null heads and its semantics varies in unpredictable ways. The
formation of autoreferential expressions must hence be a case of zero
affixation. This implies that the examples in (38) bear out the prediction that
AFFIXes may attach to phrases without violating any mapping principle if not
spelled out.

   Further confirmation of this prediction comes from language acquisition,
as we argue in the next section.

5.5   THE ACQUISITION OF SYNTHETIC COMPOUNDS

In nonmodular theories of affixation, one cannot make a distinction between
the acquisition of an overt affix and the acquisition of its morphosyntactic
properties. For example, the syntactic and semantic properties of the English
agentive suffix *-er* cannot be acquired prior to the acquisition of *-er* itself.
Things are different if the process of affixation is distributed amongst dif-
ferent components. The option of forming subject names may well be
universal, given its existence in a wide range of languages (see also Beard
1995). In other words, the availability of a morphosyntactic agentive AFFIX—
call it ER—may well be part of the initial state. However, the phonological
form that corresponds to this AFFIX clearly varies from language to language.
This implies that children go through an acquisitional stage in which they
have the option of forming subject names—they can attach the relevant
AFFIX to a verbal category—even if they have not acquired the associated
/affix/ of the adult language yet. We predict that children at that stage can
produce subject names on the basis of non-head-final syntactic phrases. In

contrast, adults who have a phonological correspondent to the agentive AFFIX cannot do so without violating a mapping principle.

That children can form subject names on the basis of phrases is apparent from the acquisition of agentive synthetic compounds in English. As shown by Clark, Hecht, and Mulford (1986), children use the VO order typical of English syntax in such compounds before they start using the /affix/ *-er*. (That children have not mastered *-er* yet during this early stage is shown by Clark and Hecht (1982): children initially produce forms like *wash-man* and *open-man* when asked to form a simple agentive noun on the basis of verbs like *to wash* and *to open*.) During this early stage, the forms that are produced when synthetic compounds are elicited are as in (42).

(42)   *Stage I (around age 3): VO order, no overt affix*
   a.   a kick-ball   (someone who kicks a ball)
   b.   a build-wall   (someone who builds a wall)
   c.   a bounce-ball   (someone who bounces a ball)

As noted by Clark *et al.* (1986: 22), 'essentially, what children at this stage appear to do is nominalize the *verb phrases* in the descriptions they hear' (their emphasis). These data thus confirm the view that AFFIXes can attach to phrases without problems as long as they have no overt correspondent.

If there is an overt correspondent to ER, mapping problems will arise in cases where ER is attached to a non-head-final phrase. In the adult stage this generally does not occur. Rather, the relevant subject names are derived by synthetic compounding, which does not lead to problems with the mapping principles. However, in the development of grammar from the early stage I to the adult stage there is an intermediate stage in which the overt correspondent to ER has already been acquired, but the process of synthetic compounding is not yet available. At that stage, we witness a minimal violation of the mapping principles if the relevant type of subject name is elicited.

Consider what children must learn in order to reach the adult stage. As will be clear, they must acquire the phonological correspondent to ER. In addition a process of compounding must be introduced into their grammar. Following Lieber (1983) and Sproat (1985*a*), we have argued in Chapter 3 that agentive synthetic compounds in the adult language are derivatives of N–V compounds. *Truck driver* is thus assigned the following syntactic structure:

(43)   [$_N$ [$_V$ TRUCK DRIVE] ER]

The process of compounding has not been acquired yet at stage I, given that children do not produce subject names like *a ball-kick* in addition to the ones

in (42)—such forms would result from attaching ER to a compound verb while not spelling out this AFFIX.[14]

There are two reasons to assume that children face more difficulties in learning that English has N–V compounding than in learning that /er/ is the phonological realization of ER. First, whereas the existence of ER may trigger a search for an appropriate spell-out, no such trigger exists in the case of compounding (compare footnote 14). Second, whereas -er is a productive suffix and consequently relatively frequent in the child's input, N–V compounds are relatively infrequent (see Chapter 3). What we expect, then, is that after stage I there will be a stage in which /er/ is available to the child, but the operation of N–V compounding is not. As in stage I, the relevant morphosyntactic structures are as in (44a); (44b) is still unavailable.

(44)   a. $[_N [_{VP}$ KICK$_V [_{NP}$ BALL$]]$ ER$]$
        b. $[_N [_V$ BALL$_N$ KICK$_V]$ ER$]$

However, ER has a phonological correspondent at stage II (at around the age of four). Given the phonological selectional requirements imposed by /affix/es, (44a) can be mapped onto (45a), (45b), or (45c).

(45)   a. $[[_\omega$ kick er$]$ $[_\omega$ ball$]]$
        b. $[[_\omega$ kick$]$ $[_\omega$ ball er$]]$
        c. $[[_\omega$ kick er$]$ $[_\omega$ ball er$]]$

Each of these realizations violates a single mapping principle. We therefore expect the child to produce either one of these forms when forced to realize (44a). As explained in section 5.3, the mapping to (45a) violates linear correspondence, while (45b) and (45c) run counter to input correspondence and quantitative correspondence, respectively.

The predicted optionality does indeed occur. Clark *et al.* (1986: 25) show that ER is spelled out in the second acquisitional stage, which starts around the age of four, but that the verb and its object still show up in the head-first order typical of English syntax. Children then produce forms as in (46a–c), as expected.

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[14] Note that compounding is not a universal option in the way that some morphological operations encoded by AFFIXes may be. Even in a language that has compounding, there can be arbitrary gaps. English, for example, has both compounds with verbs as left-hand part (e.g. *swearword*) and compounds with adjectives as right-hand part (e.g. *honey-sweet*), but it nevertheless lacks V–A compounds (see Selkirk 1982: 15). V–A compounding also is not universally impossible, however; Dutch, for example, has compounds like *fonkelnieuw* 'shine-new' and *druipnat* 'drip-wet'. It is not very surprising that compounding is not universal, as it is not the expression of a semantically regular operation as opposed to the operation that relates a predicate to a subject name. See Chapter 3 for some discussion on this issue.

(46)   *Stage II (around age 4): VO order, overt affix on either V, N, or*
        both (in order of decreasing frequency)
   a.   a giver-present   (someone who gives a present)
   b.   a dry-hairer   (someone who dries hair)
   c.   a mover-boxer   (someone who moves boxes)

Since (46a) occurs more often than (46b), which in turn appears more fre-
quently than (46c), it seems that ranking of the three mapping rules is
necessary, with linear correspondence as the most easily violable one. This is
not something we will elaborate on, but we may point out that attachment of
ER to a phrase and subsequent violation of linear correspondence by children
is also required to explain data reported by Randall (1982). Randall shows
that children can interpret a phrase like *writer with a candy bar* as 'someone
who writes with a candy bar'; that is, as corresponding to a morphosyntactic
structure [[WRITE WITH A CANDY BAR] ER].

   Problems with mapping disappear when the child acquires the process of
N–V compounding (as would be evidenced by the appearance of N–V
compounds like *to baby-sit*).[15] This process makes available the morpho-
syntactic structure in (44b), which can be mapped onto (47). In this repres-
entation, /er/ has a base with which to form a phonological word, without
violating a mapping principle. The /affix/ is linearly external to /ball kick/, as
required by linear correspondence, it is attached to /kick/, as required by
input correspondence and ER is spelled out no more than once, as required
by quantitative correspondence. This phonological realization hence
becomes the norm in stage III, the adult state.

(47)   [[ω ball] [ω kick er]]

Although subject names are realized in various ways during acquisition, it
is correctly predicted that forms like (48) never occur. As pointed out in
section 5.3, such forms violate linear correspondence and input correspon-
dence gratuitously. They will be blocked by (47).

(48)   [[ω ball er] [ω kick]]

Interestingly, infrequent forms of the type produced in stage I survive in the
adult language. There is some idiosyncratic variation as to how ER is spelled
out. Of course, the regular realization of [VERB ER] is */verb/-/er/*, but there are

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[15] We assume that the acquisition of N–V compounding implies the possibility of forming
an N–V compound in which the noun is an argument of the verb. Such compounds will not
surface as such, due to the type of morphosyntactic competition discussed in Chapter 3.

lexical exceptions. In (49a), for example, ER is spelled out by /ist/, which normally spells out noun-selecting IST. In (49b) it is not spelled out separately, while (49c) is perhaps a case of complete suppletion.

(49)   a.   [TYPE ER] ↔ /type/+/ist/
        b.   [COOK ER] ↔ /cook/
        c.   [STEAL ER] ↔ /thief/

In line with section 5.3, idiosyncratic spell-out can be understood in terms of specific mapping rules (see the discussion of (9) and (10)). For example, /cook/ results from the rule given below, in conjunction with the regular spell-out rule for the verb COOK (recall that P(X) stands for the phonological realization of a (morpho)syntactic entity X).

(50)   If   ER selects (a category headed by) COOK,
        then P(COOK, ER) = P(COOK)

Suppose now that there is a specific mapping rule according to which ER is not spelled out when it merges with a particular verb-dependent combination, as in (51).

(51)   If   ER selects [$_\alpha$ V X], where α is a projection of V
        then P(α, ER) = P(α)

Usually if ER attaches to a V–X combination, this will give rise to a synthetic compound, for reasons just explained. However, if ER is not separately spelled out, its base may as well be a syntactic phrase with verb–object order since this will not lead to violations of any mapping principle. In other words, we expect that idiosyncratic subject names of the type just described can contain complete VPs. This is the case, as shown by the English examples in (52) (see also Bauer 1983: 205). A similar observation can be made for Dutch (see (53)) and for French (see Lieber 1992: 67). The relevant structures are comparable to the subject names produced in the English acquisitional stage I.[16]

(52)   a.   scare crow
        b.   pick pocket

---

[16] The same may be possible with other AFFIXes, for example ING: *you better behave or you'll find out what I mean by a smack bottom* (heard in *Shrek*, the movie). Note that the examples in (52) and (53) appear to have compound rather than phrasal stress. Although we have nothing to say about this issue, it indicates that stress is determined on the basis of the derived form, and not just on the basis of the phrase it contains.

      c.   know nothing
      d.   stay at home
      e.   pick me up

(53)   a.   weet al
         know everything
         'wise guy'

      b.   spring in 't veld
         jump in the field
         'madcap'

      c.   sta in de weg
         stand in the way
         'obstacle'

The Dutch examples consistently show verb-first order, which indicates that they are derived from CPs rather than VPs; see section 5.8 for some discussion.

To summarize, Clark *et al.*'s data are relevant for two reasons. First, as predicted by a modular view of selection, the acquisition of an /affix/ ultimately triggers a shift in the type of host the corresponding AFFIX takes. Once the overt affix is acquired, the option of attaching ER to a syntactic phrase disappears (except for idiosyncratic cases like (52), in which the regular spell-out rule for ER does not apply). Second, variation in the intermediate acquisitional stage II, as well as the absence of forms like *baller kick*, can be understood in terms of the three mapping rules introduced above. The effects of these mapping rules will be further explored in section 5.6.

5.6 SUBJECT NAMES IN THE ADULT LANGUAGE

Given the right circumstances, we may expect other instances of the type of forms found in acquisitional stages I and II to occur in the adult language. Recall that stage II arises as the result of the unavailability of N–V compounding to the child, while the phonological counterpart of ER, /er/, has already been acquired. Consequently, if certain other types of verbal compounding are absent in the adult language, so that the corresponding semantics can only be expressed syntactically, we expect subject names to pattern with stage II, rather than stage III.

An example of this can be seen in subject names derived from verb-particle combinations, as discussed by Sproat (1985*a*). Although a particle and a verb

can be combined syntactically, yielding verb-particle order, it is impossible to combine them in a particle-verb compound in English:

(54) a.   to throw away
      a'. *to away-throw
      b.   to stand in
      b'. *to in-stand
      c.   to let down
      c'. *to down-let

English does indeed have complex words that seem to consist of a preposition and a verb, but these are not related to the verb-particle construction. Examples are *outperform, overact*, and *underfeed* (see Selkirk 1982: 15). Such forms are clearly not morphological instantiations of the (nonexisting) verb-particle combinations **to perform out, *to act over*, and **to feed under*. Indeed, verbs of this type do not even seem to be compounds; they rather appear to be derived by prefixation. First, they do not have compound stress (on the left), but share the rightward stress pattern of other prefixed verbs. Second, they have a specialized semantics, often associated with degree. Such specialization is typical of affixes, while the semantic relation between the head and nonhead of a compound is unpredictable. Third, not every preposition can occur in the preverbal position. As far as we know, there are no P–V complexes with, for instance, *away, in, about*, and *across*. Such restrictions suggest that preverbal prepositions are listed as such, in contrast to the left-hand parts of compounds. It is reasonable to claim, then, that English lacks P–V compounds.

If so, the formation of subject names based on verb-particle combinations should be problematic in the adult language in the same way that synthetic compounding is during acquisitional stage II. Given a morphosyntactic structure in which ER is attached to CUT UP, for example (see (55a)), the morphophonological structures in (55b–d) are available. Like (45a–c), (55b–d) violate linear correspondence, input correspondence, and quantitative correspondence, respectively. If the synthetic compound *upcutter* were available, these forms would be blocked, but given the absence of particle-verb compounding in English this form does not enter into the competition.

(55) a.   [[CUT UP] ER]
      b.   [[ω cut er] [ω up]]
      c.   [[ω cut] [ω up er]]
      d.   [[ω cut er] [ω up er]]

Indeed, forms of this type are attested in adult English (see Bauer 1981: 288–9 and Sproat 1985*a*). Some examples are given in (56). (Which form is used

in particular cases is subject to lexical variation and possibly to phonological conditions; the type in (56c) is the most frequent, as observed by Yip 1978).

(56) a. passer by
      b. come outer
      c. cleaner upper

It seems, then, that ER suffixation presents a subdomain of English morphology in which violations of mapping principles are sanctioned when forced (see section 5.3).

There is, in fact, a fourth way of realizing a syntactic structure in which ER is attached to a verb–particle combination. As noted in the previous section, spell-out of a SUFFIX can be suppressed on an idiosyncratic basis, giving rise to forms like *scare crow*. The same occurs with derivations of certain verb–particle combinations. An example is *stand in*, the subject name derived from the particle verb *to stand in*. Since ER does not have a separate correspondent in (57b), all conditions on the placement of such a correspondent are satisfied vacuously.

(57) a. [[STAND IN] ER]
      b. [[$_\omega$ stand] [$_\omega$ in]]

As said previously, a mapping as in (57) is only available if there is an idiosyncratic rule that suppresses the regular realization of ER (see (58)). The implication is that the pattern will not extend to all subject names derived from particle verbs. This situation is comparable to the one found with subject names derived from verb–argument combinations, where there is a rule allowing idiosyncratic suppression of separate spell-out of ER in *scare crow* but not, for example, in **drive truck*.[17]

(58) If   ER selects [$_\alpha$ STAND IN], where α is a projection of STAND
      then P(α, ER) = P(α).

This situation contrasts with that obtaining when an AFFIX does not have a spell-out in the language at all. As with *stand in*, a derivation with such an AFFIX does not lead to problems with respect to mapping, but in this case no

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[17] Some nouns zero-derived from verb–particle combinations are object names rather than subject names (compare *a throw away*, *a handout*). Plausibly, these also involve affixation with ER, since this affix is independently known to derive object names occasionally when spelled out (see Booij 1986 and Beard 1990).

idiosyncratic spell-out rule is required to achieve this. Indeed, syntactic verb–particle combinations productively undergo regular V-to-N conversion:

(59)   [$_N$ make up]   [$_N$ let down] [$_N$ push up]
        [$_N$ give away] [$_N$ break in] [$_N$ break down]

Recapitulating, the contrast between subject names derived from verb-noun and verb-particle combinations originates in the fact that English has N–V but not Prt–V compounding. Consequently, synthetic compounds block any alternative realization of subject names derived from verb-argument combinations, while such alternative realizations can surface in the case of subject names derived from particle verbs.[18]

In this respect, there is an interesting contrast between English and Swedish. As in English, there are syntactic verb-particle combinations in Swedish, showing the expected head-first order (see (60)). However, there is also an option of combining verb and particle in a compound. In such cases, the verb follows the particle (see (61)). (For the coexistence of the forms in (60) and (61), see Chapter 3.)

(60)   stiga upp   resa av   låna ut   somna in
        rise up   *travel off* *lend out*   *sleep in*
        'to rise'   'to depart' 'to lend out' 'to fall asleep'

(61)   uppstiga   avresa   utlåna   insomna
        up-rise   *off-travel* *out-lend*   *in-sleep*
        'to rise'   'to depart' 'to lend out' 'to fall asleep'

---

[18] The absence of particle-verb compounds in English seems to imply that forms like **upcutter* should not occur at all. Unexpectedly, *onlooker, bystander, outlier,* and *inswinger* instantiate exactly this pattern. We propose the following account. It is in the spirit of representational modularity to assume that there is no linear order in (morpho)syntax. Thus, the right-hand head rule and the OV/VO parameter are mapping principles that determine the order in which a head and its dependents are spelled out (see Sproat 1985*a* for morphology and Neeleman and Weerman 1999 for syntax). According to this view, violation of the head-first nature of English syntax is a violation on a par with violations of the other mapping principles. This means that (i) illustrates another way of realizing subject names of verb-particle combinations. It satisfies the three mapping principles discussed earlier, at the cost of spelling out verb and particle in the wrong order.

(i)   a. [[LOOK ON] ER]
       b. [[$_\omega$ on] [$_\omega$ look er]]

So, examples of this type differ crucially from synthetic compounds like *truck driver*. The latter are derived compounds. They therefore do not violate any mapping principles and hence block other possible realizations. In contrast, forms like *bystander* are based on syntactic combinations spelled out incorrectly. Consequently, they do not block other realizations. Indeed, *onlooker* coexists with *looker on*.

That the forms in (61) are compounds is apparent from three properties in which they contrast with English preposition-verb combinations (analysed above as prefixed verbs). First, they display the stress pattern of compounds rather than prefixed verbs: stress falls on the particle (Gunlög Josefsson, personal communication). Second, the particles in (61) do not make a systematic contribution to the semantics of the particle–verb combination. This kind of semantic unpredictability is typical of compounds as opposed to prefixed verbs. Third, the range of prepositions that may precede the verb in structures like (61) is identical to the range of prepositions that may function as syntactic particles. This lack of restrictions is as expected of the left-hand part of compounds.

Given the availability of compounds of the type in (61), we expect subject names of verb-particle combinations to take the form of synthetic compounds in Swedish. If ER is attached to a particle-verb compound, as in (62a), no principles are violated in the mapping to the phonological representation in (62b).

(62) a. [[PRT V] ER] ↔
      b. [[$_\omega$ /prt/] [$_\omega$ /v/ /are/]]

Moreover, we expect that the patterns found with English derived particle verbs, which all violate a mapping principle, are ruled out in Swedish. This is correct, as (63) shows.

(63) a. angripare   utgivare
         on-clutch-er   *out-give-er*
         'attacker'   'publisher'

      b. *gripanare   *givutare
         clutch-on-er   *give-out-er*

      c. *gripare an   *givare ut
         clutch-er on   *give-er out*

      d. *gripare anare   *givare utare
         clutch-er on-er *give-er out-er*

We finally predict that Swedish children will go through an acquisitional stage comparable to the steady state for subject names of verb–particle combinations in English, namely when they have acquired the /affix/ that spells out ER but not yet the option of forming particle–verb compounds. As far as we know, there is no detailed study of the acquisition of subject names in Swedish, so that we do not know whether this prediction is borne out. However, the acquisition of participials indicates that the prediction may be

on the right track. Before particle–verb compounding is acquired, children produce participles as in (64) (from Håkansson 1998: 42), in violation of input correspondence. (The adult forms, after acquisition of particle–verb compounding, are the expected *uppätna* and *inlåsta*.)

(64)   a.   ätuppna
             eat-up-PART
        b.   låstinda
             load-in-PART

To summarize, the mapping between the syntactic and phonological struc-ture of words is restricted by three conditions. Violation of these conditions is only allowed in language-specific subdomains of morphology, so that phrasal affixation is severely restricted. In the remainder of the chapter we will argue that in two different types of circumstances phrasal affixation is possible without violating mapping principles. Under such circumstances, it occurs productively.

5.7   PHONOLOGICAL PHRASAL AFFIXATION

We have argued that AFFIXes can take a full phrase as their input; it is their phonological counterpart that needs a word as host. But not just any word will do. Input correspondence requires that the host of an /affix/ corresponds to the category selected by the AFFIX, or to the head of that category if it is complex. It is this that rules out ungrammatical cases of phrasal affixation:

(65)   a. $[_Y [_{XP} X \ WP] \ \text{AFFIX}] \leftrightarrow$
        b.   */x/-/wp/-/affix/

Interestingly, the phonological representation in (65b) is not ruled out across the board. Although it violates input correspondence if associated with (65a), no mapping principles are violated if prior to the attachment of the overt affix a process of zero derivation takes place. In other words, the syntactic structure in (66a) can successfully be mapped onto the phonological one in (66b).

(66)   a. $[_Z [_Y [_{XP} X \ WP] \ \text{AFFIX-1}] \ \text{AFFIX-2}] \leftrightarrow$
        b.   /x/-/wp/-/affix-2/

Linear correspondence is satisfied because /affix-2/ appears external to the material contained in Y and quantitative correspondence is satisfied because

no element is spelled out more than once. As we will now argue, input correspondence, repeated below in (67), is satisfied as well.

(67)   *Input Correspondence*
       If   an AFFIX selects (a category headed by) X,
              the AFFIX is phonologically realized as /affix/, and
              X is phonologically realized as /x/,
       then   /affix/ takes /x/ as its host.

AFFIX-2 in (66a) takes as its input a projection of AFFIX-1. Hence, (67) dictates that /affix-2/ must attach to the phonological correspondent of AFFIX-1, if there is one (as stated in the 'if X is phonologically realized as /x/' clause). AFFIX-1 does *not* have a correspondent, however. The conditional nature of the constraint therefore implies that it is satisfied vacuously in (66). /Affix-2/ is consequently free to attach to any adjacent word.

We predict, then, that AFFIXes with an overt counterpart, which cannot freely attach to phrases because of mapping problems, *can* productively take zero-derived phrases as their input. This prediction turns out to be correct. As (68a–c) show, the English plural SUFFIX and the Dutch diminutive SUFFIX, which both have an overt correspondent, can be attached to phrasal subject names in which ER idiosyncratically fails to be spelled out; (68d) gives a similar case involving conversion of V to N; in (68e–f), finally, auto-referential AFFIXation is followed by attachment of a progressive-like PREFIX and an agentive SUFFIX, which are again spelled out.[19]

(68)   a.   [[[STAND IN] ER] PL] ↔
       a′. [[$_\omega$ stand] [$_\omega$ in s]]
       b.   [[[SCARE CROW] ER] PL] ↔
       b′. [[$_\omega$ scare] [$_\omega$ crow s]]
       c.   [[[SPRING IN HET VELD] ER] DIM] ↔
       c′. [[$_\omega$ spring] [$_\omega$ in 't] [$_\omega$ veld je]]
            jump   *in the   field* DIM
            'little madcap'

[19] Since the PREFIX corresponding to *ge-* attaches to verbs, not nouns, (68e) must in fact involve two instances of zero derivation before prefixation takes place: the nominal head derived by the autoreferential AFFIX undergoes N-to-V conversion first. The verb thus derived does indeed exists: witness an example like *zit toch niet de hele tijd zo te wat-is-er-nou-weer-aan-de-hand-en* 'don't "what now" all the time' (lit. 'sit not the whole time to what-is-there-now-again-on-the-hand-INF'). A similar line of argumentation may apply to (68f,f′), since ER usually attaches to verbal categories.

d.   [[[PUSH UP] NOM] PL] ↔
d'. [[$_\omega$ push] [$_\omega$ up s]]
e.   [PROG [[WAT IS ER NOU WEER AAN DE HAND] AUTOREF]] ↔
e'. [[$_\omega$ ge wat] is er   nou weer aan de hand]
        GE *what is there now again on   the hand*
     'continuously saying "now what?"'
f.   [[[BAN DE BOM] AUTOREF] ER] ↔
f'. [[$_\omega$ ban] [$_\omega$ de bom er]]
     ban   the bomb ER
     'someone who adheres to the "ban the bomb" slogan'

Some evidence that the phonological structures are as indicated comes
from English progressive assimilation. The pronunciation of the plural
morpheme in examples like (68a',b',d') depends on whether the preceding
consonant is voiced (see (69a,b)). Since such assimilation does not take place
across word boundaries (see (69c)), the suffix must be part of the preceding
phonological word.

(69)   a.   stand in[z], scare crow[z]   (underlying /z/ surfaces)
       b.   push up[s], pick pocket[s]   (progressive assimilation)
       c.   pick pocket [z]en training (no progressive assimilation)

The combination of facts discussed so far strongly supports a modular view
of selection. Phrasal affixation is allowed either if the AFFIX does not cor-
respond to an /affix/ or if the head of the selected category is not spelled out.
Such sensitivity to the phonological realization of material cannot be
expressed in frameworks in which selection is not modular, since such frame-
works imply that zero morphemes and overt morphemes have the same
m-selectional properties.

5.8 SYNTACTIC PHRASAL AFFIXATION

The examples in (68) illustrate what one could call phrasal /affix/ation: the
phonological counterpart of a syntactic phrase hosts an /affix/. Still, due to
the intermediate step of zero derivation, the examples do not involve phrasal
AFFIXation: AFFIX-2 in (66) combines with a head derived by AFFIX-1. There
are circumstances, however, in which the mapping principles allow genuine
phrasal derivation by an overt affix. The mapping in (65) is infelicitous with
respect to input correspondence because /wp/ intervenes between /x/ and the

/affix/. Hence, if the derived phrase is head-final, the mapping to phonology should be unproblematic:

(70) a. [$_Y$ [$_{XP}$ WP X] AFFIX] ↔
      b. /wp/-/x/-/affix/

The grammaticality of (70) explains certain bracketing paradoxes which span morphology and syntax (see Pesetsky 1985, Sproat 1985*a*, Di Sciullo and Williams 1987, and Spencer 1988). Some English examples are given in (71). In all these cases, the /suffix/ combines with the phonological correspondent of the head of the syntactic phrase that its syntactic counterpart combines with (this analysis echoes earlier work by Sproat (1985*a*)).

(71) a.   [[ATOMIC SCIENCE] IST] ↔
      a′. [[$_ω$ atomic] [$_ω$ scient ist]]
      b.   [[GENERATIVE SYNTAX] IST] ↔
      b′. [[$_ω$ generative] [$_ω$ syntac tician]]

Although supported by the interpretation of the examples at hand, it may not be immediately obvious that the syntactic bracketing is as indicated. The analyses advanced by Williams (1981*b*) and Spencer (1988) assume that *atomic* and *generative* combine with *scientist* and *syntactician* respectively, on a par with examples like *crazy scientist* and *lazy syntactician*. According to this view, the mismatch in bracketing paradoxes like the ones in (71) is between their morphosyntactic structure and their semantics.

   Such an analysis is implausible for comparable cases in Dutch, as we will now argue. The examples we will look at are given below.[20]

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[20] According to Spencer (1988), such cases must involve a phrase listed in the lexicon. Hence, the impossibility of *a wooden guitarist*. We believe that this is by and large correct: most relevant forms are indeed derived from lexicalized phrases. However, the more basic notion relevant here seems to be that of the institutionalization of a concept, which of course often leads to lexical listing of the form expressing it. Phrases that are not yet lexically listed can be derived. Imagine that someone invents a hydraulic guitar (a new type of instrument operated by a hydraulic pump). It seems to us that in those circumstances (ib) is grammatical on the relevant reading, even if one does not know about hydraulic guitars. Upon hearing (ib) it is more likely that one will ask what a hydraulic guitar is than how Bob came to be hydraulic. The same line of argumentation holds of (ii) and (iii). (An analysis for these cases along the lines of (72) is motivated by the absence of a declensional schwa on the adjective; see below.)

(i) a. Bob speelt al   vanaf zijn derde hydraulisch gitaar.
         Bob plays already from his third hydraulic   guitar
         'Bob has played hydraulic guitar since he was three.'

(72)   a.   [[KLASSIEK GITAAR] IST] ↔
              [[$_\omega$ klassiek] [$_\omega$ gitaar ist]]
              classical   guitar ist

        b.   [[TRANSFORMATIONEEL GENERATIEF] IST] ↔
              [[$_\omega$ transformationeel] [$_\omega$ generativ ist]]
              transformational   generative ist

        c.   [[FINANCIEEL ADVIES] ER] ↔
              [[$_\omega$ financieel] [$_\omega$ advis eur]]
              financial   advice er

        d.   [[ROTTERDAMS KLAVERJAS] ER]
              [[$_\omega$ rotterdams] [$_\omega$ klaverjas er]]
              Rotterdam-style Klaberjass er
              'someone who plays Klaberjass (a card game) in the Rotterdam
              way'

In Dutch, as opposed to English, prenominal modifiers are conjugated. In
certain contexts, for instance if they are part of a definite DP, prenominal
modifiers must end in a declensional schwa. The phenomenon is demon-
strated in (73).

(73)   a.   de beroemd*(-e)   gitarist
              the famous(-DECL) guitarist

        b.   de productief*(-e)   generativist
              the productive(-DECL) generativist

        c.   de onbetrouwbaar*(-e)   adviseur
              the untrustworthy(-DECL) adviser

        d.   de slim*(-e)   klaverjasser
              the smart(-DECL) Klaberjass-player

        b.   Bob is de hydraulisch gitarist   van Bob and the Bananas.
              Bob is the hydraulic   guitarist of Bob and the Bananas

   (ii) a.   Bob verdient zijn brood met historisch-collectief onderzoek.
              Bob earns   his bread with historical-collective   research
              'Bob earns a living doing historical-collective research.'

         b.   Bob is een historisch-collectivist van naam.
              Bob is a   historical-collectivist of   name
              'Bob is a historical-collectivist with a good reputation.'

   (iii) a.   Daarnaast geeft hij ook prefixaal advies.
              In-addition gives he also prefixal   advice
              'In addition, he also gives prefixal advice.'

         b.   Bob is de prefixaal adviseur van de Nederlandse Taalunie.
              Bob is the prefixal   advisor of the Dutch   Language-foundation

In other contexts, such as the ones in (74), insertion of a declensional schwa is impossible. In the case of (74b,d), this is because we are dealing with adverbial, rather than adjectival modification. In (74a,c), the DP is indefinite.

(74) a. Hij speelt klassiek(*-e)   gitaar.
          he plays   classical(-DECL) guitar

      b. Zijn onderzoek is transformationeel(*-e)   generatief
          his   research   is transformational(-DECL) generative
          georienteerd.
          oriented

      c. Hij geeft financieel(*-e)   advies.
          he gives financial(-DECL) advice

      d. Zij wil   altijd weer Rotterdams(*-e)   klaverjassen.
          she wants always again Rotterdam-style(-DECL) Klaberjass
          'Again and again she wants to play Klaberjass in the Rotterdam way.'

The competing analyses of bracketing paradoxes make different predictions about the distribution of the declensional schwa in examples like (72). Analyses based on Williams 1981*b* or Spencer 1988 would assign these examples and the ones in (73) identical syntactic representations. Such analyses hence predict that the adjectives in (72) must carry a declensional schwa in definite contexts.[21] The analysis proposed here assumes that the modifier is part of a constituent that does not host prenominal declension elsewhere (as (74) shows), and therefore no such declension is expected, not even when a definite determiner takes the entire structure as its complement. The data in (75) bear out the latter prediction and thus confirm that overt suffixes may attach to head-final phrases. The asterisks indicate that the schwa cannot appear on the intended reading.[22]

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[21] Some speakers treat *klassiek(-e) gitarist* as a semantic bracketing paradox, and hence allow a declensional schwa (see below). This is impossible for the cases in which the modifier is an adverb rather than an adjective in the examples in (74). On the reading that does not involve a bracketing paradox, the declensional schwa is of course obligatory for all speakers. Thus, *de Rotterdamse klaverjasser* refers to a Klaberjass player from Rotterdam, while *de transformationele generativist* refers to a generativist who is transformational (if such a thing exists).

[22] One might think that Dutch examples like *klassiek gitarist* 'classical guitarist' could be analysed as synthetic compounds. They would then contain the A–N compound *klassiek gitaar* 'classical guitar', which does not occur in isolation, but which would be licensed when embedded under the derivational suffix *-ist* (compare our account of subject names like *truck driver* in Chapter 3). Although an analysis along these lines would explain the absence of a declensional schwa on the adjective, it must be rejected for other reasons. First, in nominal compounds stress falls on the nonhead (*básgitaar* 'bass guitar'), and this stress does not shift

(75)   a.   de klassiek(*-e)   gitarist
            *the classical(-*DECL*) guitarist*

       b.   de transformationeel(*-e)   generativist
            *the transformational(-*DECL*) generativist*

       c.   de financieel(*-e)   adviseur
            *the financial(-*DECL*) adviser*

       d.   de Rotterdams(*-e)   klaverjasser
            *the Rotterdam-style(-*DECL*) Klaberjass-player*

Note that adjectives modifying the person playing Rotterdam-style Klaberjass are declined regularly and hence end in schwa in the relevant context. Furthermore, they obligatorily precede modifiers of the card game:

(76)   a.   de bekend*(-e) Rotterdams(*-e) klaverjasser
            the well-known Rotterdam-style Klaberjass-player

       b.   *de Rotterdams   bekende   klaverjasser
            the Rotterdam-style well-known Klaberjass-player

The proposed analysis, which involves mismatches between morphosyntax and morphophonology, is not necessarily appropriate for all bracketing paradoxes. Since a morphosyntactic structure is not only mapped to a morphophonological representation, but also to a morphosemantic one, a mismatch can occur in the latter mapping as well as the former. This gives rise to a second type of bracketing paradox that yields to an analysis along the lines of Beard 1991 and Williams 2003. Such bracketing paradoxes do not involve phrasal affixation. Indeed, the presence of the declensional schwa in the examples in (77) shows that ER is attached to the verb rather than to a verbal phrase.

(77)   a.   een mooi*(-e) danser
            a   beautiful dancer

       b.   de warm*(-e) bakker
            the warm   baker
            'the bread-seller who bakes the bread himself'
            (not normally: 'the baker who is warm')

---

when *-ist* is attached (*básgitarist* 'bass guitarist'). In *klassiek gitarist*, however, stress is on the derivational suffix. Second, the adjective in nominal compounds has to meet certain criteria: it has to be simplex and Germanic. In contrast, the adjective in the bracketing paradoxes under discussion can be complex and non-Germanic, as illustrated by examples like *electrisch gitarist* 'electric guitarist'.

Further support for the option of overt suffixation of head-final phrases comes from the Dutch examples in (78). Although unusual, these examples are grammatical, a fact which can only be understood if their syntactic representations are as indicated. The point is that verbs follow, while nouns precede, their complements in Dutch. Consequently, the word order in (78) strongly suggests that the agentive AFFIX is attached to a VP. (If the nominalizing AFFIX were attached at the head level, the complement should occur to the right of the noun thus derived.)

(78)   a.   [[$_{VP}$ AAN DE WEG TIMMER] ER] ↔
        a′.   [[$_{\omega}$ aan] [$_{\omega}$ de weg] [$_{\omega}$ timmer aar]]
              on   the road   hammerer
              'careerist'

        b.   [[$_{VP}$ VAN MUGGEN OLIFANTEN MAAK] ER] ↔
        b′.   [[$_{\omega}$ van] [$_{\omega}$ muggen] [$_{\omega}$ olifanten] [$_{\omega}$ maak er]]
              from   gnats   elephants   maker
              'someone who makes a fuss about little things'

The proposed analysis of (71), (72), and (78) rules out bracketing paradoxes of the relevant type if the derived phrase is not head-final (see (65)). It is therefore correctly predicted that examples like those in (78) will not occur in a VO language like English. It is also predicted that examples like (71) and (72) will be ungrammatical if the head of the NP that hosts the AFFIX is followed by a PP. As shown by (79), this is indeed the case.

(79)   a.   [[HISTORY OF SCIENCE] IST] ↔
        a′.   *[[$_{\omega}$ history] [$_{\omega}$ of] [$_{\omega}$ scient ist]]
        b.   [[AUTONOMY OF SYNTAX] IST] ↔
        b′.   *[[$_{\omega}$ autonomy] [$_{\omega}$ of] [$_{\omega}$ syntac tician]]

In this light, it is interesting to compare the examples in (78) to the ones in (53). Deverbal AFFIXes can in principle attach to either VPs or CPs. Since Dutch is a verb-second language with head-final VPs, word order will be different in the two cases: verb-final and verb-initial, respectively.[23] This has direct repercussions for the realization of ER. As predicted, mapping to an /affix/ is unproblematic if ER has attached to a VP, but if it is attached to a CP, spell-out will violate either input correspondence or linear correspondence. It is no coincidence, then, that head-initial cases typically lack a separate spell-out of the nominalizing AFFIX, whereas in head-final cases ER is usually spelled out. Compare for instance (53b), repeated here as (80), with (78).

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[23] In the examples in (53) the verb is uninflected, but V-to-C is not exclusively a prerogative of verbs with finite inflection (see Johnson and Vikner 1994, Hoekstra 1997, and Hoeksema 2001 for discussion).

(80)   a.   [[_CP SPRING IN HET VELD] ER] ↔
        b.   [[_ω spring] [_ω in 't] [_ω veld]]

It is true that an AFFIX attached to a head-initial phrase could be spelled out
as a /prefix/ without violating any mapping principle. However, it is a per-
vasive property of category-changing affixes, such as the ones under discus-
sion, that they are realized as /suffix/es. The right-hand head rule is valid for a
large number of languages; most potential counterexamples in these lan-
guages have received alternative explanations (see Neeleman and Schipper
1992 and references mentioned there). In all languages in which the right-
hand head rule holds, then, the mirror image of (70) cannot exist. Of course,
things should be different in languages with left-headed morphology.
Although we will not go into this in any detail, Tagalog shows that, as expected,
AFFIXes attached to a head-initial phrase can be spelled out by a /prefix/ in a
language that has left-headed morphology (see Lieber 1992). The relevant
construction concerns phrases (of various categories) that are verbalized. An
example is given in (81) (from Schachter and Otanes 1972), where the verb-
alized phrase is *nasa akin* 'in my possession'.

(81)   a.   [_V PA [_PP NASA AKIN]] ↔
        b.   [[_ω p(a)-um-(n)a-sa] [_ω akin]]
             'come into my possession'

In conclusion, AFFIXes spelled out as /suffix/es cannot attach to phrases,
unless the phrase is head-final. Zero phrasal derivation, on the other hand,
may apply to non-head-final phrases as well. This difference is further illus-
trated by properties of mixed categories.

5.9   MIXED CATEGORIES

Although AFFIXes may in principle attach to syntactic categories at different
levels of projection, they often bring along semantic requirements that
restrict this freedom. The AFFIX that derives subject names, for example,
must bind the external θ-role of the head of its host. It can therefore not
combine with verbal projections in which this role is already satisfied, as
illustrated in (82).

(82)   a.   *a he-know(s)-all
        b.   *een zij-spring(t)-in-het-veld
             a   *she-jumps-in-the-field*

A similar requirement is imposed by the AFFIX that corresponds to /able/, which only takes inputs headed by verbs that have an unsaturated internal θ-role.

Restrictions of this type are not expected of AFFIXes that are thematically neutral. As long as the mapping principles are satisfied, AFFIXes that do not impose thematic requirements may attach to projections of various levels. As we will now argue, this provides a straightforward account of so-called mixed categories.

A mixed category is a phrase whose categorial features appear to change at some point in its projection line (see Jackendoff 1977, Abney 1987, Reuland 1988, Bresnan 1997, among many others). One example is the Dutch 'nominal infinitive' (see Hoekstra and Wehrmann 1985, Hoekstra 1986, and van Haaften *et al.* 1986). This construction is headed by an apparently verbal form, the infinitive. It has the internal syntax of a VP up to a certain point, above which it behaves like an NP. The point at which the switch in category takes place can be located anywhere in the verb's projection line (contra Lapointe 1999):

(83)   a.   Deze zanger is vervolgd   voor dat stiekeme jatten   van
            This singer is prosecuted for   that sneaky   pinch-INF *of*
            succesvolle liedjes.
            successful   songs
            'This singer has been prosecuted for sneakily pinching successful songs.'

       b.   Deze zanger is vervolgd   voor dat stiekeme succesvolle liedjes
            This singer is prosecuted for   that sneaky   successful   songs
            jatten.
            pinch-INF

       c.   Deze zanger is vervolgd   voor dat stiekem   succesvolle liedjes
            This singer is prosecuted for   that sneakily successful   songs
            jatten.
            pinch-INF

In (83a) the verbal projection is nominalized at the lowest level. Its head behaves like a noun in three respects: (*i*) it precedes its internal argument, which is a prepositional phrase, (*ii*) it is modified by an adjective (as is shown by the declensional schwa on *stiekem*, which never occurs on adverbs), and (*iii*) it follows a determiner. In (83b), the internal argument is a DP in pre-head position, the typical realization of the internal argument of a verb. It seems, then, that nominalization takes place after merger of the object. From this point upward, however, the phrase shows the same nominal character-istics as before. In (83c) nominalization takes place at yet a higher level, as indicated by the fact that the argument-verb combination is now modified by

an adverb rather than an adjective (as is shown by the fact that *stiekem* does not carry a declensional schwa).

An analysis in terms of a projection that switches category predicts that no nominal elements are to be found below the level at which nominalization appears to take place, that is, below the level that still shows verbal syntax. Conversely, we do not expect *verbal* elements to be found *above* a level at which nominalization already appears to have taken place. Borsley and Kornfilt (2000) argue extensively that this prediction is correct. It is easy to illustrate this for the nominal infinitive. Once the projection is nominalized, as indicated by the presence of an adjective, subsequent merger of adverbials is barred (see Hoekstra and Wehrmann 1985):

(84)   a.   Deze zanger is vervolgd voor dat constante stiekeme liedjes
            This singer is prosecuted for   that constant   sneaky   songs
            jatten.
            pinch-INF

       b.   Deze zanger is vervolgd voor dat constante stiekem liedjes
            This singer is prosecuted for   that constant   sneakily songs
            jatten.
            pinch-INF

       c.   *Deze zanger is vervolgd voor dat constant   stiekeme liedjes
            This   singer is prosecuted for   that constantly sneaky   songs
            jatten.
            pinch-INF

       d.   Deze zanger is vervolgd voor dat constant   stiekem liedjes
            This singer is prosecuted for   that constantly sneakily songs
            jatten.
            pinch-INF

So, an analysis of mixed categories in terms of a category change at variable levels of projection is attractive enough.[24] One of the first to propose such an analysis was Jackendoff (1977), who introduced the 'deverbalizing rule scheme' in (85).

(85) $N^i \rightarrow V^i$ affix$_N$

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[24] The literature contains at least three alternative lines of analysis. The first has it that in mixed categories a single affixed head projects an ambiguous set of categorial features (see van Haaften *et al.* 1986) or two different sets of categorial features (see Reuland 1988 and Lapointe 1999), thereby extending the theory of phrase structure specifically for these cases. The second denies that mixed categories are derived by affixation. Pullum (1991) proposes that in gerunds the projection changes category by itself as it were, on the basis of gerund-specific projection rules. Spencer (1999) develops a variant of this analysis in terms of argument

An important feature of most analyses based on something like (85) is that they identify 'affix$_N$' with the overt affix that shows up on V. Thus, *-en* is seen as the spell-out of the nominalizing affix in Dutch nominal infinitives, which implies that the structures in (86) hold of the examples in (83), where EN is the AFFIX that corresponds to /en/. (See Hoekstra 1986 and van Haaften *et al.* 1986 for discussion.)

(86)

a.
```
            DP
          /    \
         D      NP
              /    \
            AP      N'
                  /    \
                 N      PP
               /   \
              V     EN
```

b.
```
            DP
          /    \
         D      NP
              /    \
            AP      N'
                  /    \
                 V'     EN
               /   \
             DP     V
```

c.
```
            DP
          /    \
         D      NP
              /    \
            VP      EN
          /    \
        Adv     VP
              /    \
            DP      V
```
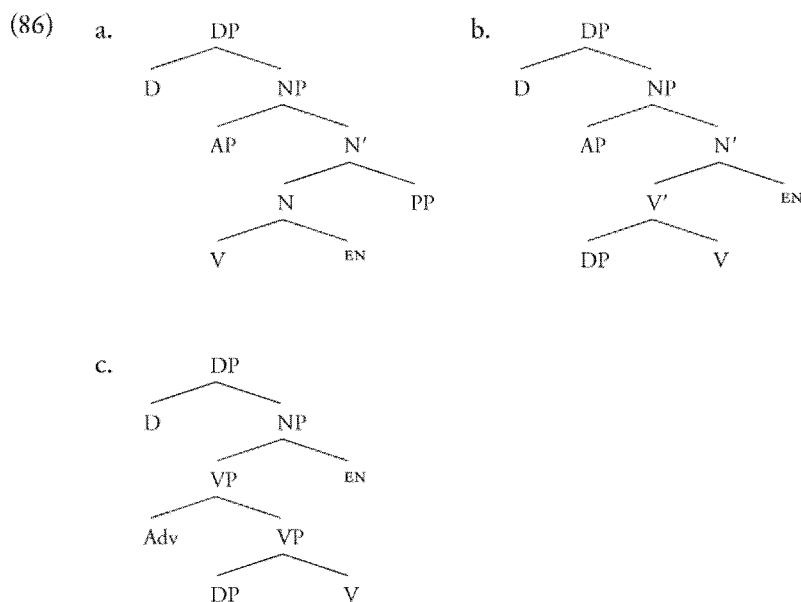
Although possible, this is not a very likely analysis. The point is that /en/ never spells out a category-changing AFFIX in any other case than this. Elsewhere it is the phonological realization of a non-category-changing

structure. Since the properties of a mixed category can no longer be derived from the material it dominates, such analyses would seem to violate compositionality (if the change is semantic) or inclusiveness (if it is syntactic)—again, a qualitative extension of the theory in order to deal with these specific cases. The third line of analysis is based on the idea that lexical heads are not specified for category, and that the categorial properties of the projected phrase are determined by the functional heads it contains (see Marantz 1997, Schoorlemmer 2001, and Borer 2003). Although such analyses satisfy inclusiveness, they face some other problems. First, they cannot account for the directionality of conversion. Don (1993) shows that V-to-N conversion and N-to-V conversion pairs differ crucially, something which approaches of this type cannot capture. Second, such approaches do not allow nominalization at intermediate levels: only full lexical projections can be the complement of a nominal functional head. Hence, examples like (83b) and (84b) are unexpected. This problem can be solved at the cost of a sufficient number of verbal functional projections, namely one per XP that may accompany the lexical head (see Alexiadou 1997 and Cinque 1999). It is not obvious that such a proliferation of functional structure is desirable (see Bobaljik 2000 and Haider 2000 for discussion).

infinitival marker. Thus, the proposed analysis is *ad hoc*: /en/ must be assumed to be associated with a nominalizing AFFIX, as well as being associated with the infinitival marker, only to account for the mixed category (see Schoorlemmer 1999 for similar argumentation).

If the overtly realized AFFIX is not responsible for the category change, but we still wish to maintain the analysis of the nominal infinitive as derivation at various levels of the verbal projection, the most straightforward conclusion is that the construction involves a second AFFIX, which is not spelled out.[25] Hence, we analyse the examples in (83) as below.

(87)   a.   DP   b.   DP

                   D   NP   D   NP

                       AP   N'   AP   N'

                              N   PP   V'   AFF

                         V-EN   AFF   DP   V-EN

        c.   DP

                   D   NP

                       VP   AFF

                  Adv   VP

                       DP   V- EN
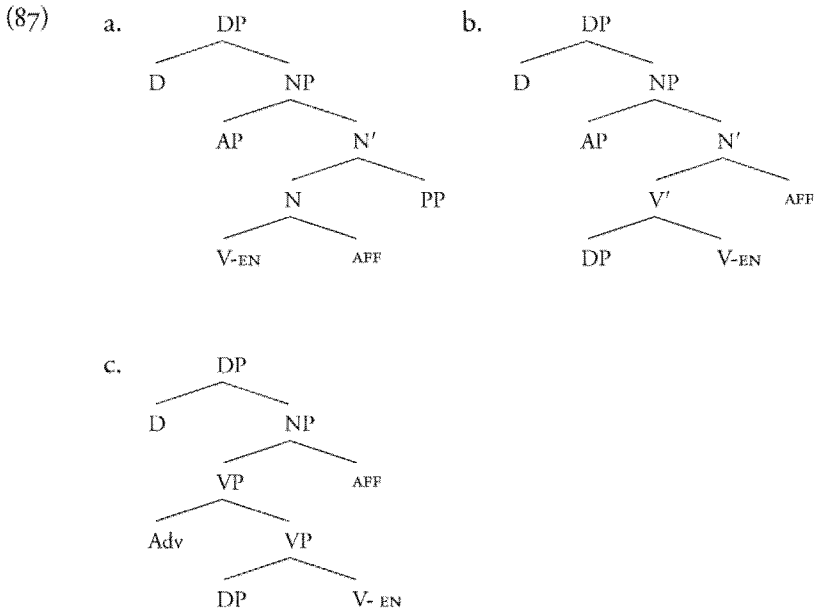
Our view of m-selection makes clear predictions concerning the question in which languages the AFFIX involved in the derivation of a mixed category can

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[25] At this point, it should be noted that all examples of phrasal zero affixation we have discussed derive a nominal category. In contrast, phrasal zero derivation to a verbal category seems much rarer. It does occur, however. The example in (ia) is from *The Long Goodbye*; (ib) is from a Monty Python sketch in which Mrs Sartre complains about her husband messing up the apartment.

(i)   a. Three adjectives, you lousy writer. Can't you even [$_V$ stream-of-consciousness]
          you louse without getting it in three adjectives for Chrissake.
      b. Revolutionary leaflets everywhere. One of these days I'll [$_V$ revolutionary
          leaflets] him.

Similarly, a Dutch example like (ii) seems acceptable to us in the context of someone training for a black belt in some martial art. Note that *zwarte band* must be an NP rather than a nominal compound, given that the noun bears stress and the adjective is inflected.

be spelled out. Recall from section 5.8 that the mapping in (88) violates input correspondence while the mapping in (89) does not.

(88)   a. $[_Y [_{XP} X WP] \text{ AFFIX}] \leftrightarrow$
       b.   */x/-/wp/-/affix/

(89)   a. $[_Y [_{XP} WP X] \text{ AFFIX}] \leftrightarrow$
       b.   /wp/-/x/-/affix/

What we expect, then, is that mixed categories can involve overt suffixation of head-final syntactic phrases, while they must involve zero affixes in case the syntax is head-initial and the morphology characterized by the right-hand head rule (see also Lapointe 1999). Of course, head-final languages may also employ zero affixes (as is the case in the Dutch nominal infinitive), but they do not have to.

These predictions seem to be correct. Mixed categories in head-initial languages with head-final morphology appear to be systematically derived through zero affixation.[26] Perhaps the best-known mixed category is the English gerund, for which Jackendoff originally proposed the deverbalizing rule scheme in (85).[27] As expected, gerunds are not marked by an overt nominalizing suffix:

(90)   a.   John's constant singing of the Marseillaise
       b.   John's constantly singing the Marseillaise

(ii)   Hij moet elke avond $[_V$ zwarte band]en.
       he must every evening black belt-INF
       'He must train for his black belt every evening.'

We do not know why phrasal conversion to V is so much rarer than phrasal conversion to N. For some relevant discussion, see Baker 2003. To complete the picture, we may note that phrasal conversion to A seems productive, at least in certain registers:

(iii)   a.   This is too $[_A$ last year] to wear.
        b.   That music is so $[_A$ early eighties].

[26] It is sometimes argued that past participles in languages like English are mixed categories, which, if correct, would be an obvious counterexample to this claim. However, phrases headed by a past participle are not mixed categories. Instead, there are two participles, one adjectival and the other verbal (the latter being historically related to the former). The adjectival participle heads a phrase which is fully adjectival, the verbal participle heads a phrase which is fully verbal—but a participle never heads a phrase that changes category midway. For arguments, see Wasow 1977, Williams 1982, and Ackema 1999*a*.

[27] A curious property of the English gerund is that the equivalent of (83b) is impossible. If the nominalization involves more than just the head, modification by an adjective is impossible: *John's *constant/constantly singing the Marseillaise is terrible* (see Pullum 1991). Wescoat (1994) and Malouf (1998) note, however, that until the beginning of the twentieth century examples like *the untrewe forgyng and contryvyng certayne testamentays* and *my wicked*

Like Dutch /en/, English /ing/ only seems to be related to a nominal AFFIX in the construction at hand. Elsewhere it corresponds to the AFFIX that derives the present participle.[28] An analysis of nominal gerunds as involving overt affixation must therefore rely on a homophony for which there is no independent evidence. Moreover, in (90b) /ing/ seems to appear internal to the phrase that the corresponding AFFIX attaches to, which would constitute a violation of linear correspondence. These observations do not as such invalidate an analysis in terms of overt affixation, but an alternative that avoids these problems would be preferable. Following Yoon (1996), we therefore conclude that the construction is more plausibly analysed as involving a zero nominalizing affix.

Essentially the same observations hold of the Spanish nominal infinitive, as Yoon and Bonet-Farran (1991) argue. As in English, verbal projections can be nominalized at various projection levels in Spanish without there being an overt nominalizing suffix:

(91)   a.   El tocar   de la guitarra de María me pone nervioso.
            *the play-*INF *of the guitar   of Maria me makes nervous*
            'Mary's playing of the guitar makes me nervous.'

       b.   El tocar   la guitarra de María es muy elegante.
            *the play-*INF *the guitar   of Maria is very elegant*
            'Mary's playing the guitar is very elegant.'

       c.   El cantar   yo *La Traviata* traerá   malas consecuencias.
            *the sing-*INF *I   La Traviata will-lead bad   results*
            'my singing *La Traviata* will have bad consequences.'

The suffix *-ar* that accompanies the verb in the examples in (91) spells out an infinitival AFFIX elsewhere. This implies that analysing the structure as

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leaving my father's house are in fact attested. We do not know why these have disappeared, but speculate that it might be related to ease of parsing. Upon hearing *John's constant singing*, the hearer will analyse *singing* as a noun. The following DP is consequently unexpected and necessitates reanalysis of the head as verbal. This problem does not arise in an OV-language like Dutch, where the DP appears before the head, that is, before the hearer has to decide whether this is a verbal or a nominal head. (Note that English has changed from an OV to a VO language, a change that predates the loss of the mentioned construction.)

[28] A different matter is that the present participle itself has a verbal and an adjectival incarnation (compare *a slowly revolving planet* and *an uncompromising attitude*). As is the case with past participles (see footnote 26), this does not give rise to mixed categories. The verbal present participle heads a VP, the adjectival one an AP (see Bennis and Wehrmann 1990). The relevant ambiguity can be captured in various ways. For example, ING could be [+V] in the lexicon, a categorial specification that must be supplemented upon merger to yield either [+V,−N] or [+V,+N]. Note that such an underspecification still does not allow ING to be construed as the nominalizing affix in mixed categories.

involving overt affixation would again require an otherwise unmotivated homophony. In addition, /ar/ appears internal to the phrase its assumed correspondent nominalizes in (91b,c); a conclusion strengthened by the observation that heads to which /ar/ is attached behave like verbs in certain respects. For example, they can host verbal clitics, as in (92) (see Yoon and Bonet-Farran 1991 and Yoon 1996). This again shows that the corresponding AFFIX can be attached higher than the position of /ar/ suggests.

(92) Nuestro cantar-las le irrita.
      our   sing-them   him irritates
      'Our singing them irritates him.'

The pattern observed in English and Spanish contrasts with the one found in head-final languages. In mixed categories in such languages, the nominalizing AFFIX is frequently spelled out. For example, as noted by Yoon (1996: 333), 'in Korean, there is a dedicated nominalizing element (a suffix) used in phrasal nominalizations, which is also the affix found in (certain types of) lexical nominalizations'. This is the suffix *-um*, as illustrated below. Crucially, this suffix never corresponds to a verbal AFFIX in the language, in contrast to English *-ing* and Spanish *-ar*.

(93) [[John-uy [chayk-ul ilk]-**um**]-i]   nolawu-n
      John-GEN *book*-ACC *read*-NOMINAL-NOM *surprise*-V.PRENOM
      sasil-i-ta.
      fact-be-PRES-DECL
      'John's reading the book is a surprising thing.'

Similarly, Turkish nominalized phrases contain suffixes which Borsley and Kornfilt (2000: 108) describe as 'the realization of a nominal mood category'. An example adopted from Erguvanli (1984: 75) is given below. The relevant suffix is *-me*:

(94) On-dan   [[dogru-yu söyle]-**me**-sin-i]   bekle-r-di-m.
      he-ABL   *truth*-ACC *tell*-NOMINAL-POSS3-ACC *expect*-AOR-PAST-1SG
      'I (would have) expected him to tell the truth.'

Basque, a head-final language, spells out the nominalizing suffix as *-ari* in the example below (from Hornstein and San Martin 2000):

(95) Nik   [anaia   neskekin ibiltze]-**ari**   ondo
      I-ERG   *brother*-ABS *girls-with go-out*-NOMINAL.DET.DAT *well*
      deritsot.
      consider-I
      'I think that my brother going out with girls is OK.'

Quechua mixed categories as described by Lefebvre and Muysken (1988: 20–1) further strengthen the argument. Quechua is a language which has three (semantically distinct) spelled-out nominalizing AFFIXes in mixed categories, one of which is *-sqa*. In main clauses, the object can occur both to the right and to the left of the verb (see (96)), but in mixed categories the verb always has to be in final position, that is, adjacent to the nominalizing suffix (see (97)). This is exactly what one would expect under the present analysis.

(96) a. Xwan papa-ta   mikhu-n.
          Juan   potato-ACC *eat*-3
          'Juan eats potatoes.'

     b. Xwan mikhu-n papa-ta.
          Juan   eat-3   *potato*-ACC
          'Juan eats potatoes.'

(97) a. Xwan papa-ta   mikhu-**sqa**-n-ta   yacha-ni.
          Juan   potato-ACC *eat*-NOMINAL-3-ACC *know-I*
          'I know that Juan eats potatoes.'

     b. *Xwan mikhu-n papa-ta   **sqa**-n-ta   yacha-ni.
          Juan   eat-3   *potato*-ACC NOMINAL-ACC *know-I*
          'I know that Juan eats potatoes.'

We conclude that mixed categories further confirm that phrasal derivation is possible in both OV and VO languages, but that the derivational AFFIX can only be spelled out by a suffix in the former.[29]

In fact, the theory makes a further, negative, prediction. Suppose that a language is like Korean, Turkish, Basque, and Quechua in having an /affix/ that corresponds to the nominalizing AFFIX employed in mixed categories. Suppose furthermore that it is like English and Spanish in having head-initial verbal projections and head-final morphology. Mixed categories in such a language would necessarily violate some mapping principle. The structure in (98a) cannot be felicitously mapped to either (98b) or (98b′).

(98) a. [[$_{VP}$ V DP] AFF] ↔
     b. */v/-/dp/-/aff/]
     b′. */v/-/aff/-/dp/

We have seen earlier that mapping principles can be violated in certain subdomains of word formation if there is no grammatical alternative.

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[29] An anonymous reviewer points out that mixed categories in the SOV language Navajo are striking in this respect. Like the languages discussed in the main text, an overt derivational /suffix/ shows up in the relevant phrasal nominalizations, even though the language is almost entirely prefixing (see Spencer 2000).

Nominalizations of English verb-particle structures exemplify this. However, in the case of mixed categories, there *is* a grammatical alternative, namely one in which the nominalization takes place at the head level. The mapping from (99a) to (99b) is unproblematic.

(99) a. [$_{NP}$ [$_{N}$ V AFF] PP] $\leftrightarrow$
      b. /v/-/aff/-/pp/

The prediction, then, is that languages which have VO order and spell out the relevant AFFIX will not have mixed categories. This prediction seems to be correct. As Helge Lødrup (personal communication) informs us, in Norwegian the /affix/ used in productive nominalizations, *-ing*, can only correspond with a nominal AFFIX (unlike its homophonous English counterpart). As expected, the structures it derives have the external and internal syntax of NPs, rather than the mixed behaviour found in English. The crucial example in (100) is ungrammatical.

(100) a. den ulovlige   kopier**ing**en av populaere   sanger
           that illegal-DEF *copying*-DEF *of popular*-PL *songs*-PL

       b. *den ulovlige   kopier**ing**en populaere   sanger
           that illegal-DEF *copying*-DEF *popular*-PL *songs*-PL

Finally, as noted in section 5.8, our theory makes the prediction that an affix attached to a head-initial phrase could be spelled out as a prefix without violating any mapping principle. Thus, for those languages that spell out category-changing affixes as /prefix/es, the opposite prediction of the one discussed above is made: the affix can be realized in VO-languages, but not in OV-languages. Mixed categories in Bantu languages, as discussed by Bresnan and Mugane (2000), appear to confirm this prediction.

  Nonmodular theories of selection cannot very easily capture the distribution of overt affixes in mixed categories. Only if a difference is made between the selectional properties of AFFIXes and /affix/es is it possible to make sense of the fact that linear adjacency and overt realization influence the grammaticality of phrasal derivation.

5.10 CONCLUDING REMARKS

In conclusion, we have argued in this chapter that m-selection does not exist as a phenomenon separate from morphosyntactic selection (instantiated by c-selection and the like) and morphophonological selection (instantiated by phonological clitics). Rather, m-selection occurs if these types of

selection are combined. Under representational modularity, an element with m-selectional properties is a linked pair of an AFFIX and an /affix/. This reduction is not only conceptually desirable, but also yields empirical results: it explains under which circumstances phrasal affixation is allowed.

The model of grammar as given in earlier sections can now be extended as follows:

(101)

LEXICON

⇕   ⇕   ⇕

SEMANTICS		SYNTAX		PHONOLOGY
Phrasal Semantics		Phrasal Syntax		Phrasal Phonology
↓		↓		↓
Phrasal semantic structure		Phrasal syntactic structure		Phrasal phonological structure
INSERTION	↔	INSERTION COMPETITION	↔	INSERTION
Word semantic structure		Word syntactic structure		Word phonological structure
↑		↑		↑
Word Semantics		Word Syntax		Word Phonology
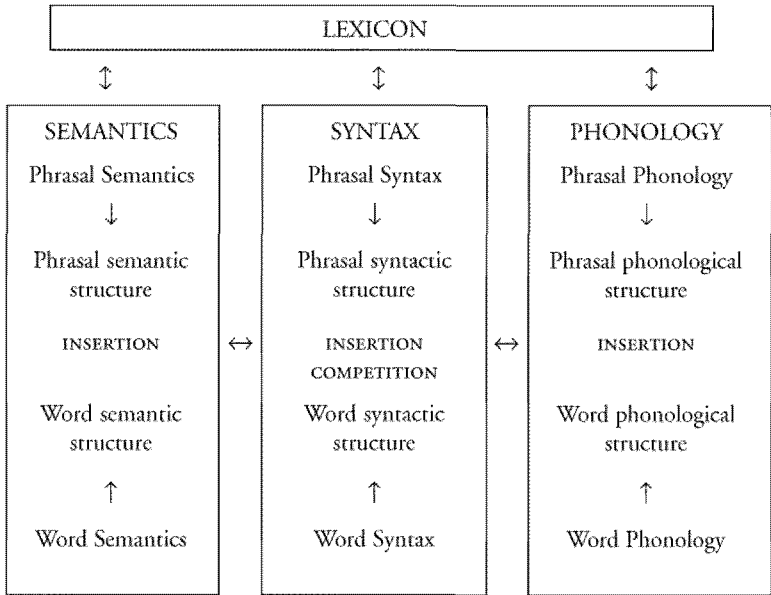
6

Context-Sensitive Spell-Out
and Adjacency

6.1 THE NATURE OF ADJACENCY
CONDITIONS

In the previous chapter we argued that separating the morphosyntax and
morphophonology of affixes is instrumental in understanding the distribu-
tion of phrases in words. In this chapter another type of interaction between
syntax and phonology is discussed. We will consider cases in which the
syntactic context apparently makes it possible for a word to receive a form
other than its usual one. More specifically, there are two ways in which the
form of a word can be altered when adjacent to a certain other word. First,
when an agreeing predicate is adjacent to the element with which it agrees,
languages sometimes allow one of these elements to be realized by a form that
expresses fewer features than encoded by the agreement relation. Second,
when a head is adjacent to a phrase, a special type of word formation may
occur: a single prosodic word may be used to spell out two syntactic term-
inals. We will argue that such word formation or adjustment of the form of a
word is not, in fact, conditioned by the syntax. Neither can it be accounted
for within the morphological component. Rather, it involves a type of
rule that operates at the interface between (morpho)syntax and (morpho)
phonology.

The status of adjacency conditions in syntax in general is a matter of some
debate. Various apparently syntactic phenomena seem to be conditioned by

adjacency. Perhaps the best-known example is case assignment in English. Abstracting away from details, a DP dependent on the verb for case must be adjacent to it, whereas the distribution of caseless elements, such as PP complements, is not restricted in the same way (see Stowell 1981):

(1)   a.   John read (*slowly) the book.
       b.   John read (slowly) to his children.

We assume that syntax deals with hierarchical rather than linear relationships, which means that linear locality conditions such as adjacency are alien to it. Hence, linear locality conditions that are syntactic at first blush must be reanalysed in one of two ways. The first is to develop a hierarchical account that happens to have the adjacency effect as a by-product. This is essentially the approach that Chomsky (1995) adopts for the data in (1). The alternative is to analyse the adjacency requirement in terms of the phonology-syntax interface, which by its very nature deals with matters of linear order and therefore provides a natural locus for linear locality conditions.

We do not address the issue of case adjacency in this chapter (although we will turn to it in Chapter 7). Instead, we show that for the type of phenomena mentioned above, a PF approach is more attractive, both conceptually and empirically. The data we discuss involve agreement weakening under subject-verb inversion in Dutch (section 6.3) and Standard Arabic (section 6.4); object cliticization in Dutch (section 6.5), subject cliticization in Celtic (section 6.6), and pro drop in Old French (section 6.7) and Arabic (section 6.8). Before we turn to these phenomena, however, we make explicit our assumptions about the syntax-phonology interface and discuss the kind of rules we will employ.

6.2 ALLOMORPHY RULES AT THE PF INTERFACE

6.2.1 The PF Interface

As discussed in Chapter 5, syntax and phonology each constitute an autonomous generative system that creates structures governed by its own well-formedness principles. This was illustrated by the example in (2). In syntax, *a big house* is a DP that consists of a determiner and a complex NP complement. In phonology, it consists of two phonological words, the first of which is formed by the determiner and the adjective. So, both constituency and labels differ.

(2)   a.   [$_{DP}$ a [$_{NP}$ [$_{AP}$ big] house]]
      b.   [$_\phi$ [$_\omega$ a big] [$_\omega$ house]]

In this chapter we will look in more detail at the mapping between syntax and phonology. In particular, we argue that there is an interface level, PF, at which syntactic representations are mapped onto an initial prosodic structure, which is itself mapped onto a phonological representation. We assume that the operations in (3a) and (3b) connect syntax to the initial prosodic structure at PF, the rules in (3c) apply at this interface level, while the operation in (3d) connects PF to phonology proper. In section 6.9 we will show how the mapping principles discussed in the previous chapter relate to the ones in (3).

(3)   a.   Linearization of syntactic terminals
      b.   Initial prosodic phrasing, on the basis of syntactic information
      c.   Application of context-sensitive allomorphy rules
      d.   Spell-out of terminals

The first thing that happens in the mapping from syntax to PF is the introduction of linear order. We will not discuss the principles that determine this linearization here; the only relevant observation for our concerns is the trivial one that this process is sensitive to syntactic constituency.

Next, an initial prosodic phrasing is determined. The principles responsible for this are sensitive to both syntactic constituency and linear order. The main operation is one that aligns certain syntactic boundaries with certain prosodic boundaries. The prosodic domains thus derived determine the application of the rules of allomorphy that form the topic of this chapter. These rules apply at PF, and can change the featural content of a terminal in the presence of another terminal in the same prosodic domain.

PF itself is mapped to phonology via the type of lexical spell-out rules discussed in the previous chapter: phonological material is associated with the features in terminals. For example, English has a lexical rule that relates the feature bundle [D, third person, singular, feminine, accusative] to the phonological form /her/. (Where relevant, we place phonological material between forward slashes.) After spell-out, within the phonological module, the prosodic structure can be adjusted on the basis of properties of the inserted phonological material and perhaps factors like speech rate. Such adjustments (or, more accurately, mismatches in mapping (section 6.9)) can, amongst other things, be made to ensure correct weight distribution. For example, if the initial prosodic structure contains a prosodic phrase ϕ that is not prominent enough from a phonological point of view, such a ϕ is usually joined with a preceding or following ϕ (see Nespor and Vogel 1986: 172–4 for such

restructuring of phonological phrases; compare also the 'wrapped' structures in Truckenbrodt 1999). Models that come particularly close to what we propose here are presented in Kaisse 1985, and in Ghini 1993 and Monachesi 2003 (for Italian). The latter two also make a distinction between initial prosodic phrasing (in their terminology φ-domain formation) and subsequent phonological adjustment (in their terminology φ-formation). Moreover, they use the same type of mapping rule to determine the initial prosodic phrasing, namely Selkirk's (1986) right alignment rule introduced in (4) below. Because rules of allomorphy operate at the PF interface, they cannot be sensitive to 'late' phonological adjustments of the prosodic structure.

This view on the interface between syntax and phonology has a close affinity with the view on this interface in Distributed Morphology (see Halle and Marantz 1993 and subsequent work) and precursors of this model (like Pranka 1983). In particular, we adopt from this framework the notion of spell-out (or vocabulary insertion) and the idea that there are post-syntactic allomorphy rules that adjust the feature content of terminals in particular environments. The main difference concerns the claim that allomorphy rules can be sensitive to initial prosodic phrasing. The Morphology module in Distributed Morphology, which is where the relevant allomorphy rules operate, precedes all phonology (but see Adger 2001, where an argument is made for initial prosodic word structure as the conditioning environment for certain allomorphy rules). We will show that, as a consequence of this difference, the scope of context-sensitive allomorphy rules is extended to a class of phenomena usually dealt with in syntax.

Let us now discuss in some more detail the principles of initial prosodic phrasing and the allomorphy rules sensitive to this phrasing, starting with the former.

6.2.2 Prosodic Domains and Allomorphy Rules

As noted, the initial prosodic structure is determined by alignment conditions that associate boundaries of syntactic categories with boundaries of phonological categories (see Selkirk 1986, McCarthy and Prince 1993, Truckenbrodt 1995, amongst others). In English, for example, the right edges of syntactic XPs arguably correspond to the right edges of prosodic phrases (φs). We can hence state the following mapping rule for this language:

(4)   Align (⟨right edge, XP⟩, ⟨right edge, φ⟩)

Thus, the (partial) syntactic structure in (5a) corresponds to the (partial) prosodic structure in (5b). (Here and below φ boundaries are indicated by braces.)

(5)   a.   [[A friend [of Mary's]] [showed [some pictures] [to John]]].
       b.   {A friend of Mary's} {showed some pictures} {to John}.

There is language variation with respect to the direction of alignment. Some languages adhere to (4), whereas others align left edges of syntactic maximal projections with left edges of prosodic phrases. From the research on this variation a generalization has emerged: head-initial languages typically opt for right alignment and head-final languages for left alignment (see Selkirk 1986). Tokizaki (1999) gives the following lists of languages to illustrate the generalization:

(6)   a.   *Right alignment in head-initial languages*:
            Chimwi:ni (Kisseberth and Abasheikh 1974, Selkirk 1986),
            Kimatuumbi (Odden 1987), Xiamen (Chen 1987)
       b.   *Left alignment in head-final languages*:
            Ewe (Clements 1978), Japanese (Selkirk and Tateishi 1991),
            Korean (Cho 1990), Northern Kyungsang Korean (Kenstowicz
            and Sohn 1996), Shanghai Chinese (Selkirk and Shen 1990)

The languages we discuss in this chapter are either strictly or mainly head-initial. Therefore, if the generalization is correct, they will adhere to (4), rather than display left alignment.

Although the analyses we present all rely on right alignment as in (4), it goes without saying that there are various other mapping principles that govern the association of syntactic and prosodic structures. For example, the left edge of finite CPs in English coincides with the left edge of an intonational phrase, as observed by Chomsky and Halle (1968: 372). Given that prosodic phrases must be properly contained in intonational phrases, the syntactic structure in (7a) is not mapped onto the prosodic structure in (7b), as one would expect on the basis of (4) alone, but rather onto (7b′) (parentheses indicate intonational phrases).

(7)   a.   [[John] [believes [_CP_ that [Mary] [loves [Bill]]]]].
       b.   *({John} {believes) (that Mary} {loves Bill}).
       b′. ({John} {believes}) ({that Mary} {loves Bill}).

Conversely, some boundaries triggered by (4) can be erased again. In particular, there is a strong tendency for modifiers and the material they modify to be combined in a single φ, to the extent that this is possible. Thus, prosodic boundaries are erased between a modifier and a following φ that contains the material it modifies. For instance, the earlier example in (2b) is a single prosodic phrase. The rule in question must operate at the PF interface, and cannot be a 'late' phonological adjustment of the type mentioned above,

since its application is determined by syntactic rather than phonological factors (the modifier–modifiee relation is a syntactic one). Consequently, allomorphy rules will be sensitive to the output of this rule.

It has been argued by a number of authors that there exists a type of allomorphy that involves a change in the feature content of terminals.[1] In particular, features can be deleted post-syntactically but prior to spell-out. This is the essence of Bonet's (1991, 1995) rules of impoverishment. Bonet notes that such feature reduction does not take place arbitrarily, but requires a certain context (compare also Halle and Marantz's (1993) notion of 'conditioned allomorphy'). Our main hypothesis is that one type of context to which allomorphy of this type can be sensitive is the initial prosodic domain as determined by the principles just discussed. In other words, languages may have rules of the type in (8), which state that features of a terminal contained in the same ϕ as a certain other terminal are deleted. (The order of A and B in (8) is not meant to be part of the structural description of the rule.)

(8)　$\{\ldots[_A F_1 F_2] \ldots [_B F_1 F_3] \ldots\} \rightarrow \{\ldots[_A F_2] \ldots [_B F_1 F_3] \ldots\}$

Obviously, this will affect the phonological realization of A (the terminal whose feature content is changed) if the language has spell-out rules that crucially refer to the deleted feature:

(9)　a.　$[_A F_1 F_2] \leftrightarrow /a/$
　　　b.　$[_A F_2] \leftrightarrow /a'/$

Usually, the element A will be realized as /a/ when it bears the features F_1 and F_2, but as a result of (8) it will be realized as /a'/, the form that normally surfaces when F_1 is absent.

Let us now consider the effects the prosodic phrasing determined by (4) has on the application of rules like (8). Consider structures in which A is a head in whose projection a phrase BP appears. If the language forms phonological phrases in accordance with (4), A and B will occur in the same prosodic phrase if BP immediately follows A. In all other contexts, A and B will not be contained in the same prosodic phrase. This means that a feature deletion rule like (8), which affects A only if B is present in the same local prosodic domain, can apply in (10) but not in (11) (where BP precedes A) or (12) (where a maximal projection intervenes between A and BP).[2]

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[1] We will not discuss allomorphy that is conditioned by purely phonological features or stress.

[2] We need not stipulate that BP is contained in AP. If it were not, as in [AP BP], the ϕ-boundary triggered by AP's right edge will intervene between A and B. We assume that this line of argumentation extends to structures in which BP is extraposed and adjoined to AP (indeed, extraposed material forms a separate prosodic domain). What is possible, though, is

(10) a. after linearization: $[_{AP} [_A F_1 F_2] [_{BP} [_B F_1 F_3]]]$
  b. after application of (4): $\{[_A F_1 F_2] [_B F_1 F_3]\}$
  c. after application of (8): $\{[_A F_2] [_B F_1 F_3]\}$
  d. after spell-out (cf. (9b)): $\{/a'/ /b/\}$

(11) a. after linearization: $[_{AP} [_{BP} [_B F_1 F_3]] [_A F_1 F_2]]$
  b. after application of (4): $\{[_B F_1 F_3]\} \{[_A F_1 F_2]\}$
  c. (8) not applicable: $\{[_B F_1 F_3]\} \{[_A F_1 F_2]\}$
  d. after spell-out (cf. (9a)): $\{/b/\} \{/a/\}$

(12) a. after linearization: $[_{AP} [_A F_1 F_2] [_{XP} X] [_{BP} [_B F_1 F_3]]]$
  b. after application of (4): $\{[_A F_1 F_2] X\} \{[_B F_1 F_3]\}$
  c. (8) not applicable: $\{[_A F_1 F_2] X\} \{[_B F_1 F_3]\}$
  d. after spell-out (cf. (9a)): $\{/a/ /x/\} \{/b/\}$

By its very nature, spell-out is language-specific. Languages simply do not realize the same feature bundles in the same way. If this is true of spell-out in general, it also holds of the class of allomorphy rules under discussion. However, although the content of such rules is language-specific, there are general restrictions on their format and application.

Concerning their format, we can distinguish two general types. The first consists of rules of the format in (8), which delete a morphosyntactic feature.[3] We assume that such suppression of a morphosyntactic feature is subject to a notion of recoverability: the target of the rule and the terminal mentioned in the rule's context must agree, as stated in (13).

(13) *Recoverability*
   Rules of suppression operate under agreement.

The second type of allomorphy rule states that if a particular terminal finds itself in the same prosodic domain as some other terminal, its phonological realization is altered. For example, the rule can state that a pronoun is to be realized as a simple clitic in the presence of another terminal in the same

that BP is a specifier or adjunct located at the left edge of the complement of A; A and B will then end up in the same prosodic domain, as (i) shows. We will discuss several instantiations of this pattern.

(i) a. $[_{AP} A [_{XP} BP [X \ldots]]]$
  b. $\{A B\} \{X \ldots\}$

[3] It has been proposed by Noyer (1998) and Harbour (2003) that rules of allomorphy can also insert features. We will not discuss this option here; for the type of data under consideration it is not necessary. However, see Chapter 7, rule (20) for an allomorphy rule involving feature insertion.

prosodic domain. Since a simple clitic forms a phonological word with its host, this type of allomorphy rule can have the form in (14), where angled brackets indicate phonological word (ω) boundaries.

(14) $\{ \ldots A \ldots [_B\ F_1\ F_3] \ldots \} \rightarrow \{ \ldots \langle A \ldots [_B\ F_1\ F_3] \rangle \ldots \}$

Rules like (14) do not delete a morphosyntactic feature in their target, and hence are not subject to the condition in (13). This means that such rules will not require that A shares certain features with B. However, since *some* terminal must be present in the same ϕ as B, the rule must mention one or more features that identify this terminal. This has the effect that cliticization on the basis of rules like (14) will typically apply after a certain class of syntactic heads only.

This kind of rule, too, can lead to an alternative spell-out of a terminal, namely if the usual form of B is itself a phonological word. In that case, insertion of this form is incompatible with the output of the rule, since by the strict layer hypothesis (Selkirk 1984) prosodic structure is not recursive. There must then be a special spell-out for the clitic form in order to comply with the output of (14). Thus, the language contains two spell-out rules for B, one which realizes it as an independent phonological word (see (15a)), and one that inserts something smaller than a phonological word, for instance a syllable (σ; see (15b)).

(15)   a. $[_B\ F_1\ F_3] \leftrightarrow /b_\omega/$
        b. $[_B\ F_1\ F_3] \leftrightarrow /b_\sigma/$

The form in (15b) can only be inserted if a rule like (14) has applied, as otherwise a syllable would be directly dominated by a prosodic phrase rather than a prosodic word, again in violation of the strict layer hypothesis.

It is also possible that the language contains a specific spell-out rule for the complete phonological word derived by (14), next to spell-out rules for the individual host and pronoun. In that case, the inserted form need not resemble the normal realization of either the host or the pronoun:

(16)   a. $A \leftrightarrow /a/$
        b. $[_B\ F_1\ F_3] \leftrightarrow /b/$
        c. $\langle A\ [_B\ F_1\ F_3] \rangle \leftrightarrow /c/$

Like the rule in (8), the one in (14) will only apply if BP, the phrase headed by B, is contained in AP and immediately follows A. Thus $[_{AP}\ A\ BP]$ is mapped onto $\{\langle /a/\ /b_\sigma/\rangle\}$ or $\{\langle /c/\rangle\}$, depending on the spell-out rules of the language. If BP precedes A or some other phrase intervenes between A and

BP, A and B will not end up in the same initial prosodic phrase, and hence $[_{AP}$ BP A] and $[_{AP}$ A XP BP] are mapped onto {/b$_\omega$/} {/a/} and {/a/ /x/} {/b$_\omega$/}, respectively.

Our second type of allomorphy rule, as schematized in (14), resembles Pranka's (1983) notion of S-structure merger. Pranka proposes that languages may have rules that join the features of adjacent terminals at surface structure into a single node. This node can then be spelled out in a way that deviates from the phonological realization the merged terminals would receive in isolation. Indeed, the Irish data in section 6.6 below, which we discuss in terms of a rule of the type in (14), are analysed by Pranka in terms of S-structure merger.

Although S-structure merger and prosodic word formation at PF express essentially the same insight, the advantage of making the rule sensitive to initial prosodic domains is that this correctly predicts in which contexts it can apply. To begin with, as just explained, it follows that the order between heads and phrases affected by the rule is not arbitrary: the phrase must follow the head. Pranka captures the data by stating a particular linear order as part of the structural description of the rule. However, it does not follow why this linear order condition should select head-XP order, rather than XP-head. Similarly, Pranka states as an extra condition on the application of merger that it requires adjacency between terminals at S-structure.

As mentioned in the introduction, PF allomorphy rules provide an alternative to syntactic adjacency conditions. Interestingly, they do not always require strict linear adjacency between the elements mentioned in the rule. Locality is an effect of prosodic domain formation and hence in principle elements can intervene as long as they do not trigger φ-closure. However, rules of the type in (14) form prosodic words, which means that any material that intervenes between the terminals they mention and that must form a prosodic word itself will block their application. Hence, the only elements that can intervene are other clitics.

The situation is different for rules that suppress morphosyntactic features. These do not necessarily derive prosodic words. Hence, it is predicted that the terminals that instantiate A and B in (8) can be separated as long as no φ-boundary intervenes. In practice, they can be separated by a modifier of B (recall that there is no prosodic phrase boundary between a modifier and following modified material) or a functional head in the extended projection of B. Notice that lexical heads cannot intervene, despite the fact that A and B in (17) are still contained in the same prosodic phrase. The point is that there are no agreement relations across lexical heads and consequently feature suppression in either A or B will violate the recoverability condition in (13).

(17)   a.   [$_{AP}$ A [$_{LP}$ L [$_{BP}$ B]]]
        b.   {A L B}

Let us now consider what kind of data can be accounted for in terms of this system.

6.3 DUTCH AGREEMENT WEAKENING

The Dutch verbal agreement paradigm has a curious property: the conjugation of the second person singular depends on the position of the agreeing verb with respect to the subject. As is shown by the regular present tense endings in (18), the second person singular is usually marked by -*t*:

(18)   ik loop   wij loop-en
        I walk   *we walk*-PL
        jij loop-t   jullie loop-en
        you walk-2SG   *you walk*-PL
        hij loop-t   zij loop-en
        he walk-3SG   *they walk*-PL

Dutch has verb second in root clauses, a fact traditionally analysed in terms of V-to-C raising in root environments followed by the fronting of an arbitrary constituent to Spec-CP (see den Besten 1983). Thus, when a constituent other than the subject is fronted, the net effect is subject-verb inversion:

(19)   a.   [$_{CP}$ dat [Marie vandaag naar het vioolconcert   van
              that   Mary   today   to   the violin-concerto by
              Sibelius luistert]]
              Sibelius listens
              'that Mary listens to the violin concerto by Sibelius today'
        b.   [$_{CP}$ Marie [$_{C'}$ luistert [t$_{DP}$ vandaag naar het
              Mary   listen-3SG   *today   to   the*
              vioolconcert   van Sibelius t$_V$]]].
              violin-concerto by   Sibelius
        c.   [$_{CP}$ Vandaag [$_{C'}$ luistert   [Marie t$_{AdvP}$ naar het
              today   listen-3SG *Mary   to   the*
              vioolconcert   van Sibelius t$_V$]]].
              violin-concerto by   Sibelius

Although agreement is not in general sensitive to this type of inversion, the *-t* ending that marks the second person singular is omitted in inversion structures. This results in a form homophonous to the first person singular (that is, a form without an overt ending):

(20)   a.   [$_{CP}$ dat [jij dagelijks met een hondje over straat loopt]]
              that you daily   with a   doggy   over street walk-2SG
              'that you walk with a doggy in the street every day'

       b.   [$_{CP}$ Jij [$_{C'}$ loopt   [t$_{DP}$ dagelijks met een hondje
              you walk-2SG   *daily   with a   doggy*
              over straat t$_V$]]].
              over street

       c.   [$_{CP}$ Dagelijks [$_{C'}$ loop [jij t$_{AdvP}$ met een hondje
              daily   walk you   with a   doggy
              over straat t$_V$]]].
              over street

Although Dutch is head-final within VP, it is head-initial in most, if not all, other projections (for example, in DP, NP, PP, AP, and CP). Given the generalization that head-initial languages comply with (4), Dutch will build up its initial prosodic structure by right alignment as well. Thus, a sentence like (21a) receives an initial prosodic phrasing as in (21b), rather than (21c) (which would follow from left alignment of prosodic and syntactic phrases).

(21)   a.   [$_{CP}$ dat [$_{IP}$ [$_{DP}$ Han] [$_{VP}$ [$_{PP}$ aan [$_{DP}$ een [$_{NP}$ boek
              that   Han   on   a   book
              [$_{PP}$ over [$_{DP}$ Coltrane]]]]] werkt]]]
              about Coltrane   works
              'that Han works on a book about Coltrane'

       b.   {dat Han} {aan een boek over Coltrane} {werkt}
              that Han on   a   book about Coltrane works

       c.   *{dat} {Han} {aan} {een} {boek} {over} {Coltrane werkt}
              that Han   on   a   book about Coltrane works

For the most part, the structure in (21b) is uncontroversial, except that the object and the verb are initially parsed into different prosodic phrases. A right-alignment account of Dutch hence requires a post-PF adjustment rule that joins an unstressed verb with the prosodic phrase on its left (see section 6.2 for the notion of prosodic restructuring). A left-alignment account of Dutch, on the other hand, will have to undo almost all of the initial phrasing in (21c).

It follows from (4) that when there is subject-verb inversion, the subject DP is realized in the same prosodic phrase as the verb. This is illustrated in (22c), the prosodic structure corresponding to (20c). In contrast, in (22b) the subject's right XP-boundary induces a φ-boundary between it and the verb. In the embedded clause in (22a) even more φ-boundaries intervene.

(22) a. {dat jij} {dagelijks} {met een hondje} {over straat} {loopt}
         that you daily   with a   doggy   over street walk-2SG

      b. {Jij} {loopt   dagelijks} {met een hondje} {over straat}.
         you walk-2SG daily   with a   doggy   over street

      c. {Dagelijks} {loop jij} {met een hondje} {over straat}.
         daily   walk you with a   doggy   over street

Consequently, (22a,b) require that subject agreement is spelled out in the regular way. However, if there is a specific allomorphy rule of the type in (8), it can apply in (22c). The omission of the inflectional ending in (20c) and (22c) can indeed be attributed to such a rule. To make this clear, let us consider the feature system underlying the (Dutch) person/number paradigm. (Here we will partially follow proposals by Kerstens (1993) and Harley and Ritter (2002).)

We assume the following rules for the realization of verbal agreement in the Dutch present tense. The features [Prt], [Add], and [Plr] are unitary and stand for participant (in the speech act), addressee, and plural, respectively. Which rule applies is dictated by the elsewhere condition. (Note that the apparent syncretism of second and third person singular is a historical accident; various dialects of Dutch still have a distinct second person -*st* ending.)

(23) a. [Prt] ↔ ø
      b. [Prt, Add] ↔ /-t/
      c. [Plr] ↔ /-en/
      d. elsewhere form: /-t/

The agreement alternation illustrated in (20) and (22) can now be captured by an allomorphy rule that mentions prosodic phrases as its domain of application:

(24) *Dutch Agreement Weakening*
      {[V Prt Add] [D Prt Add]} → {[V Prt] [D Prt Add]}

This rule states that the verb's [Add] feature is not realized if the verb is in the same prosodic domain as a second person DP. Consequently, the verb appears in its [Prt] form, that is, as the first person singular. (The rule will

only apply in the present tense, since there is no person agreement in the past tense to begin with.)

If the alternation in (22) is due to context-sensitive spell-out, it is predicted that a verb agreeing with a [Prt, Add] subject can only appear in its [Prt] form if no XP intervenes between the two. Intervention of an XP would have the consequence that the verb and the subject are no longer in the same prosodic phrase, in contrast to what the structural description of the rule demands. Indeed, fronting a constituent to a position between a verb in C and the subject is generally possible ((25)), except if the used form of the verb depends on the special rule in (24). This is shown in (26b) (see Paardekooper 1961 and Hoekstra 1996 for related discussion and observations).[4] Note that there is no strict adjacency condition on verb and pronoun in weakening contexts, since a modifier of the pronoun can intervene (there is no φ-bracket between modifier and modifiee). In the example in (26a), the relevant modifier is the focus particle *zelfs* 'even'.[5]

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[4] It is sometimes suggested (for instance, by Paardekooper 1961) that a topicalized XP cannot intervene between the fronted verb and an inverted first person singular subject either. We think the relevant judgement is related to the fact that it is harder to meet the pragmatic conditions that hold of the relevant type of construction in case the subject is first person singular. In particular, when an XP is fronted across the subject, the XP is typically construed as a contrastive topic, while the subject is construed as contrastively focused. But since the speaker is always given in discourse, the favoured discourse status of a first person singular subject is as a noncontrastive topic, not as a focus. However, if the right context is provided, fronting across a first person singular subject is unproblematic, as shown in (i). In the same context, fronting across a second person singular subject is still incompatible with agreement weakening.

(i) Speaker A: We moeten morgen   en   dinsdag nog aardappels halen.
                we must   tomorrow and Tuesday still potatoes   get
                'We still have to get potatoes tomorrow and on Tuesday.'

     Speaker B: Ik kan morgen   als   ik terugkom van de kapper.
                I can tomorrow when I back-come from the hairdresser
                'I can do it tomorrow when I come back from the hairdresser.'

     Speaker A: OK, dan ga op DINSDAG IK wel.
                OK then go on Tuesday I all right
                'OK, then I will go on Tuesday.'

[5] Hoekstra (1996) also judges sentences of the type in (26a), where the subject contains a DP-internal modifier, unacceptable. To us, it seems perfect. Indeed, a brief search of the internet reveals that the pattern is frequently attested. We speculate that Hoekstra's idiolect contains an additional allomorphy rule of the type in (14), stating that verb and second person singular pronoun must be realized as a prosodic word. In this case, the clitic form of the pronoun happens to be identical to that of the full pronoun. (The situation may be compared to that in Frisian, which does have a distinct clitic form of the second person singular pronoun in these contexts; see for instance de Haan 1997 and also Chapter 7.)

(25)   a.   {Volgens   mij} {gaat   zelfs hij} {op de heetste dag
          according-to me   go-3SG even he   on   the hottest day
          van 't jaar} {naar het park}.
          of   the year to   the park
          'I think that even he goes to the park on the hottest day of the year.'

      a'.   {Volgens   mij} {gaat   op de heetste dag van
          according-to me   go-3SG on   the hottest day of
          't jaar} {zelfs hij} {naar het park}.
          the year even he   to   the park

      b.   {Volgens   mij} {ging zelfs jij} {op de heetste dag
          according-to me   went even you on   the hottest day
          van 't jaar} {naar het park}.
          of   the year to   the   park
          'I think that even you went to the park on the hottest day of
          the year.'

      b'.   {Volgens   mij} {ging op de heetste dag van 't jaar}
          according-to me   went on the hottest day of   the year
          {zelfs jij} {naar het park}.
          even   you to   the park

(26)   a.   {Volgens   mij} {ga zelfs jij} {op de heetste dag
          according-to me   go   even you on   the hottest day
          van 't jaar} {naar het park}.
          of   the year to   the park

      b.   *{Volgens   mij} {ga op de heetste dag van 't jaar} {zelfs
          according-to me   go   on the hottest   day of   the year even
          jij} {naar het park}.
          you to   the park

When the allomorphy rule cannot apply, all agreement features are spelled out as usual. Thus, (26b) should improve if the *-t* ending expressing [Prt, Add] is used. Indeed, (27) is better than (26b).

(27)   ?{Volgens   mij} {gaat   op de heetste dag van 't jaar}
        according-to me   go-2SG on the hottest   day of   the year
        {zelfs jij} {naar het park}.
        even   you to   the park

The example is not perfect, but this is presumably due to a parsing difficulty rather than to a principle of the grammar. Examples with a fronted constituent between verb and inverted subject are relatively rare. This means that the presence of a *-t* ending on a verb in structures with subject-verb inversion

is a statistically reliable indication that a third person subject will follow. (Recall that, if there is no intervening material between verb and inverted subject, only third person singular subjects induce a -*t* ending on the verb.) In general, it pays off in parsing to create predictive shortcuts. Hence, we speculate that if a speaker of Dutch encounters the string in (28), where XP is not the subject, he or she will expect a third person singular subject, with the consequence that the continuation in (27) creates a garden-path effect.[6]

(28)   XP V-*t*...

We may note that the effect gets weaker with repetition or if more material intervenes between verb and subject, as expected if it is psycholinguistic in nature. Real mismatches in agreement, as in (29) for instance, are much worse than (27) to begin with, and do not improve either with repetition of the type of example or if the distance between verb and subject is enlarged.

(29)   *{Volgens   mij} {gaan op de heetste dag van 't jaar} {zelfs
        according-to me   go-PL *on the hottest day of the year even*
        jij}   {naar het park}.
        you(SG) *to   the park*

So far, we have assumed the traditional analysis of verb second, which treats the phenomenon as uniform V-to-C raising. In other words, we assume that subject-initial and non-subject-initial root clauses differ with respect to the position of the subject (which is in Spec-CP or Spec-IP, respectively). Travis (1984) and Zwart (1997) advocate an alternative view, according to which it is the position of the verb that is different in the two cases. When there is subject-verb inversion the verb is still assumed to be in C, but in subject-initial structures the verb is assumed to be in I (which is taken to precede its complement in Dutch); the subject occupies Spec-IP in both cases:

(30)   a.   [$_{IP}$ Marie [$_{I'}$ luistert [vandaag naar het vioolconcert   van
                Mary listen-3SG *today   to   the violin-concerto by*
                Sibelius t$_v$]]].
                Sibelius

---

[6] No predictive shortcut will be adopted in parsing if there is no statistically significant predictor of what is to follow. This means that in the absence of an allomorphy rule of the type under discussion, a verbal agreement marker compatible with different types of inverted subjects will not give rise to expectations in parsing beyond the general expectation that the subject be compatible with the agreement marker. Hence, there will be no garden-path effects with such agreement.

    b.   [$_{CP}$ Vandaag [$_{C'}$ luistert [$_{IP}$ Marie [$_{I'}$ t$_V$ t$_{AdvP}$ naar het
        today   *listen*-3SG *Mary*   *to*   *the*
        vioolconcert   van Sibelius t$_V$]]]].
        violin-concerto by Sibelius

The proposed allomorphy rule is compatible with either analysis of verb second, as it does not mention the syntactic position of the verb. Hence, we will not try to decide between the two approaches (see Weerman 1989, Vikner and Schwartz 1996, and Williams 1998 for some discussion). However, at first sight the asymmetric theory of verb second seems to make available an alternative account of the Dutch agreement alternation in terms of an allomorphy rule that is sensitive to the syntactic position of the verb. It could be argued that if V is in I or in its base position, second person singular is realized as *-t*, while if it is in C, this ending is omitted. Using the features introduced above, this can be expressed by the rule in (31).

(31)   *Dutch Agreement Weakening*
        [Prt Add] → [Prt] / [$_C$___]

Such an alternative account is not satisfactory. First, it is arbitrary that the weakening rule should mention C rather than I or the verb's base position. The distribution of full and weakened agreement could just as well have been the other way around. In contrast, our account ties the possibility of applying the weakening rule to the presence of an agreeing element in the same prosodic domain. Thus, it is no coincidence that it only applies when there is subject–verb inversion.

    Second, the adjacency effect illustrated in (26) remains a mystery if agreement weakening is conditioned by the syntactic position of the verb only. In both (26a) and (26b) the verb is in C, the only difference being that in (26b) a constituent intervenes between verb and subject. That such intervention blocks application of the weakening rule suggests that the syntactic position of the verb is irrelevant. What the rule should state instead is that verb and subject must be in a local relation.

    Third, Travis's and Zwart's analyses incorporate the traditional analysis of verb second as a subcase. It is still possible to raise the verb to C and move an arbitrary constituent to Spec-CP. There is nothing in the theory as such that rules out derivations in which this arbitrary constituent is the subject. Thus, unless additional statements are added, subject-initial clauses are predicted to be ambiguous between a CP and an IP analysis. However, in that case subject-initial clauses should optionally show agreement weakening, in

accordance with the rule in (31). This is not the case:

(32)   a. [$_{IP}$ Jij [$_{I'}$ loopt   [dagelijks met een hondje over
            you   walk-2SG *daily   with a   doggy over*
            straat t$_v$]]].
            street

       b. *[$_{CP}$ Jij [$_{C'}$ loop [$_{IP}$ t$_{DP}$ t$_v$ [dagelijks met een hondje over
             you   walk   daily   with a   doggy over
            straat t$_v$]]]].
            street

This last problem can be circumvented if subjects are barred from moving to
Spec-CP. For example, Zwart (1997) suggests that movement of an argument
to Spec-CP is triggered if it is either old information (a topic) or contrastive.
Subjects can have these interpretations *in situ* (or at any rate in a position
lower than Spec-CP), and hence economy prevents them from moving into
the COMP domain.

   The assumption that movement of an argument to Spec-CP is blocked in
case it does not make available a new discourse function seems untenable to
us. Objects, too, can be interpreted as contrastive or old information in their
base position or a position lower than Spec-CP. Nevertheless, they optionally
move to Spec-CP, as illustrated below for a contrastively focused object.
There does not seem to be a difference in the discourse status of *Bob* in the
examples in (33).

(33)   a. BOB heb ik een boek gegeven, niet Rob.
            Bob have I a   book given,   not Rob
            'I have given a book to Bob, not to Rob.'

       b. Ik heb BOB een boek gegeven, niet Rob.
            I have Bob a   book given,   not Rob

It could be that for some unknown reason subjects in general cannot be
moved to topic or focus positions. But this would have to be a principle
specific to Dutch, since in a language like Hungarian topic subjects and
focused subjects obligatorily move to the designated positions in the left
periphery of the clause. Hence, the principle would serve no other function
than to exclude the undesired examples of the type in (32b), making it *ad hoc*.
Once an allomorphy rule sensitive to prosodic phrasing is adopted, however,
it is no longer necessary to prevent the subject from moving to Spec-CP. If
the subject precedes the verb, the rule will not apply, no matter whether the
clause is a CP or IP.

6.4 ARABIC AGREEMENT WEAKENING

In Dutch, agreement weakening is restricted to the second person singular (it targets the [Add] feature). Of course, similar rules may affect other features in other languages. In fact, a context-sensitive rule of suppression that targets the [Plr] feature can account for a well-known agreement alternation in Modern Standard Arabic.[7]

The basic observation is as follows. Standard Arabic is a VSO language which allows for movement of various constituents to a preverbal position. If the subject is fronted, yielding SVO order, there is full agreement in person, number and gender (strong agreement). But if the subject remains *in situ* (or in Spec-IP in some analyses), agreement is restricted to person and gender only (weak agreement). This is illustrated in (34) (unless indicated otherwise, all examples in this section are from Fassi Fehri 1993: 28–32).

(34) a. daxal-at   n-nisaaʔ-u   makaatib-a-hunna.
          entered-FEM *the-women*-NOM *office*-PL-ACC-*their*-FEM
          'The women entered their offices.'

      a′. *daxal-na   n-nisaaʔ-u   makaatib-a-hunna.
           entered-FEM-PL *the-women*-NOM *office*-PL-ACC-*their*-FEM

      b. n-nisaaʔ-u   daxal-na   makaatib-a-hunna.
          the-women-NOM *entered*-FEM-PL *office*-PL-ACC-*their*-FEM

      b′. *n-nisaaʔ-u   daxal-at   makaatib-a-hunna.
           the-women-NOM *entered*-FEM *office*-PL-ACC-*their*-FEM

There is one exception to this general pattern: there is obligatory full agreement with postverbal pronominal subjects. We abstract away from this here, but return to it in section 6.8.

Although there seems to be general consensus that preverbal subjects are topics, their syntactic status is a matter of debate. It is sometimes suggested that they are uniformly in a left-dislocated position. According to this view, strong agreement can be analysed as an incorporated subject pronoun (see section 6.6 on Irish); this pronoun would then be linked by coreference with a dislocated nominative DP. Such an analysis appears to be corroborated by the fact that there is a parallel construction involving objects:

(35) al-ʔawlaad-u   darad-tu-hum.
      the-children-NOM *beat-I-them*
      'The children, I beat them.'

---

[7] For the sake of brevity, we will sometimes refer to Modern Standard Arabic as 'Arabic' (though the agreement alternation under discussion is not generally found in the modern dialects of Arabic).

However, as Fassi Fehri (1993) points out, the view that preverbal subjects are uniformly left-dislocated is untenable. Note first that preverbal objects need not be accompanied by a resumptive clitic:

(36) a. baqarat-an šaahad-tu.
          *cow-*ACC   *saw-I*
          'A cow, I saw.'

      b. kull-a   rajul-in   ʔ-ahtarim-u.
          *every-*ACC *man-*GEN *I-respect-*INDIC
          'Every man, I respect.'

Thus, there are two constructions in which an object DP appears in preverbal position: a dislocation structure and a topicalization structure. The former involves coreference with a resumptive pronoun, the latter is derived by movement. Fassi Fehri shows that not every type of DP that can be topicalized can occur in dislocation. In particular, indefinites and quantifiers can only be topicalized, as the contrast between (36) and (37) shows.

(37) a. *?baqarat-un dabah-tu-haa.
          *cow-*NOM   *cut.throat-I-her*
          'A cow, I cut its throat.'

      b. *?kull-u   rajul-in   ʔ-ahtarim-u-hu.
          *every-*NOM *man-*GEN *I-respect-*INDIC*-him*
          'Every man, I respect him.'

Moreover, elements in dislocation cannot follow a question particle (or a complementizer), but topicalized elements can:

(38) a. ʔa zayd-an   raʔay-ta?
          Q *Zayd-*ACC *saw-you*
          'Is it Zayd that you saw?'

      b. *??a zayd-un raʔay-ta-hu.
          Q *Zayd-*NOM *saw-you-him*

Crucially, preverbal subjects can be indefinites or quantifiers, and they can follow a question particle:

(39) a. baqarat-un takallam-at.
          *cow-*NOM   *spoke-*3SG.FEM
          'A cow has spoken.'

b. kull-u   rajul-in   y-ahtarim-u   haadaa.
    every-NOM *man*-GEN *3-respect*-INDIC *this*
    'Every man respects this.'

(40)   ʔa zayd-un   qaal-a   haadaa.
       Q *Zayd*-NOM *said*-3SG.MASC *this*
       'Is it Zaid that said this?'

These data show that preverbal subjects need not be dislocated.[8] This in turn entails that strong agreement is genuine agreement, not an incorporated pronoun. Otherwise, subject topicalization structures should show weak agreement, contrary to fact.[9]

The agreement alternation in Arabic can be dealt with by the same type of context-sensitive allomorphy rule that is responsible for the agreement alternation in Dutch. Let us assume that VSO word order is derived by fronting of the verb to some functional head F (cf. (41a)), while SVO order is derived by movement of the subject to Spec-FP (cf. (41b); see Sproat 1985*b*, McCloskey 1996, and others, also for discussion of the nature of F, something irrelevant to our present purposes). As will be clear from the previous sections, the two structures differ as to whether or not the verb is realized in the same prosodic phrase as the subject. Given the mapping principle in (4) this is only the case in the VSO order, as indicated in (41a′,b′). (In the PF representations in (41) 'subject' and 'object' stand for the relevant terminal nodes; recall there is no syntactic structure at PF. For convenience, we will also occasionally represent the terminals in an XP at PF as 'XP'.)

(41)   a. $[_{FP} [_F V] [_{IP}$ subject $t_v [_{VP} t_v$ object]]]
       a′. {V subject} {object}
       b. $[_{FP}$ subject $[_F V] [_{IP} t_{subject} t_v [_{VP} t_v$ object]]]
       b′. {subject} {V object}

As a consequence, an agreement weakening rule of the type discussed in section 6.3 can affect (41a′), but not (41b′). The rule in question is formulated in (42).

[8] Of course, if the subject is referential it can occur in both topicalization and dislocation structures. In contrast to dislocated objects, dislocated subjects are not accompanied by an overt resumptive pronoun, because Arabic drops pronominal subjects (at least nonfocused ones; see section 8 for some discussion).

[9] Ouhalla (1991) argues against a movement analysis of topicalization structures on the basis of the fact that in exceptional case marking constructions preverbal subjects appear in the accusative, which implies that they cannot have moved from another case position. For an alternative account, compatible with the assumptions made here, see Neeleman and Weerman (1999: 195–202).

(42)   *Arabic Agreement Weakening*
      {[V Plr ...] [D Plr ...]} → {[V ...] [D Plr ...]}

(Note that the rule in (42) will not apply if the object in (41b) happens to be plural, due to the general recoverability condition in (13), which governs application of such rules.)

The idea that the Arabic agreement alternation is a PF phenomenon also forms the basis of Benmamoun's (2000) account. It is developed differently, however: Benmamoun proposes a process of PF merger (rebracketing under adjacency) that affects subject and verb. It has the effect that the number feature on the subject counts as exponent of the number feature on the verb, so that the latter is not expressed independently anymore. This is very similar to what the rule in (42) expresses. The difference between the two accounts lies in the characterization of the configuration that triggers agreement weakening. From Benmamoun's account of how PF merger works, it does not follow that only postverbal subjects can undergo this process. Topicalized subjects, too, are adjacent to the verb, so it is not immediately clear what should stop PF merger and thus suppression of the verb's number feature.

The rule in (42) straightforwardly accounts for a further set of data discussed by Benmamoun (2000). In structures containing both an auxiliary verb and a main verb, the subject can be placed either between the two verbs or in sentence-initial position. Agreement co-varies with order: only verbs that follow the subject show strong agreement, as illustrated in (43) (from Benmamoun 1996: 109).

(43)   a.   kaanat   T-Taalibaat-u   ya-ʔkul-na.
           be-PAST-3sg-FEM *the-students*-FEM-PL-NOM 3-*eat*-FEM-PL
           'The students were eating.'

      b.   T-Taalibaat-u   kun-na   ya-ʔkul-na.
           the-students-FEM-PL-NOM *be*-PAST-3-FEM-PL 3-*eat*-FEM-PL

      b′. *kun-na T-Taalibaat-u ya-ʔkul-na.
           be-PAST-3-FEM-PL   *the-students*-FEM-PL-NOM 3-*eat*-FEM-PL

We assume that the auxiliary is generated in an Aux position (perhaps T) and moved to F, as in (44a). The optional subject movement discussed above then results in (44b). As the corresponding prosodic structures show, agreement weakening can apply to the auxiliary in (44a′), but not in (44b′). Neither structure allows for weakening the main verb's agreement.

(44)   a.   [$_{FP}$ [$_F$ V$_{aux}$] [$_{AuxP}$ subject t$_{aux}$ [$_{vP}$ V$_{main}$ object]]]
      a′. {V$_{aux}$ subject} {V$_{main}$ object}

b. $[_{FP}$ subject $[_F V_{aux}] [_{AuxP} t_{subject} t_{aux} [_{VP} V_{main}$ object]]]

b'. {subject} {$V_{aux} V_{main}$ object}

Thus, the Arabic data can be analysed as involving agreement weakening in prosodic phrases. An alternative, syntactic analysis might be that strong agreement obtains when the subject and the verb are in a specifier-head configuration in overt syntax. Analyses based on such an assumption have indeed been proposed by Huybregts (1991), Fassi Fehri (1993), Bolotin (1995), and Guasti and Rizzi (2002). Let us consider this type of syntactic account.

Suppose that strong agreement in Standard Arabic requires the verb and its subject to be in a specifier-head configuration in overt syntax. Then, the data in (43) can be analysed as follows. In (43b), both the main verb and the auxiliary have strong agreement, which implies the subject must move from a specifier position in which it checks the main verb's features (say Spec-FP$_2$) to Spec-FP, where it checks the auxiliary's features, as in (45a). In (43a), only the main verb has strong agreement, with the consequence that movement of the subject to Spec-FP is procrastinated (or takes the form of feature movement).[10] This is illustrated in (45b).[11]

(45)   a. $[_{FP}$ subject $[_F V_{aux}] [_{AuxP} t_{subject} t_{aux} [_{FP2} t_{subject} [_{F2} V_{main}]$ $[_{VP} t_{v\text{-}main}$ object]]]]

        b. $[_{FP} [_F V_{aux}] [_{AuxP}$ subject $t_{aux} [_{FP2} t_{subject} [_{F2} V_{main}] [_{VP} t_{v\text{-}main}$ object]]]]

With this in mind, let us return to the examples that do not involve an auxiliary. Assuming the same structures as before, the SVO and VSO orders must be analysed as in (46a) and (46b) respectively. However, if the trace of the subject can check strong agreement against the main verb in FP$_2$ in structures with an auxiliary as in (45), there is no reason why it cannot do so in (46b). In other words, there is no reason why strong agreement should be incompatible with VSO order, as in fact it is. (Possibly the AuxP is not

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[10] Huybregts (1991) in fact assumes that there is overt agreement checking in VSO structures as well, the difference with SVO being that there is an empty expletive specified as third person singular present in the higher subject position in apparent VSO structures. This assumption also underlies the analyses in Fassi Fehri 1989 and Mohammad 1990. Fassi Fehri (1993: 38–42) points out a number of disadvantages of this view, however. A main drawback is that it just seems to shift the problem, since the question now is why the empty expletive must be specified as singular while being associated with a plural subject.

[11] In line with minimalist assumptions, checking takes place in the functional domain. The subject may have been base-generated in Spec-VP, something from which we abstract away in (45). Finally, we assume that the subject moves to the regular subject position, Spec-IP (AuxP in (45)), in order to check nominative case, but this, too, is irrelevant to the argument.

present in (46), so that the overt subject would be located in Spec-FP$_2$. This does not affect the argument.)

(46) a. [$_{FP}$ subject [$_F$ V] [$_{AuxP}$ t$_{subject}$ t$_V$ [$_{FP2}$ t$_{subject}$ [$_{F2}$ t$_V$] [$_{VP}$ t$_V$ object]]]]
      b. [$_{FP}$ [$_F$ V] [$_{AuxP}$ subject t$_V$ [$_{FP2}$ t$_{subject}$ [$_{F2}$ t$_V$] [$_{VP}$ t$_V$ object]]]]

The only difference between (45) and (46b) is that in the latter structure agreement is checked by the verb's trace, rather than by the head of the verbal chain. This means the syntactic account can be salvaged by assuming that only overt verbs can check strong agreement in Arabic. However, traces are copies of their antecedents (Chomsky 1995), which means that there is no reason to expect that they could not participate in checking relations. In fact, verbal traces can perfectly well participate in regular syntactic checking. For example, agreeing verbs in verb-second languages can move to C across the subject without this leading to any problems.[12]

6.5 CLITICIZATION IN DUTCH

6.5.1 Middle Dutch

Like present-day Dutch (see section 6.3), Middle Dutch has verb second in root contexts. As opposed to modern Dutch, it has a set of object clitics, in addition to the strong and weak pronouns that exist in both languages. These clitics occupy a fixed position in the clause: they immediately follow the head in C, with which they form a phonological word. Thus, in main clauses they attach to the fronted verb, whereas in embedded clauses they attach to the complementizer (the observation and the examples are due to Weerman 1989: 15):

(47) a. Nu moete-ne Onse Vrouwe bewaren.
          now must-him Our Lady   save
          'Now, Our Lady must save him.'

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[12] A possible problem for the approach to the Arabic agreement alternation we propose may be caused by VOS orders, in which agreement is weak (this order is rare, but does occur). This fact cannot be a consequence of the rule in (42), given that verb and subject are not in the same prosodic domain. One alternative would be to assume that in the case of VOS order no [Plr] feature can be generated on the verb in the first place. Suppose, for example, that such a feature must be checked in syntax, and that syntactic checking requires the relevant phrase to precede the head (see also Chapter 7). This would make a verb bearing [Plr] compatible with VSO and

    b. Soe troest-se de hope vander goetheit Gods.
       *Thus consoles-her the hope of-the goodness God-*GEN
       'Thus, hope in the goodness of God consoles her.'

    c. datt-en God niet en spaert
       that-him God not NEG *saves*
       'that God does not save him.'

    d. dat-si de moeder wacht
       that-them the mother awaits
       'that the mother awaits them.'

We will argue that this type of cliticization involves another allomorphy rule sensitive to initial prosodic phrasing, this time of the type in (14).

According to one view, clitics are nominal elements which are base-generated on the verb and which absorb the verb's internal θ-role and accusative features (see for instance Miller and Sag 1997, Monachesi 1999, and references mentioned there). For Middle Dutch object clitics, however, such an analysis cannot work.[13] The data in (47c,d) show that the clitic attaches to C even if this position is occupied by a complementizer rather than the verb. Since the clitic is the internal argument of the verb all the same, it seems that for this type of cliticization it must be assumed that the clitic starts out as the verb's complement and moves to its surface position.

This ties in with another popular view of cliticization, according to which the phenomenon is an instance of head movement. Note, however, that an analysis which proposes that Middle Dutch object clitics move from their base position directly to C violates Travis's (1984) head movement constraint, as illustrated in (48). (We assume that clitics are D heads; see Corver and Delfitto 1993, amongst others.)

(48) $[_{CP} \dots \text{C-D} [_{IP} \dots [_{VP} \dots [_{DP} \text{t}_D] \text{V}] \dots]]$

This means that cliticization to C must be a two-step process. As Cardinaletti and Roberts (2002) propose for analogous structures, the object DP first undergoes phrasal movement to the left periphery of IP (thus avoiding a violation of the head movement constraint), after which its head cliticizes

SVO sentences (in which the subject precedes the verb or its trace), but incompatible with VOS order. Thus, weak agreement with VOS order would be a case of non-generation of the relevant feature, rather than reduction. As explained in the main text, an account based on syntactic checking cannot as such be responsible for agreement weakening in VSO contexts.

[13] This analysis (or the syntactic analysis in terms of head movement mentioned below) appears to be more appropriate for cliticization of the type found in Romance. In Romance, as opposed to Germanic, clitics move along with the verb and show up in positions from which their pronominal counterparts are barred.

to C. Independent evidence for the existence of the conjectured phrasal movement is that full pronouns can undergo it as well. They, too, can be found in a position to the left of the subject (see (49a,b)), as well as in positions lower in the tree (see (49c,d)) (Middle Dutch examples are taken from van Gestel *et al.* 1992: 112, 150).

(49)   a.   Doe so bat   heme Lanceloet.
            then so asked him   Lancelot
            'Then Lancelot asked him thus.'

       b.   dat mi die crancheit sal   doen dolen
            that me the illness   will do   wander
            'that the illness will make me err'

       c.   Soe moetti [. . .] mine mesdaet mi vergheven.
            so   must-he   my   crime   me forgive
            'So he must forgive me my crime.'

       d.   In   hebbe niet mi gheset   daertoe.
            I-NEG *have   not me applied there-to*
            'I have not applied myself to that.'

Cardinaletti and Roberts (2002) view cliticization in the cases under discussion as an instance of head movement. The D-head of the pronominal DP incorporates into the host. The complete derivation is given in (50), where the first step of DP movement consists of adjunction to IP (Cardinaletti and Roberts analyse it as movement to the specifier position of a functional projection between CP and IP, but this does not affect the argumentation here).

(50)   [$_{CP}$ . . . C-D [$_{IP}$ [$_{DP}$ t$_D$] [$_{IP}$ subject . . . [$_{VP}$ . . . t$_{DP}$ V] . . .]]]

Although this derivation does not involve head movements that skip a head, the step of incorporation in (50) violates Huang's (1982) condition on extraction domains, which bans movement from adjuncts and specifiers (see also Baker 1988 for arguments that incorporation out of adjuncts or specifiers is impossible).[14] Moreover, if object cliticization is achieved through

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[14] This problem can perhaps be avoided by adopting a view on clitics originally proposed by Muysken (1982), according to which they are simultaneously heads and maximal projections. According to this view, there is no extraction of a head from an adjunct or specifier when the clitic incorporates. However, the analysis faces another problem. In order for the first movement (to the left edge of IP) not to violate the head movement constraint, a phrasal chain must be formed. Syntactic incorporation of phrases into heads is presumably impossible, however, so the second movement step must involve a head chain. The resulting composite chain therefore violates chain uniformity (see Chomsky 1995; or, alternatively, the lowest trace violates Müller and Sternefeld's (1993) principle of unambiguous binding).

movement, it remains unclear why it invariably takes the form of encliticiza-
tion rather than procliticization in Middle Dutch. As we will now argue, a
prosodic account of the actual step of cliticization fares better in these
respects.

The DP movement to the left edge of IP, which is independently available
for object pronouns in Middle Dutch, creates a context in which a pronoun
finds itself in the same prosodic phrase as the complementizer or the fronted
verb in C. This contrasts with what is the case when the pronoun remains in
its base position or is shifted to a position following the subject. The relevant
structures are given in (51).

(51)   a. $[_{CP} \ldots C \ [_{IP}$ pronoun $[_{IP}$ subject $\ldots [_{VP} \ldots t_{pron}$ V$] \ldots]]]$
         a′. $\{ \ldots \} \ \{C$ pronoun$\} \ \{$subject$\} \ \{ \ldots \} \ \{V\}$
         b. $[_{CP} \ldots C \ [_{IP}$ subject $\ldots [_{VP}$ pronoun $[_{VP} \ldots t_{pron}$ V$] \ldots]]]$
         b′. $\{ \ldots \} \ \{C$ subject$\} \ \{ \ldots \} \ \{$pronoun$\} \ \{ \ldots \} \ \{V\}$
         c. $[_{CP} \ldots C \ [_{IP}$ subject $\ldots [_{VP} \ldots$ pronoun V$] \ldots]]$
         c′. $\{ \ldots \} \ \{C$ subject$\} \ \{ \ldots \} \ \{$pronoun$\} \ \{V\}$

In (51a′), but not in (51b′) or (51c′), an allomorphy rule of the type in (14) can
apply:[15]

(52)   *Middle Dutch Pronoun Weakening*
         $\{ \ldots [+V] \ldots [D \ (Prt) \ (Add) \ldots] \ldots \}$
         $\rightarrow \{ \ldots \langle [+V] \ldots [D \ (Prt) \rightarrow (Add) \ldots] \rangle \ldots \}$

In contrast to the cases discussed in the previous sections, the allomorphy
affects the prosodic status of the pronoun, rather than the feature make-up of
the terminal. Note, however, that the alternation in question cannot be
derived by a purely phonological (post-interface) rule, since in several cases
there is no plausible phonological relation between the full pronoun and the
associated clitic. For example, the object pronoun for the third person

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[15] At this point, we should note that the rule can apply recursively. Consider the situation in
which the head in C is followed by a subject pronoun and an object pronoun. The initial prosodic
phrasing allows for cliticization of the subject pronoun, as this element is contained in the same φ
as the preceding head. On the plausible assumption that edges of clitics cannot support
φ-boundaries, subject cliticization leads to an adjustment of the prosodic structure, such that the
object pronoun finds itself in a φ with material it can cliticize to. As a result, a post-C subject-
object clitic cluster can arise, as the example in (i) shows (from van Gestel *et al.* 1992: 147). Note
that this example illustrates that a clitic does not have to be string-adjacent to C, as long as the
material that intervenes does not form an independent prosodic word (see section 6.2).

(i)   Soe darict   u   vertellen wel.
       so   dare-I-it you   tell   well

feminine singular is *haer* (/ha:r/), whereas the clitic is *se* (/sθ/). There must be independent spell-out rules for these two forms, and application of (52) forces insertion of a pronominal form smaller than a prosodic word: a clitic. If (52) does not apply, insertion of the clitic form is blocked by the strict layer hypothesis (see section 6.2).

As opposed to the allomorphy rule discussed in section 6.3, it appears that the rule in (52) applies optionally: full pronouns can occur in precisely the same position as clitics (see (49a,b)). This may seem awkward at first glance. However, the rule differs from the ones discussed before in that it has an effect on interpretation. In particular, since a clitic cannot bear stress, interpretations that rely on the presence of stress (such as focus or contrastive topic) can only obtain if the rule does not apply. In other words, we can maintain that rule application is obligatory, but relative to a target inter-pretation. The full pronouns in (49a,b) should hence have a discourse status which differs from that of the clitics in (47). Although likely, this is obviously hard to test for a dead language.

There is an issue of execution related to this suggestion: how does PF 'know' that the pronoun must be contrastive and hence receive stress? This is an instantiation of the more general problem of how intonation and interpretation are linked, given that in the traditional T-model there is no direct relation between phonology and semantics. Two possible solutions present themselves. One could assume that foci and contrastive topics are marked as such by a feature in syntax, the module that connects semantics and phonology in the T-model. These features can then be taken to block application of the rule in (52). Alternatively, one could adjust the T-model in such a way that PF is directly linked to pragmatic interpretation (see Reinhart 1995, Szendrői 2001 and Samek-Lodovici 2002; see also section 6.9). If so, the pragmatic module may require stress on the pronoun, which would again block application of (52).

The prosodic approach to Middle Dutch object cliticization accounts for the distribution of clitics without running into the problems mentioned in connection with the syntactic alternative. It also explains why cliticization to C consistently involves encliticization. Given that Middle Dutch is a verb-second language, XPs in general, and thus pronouns as well, can be fronted to a position preceding C in main clauses (as in (53a)). However, pronouns cannot reduce to clitics if fronted to this position, since they do not find themselves in the same prosodic domain as the verb in C. In other words, the structural description for the weakening rule in (52) is not met in (53b). Similarly, in (51c,c′) the pronoun cannot procliticize to the verb that follows it, since there is a φ-boundary that separates them.

(53)   a.   [$_{CP}$ pronoun [$_{C}$ V] [$_{IP}$ subject … [$_{VP}$ … t_{pron} t_V] …]]
       b.   {pronoun} {V subject} { … }

Note, finally, that the distribution of Middle Dutch object clitics cannot be accounted for by merely stating that they require a phonological host on their left; the rule in (52) must be involved. If it were not, it would be unclear why an object pronoun cannot cliticize in its base-position, or in a scrambled position below the subject.

6.5.2 Modern Dutch

Let us now compare the situation in modern Dutch with the Middle Dutch state of affairs. Modern Dutch has lost object cliticization to C:

(54)   *dat-'t Jan gedaan heeft
        that-it John done   has
        'that John has done it'

This can be explained in terms of the above analysis. Modern Dutch differs from Middle Dutch in that object pronouns can no longer be shifted across the subject.[16] This is illustrated in (55) (compare with the Middle Dutch examples in (49)).

(55)   a. *Toen vroeg hem Lancelot waar de jonkvrouw was.
            then   asked him Lancelot where the lady   was

        b. *dat mij de ziekte zal doen dwalen
            that me the illness will make wander

        c. Toen vroeg Lancelot hem waar de jonkvrouw was.
            then   asked Lancelot him where the lady   was
            'Then Lancelot asked him where the lady was.'

        d. dat de ziekte mij zal doen dwalen
            that the illness me will make wander
            'that the illness will make me wander'

Given the absence of this type of movement, object pronouns do not immediately follow C. Therefore, the structural description of a rule like (52) is not met; only the representations in (51b,b′) and (51c,c′) exist. Such a rule can hence not be acquired in modern Dutch. As a consequence, the language does not have specific clitic forms for objects any more, only strong and weak

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[16] Focused elements or contrastive topics can be fronted to a position preceding the subject (see (25a′,b′) for examples). Object pronouns can undergo this movement as well. This does not affect the argument, however, since reduction of foci and contrastive topics is impossible to begin with, as argued above.

object pronouns (see Cardinaletti and Starke 1999 on the distinction between weak pronouns and clitics).

In fact, the analysis predicts that one type of pronoun can still be cliticized onto C in modern Dutch. Subject pronouns are usually realized in the same prosodic phrase as the complementizer or the fronted verb (the pronoun in (56) is a subject):

(56) a. $[_{CP} \ldots C [_{IP}$ pronoun $\ldots$
      b. $\{ \ldots \} \{$C pronoun$\} \{ \ldots$

In (56b), the subject pronoun could undergo an allomorphy rule of the type under discussion. Modern Dutch does indeed have one clitic form, namely for third person singular masculine subjects. This is the form *ie* (pronounced /iː/), the clitic counterpart of the full form *hij* (pronounced /hɛi/). The following spell-out rules are thus part of modern Dutch grammar:

(57) a. [D, Masc] $\rightarrow$ /hɛi$_\omega$/
      b. [D, Masc] $\rightarrow$ /iː$_\sigma$/

The distribution of the clitic form is regulated by the rule in (58) (in conjunction with the strict layer hypothesis).

(58) *Modern Dutch* Hij *Weakening*
      $\{ \ldots C \ldots [D \ Masc] \ldots \} \rightarrow \{ \ldots \langle C \ldots [D \ Masc] \rangle \ldots \}$

If *ie* is not just a weak pronoun but a clitic form that results from application of (58) it should behave on a par with the Middle Dutch object clitics. Indeed it does: in all contexts where the subject is not right-adjacent to C, *ie* cannot appear. This is the case when a constituent is fronted to a position between C and the subject, as in (59c,c′), as well as when the subject is topicalized in a main clause, as in (59d,d′)):[17]

(59) a.   {dat hij}   {gisteren} {de afwas} {deed}
           that he$_{STRONG}$ *yesterday the dishes did*
           'that he did the dishes yesterday'

      a′. {dat ie}   {gisteren} {de afwas} {deed}
           that he$_{CL}$ *yesterday the dishes did*

      b.   {Gisteren} {deed hij}   {de afwas}.
           yesterday did   he$_{STRONG}$ *the dishes*

---

[17] Note that the order in (59c,c′) favours a contrastive reading of the subject, which precludes the use of a weak pronoun or clitic as well. However, if something else in the sentence is focused,

    b′. {Gisteren} {deed ie} {de afwas}.
        yesterday   did   he$_{CL}$ *the dishes*

    c. {dat gisteren} {hij}   {de afwas} {deed}
        that yesterday he$_{STRONG}$ *the dishes   did*

    c′. *{dat gisteren} {ie} {de afwas} {deed}
        that yesterday he$_{CL}$ *the dishes did*

    d. {Hij}   {deed gisteren} {de afwas}.
        he$_{STRONG}$ *did   yesterday the afwas*

    d′. *{Ie} {deed gisteren} {de afwas}.
        he$_{CL}$ *did   yesterday the dishes*

We find, then, that the possibility of cliticization depends on whether or not the syntax allows a pronoun to follow a head immediately. This confirms the view that this type of cliticization is conditioned by prosodic phrasing.

The proposed analysis seems to predict that object cliticization could occur in specific circumstances in Modern Dutch after all. It is possible for the object to end up to the immediate right of a fronted verb when the subject is topicalized, as in (60).

(60)   a. $[_{CP}$ subject $[_{C}$ V] $[_{IP}$ t$_{subject}$ $[_{VP}$ pronoun t$_{V}$]]]
        b. {subject} {V pronoun}

Still, there are no special reduced (clitic) forms for object pronouns in this context. The following data illustrate this:[18]

(61)   a. {Bob} {vergeet haar}   {nooit}.
        Bob   forgets   her$_{STRONG}$ *never*
        'Bob will never forget her.'

weak pronouns can be used in this order, whereas use of *ie* still leads to ungrammaticality. An example is given below:

(i) a. dat op mooie   dagen ze   alleen over   reisjes naar het zuiden
        that on beautiful days she$_{WEAK}$ *only about trips to   the South*
        wil   praten
        wants talk-INF
        'that on beautiful days she only wants to talk about trips to the South'

    b. *dat op mooie   dagen ie   alleen over reisjes naar het
        that on beautiful days he$_{CL}$ *only about trips to   the*
        zuiden wil   praten
        South wants talk-INF

[18] Here we borrow the object clitic form *ze* from Middle Dutch. The same form does in fact still occur in some variants of Dutch today. These dialects still have object cliticization to C and pronoun fronting across the subject, on a par with Middle Dutch. An example is West Flemish; see Haegeman 1990.

    b.   {Bob} {vergeet d'r}   {nooit}.
        Bob   forgets   her$_{\text{WEAK}}$ *never*

    c.   *{Bob} {vergeet ze}   {nooit}.
        Bob   forgets   her$_{\text{CL}}$ *never*

Note, however, that in the syntactic representation of these sentences there is an element between the verb and the object, namely the trace of the subject (see (60a)). The question, then, is whether traces can motivate φ-boundaries in the initial prosodic representation. This relates to the more general question of at which levels traces are present in the mapping from syntax to phonology. We will defer discussion of whether or not traces themselves are visible at PF to Chapter 7 (noting for the moment that the trace of a top-icalized subject in Arabic may not trigger agreement weakening; compare section 6.4). What must be established at this point is whether or not traces trigger φ-closure. We expect them to do this, since initial prosodic phrasing occurs on the basis of syntactic information (see (3b)), and since traces of maximal projections are maximal projections themselves. Right alignment of syntactic and prosodic phrases will hence have the result that (60a) is mapped to the initial prosodic representation in (62) rather than to the one in (60b).

(62)   {subject} {V} {pronoun}

In this representation the object pronoun and the fronted verb are not in the same prosodic phrase, so the structural description for a hypothetical rule of cliticization in modern Dutch is not met.

    One may wonder whether there is independent evidence for the assumption that traces trigger φ-closure. Although we cannot discuss this in detail, we think that *wanna* contraction in English may provide such evidence. This process can be analysed as largely parallel to cliticization in Dutch: if *to* finds itself in the same prosodic domain as a verb, the two elements are realized as a single prosodic word:

(63)   *English* to *contraction*
        { ... V ... I$_{\text{INF}}$ ... } → { ... ⟨V ... I$_{\text{INF}}$⟩ ... }

The English lexicon has a special spell-out rule for the combination of *want* and *to* when these form a single phonological word (compare (16) in section 6.2):[19]

(64)   ⟨WANT I$_{\text{INF}}$⟩ → /wanna/

---

[19] This type of rule of vocabulary insertion is, of course, quite common. It accounts for forms like German *zum* which spells out a prosodic word consisting of *zu* 'to' and *dem*

Forms like *wanna* must be listed as such in the lexicon because only com-
binations of *to* with a specific set of verbs are spelled-out in an idiosyncratic
manner. (The idea that forms like *wanna* are listed also underlies Postal and
Pullum's (1982) and Roberts' (1997*b*) analyses. However, see Hudson 2003
for an alternative.)

There is indeed evidence that the rule in (63), whose application is
necessary for *wanna* insertion to occur, is sensitive to φ-boundaries: *wanna*
contraction is blocked when *want* and *to* are contained in different prosodic
phrases. The examples in (65) illustrate this (see Postal and Pullum 1982 and
Goodall 2001).

(65)   a.   [It seems [like [to want]] [to regret that one does not
            have]].
       b.   [I don't want [anyone [who continues [to want]]] [to stop
            wanting]].
       c.   [One must [want] [to become an over-effective
            consumer]].

In these examples there is at least one right XP bracket between *want* and *to*.
As a result, the two do not end up in a single prosodic phrase. (In fact, they
are in different intonational phrases in at least (65a) and (65b).) In these
contexts, *wanna* contraction is impossible.[20]

If *wanna* contraction is indeed sensitive to prosodic phrasing, the old
observation that traces block *wanna* contraction (Lakoff 1970) suggests that
these elements trigger φ-closure. In (66b,b'), the right edge of the trace
induces a φ-boundary that separates *want* and *to*.[21]

(66)   a.   [Who do [you want [to meet t_{WH}]]]?
       a'. {Who} {do you} {want to meet}?
       b.   [Who do [you want [t_{WH} to meet John]]]?
       b'. {Who} {do you} {want} {to meet John}?

'the.DAT', or French *du* (from *de le* 'of the.MASC.SG'). In general, spell-out rules can refer to
more than one terminal; some morphological examples were discussed in the previous
chapter.

   [20] *Wanna* contraction is also impossible if either *want* or *to* is part of a coordinated con-
stituent. Although we do not have an explanation for this, we speculate that it is related to the
fact that weakened forms are barred from being coordinated (see section 6.6). If so, it is in line
with a prosodic account of the phenomenon.

   [21] The argument is based on the assumption that examples like (66a) do not contain a PRO
subject (as argued by Brame 1976, Manzini and Roussou 2000, and others) and hence no

Thus, the rule that groups WANT and infinitival I in a prosodic word cannot apply in (66b′), with the consequence that the spell-out rule in (64) cannot apply either:

(67)   *Who do you wanna meet John?

For precisely the same reason, the presence of the subject trace in (60) blocks application of an object pronoun reduction rule in Dutch.

This is not to say that prosodic structures as in (62) will surface as such. As argued in section 6.2, there are phonological operations that apply beyond the PF interface, after allomorphy rules have applied. These deal with weight distribution, amongst other things. Following Nespor and Vogel (1986) and Truckenbrodt (1999), we assumed that phonological phrases that do not contain enough material trigger restructuring: they are joined with an adjacent prosodic phrase. This may happen to the φ that contains only the verb in (62), resulting in the representation in (68).

(68)   {/subject/} {/verb/ /pronoun/}

Because of late restructuring rules of this type, and because traces are not spelled out, we expect that phonological processes that apply beyond the PF interface will not be sensitive to traces. This appears to be correct (see Nespor and Vogel 1986: 48–57 for detailed discussion).

6.5.3 Phonological Cliticization

Not all clitic forms in Dutch are governed by allomorphy rules like (52) and (58). Consider the examples below, in which a specifier and a head are combined into a phonological word. This may seem surprising, given that in the initial prosodic structure specifiers and heads are placed in different prosodic phrases in Dutch.

φ-boundary between *want* and *to*. Alternatively, if there is a PRO subject, it could be assumed to follow VP or *to* (not being exceptionally case-marked by the matrix verb). This second solution also applies to traces of A-movement. It has been observed (see Jaeggli 1980 and Berendsen 1985) that these do not seem to block contraction (cf. *John seemsta be happy*). However, such traces do not carry case. If case is central in the linearization of arguments, as argued in the next chapter, an NP-trace in subject position need not be linearized as an exceptionally case-marked subject; it may also follow VP or *to*.

(69)   a.   Dat is jofel.
              that is neat

        b.   [ω Da's] jofel.
              that-'s   neat

Cliticization of this type is not a result of allomorphy rules, but of the availability of a clitic form in the lexicon that is in free variation with the full pronoun. The clitic form must of course find a host, but this need not be a particular syntactic category and whether an adjacent word is available as host is not determined by the initial prosodic phrasing. Rather, it is dependent on the output of the phonological readjustment rules that operate after spell-out.

In the case at hand, the crucial observation is due to Hoeksema (1985), who shows that the formation of *da's* cannot be due to a rule of final *t* deletion, given that in the same context the demonstrative *dit* 'this' does not give rise to **di's*. It seems, then, that *da* is stored in the lexicon as a variant of *dat*, while *dit* lacks the variant *di. The reduced version of the demonstrative is phonologically best characterized as a proclitic. Its insertion therefore gives rise to a grammatical string only if restructuring of the initial prosodic structure results in a phonological phrase {*da is*...}, which in turn gives rise to a phonological word ⟨*das*⟩. Of course, since *da* is a clitic, it has little prosodic weight. Hence, a φ containing only this element will indeed usually undergo restructuring.

There is independent evidence for the free availability of the clitic form *da*. The reduced form of the demonstrative also occurs in examples like (70) and (71). The former is phonologically different from (69) in that the verb in C has an initial consonant. The latter is syntactically different: it shows that the distribution of the reduced demonstrative is not restricted to Spec-CP. In neither context is a shortened variant of *dit* 'this' allowed.

(70)   a.   Dat mag niet.
              that may not
              'That is not allowed.'

        b.   [ω dammag] niet.
              that-may   not

(71)   a.   Jan vraagt of   je dat nu   eindelijk gedaan hebt.
              John asks   whether you that now finally   done   have
              'John asks whether you have now finally done that.'

        b.   Jan vraagt of   je [ω dannu] eindelijk gedaan hebt.
              John asks   whether you that-finally   done   have

In this analysis, the example in (69) is a case of context-independent allo-morphy, and hence not sensitive to the initial prosodic phrasing, as opposed to the special clitics discussed above.

Let us now return to our main line of argumentation.

6.6 CELTIC SUBJECT CLITICIZATION

The above account of object cliticization in Middle Dutch supports an analysis of pro drop in some Celtic languages along the lines of Anderson (1982), Pranka (1983), and Doron (1988). Consider Irish. The most striking property of this language from the perspective of this chapter is that the agreement morphology that is present in pro drop structures (resulting in the so-called synthetic form of the verb) is omitted when the subject is overtly realized (resulting in the so-called analytic form of the verb). In this respect, Irish differs from classic pro drop languages like Italian, in which agreement is always present. The examples in (72), from McCloskey and Hale 1984, illustrate the phenomenon.[22]

(72)   a.   Chuirfinn   isteach ar an phost sin.
            put-COND-ISG *in*   *on the job*   *that*
            'I would apply for that job.'

       a′. *Chuirfinn   mé isteach ar an phost sin.
            put-COND-ISG *I in*   *on the job*   *that*

       b.   *Chuirfeadh isteach ar an phost sin.
            put-COND   *in*   *on the job*   *that*

       b′. Chuirfeadh Eoghan isteach ar an phost sin.
            put-COND   *Owen   in*   *on the job*   *that*

Several analyses of the complementary distribution between agreement and subject assume that the apparent agreement ending in (72a) is in fact an incorporated subject pronoun.[23] There are two basic variants of this view. In one it is assumed that the pronoun is incorporated through syntactic head-to-head movement; the other assumes a phonological or morphological reanalysis.

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[22] Hendrick (2000) notes that certain verb–pronoun combinations do not partake in the agreement alternation; we will ignore this fact below, as it does not affect the analysis.

[23] It has been argued that similar data in other Celtic languages also involve pronoun incorporation; see for instance Anderson 1982 on Breton, and Adger 2000 on Scottish Gaelic. Stump (1984) provides a critique of Anderson's incorporation analysis. We believe that the

The syntactic approach faces a couple of problems, one of which it shares with the syntactic analysis of object cliticization in Middle Dutch: the condition on extraction domains excludes incorporation out of subject DPs. Moreover, as pointed out by McCloskey and Hale (1984), the pronoun can be incorporated from the left-hand part of a coordinated subject, as illustrated in (73). If the incorporation involved syntactic movement, this would violate the coordinate structure constraint.

(73)   da mbeinn-se   agus tusa   ann
        if be-COND-1SG-CONTR *and you*-CONTR *there*
        'if I and you were there'

The alternative relies on either phonological or morphological adjustment of the verb–pronoun sequence (see Pranka 1983, Doron 1988, and Adger 2000). Evidently, the type of allomorphy rule proposed here can provide an account of the data along such lines. The analysis runs entirely parallel to that of Dutch clitics in the previous section.

more serious of the problems he mentions are problems for the syntactic incorporation analysis only, as discussed below.

As an alternative to an incorporation analysis, Stump (1984) proposes what he terms an 'agreement analysis' for Breton. According to this analysis, agreement is optional, but required to license a pro subject (as would be expected on the basis of traditional analyses of Italian-style pro drop). For the Irish data, comparable analyses have been proposed by McCloskey and Hale (1984) and Legate (1999). The main problem these analyses face is that they need an additional assumption to account for the complementary distribution between overt pronouns and agreement, as compared to incorporation analyses. In addition to the claim that agreement is optional, something must be said about the impossibility of combining an overt pronoun with agreement (as is possible in pro drop languages of the Italian type).

Stump introduces a parameter that states that in some languages agreement cannot govern an overt subject, whereas in others this is allowed. Legate argues that Irish has a null pronominal form that can realize any set of phi features, but that this can be inserted only if the phi features of the verb are spelled out. According to Legate, this means that the null pronoun requires a more specific context than an overt pronoun, which can be used regardless of whether the phi features of the verb are spelled out. If so, the elsewhere principle rules out insertion of an overt pronoun in contexts licensing the null pronoun. Note, however, that overt pronouns cannot be inserted in just any context: as opposed to the null pronoun, they must spell out a specific set of phi features. This means that the contexts in which an overt pronoun can be inserted do not form a superset of the contexts that allow insertion of the null pronoun. For instance, first person singular agreement blocks insertion of an overt third person singular pronoun, but it does license the null pronoun. Conversely, the analytic form of the verb licenses an overt pronoun, but not the null pronoun. Hence, a particular overt pronoun never stands in an elsewhere relation with the null pronoun.

Another potential drawback of agreement analyses is that they do not explain why VSO structures are the typical environment in which complementarity between pronouns and agreement is found (see Roberts and Shlonsky 1996).

Note first that the VSO ordering of the Celtic languages has the consequence that verb and subject are realized in the same prosodic phrase. Assuming that VSO word order is derived by verb movement to some functional head F, the following structures obtain (see also section 6.4 on Arabic):

(74)   a.   [$_{FP}$ [$_F$ V] [$_{IP}$ subject t$_V$ [$_{VP}$ t$_V$ object]]]
       b.   {V subject} {object}

Since the verb and the subject are in the same φ in (74b), they can be subject to an allomorphy rule of the format in (14). The data in (72) are due to (75), which is identical to the rule that governs the distribution of object clitics in Middle Dutch, except for the specification of the pronoun's host:

(75)   *Irish Pronoun Weakening*
       { … [-N] … [D (Prt) (Add) …] … }
       → { … ⟨ [-N] … [D (Prt) (Add) …] ⟩ … }

This rule must of course be combined with spell-out rules for verbs, regular pronouns, and pronouns that form a phonological word with the verb. The rule mentions the categorial feature [-N], rather than the category V, because after prepositions one finds the same complementary distribution of overt DPs and (apparent) agreement (see Acquaviva 2000 and references mentioned there). This is of some interest, since it shows that the syntactic function of the pronoun with respect to its host is irrelevant in structures that allow weakening. The crucial factor is that the pronoun and its host must be in the same prosodic phrase.

A feature in which Irish pronoun weakening differs from its Middle Dutch counterpart is that the rule seems to apply obligatorily. As Doron (1988: 203) notes: 'when a synthetic form exists, such as *chuirfinn*, it is in general ungrammatical to use an analytic form together with a pronominal subject.' This is illustrated by Doron's example in (76) (compare with (72b′); all Irish and Welsh examples below are taken from Doron).

(76)   *Chuirfeadh mé isteach ar an phost sin.
       put-COND   *I   in   on the job   that*

For Middle Dutch we suggested that the optionality of cliticization was only apparent. The full pronoun can only occur in the position fitting the structural description of the weakening rule if it is in focus or a contrastive topic. These interpretations require stress on the pronoun, which is incompatible with realization as a clitic. In Irish, however, an alternative

means of marking contrastiveness is employed, namely insertion of the suffix *-se*. This suffix is compatible with full as well as reduced pronouns; the latter option is demonstrated in (77). The existence of this way of marking contrastiveness has the consequence that interpretational requirements cannot block application of the pronoun weakening rule. Hence, it applies obligatorily whenever its structural description is met.

(77)   Chuirfinn-se
        put-COND-1SG-CONTR

The availability of a special suffix marking contrastiveness in Irish but not Dutch explains a further difference between pronoun weakening in the two languages. Whereas Irish allows reduction of the first part of a coordinated subject, as was illustrated by (73), the same is impossible in Dutch:

(78)   a.   dat   hij   en   Jan   naar huis gaan
              that *he*_{STRONG} *and John to   home go*
              'that he and John go home'

        b.   *dat   ie   en   Jan   naar huis gaan
              *that he*_{CL} *and John to   home go*

Note that, as such, the phenomenon of first conjunct reduction finds a natural explanation on our account. The alignment condition in (4) has the effect that the verb and the subject's first conjunct form a prosodic phrase from which the second conjunct is excluded:

(79)   a.   [_{FP} [_F V] [_{IP} [pronoun and pronoun] t_V [_{VP} t_V ...]]]
        b.   {V pronoun} {and pronoun} { ... }

Hence, the weakening rule may affect the first, but not the second, conjunct. The reason why this nevertheless does not occur in Dutch is that coordinated pronouns are typically interpreted as being contrastive (see Cardinaletti and Starke 1999). Consequently, destressed forms like clitics or weak pronouns cannot be coordinated in languages that mark contrastiveness by stress; see (80). The coordinated pronoun in the first conjunct of (78) can therefore not undergo reduction to *ie*.

(80)   a.   Ik   zie hem   en   haar.
              *I   see him*_{STRONG} *and her*_{STRONG}

        b.   *Ik   zie 'm   en   d'r.
              *I   see him*_{WEAK} *and her*_{WEAK}

Use of the contrastive *-se* suffix in Irish, which is compatible with reduced forms, avoids this problem. There is no difficulty in weakening a coordinated pronoun, as long as *-se* is present. Indeed, omission of *-se* results in ungrammaticality; compare (81) with (73):

(81) *da mbeinn   agus tu(sa)   ann
       if   be-COND-1SG *and   you*(-CONTR) *there*
       'if I and you were there'

As was the case for Dutch, our theory predicts that pronoun weakening is blocked if the pronoun precedes the verb, since in that case pronoun and verb are not in the same φ. Thus it is no coincidence that the type of agreement alternation discussed in this section is typical of languages whose syntax allows or requires VSO structures (such as Irish, Hebrew (in past and future tenses; see Doron 1988), and Chamorro (see Chung 1982)).

The relation between VS order and pronoun weakening is corroborated more directly by Welsh. Welsh shows the same alternation between synthetic and analytic forms of the verb as does Irish, but in Welsh it seems to be optionally possible to have a pronoun accompany a synthetic verb form, as in (82).

(82) 'r   oeddwn   (i) 'n cwyno.
       COMP *be*-PAST-1.SG *(I) in complain*
       'I was complaining.'

We assume that the spell-out rules for pronouns in both languages are essentially the same: in postverbal subject position a pronoun undergoes weakening, and obligatorily so. The only difference between the two is that, as argued by Doron, the contrastive marker is spelled out as *-se* in Irish, while it takes the form of a reduplicant pronoun in Welsh (see also Rouveret 1991). A parallel type of doubling can be observed with object pronouns in French. Unfocused pronouns are obligatorily cliticized to the verb (by syntactic cliticization, see footnote 13). When the object is in focus, however, a tonic double appears in its base position. Kayne (2002) argues that the clitic and its double start out as one complex DP (see also Uriagereka 1995 and Papangeli 2000 for analyses of object clitic doubling in other languages based on different variants of this idea). Subsequently, the tonic pronoun is stranded by movement of the clitic, as in (83a).[24]

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[24] French allows subject clitics to be doubled by full DPs or contrastive pronouns. The relevant data cannot be analysed along the same lines, as the condition on extraction domains would then be violated. The general consensus seems to be that such structures involve either left dislocation of the double or, in some varieties of French, reanalysis of the clitic as agreement.

(83)   a.   Je [$_{VP}$ [$_V$ le   vois] [$_{DP}$ t$_D$ [$_{DP}$ lui]]].
            I   him see   him
            'It is him that I see.'

       b.   *Je [$_{VP}$ vois [$_{DP}$ lui]].
            I   see   him

Note that doubling is obligatory in these contexts, as (83b) shows. This implies that the tonic form is not simply a full counterpart of the clitic, but indeed a double that accompanies the clitic in instances of focus, as assumed for Welsh.

A syntactic difference between Welsh and Irish is that, in addition to VSO order, Welsh allows fronting of the subject, yielding SVO order. If a verb is combined with a pronominal subject in this order, the pronoun cannot undergo weakening and the verb must appear in its analytic form (see (84)). Moreover, if the pronoun is focused, there is overt doubling; that is, two instances of the pronoun. This then confirms that the synthetic form of the verb is the result of an allomorphy rule of the type in (75), which cannot apply if the pronoun precedes the verb.

(84)   yfi   oedd(*wn)   yn cwyno.
       I-REDUP *be*-PAST(-1SG) *in complain*
       'It was I that was complaining.'

We have now seen two processes of pronoun weakening conditioned by prosodic phrasing. In the next section, we discuss a radical variant of pronoun reduction. Old French pronouns can be reduced to zero in a context which fulfils our predictions exactly.

6.7 OLD FRENCH PRO DROP

The distribution of pro drop in Old French, as discussed by Adams (1987), displays curious asymmetries between root and embedded clauses and between structures with and without subject–verb inversion. Old French was a verb-second language. Pro drop turns out to be possible in only one context, namely in clauses in which subject–verb inversion would occur if the subject were overt (an observation that goes back to Foulet 1928). Thus, it is possible in declarative main clauses in which a constituent other than the subject is fronted and in yes/no questions, but it is unattested in embedded clauses and subject-initial declaratives; see (85)

((85a,b) are from Adams 1987, (85c,d) are constructed examples of unattested structures).[25]

(85) a. Einsi corurent __ par mer tant que il   vindrent à
          thus ran-3PL   *by   sea   until   they came*-3PL *to*
          Cademelée.
          Cadmée
          'Thus they ran by the sea until they came to Cadmée.'

      b. Oserai __ le vous demander?
          dare-1SG   *it you ask*
          'Do I dare ask it of you?'

      c. *Einsi corurent li   Grieu par mer tant que __ vindrent
          thus   ran-3PL *the Greeks by sea until   came*-3PL
          à Cademelée.
          to Cadmée

      d. *__ corurent einsi par mer tant que il   vindrent à
             ran-3PL *thus by   sea   until   they came*-3PL *to*
          Cademelée.
          Cadmée

The generalization emerging from these data is that omitted subjects must immediately follow the inflected verb. Such a right-adjacency condition can be derived from the prosodic theory of reduction developed above. Only if the subject immediately follows the inflected verb is it grouped in the same prosodic phrase as this head:

(86) a. [$_{CP}$ XP [$_C$ V-agr] [$_{IP}$ subject ... [$_{VP}$ t$_V$ ...] ...]]
      a′. {XP} {V-agr subject} {...
      b. [$_{CP}$ C [$_{IP}$ subject ... [$_{VP}$ V-agr ...] ...]]
      b′. {C subject} {...} {V-agr ...} {...
      c. [$_{CP}$ subject [$_C$ V-agr] [$_{IP}$ t$_{subject}$ ... [$_{VP}$ t$_V$ ...] ...]]
      c′. {subject} {V-agr ...} {...

One may therefore assume that this type of pro drop is the result of an allomorphy rule, on a par with the reduction rules for pronouns discussed in sections 6.5 and 6.6. There is an important difference, however. The earlier reductions affected the form of the pronoun, rather than the spell-out of its features: the pronoun was realized as a clitic or an affix, but nevertheless all its

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[25] In some circumstances Old French allows verb second in embedded clauses, giving rise to subject–verb inversion. In such cases, pro drop is in fact possible in embedded clauses (see Roberts 1993 and references cited there).

features were expressed. In contrast, in the Old French case the reduction involves the spell-out of the pronoun's features, since (rather obviously) none of these features is overtly realized in the examples in (85a,b). As suggested in section 6.2, suppression of features is only possible under agreement with another element in the prosodic phrase that contains the affected element (see (13)). The consequence is that Old French pro drop has a more limited distribution than pronoun weakening in Middle Dutch or Celtic. Whereas the latter is possible when the pronoun is right-adjacent to a verbal head, Old French pro drop requires right-adjacency to a head that agrees with the pronoun. This is precisely what the data in (85) show. These data are hence accounted for by the following rule:

(87)   *Old French Pro Drop*
        { ... [X (Plr) (Prt) (Add)] ... [D (Plr) (Prt) (Add)] ... } →
        { ... [X (Plr) (Prt) (Add)] ... [ ] ... }

The rule deletes all features of the subject pronoun, with the consequence that no vocabulary insertion will take place.

Old French pro drop is thus analysed on a par with Dutch second person agreement weakening (see section 6.3). It, too, presents an instance of the rule scheme in (8). The difference with the Dutch case is that in Old French the pronoun, rather than a feature of the agreeing verb, fails to be spelled out.

As was the case in Middle Dutch, Old French pronoun weakening appears to be optional. But again this is only apparent, since the structure with the overt pronoun and the structure with the reduced (null) pronoun fulfil different discourse functions. According to Sprouse and Vance (1999: 274) 'null and overt pronouns in postverbal position, although they are referentially equivalent, carry the potential for a discourse distinction that is realized in declaratives'. In particular, covert postverbal subject pronouns are associated with thematic (old) information in Spec-CP, whereas overt pronouns can be associated with new information in this position (Vance 1997). Moreover, Adams (1987: 6, fn. 6) notes that Old French did not have a series of special tonic forms of the pronouns, but used one series for both non-emphatic and emphatic contexts. This means that, as assumed for Middle Dutch (but, again, hard to test for a dead language), the overt post-V subject pronouns may also have been emphatic, a reading obviously incompatible with the null form.

As discussed with the other phenomena, it is conceivable that Old French pro drop is subject to a syntactic adjacency condition. This is, in fact, more or less what Adams (1987) proposes. She analyses the phenomenon as involving an empty pronominal subject *pro*. Following Rizzi (1986), she assumes that the occurrence of *pro* is subject to two conditions: both its content and its

position must be identified. The general consensus seems to be that content identification of *pro* relies on rich agreement, which Old French has. Adams further argues that positional identification of *pro* takes the form of head government in a particular direction. This is summed up in (88) (Adams's (8)).

(88)   a.   The position and content of *pro* must be identified
           i. The position of *pro* is identified by a governing head
          ii. The content of *pro* is identified by coindexation with the proper features
    b.   Government of *pro* (a.i) must be in the canonical direction.

On the further assumptions that the governing head mentioned in (88a.i) is I°, and that this head governs to the right (Old French is a VO language), the data in (85) follow.

Again, however, it seems to us that the prosodic account has advantages over an account in syntactic terms, in this case government. Apart from the fact that the syntactic account does not extend to the other cases unified under the prosodic account, some of the properties of the phenomenon at hand are quite unexpected. First of all, the licensing conditions in (88) must crucially involve the surface position of *pro*. In subject-initial declarative main clauses, a trace of the subject is governed in the canonical direction by the inflected verb (see (89a)). It is unclear why this is not sufficient to license a fronted *pro*. Other properties of nominal elements that require government in GB theory, such as the case of object DPs, can be licensed by government of a trace of the element in question (see (89b)).

(89)   a.   *$[_{CP}$ *pro* $[_C$ V-AGR] $[_{IP}$ t$_{pro}$ ... $[_{VP}$ t$_V$ ...] ...]]
      b. $[_{CP}$ DP-acc $[_C$ V-agr] $[_{IP}$ subject ... $[_{VP}$ t$_V$ t$_{DP}$ ...] ...]]

In contrast, a PF account does explain why it is the surface position of the element to be reduced that counts.

Moreover, in the syntactic account it is accidental that it is I° that must govern *pro*. After all, there is no reason why the licenser of *pro*'s content (which undoubtedly is I°) and the licenser of its position should be one and the same. It must hence be stipulated in the syntactic account that government by C is not sufficient for positional licensing of *pro* (government by C would license the ungrammatical (85c)). In the end, then, the syntactic account of the ungrammaticality of pro drop in embedded clauses in Old French is based on a stipulation. The prosodic account, on the other hand, explains why right-adjacency to an agreeing head (rather than to an arbitrary head) is expected in cases of non-spell-out.

6.8 ARABIC PRO DROP

In section 6.4 we discussed the phenomenon of agreement weakening in VSO structures in Standard Arabic. As it turns out, Arabic has a second prosodically conditioned reduction rule, one which targets the subject rather than the verb. This second rule is identical to the rule of pro drop in Old French, proposed in the previous section. Pronominal subjects can fail to be spelled out if they follow an agreeing head, a situation captured by the following rule (which is identical to (87), except for the [Fem(inine)] feature required for gender agreement):

(90)   *Arabic Pro Drop*
       { ... [X (Plr) (Prt) (Add) (Fem)] ... [D (Plr) (Prt) (Add) (Fem)] ... }
       → { ... [X (Plr) (Prt) (Add) (Fem)] ... [ ] ... }

This rule must apply in VSO structures like (91a,a′) (abstracting away from contrastive readings of the subject); in SVO structures like (91b,b′) the structural description of the rule is not met, and hence a pronominal subject must be spelled out.

(91)   a. $[_{FP} [_F V] [_{IP}$ subject $t_V [_{VP} t_V$ object]]]
       a′. {V subject} {object}
       b. $[_{FP}$ subject $[_F V] [_{IP} t_{subject} t_V [_{VP} t_V$ object]]]
       b′. {subject} {V object}

At first sight, it would seem difficult to prove that only postverbal subjects undergo pro drop in Arabic. Omission of the subject in both SVO and VSO structures results in a surface VO string. Moreover, since pro drop is possible only if there is full agreement on the verb, and full agreement is typical precisely of SVO order (see section 6.4), one might be inclined to draw the opposite conclusion, namely that pro drop is restricted to preverbal subjects. However, there is what seems to be conclusive empirical evidence for post-verbal, and against preverbal, pro drop. The data involve clauses introduced by one of two complementizers, the first of which exclusively shows up in VSO clauses, while the second requires SVO order.

  The complementizer *ʔanna* (or *ʔinna* in main clauses) assigns accusative case to a subject to its right under adjacency. Hence, it only occurs in SVO clauses, not in VSO clauses (see Fassi Fehri 1993: 50):

(92)   a.   ʔinna n-nisaaʔ-an   daxal-na   makaatib-a-hunna.
            that the-women-ACC *entered*-FEM-PL *office*-PL-ACC-*their*-FEM

b. * ?inna daxal-at n-nisaa?-u   / n-nisaa?-an
that entered-FEM *the-women*-NOM / *the-women*-ACC
makaatib-a-hunna.
office-PL-ACC-*their*-FEM

Now, as noted by Mohammad (1990: 100) 'the complementizer *?anna* "that" never allows *pro* to follow it'. Mohammad provides the following data in support:

(93) a. al-?awlaad-u qaaluu   ?anna-hum saafaruu.
          the-boys-NOM *said*-3PL-MASC *that-they*   departed-3PL-MASC

      b. *al-?awlaad-u qaaluu   ?anna __ saafaruu.
          the-boys-NOM *said*-3PL-MASC *that*   *departed*-3PL-MASC

This shows that pro drop is impossible in preverbal position.

The second complementizer is *?an*, which does not have case assigning properties and perhaps as a result of this does not license SVO order (see Fassi Fehri 1993: 78). VSO order is obligatory, as (94) shows.

(94) a. * ?an n-nisaa ?-u   / n-nisaa ?-an   daxal-na
          that the-women-NOM / *the women*-ACC *entered*-FEM.PL
          makaatib-a-hunna
          office-PL-ACC-*their*-FEM

      b. ?an daxal-at   n-nisaa?-u   makaatib-a-hunna
          that entered-FEM *the-women*-NOM *office*-PL-ACC-*their*-FEM

As observed by Plunkett (1993: 236), pro drop is licensed in these structures. She gives the example below in evidence:

(95) y-uriid-u   ?an ya-xruju-a __.
      want-3.M.SG *that leave*-3-MASC-SG-SUBJ
      'He wants to leave.'

This shows that pro drop is possible in postverbal position, in accordance with the rule in (90).

As noted, subject omission in Arabic does not only bear on the theory of pro drop, but also on accounts of strong versus weak agreement. The reason is that we unexpectedly find obligatory strong agreement in pro drop structures, which, as we have just seen, have a postverbal subject (see (96); compare Benmamoun 2000: 127). (In contrast, VSO structures with an overt subject show weak agreement, see section 6.4.)

(96)   ya-dxul-uuna ___ al   bayt-a.
        enter-3.MASC.PL   *the house*-ACC
        'They entered the house.'

It seems hard to account for this observation in the minimalist syntactic analysis of Arabic agreement sketched in section 6.4. Recall that in this account, strong agreement triggers overt raising of the subject to the specifier of an agreement projection, while weak agreement is only checked after spell-out (covertly). Hence, given that pro drop must be licensed by strong agreement, it should be restricted to preverbal position. Put differently, if strong agreement must be checked in overt syntax, it is hard to see how lack of phonological content in the subject would void this requirement.

In the prosodic approach the difference in agreement in VSO clauses with and without pro drop can be explained in the following way. Both pro drop and weak agreement are the result of reduction rules, which affect the subject and the verb respectively. The question raised by the obligatory strong agreement in pro drop structures, then, is why application of the pro drop rule would block application of the agreement weakening rule. Why is it that both reduction rules cannot apply at the same time?

The reason is that application of agreement weakening destroys the context for the pro drop rule and vice versa. The rule for agreement weakening is repeated below:

(97)   *Arabic Agreement Weakening*
        $\{[V \text{ Plr}\ldots] [D \text{ Plr}\ldots]\} \rightarrow \{[V\ldots] [D \text{ Plr}\ldots]\}$

The rule for pro drop in (90) requires a fully agreeing verb in the context of the pronoun, whereas (97) deletes one of the verb's phi-features. Conversely, the rule in (97) requires a pronoun with a [Plr] feature in the context of the verb, whereas (90) deletes all features of the pronoun. So, in either order application of one rule blocks application of the other, with the effect that pro drop is accompanied by strong agreement.

To conclude this section, let us return to an issue left open in section 6.4. Whereas overt postverbal lexical DP subjects trigger agreement weakening, overt postverbal pronominals do not. This is demonstrated by the following examples from Aoun *et al.* (1994: 209):

(98)   a.   Naamuu   hum.
             slept-MASC-PL *they*

        b.   *Naama   hum.
             slept-MASC-SG *they*

Given the above discussion of pro drop in Arabic, this fact can now be analysed on a par with the co-occurrence of synthetic verb forms with an overt pronominal subject in Welsh and the co-occurrence of object clitics with tonic pronominal doubles in French. Following Doron (1988), we have assumed that (apparent) pro drop in Welsh is in fact obligatory: postverbal subject pronouns are always reduced to phonological affixes. However, when the subject is focused, the reduced pronoun is doubled by a full form (see (99a,a')). Similarly, emphasis is reconciled with object cliticization in French by a tonic pronominal double (see (99b)).

(99) a. $[_{FP}$ V $[_{IP}$ [[pronoun$_I$] pronoun$_2$] ...]]
      a'. {⟨V pronoun$_I$⟩ pronoun$_2$} {...
      b. Je $[_{VP}$ $[_V$ le vois] $[_{DP}$ t$_D$ $[_{DP}$ lui]]]

The same pattern is found in Arabic. Pro drop is obligatory. However, if the subject is focused, it is doubled by a tonic pronoun (see also Benmamoun 2000: 127; for general discussion of pronoun doubling in Arabic, see Eid 1996). Since pro drop blocks weakening of verbal agreement, as we have just seen, the structure will require strong agreement:[26]

(100) a. $[_{FP}$ V-agr $[_{IP}$ [[pronoun$_I$] pronoun$_2$] ...]]
       b. {V-agr [ ] pronoun$_2$} {...

6.9 CONCLUDING REMARKS

In this chapter we have argued that certain allomorphy rules are sensitive to initial prosodic phrasing. If a terminal finds itself in the same prosodic phrase at PF as a certain other terminal, its feature content may be altered, or the two terminals may be grouped together in a phonological word. In both cases the result can be that the terminal receives a spell-out different from the one it usually receives. We have seen six examples of this. In Dutch and Arabic, a feature of an inflected verb is deleted prior to vocabulary insertion if the subject is in the same φ. In Middle Dutch and

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[26] This accounts for the grammaticality of (98a). It does not yet account for the impossibility of combining weak agreement with a phonologically realized pronoun (as in (98b)), or with two pronouns in the case of doubling. Such structures could be derived by applying agreement weakening instead of pro drop (compare the discussion above). This will not happen, however. Apart from the double in focus constructions, pronouns are weak in Arabic (so, pronoun focusing involves a weak pronoun doubled by a strong one). It is a general property of languages that allow pro drop that weak pronouns cannot be used in positions where pro drop is possible.

Celtic, a pronominal argument is realized as a clitic when it is in the same
φ as another head. In Old French and Arabic, finally, a pronominal
argument is reduced to zero when it is in the same φ as an agreeing verb.
Syntactic analyses of the relevant phenomena do not seem adequate;
moreover, they do not seem to allow for a generalization covering all these
cases, as opposed to the prosodic analysis.

The local domain employed in the allomorphy rules discussed here may
play a role in other grammatical processes as well. In particular, since the
morphosyntactic features of terminals are accessible at PF, one can imagine
that the process of feature checking may in certain cases take place at PF
rather than in syntax proper. If so, such cases of feature checking should be
sensitive to the initial prosodic phrasing as well. We believe that there are
indeed checking relations that can be analysed in this way. This will be the
topic of the next chapter. To conclude the present chapter, let us clarify two
remaining issues. One concerns the proposed allomorphy rules; the other the
model of grammar as developed in previous chapters.

6.9.1 An Asymmetry in Feature Suppression

The first type of allomorphy rule we discussed suppresses a morphosyntactic
feature in a terminal under agreement with another terminal in the same φ.
There is an asymmetry with respect to which of the two terminals is affected by
suppression, however. If only one feature is suppressed, this will be a feature of
the agreeing verb, not of the DP argument. For example, a second person
singular pronoun is never spelled out as a first person singular pronoun when it
immediately follows a second person singular verb. An agreement alternation
as in the hypothetical Dutch examples in (101) is not attested, as far as we know.

(101)   a.   Jij   loopt   dagelijks met een hondje over straat.
             you walk-2SG *daily   with a   doggy   over street*
             'Every day you walk with a doggy in the street.'

        b.   Loopt   ik dagelijks met een hondje over straat?
             walk-2SG *I daily   with a   doggy   over street*
             'Do you walk with a doggy in the street every day?'

Thus, there is no allomorphy rule of the type in (102) (compare with (24)).

(102)   *Hypothetical Dutch Agreement Weakening*
        {[V Prt Add] [D Prt Add]} → {[V Prt Add] [D Prt]}

On the other hand, it is not impossible to suppress features of the DP: they can be
suppressed entirely, giving rise to pro drop of the Old French and Arabic type.

Apparently, there is a PF condition that has the effect that either none or all of the features of an argument can be suppressed, whereas verbs allow suppression of just one of their features. The relevant condition can be formulated as follows:

(103)   If a predicate agrees with an argument, then the phi-features in the predicate form a subset of the phi-features in the argument.

A rule like (102) cannot exist, because its output would violate the PF condition in (103): the features of the subject are no longer a superset of those in the predicate. (Note that (103) is satisfied if argument and predicate have the same features, since it mentions a subset rather than a proper subset.) In contrast, full pro drop is compatible with (103) because it suppresses the argument altogether. Hence, at PF there is no longer an agreement relation, so that (103) is satisfied vacuously.

The condition in (103) implies that agreement relations are inherently asymmetrical, as also expressed by Corbett's (1983, 1994) distinction between targets and controllers of agreement. We speculate that it has a functional basis, in terms of interpretive strategies employed in parsing. The simplest way for a hearer to determine the reference of an argument is to consider the interpretable features associated with the form that spells out this argument. In case one of the features of the argument is deleted, this strategy will give the wrong result. But if no argument at all is present, this strategy cannot apply. Instead, the hearer will rely on the uninterpretable features on the verb to determine the reference of the dropped pronoun.

6.9.2 Mapping and Representational Modularity

Up to now we have talked about the mapping from syntax to phonology as if the phonological representation is derived from the syntactic one. We distinguished a syntactic representation, an 'initial' prosodic representation and 'late' prosodic adjustments within phonology proper. This suggests a model like (104).

(104)   Syntax → PF → Phonology

However, given the notion of representational modularity discussed in the previous chapter, there is another possibility. PF could be one of the independent representations a sentence has, connected to syntax and phonology by non-directional mapping principles (principles that state that a certain part of one representation corresponds to a certain part in another representation).

For the most part, it has few empirical consequences whether the relation between syntax and phonology is viewed as a derivational sequence of mappings or as non-directional mappings between three independent representations. But there is a conceptual advantage attached to the latter view. This is connected to the mapping principles proposed in the previous chapter. These relate syntax and phonology proper, without referring to PF. Consider for example, input correspondence, which we repeat in (105).

(105)   *Input Correspondence*
        If   an AFFIX selects (a category headed by) X, the AFFIX is pho-
                nologically realized as /affix/, and X is phonologically realized
                as /x/,
        then   /affix/ takes /x/ as its host.

X and AFFIX are parts of the syntactic representation, whereas /affix/ and /x/ spell out these elements in phonology proper (through vocabulary insertion). Suppose (104) were correct. In that case, there cannot be a mapping principle that directly connects syntax and phonology. This means that (105) can only be implemented as a condition on the mapping from PF to phonology, but if so, the syntactic information it refers to must be encoded at PF. In particular, PF must keep track of which terminal heads the phrase to which the AFFIX attaches in syntax. Similarly, for linear correspondence (see (11) in Chapter 5) to be understood as a condition on PF-phonology mapping, both the right and left edges of syntactic phrases must be represented at PF. As far as we know, this kind of information does not play any role at PF itself, and hence seems superfluous at this level. Thus, (104) forces information to be represented at a level where it does not belong. (This is equivalent to the argument in Jackendoff 1997 against insertion of the phonological properties of lexical items in syntax.)

Things are different if PF is a third independent representation of a sentence. If representational modularity is taken seriously, it is unnecessary to assume that the grammar is directional. Mapping principles may therefore link any two levels of representation. In fact, additional stipulations would be necessary to restrict mapping to particular pairs of representations only. The implication is that the three levels of representation under discussion can give rise to three types of mapping principles:

(106)

(MORPHO)SYNTAX	↔	(MORPHO)PHONOLOGY
↕		↕
PF		
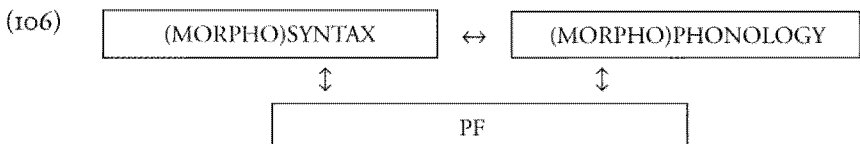
Indeed, three types of mapping principles can be distinguished. The alignment principle in (4) operates between syntax and PF; the mapping principles of Chapter 5 operate between syntax and phonology; and spell-out (or vocabulary insertion) relates PF to phonology. In fact, the 'late' adjustments of prosodic structure mentioned above are nothing but mismatches of the type familiar from Chapter 5—in this case between prosodic domains at PF and in phonology proper.

The model in (106) makes it possible for mismatches between two levels of representation to be forced by mapping between one of these and the third. Put differently, one mapping can take priority over another one, comparable to the kind of competition discussed by Szendrői (2001), Revithiadou (2002), Williams (2003), and others. Such a forced mismatch must play a role in some cases of phrasal derivation. In section 5.8 we argued that *classical guitarist* has a syntactic representation as in (107a) and a phonological representation as in (107c). Given right alignment (and its suppression in structures of modification), the PF representation of this expression must be as in (107b), with a ϕ-boundary preceding the AFFIX. Given that input correspondence demands that the /affix/ form a phonological word with /guitar/, no ϕ-boundary may precede the /affix/ in phonology. Hence, the mapping between syntax and phonology in this case forces a mismatch between phonology and PF.

(107)   a.   Syntax: [[$_{\text{NP}}$ classical guitar] AFFIX]
        b.   PF: {classical guitar} {AFFIX}
        c.   Phonology {⟨ /classical/ ⟩ ⟨ /guitar/ /ist/ ⟩}

Much more can be said about this type of competition, but this would take us too far afield here.

As a final argument for representational modularity and the non-directionality of the grammar, we may note that it correctly predicts that there are mapping principles that directly link semantics to either phonology or PF. Such connections are required to express the relation between, for example, the question interpretation of a sentence and its intonation, the destressing of elements that are anaphoric in discourse and the stressing of focused elements. As noted in section 6.5, the alternative is to encode the relevant semantic information as syntactic features, which in turn feed phonology and/or PF. But arguably such features serve only this function and have no syntactic right of existence (see Reinhart 1995, Szendrői 2002, and Williams 2003 for further discussion).

7

PF Feature Checking

7.1 CONTEXT-SENSITIVE SPELL-OUT AND FEATURE CHECKING

The context-sensitive allomorphy rules introduced in the previous chapter have two crucial properties: they are sensitive to prosodic phrasing, and they can manipulate phi-features. More precisely, a feature may be deleted if it is in the same ϕ as an identical feature. Thus, PF is sensitive to the presence of identical features in the same local domain. This implies that inherent in our characterization of this interface level is the possibility of feature checking, alongside the more commonly assumed option of syntactic feature checking.

Feature checking has played an important role in recent syntactic theorizing (see Chomsky 1995 and much subsequent work). Two issues that play an important role in checking theory are the level at which certain features must be checked and the nature of the checking operation. According to Chomsky (1995), there is a difference between strong and weak features. The former must be checked overtly, whereas the latter need to be checked at LF only. In this chapter we will only deal with checking of the former type. The main hypothesis is that this type of checking takes place in the mapping from syntax to the initial prosodic structure. Chomsky further assumes that checking is an operation of deletion. This view cannot be maintained in frameworks adopting a realizational morphology, since it would imply that the relevant features would be absent at the point of vocabulary insertion. Hence, checking of agreement would give the paradoxical result of suppressing overt agreement morphology. There is, however, another

conceptualization of the checking relation, namely as an operation that identifies the features to be checked with identical features in a local domain. This is what we will assume here.

Chomsky (2000, 2001) assumes that the motivation for feature checking is that features can be uninterpretable, and must hence be deleted (or identified with interpretable features) via an AGREE relation, before the derivation reaches the level at which they would cause offence (LF). It is possible to reconcile this motivation for checking with the idea of PF checking advanced here if operations at the PF interface do not only feed phonology, but may also have consequences for the interpretative component. This is likely, given the effects of stress and intonation on interpretation; see section 6.9.[1]

If checking takes place in the mapping from syntax to prosody, there are two options: features can be checked in syntactic or in prosodic domains. Under the view that checking consists of feature identification, PF checking rules have the following general format (where A and B are categories, and F_1, F_2, and F_3 features):

(1) $\{[A (F_1) (F_2) (F_3) \ldots] [B (F_1) (F_2) (F_3) \ldots]\} \rightarrow$
$\{[A (F_{1_i}) (F_{2_j}) (F_{3_k}) \ldots] [B (F_{1_i}) (F_{2_j}) (F_{3_k}) \ldots]\}$

In languages that comply with the system of initial prosodic phrasing outlined in Chapter 6, prosodic checking requires post-head adjacency: a phrase BP whose features are to enter into a checking relation must immediately follow a head A that contains identical features (the syntactic structure $[_{AP}$ A BP] will correspond to a prosodic structure that fits the structural description of the rule in (1)). If another maximal projection intervenes ($[_{AP}$ A XP BP]), or if the phrase precedes the head ($[_{AP}$ BP A]), the two will not be part of the same ϕ, so that prosodic checking is impossible.

Below we will argue that prosodic checking underlies the phenomenon of complementizer agreement (section 7.2). A particular aspect of the analysis relies on the presence of traces in early stages of the mapping from syntax to phonology. The discussion of the role of traces at PF will lead to a novel account of the *that*-trace effect in terms of complementizer agreement (section 7.3), thus extending the empirical scope of the analysis in section 7.2. In section 7.4 we will argue that case checking in some languages also takes place in prosodic domains, whereas in other languages it takes place in syntactic domains. Other phenomena that may be analysed in terms of PF feature checking are briefly discussed in section 7.5. Section 7.6 contains some general conclusions.

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[1] Alternatively, one may argue that agreement and case are in fact interpretable at LF, in that they provide a foothold for thematic interpretation. As far as case goes, this view is inherent in the visibility condition of Chomsky (1986*b*).

7.2 GERMANIC COMPLEMENTIZER AGREEMENT

7.2.1 The Problem of Complementizer Agreement

As an initial illustration of the phenomenon of complementizer agreement, consider the following West Flemish data. The subject in West Flemish agrees with the complementizer in person and number (see Haegeman 1992, Shlonsky 1994, and de Schutter 1997). The paradigm for complementizer agreement is exemplified in (2). It is identical in form to the verbal agreement paradigm; differences in surface form result from independently motivated phonological adjustments.[2]

(2) a. dan   ik werken
         that-1SG *I   work*-1SG

     b. da   gie werkt
         that-2SG *you work*-2SG

     c. da   ze/Valère werkt
         that-3SG *she/Valerie work*-3SG

     d. dan   wunder werken
         that-1PL *we   work*-1PL

     e. da   gunder werkt
         that-2PL *you*.PL *work*-2PL

     f. dan   zunder/Pol en Valère werken
         that-3PL *they/Paul   and Valerie work*-3PL

Since various instances of agreement have been analysed in terms of feature checking in syntax, one option would be to extend this account to complementizer agreement. Whether this is possible depends on what syntactic conditions hold of checking relations. The traditional view is that the structural configuration in which syntactic checking takes place is that between a head and its specifier.[3] However, in the case of complementizer agreement, there is no specifier-head configuration between the agreeing elements, at least not at an observational level. The constituent with which

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[2] Haegeman (1992) suggests that the underlying form of the complementizer marking the second and third person singular, as well as the second person plural, is *dat*. The *-t* ending is truncated before a consonant (as in (2b,c,e)) and voiced before a vowel. There is some dialect variation with respect to the form of the paradigm, as well. In particular, the *-en* for first person singular is omitted by some speakers.

[3] We will discuss more recent approaches to syntactic checking below.

the complementizer agrees is embedded in its complement. It is, in fact, impossible to move the subject to Spec-CP:

(3) *... wunder   dan *t*   werken
     ... *we*   *that*-1PL *work*-1PL

The observation that at least on the surface complementizer agreement does not require a specifier-head relationship is strengthened by data from East-Netherlandic dialects, as discussed by van Haeringen (1958). In these dialects, as opposed to what we find in Flemish, regular verbal agreement and complementizer agreement have different paradigms. This is illustrated below:

(4) a.   datte   wij speult
          that-PL *we play*-PL

     a'. *datte   wij speule
          that-PL *we play*-PL

     b.   Wij   speult.
          we   play-PL

     b'. *Wij speule.
          we   play-PL

     c.   *Dan speult   wij.
          then play-PL *we*

     c'. Dan speule wij.
          then play-PL *we*

There are two plural endings in (4), *-e* and *-t*, which have a different distribution. The *-t* ending appears whenever there is a specifier-head configuration between the subject and the agreeing element. If there is no such configuration, *-e* is used. Thus, the ending involved in complementizer agreement, *-e*, cannot be attached to the verb if the subject precedes it, only if it follows it (on the surface).

These data can be reconciled with approaches based on uniform checking in specifier-head configurations by assuming that such a configuration obtains at an earlier stage of the derivation. In particular, one could assume an agreement projection below C, whose head checks the subject's features and subsequently moves to adjoin to C (compare Hoekstra and Maracz 1989):

(5) [$_{CP}$ C-Agr [$_{AgrP}$ DP [$_{Agr'}$ t$_{Agr}$ ...]]]

Such proposals come in two variants. In one, the agreement projection is the projection in which regular subject-verb agreement is also checked, say AgrSP

(compare Zwart 1997). In the other it is a special AgrC phrase in the COMP domain of the clause (compare Shlonsky 1994). Both these syntactic approaches face problems, however.

First, the syntactic distribution of the subject, the verb, and other material in the Germanic OV languages can be accounted for without any functional projections between C and VP. The empirical evidence for the existence of such projections is hence indirect at best (see Reuland 1990, and Ackema, Neeleman, and Weerman 1993 for some discussion). There is an additional problem with respect to agreement phrases specifically, since the concept 'agreement' by definition refers to a relation rather than a particular semantic notion which could be expressed by a head (compare Chomsky 1995, chapter 4). Hence, to postulate such projections simply to reconcile the data in (2), (3), and (4) with the assumption that checking uniformly requires a specifier-head configuration is not very attractive.

A second problem with analyses of the type in (5) is that complementizer agreement is retained if the Agr-head moves into the C-projection, but not if the subject does so. In the latter case, we find regular verbal agreement, as demonstrated by the East-Netherlandic data in (4). If checking in intermediate stages of the derivation is allowed, this asymmetry is unexpected. One way to deal with this problem is to adopt the asymmetric theory of verb second (see Travis 1984 and Zwart 1997). Recall from Chapter 6 that according to this theory, subject-initial root clauses are IPs (or AgrSPs), while non-subject-initial clauses are CPs. If so, the type of agreement can be linked to the type of head in which it occurs. The data in (4) can be understood if plural agreement is spelled out as *-t* in I (or AgrS) and V, and as *-e* in C:

(6)   a. $[_{CP}$ datte $[_{AgrSP}$ wij $[_{AgrS'}$ AgrS $[_{VP} \ldots$ speult]]]]
           that-PL   *we*   *play*-PL

      b. $[_{AgrS}$ Wij $[_{Agr'}$ $[_{AgrS}$ speult] $\ldots$]].
           we   *play*-PL

      c. $[_{CP}$ Dan $[_{C'}$ speule] $[_{AgrSP}$ wij $[_{AgrS'}$ AgrS $\ldots$]]].
           then   *play*-PL   *we*

However, as pointed out in Chapter 6 with reference to the agreement alternation in the second person singular in Dutch, the asymmetric theory of verb second incorporates as one option the traditional analysis involving topicalization to Spec-CP. Since there is no reason why the subject could not be topicalized, (4b') would be ruled in with the structure in (7).[4]

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[4] An account based on the syntactic position of the verb would appear to be supported by Lower Bavarian data discussed by Bayer (1984), Watanabe (2000), and Weiß (2002). This is because the form of the first person agreement marker depends on whether the verb has

(7)   *[$_{CP}$ Wij [$_{C'}$ [$_C$ speule] [$_{AgrSP}$ t$_{DP}$ [$_{Agrs'}$ AgrS ...]]]].
      we   *play*-PL

The third problem for analyses based on Agr projections is that complementizer agreement and verbal agreement sometimes co-occur, while they are in complementary distribution elsewhere. In (2) and (4a), both the complementizer and the verb carry agreement, which would seem to be incompatible with the analysis in which a single AgrS phrase is assumed to be the locus of checking for both types of agreement. But the assumption that there are two Agr heads, as in Shlonsky's theory, leads to another problem, namely why only one agreement ending shows up on fronted verbs (compare (4b–c)). The examples below are ungrammatical:

(8)   a.   *Wij speul-t-e.
           we   *play*-PL-PL

      b.   *Dan speul-t-e   wij.
           then   *play*-PL-PL *we*

Shlonsky (1994: 366–7) does account for this fact, but at the cost of introducing auxiliary assumptions that do not follow from the syntactic checking

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undergone verb second or not (examples from Bayer 1984):

(i)   a.   das-ma mir noch Minga fahr-n
           that-MA *we* *to*   *Munich drive*-N

      b.   Mir fahr-ma noch Minga.
           we *drive*-MA *to*   *Munich*

      c.   Fahr-ma mir noch Minga.
           drive-MA *we* *to*   *Munich*

Under the assumption that verb second is uniform V-to-C raising, this distribution could be accounted for by an allomorphy rule that is sensitive to the syntactic context in which the verb finds itself. It is possible that the kind of rule discussed in the previous chapter can be conditioned in such a way. However, it is not clear to us whether this would be the correct approach. The relevant morpheme, *ma*, seems to be developing from a clitic to an agreement marker. In some variants of Lower Bavarian, the change is complete. At this stage, there is no alternation as in (i); instead, *ma* also shows up on verbs that have not been fronted (the example is from Weiß 2002):

(ii) wa-ma   doch zwou kei kod   ham-ma
      because-MA *yet* *two* *cows owned have*-MA
      'because we have owned two cows after all'

It could be that the data in (i) are typical of a stage with obligatory subject clitic doubling, much as in spoken French. The argument usually given for an analysis of *ma* as an agreement marker at this stage is that its presence blocks insertion of the 'regular' -*n* agreement ending. This however, might also be due to a morpho-phonological deletion rule.

theory as such. The same is true of Carstens (2003), who proposes a condition that simply renders one of the two agreement endings inert.[5]

Finally, it seems to be the case that complementizer agreement requires the agreeing head and the subject to be adjacent in surface structure. This can be shown in idiolects of Flemish in which complementizer agreement is optional. Here, when C appears in its agreeing form, it cannot be separated from the subject by adverbials or other fronted material. This restriction is lifted, however, when C appears without an agreement ending (examples from Peter Vermeulen, personal communication):

(9)   a.   da / dan   zunder op den warmste dag van 't jaar
           that / that-3PL *they   on the   hottest   day of   the year*
           tegen   under wil gewerkt en
           against their   will worked   have
           'that they have worked against their will on the hottest day of
           the year'

      b.   da / *dan   op den warmste dag van 't jaar   zunder
           that / that-3PL *on the   hottest   day of   the year they*
           tegen   under wil gewerkt en
           against their   will worked   have

In other variants of Flemish, complementizer agreement is obligatory. From the discussion in Haeberli (1999: 184) one may conclude that in these variants nonadjacency of the complementizer and the subject leads to ungrammaticality.

Again it is not impossible to account for the adjacency condition on complementizer agreement in an approach based on checking in specifier-head configurations. Shlonsky, for example, gives an account based on conditions on nominative case assignment and a prohibition against adjunction of adverbials in the COMP domain. But again, the existence of these conditions, and hence of the adjacency restriction, does not follow from the core assumptions of the general approach of syntactic agreement checking.

7.2.2 Complementizer Agreement as a PF Phenomenon

By contrast, complementizer agreement shows the hallmarks of a prosodically conditioned process. It does not occur when the agreeing head and

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[5] The rule in question could be made less *ad hoc* by relating it to morphophonological truncation rules of the type suggested for Lower Bavarian in footnote 4. However, it would be a coincidence then that all dialects with distinct complementizer and verb agreement paradigms would have to have precisely the same type of truncation rule.

the subject fail to be adjacent ((9b) versus (9a)), and it does not occur when the subject precedes the head ((4b) versus (4c′)). Therefore, we hypothesize that complementizer agreement is a particular instance of the general PF feature checking rule in (1):

(10) *Germanic complementizer agreement*
      {[C (Prt) (Add) (Plr)] [D (Prt) (Add) (Plr)]} →
      {[C (Prt$_i$) (Add$_j$) (Plr$_k$)] [D (Prt$_i$) (Add$_j$) (Plr$_k$)]}

As explained in the introduction, rules like this are not meant to replace the presumably universal option of feature checking in syntax. It is simply an additional way of checking features made available by the hypothesis that PF operations can be sensitive to syntactic feature bundles (see Chapter 6 for discussion).

The rule in (10) captures the fact that complementizer agreement requires adjacency of the C-head and the subject, as illustrated for Flemish in (9). The syntactic and prosodic structures of these examples are given in (11). Since the subject does not form a prosodic phrase with C in (11b′), the rule in (10) is not applicable. As argued above, the configuration for syntactic checking also does not obtain, so that the complementizer must appear in its non-agreeing form (or, in those variants of Flemish in which complementizers are obligatorily specified for phi-features, the structure is ruled out). In (11a′) the structural description of the rule *is* met and hence insertion of an agreeing complementizer is licensed.[6]

(11) a.   [$_{CP}$ C [$_{IP}$ subject … [$_{VP}$ … V …] …]]
      a′. {C subject} {…} {…V…} {…
      b.   [$_{CP}$ C [$_{IP}$ XP [$_{IP}$ subject … [$_{VP}$ … V …] …]]]
      b′. {C XP} {subject} {…} {…V…} {…

Note that in root clauses with subject-verb inversion agreement can in principle be checked both syntactically and prosodically (but see below):

(12) a.   [$_{CP}$ XP [$_c$ V] [$_{IP}$ subject … [$_{VP}$ … t$_v$ …] … t$_v$ …]]
      b.   {XP}{V subject} {…

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[6] Van Craenenbroeck and van Koppen (2001) note one exception to the adjacency condition: in constructions with an expletive, it is the expletive rather than its associate that must be adjacent to C. This can be understood if associates share their phi-features with the expletive subject, either because the two form a CHAIN, or because the expletive is first merged with the associate and then moved to the subject position (see Moro 2000 and Kayne 2002). Independent evidence for a chain-like relation between expletive and associate is the traditional observation that this relation is subject to the same locality conditions as A-movement (see Chomsky 1981).

Given the option of syntactic checking in this configuration, it should be the case that the subject need no longer be adjacent to C, even though it agrees with it. This prediction is borne out (Peter Vermeulen, personal communication):

(13) Volgens   Valère en   op den warmste dag van 't jaar
      *according to Valerie have-*3PL *on the hottest   day of   the year*
      zunder tegen   under wil gewerkt.
      they   against their will worked
      'According to Valerie they have worked against their will on the hottest day of the year'

Several other properties of C-agreement can be understood in terms of the prosodic checking analysis.

To begin with, the analysis may explain why C-agreement must be subject agreement and cannot be object agreement. In the great majority of cases in which there is an argument in the same prosodic domain as C, this is the subject. In non-root clauses, objects will be in a different φ because the subject intervenes. The same holds of non-subject-initial root clauses. In subject-initial root clauses, the trace of the subject intervenes between the C position and an object, and as we have argued in Chapter 6, traces trigger φ-closure too. Consequently, in all of these cases C-agreement with the object is excluded. There is only one construction in which the object does find itself in the same φ as C, namely when it is fronted across the subject (see section 6.5):

(14) a. dat [zulke boeken]ᵢ zelfs Jan tᵢ niet leest
          that such   books   even John   not   reads
          'that even John does not read such books'

      b. {dat zulke boeken} {zelfs Jan} {niet leest}
          that such   books   even John   not   reads

Plausibly, however, phi-features can only be checked against elements in A-positions. There is, for example, no phi-feature agreement with adjuncts. (This is in spite of the fact that adjuncts can show other types of agreement; for example, they can trigger wh-feature agreement with C when extracted successive cyclically; see section 7.3.) Since the object is in an A'-position in (14), it cannot feed phi-feature agreement.

Given that C-agreement must be subject agreement, and given that the subject does not carry tense features, it follows that if a complementizer would carry tense features, these could not be licensed by prosodic checking. Nor can they be checked syntactically, since no tense-bearing element (such

as V or VP) occurs in its specifier position. However, tense features must be checked if generated in C, because C is noneventive, and hence such features are uninterpretable in this element (in contrast to tense features in a verb). The upshot is that in fact no tense features can be generated in C. This is correct, as noted by Hoekstra and Smits (1998). They make the generalization that 'complementizer agreement can be agreement for person and number but it may not express tense'. As a consequence, if a language has a verbal agreement paradigm that also expresses tense (because of fusion), this language cannot have complementizer agreement (compare Hoekstra and Smits's 'Identity Generalization').

Further evidence for a prosodic approach to C-agreement comes from embedded verb second clauses in Frisian. Frisian shows complementizer agreement in the second person singular. In addition, it has a subject cliticization rule comparable to the one assumed for the Dutch third person singular pronoun *-ie* in the previous chapter: subjects cliticize to an immediately preceding head in C. Thus, in the second person singular, a complementizer can show the ending *-sto*, which is a combination of the second person singular agreement marker *-st* and a cliticized form of the subject pronoun *do* 'you' (see Visser 1988, Hoekstra and Maracz 1989, and de Haan 1994 for discussion):

(15)   dat-st-o   soks net leauwe moat-st
        that-2SG-you such not believe must-2SG
        'that you should not believe such things'

Frisian embedded clauses do not only display the head-final order of (15); they also allow verb second in certain contexts (see de Haan and Weerman 1986, and de Haan 2001). Interestingly, embedded verb second blocks complementizer agreement. Thus, we find the non-agreeing form of the complementizer in this context, as illustrated in (16) (example from Zwart 1997: 198).

(16)   dat do / *dat-st-o   moat-st soks net leauwe
        that you / that-2SG-you must-2SG such not believe

As noted in section 6.2 for English, the left edge of a finite CP coincides with the left edge of an intonational phrase (see Chomsky and Halle 1968: 372). Given that prosodic phrases must be properly contained in intonational phrases, the syntactic structure in (17a) is not mapped onto the prosodic structure in (17b), but rather onto (17b') (parentheses indicate intonational phrases).

(17)   a.   [[John] [believes [_CP that [Mary] [loves [Bill]]]]].
        b.   *(\{John\} \{believes) (that Mary\} \{loves Bill\}).
        b'. (\{John\} \{believes\}) (\{that Mary\} \{loves Bill\}).

There seems to be consensus in the literature that embedded verb second in Frisian involves CP-recursion (see de Haan and Weerman 1986, and Iatridou and Kroch 1992). If so, the structure of an example like (16) is like (18a). On the assumption that left-alignment of finite CPs with intonational phrases also obtains in Frisian, as is likely, (18a) will be mapped onto the initial prosodic structure in (18b) (which is itself subject to 'late' phonological adjustment rules (see Chapter 6); for example, the intonational phrase that only contains the complementizer is presumably too light to survive as such in phonology proper). Since in (18b) the subject is not in the same prosodic phrase as the complementizer, complementizer agreement is not licensed, which accounts for (16).

(18)   a. $[_{CP}$ dat $[_{CP}$ do$_i$ $[_C$ moat-st$_j]$ $[_{VP}$ t$_i$ soks net leauwe t$_j]]]$
            that   you   must-2SG   such not believe

       b.   ({dat}) ({do} {moat-st} {soks} {net leauwe})
            that   you   must-2SG such   not believe

The conclusion that the subject is not in the same prosodic domain as the complementizer in embedded verb second contexts is corroborated by the fact that not only complementizer agreement, but also cliticization to C is blocked. Thus, the example in (19a), without complementizer agreement but with the clitic form of the second person singular subject, is impossible. The same is true of the clitic forms of other persons; (19b), for example, shows that in embedded verb second clauses the full form of the third person singular pronoun *hy* must be used, rather than the clitic form *er* (see de Haan and Weerman 1986: 85).

(19)   a.   *dat-o   moat-st   soks net leauwe
            that-you must-2SG such not believe

       b.   dat hy/*-er moat   soks net leauwe
            that he/-he must.3SG such not believe

Although some of the syntactic approaches to complementizer agreement offer an account of why agreement is ruled out in this context (see Zwart 1997, van Craenenbroeck and van Koppen 2001, and Carstens 2003 for various suggestions), they offer no insight as to why subject cliticization is ruled out in precisely the same context.

   A further advantage of the prosodic approach is that it explains the possible co-occurrence of complementizer agreement and verb agreement, argued above to be problematic for syntactic approaches that assume a single agreement projection in which both complementizer and verb agreement relations are established (see Zwart 1997). After all, the subject can form a

prosodic phrase with C at PF while at the same time occupying a position triggering verb agreement in syntax. This accounts for (2), with agreement on both the complementizer and the verb.

The rule in (10) thus is sufficient to account for the distribution of complementizer agreement in languages like West Flemish or Frisian. The actual form of the agreement is regulated by a set of general spell-out rules for verbal heads (verbs and complementizers).

The East-Netherlandic dialects mentioned before differ from Flemish and Frisian only in having a paradigm for complementizer agreement that is different from regular verb agreement. In general, when there are multiple paradigms for a single category, stems must contain an arbitrary feature indicating which paradigm is to be used. This is often just a lexical property of the stem. For example, which declension class should be used in, say, Latin is a matter of lexical variation. We assume that the relevant feature is inserted at PF prior to spell-out. What is special about East-Netherlandic is that the feature in question is introduced by an allomorphy rule of the type discussed in Chapter 6. Thus, East-Netherlandic dialects have the same rule for complementizer agreement as Flemish (the one in (10)), but in addition their grammar contains the allomorphy rule in (20), where F stands for the feature that requires insertion of forms from the complementizer agreement paradigm.

(20) *East Netherlandic Agreement Allomorphy*
$\{[\text{C } (\text{Prt}_i) (\text{Add}_j) (\text{Plr}_k)] [\text{D } (\text{Prt}_i) (\text{Add}_j) (\text{Plr}_k)]\} \rightarrow$
$\{[\text{C } (\text{Prt}_i) (\text{Add}_j) (\text{Plr}_k) \text{ F}] [\text{D } (\text{Prt}_i) (\text{Add}_j) (\text{Plr}_k)]\}$

According to this view, an inflected verb always carries the same set of phi-features. However, the spell-out of this set depends on whether the structural description of the rule in (20) is met. It follows, then, that in root clauses with subject–verb inversion, agreement will be realized as /-e/ rather than /-t/. Moreover, it will be impossible to affix both /-t/ and /-e/ to a verb, as in (8b), something that might be expected under syntactic approaches assuming separate functional projections for the checking of complementizer and verb agreement (see Shlonsky 1994).

In contexts in which the structural description of the rule in (20) fails to be met, we expect a fronted verb to be inflected according to the regular paradigm. Indeed, (4b) illustrated that when the subject precedes the agreeing head, as in (21), plurality is realized as /-t/.

(21) a. $[_{CP}$ subject $[_C$ V$]$ $[_{IP}$ t$_{SUBJECT} \ldots [_{VP}$ t$_V \ldots] \ldots]]$
      b. {subject} {V ...} {...

Interestingly, if the analysis is correct, the regular paradigm should also be used when the subject does follow the head but is not adjacent to it, as in the structures in (22).

(22)   a. $[_{CP} \dots [_C V] [_{IP} XP [_{IP} \text{subject} \dots [_{VP} t \dots] \dots]]$
        b. $\{ \dots \} \{V\ XP\} \{\text{subject}\} \{ \dots$

It turns out that the agreement form used in structures like (22) is indeed the general, not the special, one, as can be shown with data from the Hellendoorn dialect (Jan Nijen Twilhaar, personal communication). This dialect shows the by now familiar alternation between the regular *-t* ending and the *-e* ending used in complementizer agreement:

(23)   a.   Wiej loopt   noar 't   park.
              *we   walk-*PL* to   the park*

        b.   darre   wiej noar 't   park loopt
              *that-*PL* we   to   the park walk-*PL

        c.   Volgens   miej lope   wiej noar 't   park.
              *according-to me   walk-*PL* we   to   the park*

If a constituent is fronted to a position between the verb and a postverbal subject, only the regular agreement form can be used:

(24)   Volgens   miej loopt/*lope   op den wärmsten dag van
        *according-to me   walk-*PL*/*walk-*PL* on the   hottest   day of*
        't joar   ook wiej noar 't   park
        the year also we   to   the park
        'According to me, we too walk to the park on the hottest day of the
        year.'

Note that these data provide direct counterevidence against the idea that it is the syntactic position of the verb that determines the form of its agreement, since this position is not different in (24) as compared to cases of inversion in which subject and verb happen to be adjacent.[7]

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[7] It is possible that a complementizer contains phi-features but is not spelled out; for example, as a result of the doubly-filled COMP filter. If so, the affix that expresses the agreement features can take the element in Spec-CP as its host. This accounts for examples like (ia), from van Craenenbroeck and van Koppen 2001. Example (ib), from Vikner 1995, can be understood in the same terms if it involves CP recursion and the head of the first CP fails to be spelled out. This is plausible since in many Germanic dialects a wh-expression can be followed by a sequence of two complementizers (for example, *wie of dat* ... 'who if that'). Note that the overt

Recent developments in the minimalist programme (see Chomsky 2000, 2001) have given rise to accounts of complementizer agreement that are closer in spirit to the account developed here. The basic assumption is that agreement relations are established by a head that 'probes' the structure it c-commands and is associated with the closest 'goal'. In other words, a specifier-head relation is no longer required for feature checking, although such a relation may be forced if the probe has an additional feature requiring this (an EPP or OCC feature). Hence, a head in C may directly agree with an inverted subject, since such a subject is in its c-command domain (see Carstens 2003; a somewhat comparable approach is proposed by van Craenenbroeck and van Koppen 2001):

(25) $[_{CP}$ C $[_{TP}$ subject T $[_{VP}$ ... AGREE (C, subject); C's uninterpretable features marked for deletion

Although this approach is based on a direct checking relation between C and the subject, as is our own analysis, we think that it is in the end less satisfactory. The main problem is that it does not straightforwardly restrict the occurrence of complementizer agreement to the correct context. First, agreement under c-command is in principle unbounded, as long as it does not skip a potential goal. This means that it is unexpected that intervening adverbs should block the agreement relation between C and the subject in (25) (see (9)). After all, adjuncts themselves never show phi-feature agreement. Carstens proposes that the adverbial has some feature, perhaps case, that makes it count as a closer possible goal. As it stands, this seems *ad hoc*. Second, syntactic agreement relations can, and sometimes must, be

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complementizer in (ib) does not block PF checking between the agreeing null complementizer and the subject since it is a head rather than a maximal projection. It hence does not trigger φ-closure.

(i)   a. Iech wil   waete wievöl   gelds   te   höbs   [Maastricht dialect]
          I   want know how-much money-2SG *you have*-2SG
          'I want to know how much money you have'

      b. Peter geht erst wennst   daß du kommst   [Westphalia dialect]
          Peter goes only when-2SG *that you come*-2SG
          'Peter will only go when you come'

This kind of spell-out of the inflection of a null head on a preceding element occurs in other environments as well. An example from Dutch is the spell-out of the plural of an elided nominal head on a preceding modifier (see Kester 1996 for evidence that there is a null head in such cases):

(ii) De zeer rijke ø-n → De zeer rijken
                            the very rich PL

combined with movement. It is therefore unclear why the complementizer agreement paradigm is not used in, say, East-Netherlandic subject-initial main clauses. Carstens suggests that in verb-second languages the verb is raised to a higher position in non-subject-initial main clauses than when preceded by a subject, and that the agreement paradigm used depends on the position of the verb. This echoes Zwart's analysis discussed above and suffers from much the same problems. Finally, as a conceptual point, the analysis does not easily extend to what we think are related phenomena. As shown before, subject cliticization in Frisian, and more generally the cliticization and pro drop phenomena discussed in the previous chapter, are sensitive to the same domain as complementizer agreement, but cannot be accounted for in terms of agreement under c-command.

7.2.3 First-Conjunct Agreement

Before concluding this section, let us consider a possible extension of our analysis of complementizer agreement. Recall from the previous chapter that coordinate subjects are normally parsed into two separate prosodic phrases. This means that if a coordinate subject follows a head, only the first conjunct ends up in the same prosodic domain as that head. We used this to explain a curious pattern of cliticization in Irish, in which the first conjunct of a coordinate subject appears as a special clitic on the verb, while the second conjunct is unaffected. If complementizer agreement is checked in prosodic domains, we would therefore expect it to be possible for only the first conjunct of a coordinate subject to agree with C. In contrast, the second DP will never be in the same prosodic domain as C to the exclusion of the first DP, and hence agreement with only the second conjunct is ruled out:

(26)   a.   [$_{CP}$ C [$_{IP}$ [DP and DP] [$_{VP}$ ...]]]
        b.   {C DP} {and DP} { ...

While second-conjunct agreement is indeed unattested, first-conjunct agreement exists (see Johannessen 1998). Van Koppen (2003) discusses the phenomenon for Frisian and the dialect of Tegelen Dutch. Some examples are given in (27).

(27)   a.   Ik tink   dat-st   do en   Marie dit wykein yn Rome
              I   think that-2SG *you and Mary this weekend in Rome*
              west   ha.   [Frisian]
              been have
              'I think that you and Mary have been in Rome this weekend.'

    b.   Ich dink de-s   doow en ich ôs kenne
        *I   think that-*2sg *you   and I   us can*
        treffe.   [Tegelen Dutch]
        meet
        'I think that you and I can meet.'

The distribution of first-conjunct agreement shows many complexities, not all of which we can discuss here. In the remainder of this section we will consider how some of them can be accommodated.

According to van Koppen, first-conjunct agreement is obligatory in Frisian and Tegelen Dutch. On the other hand, as illustrated by (2f), West Flemish shows complementizer agreement with the full coordinate subject. Indeed, first-conjunct agreement leads to ungrammaticality here. In order to capture this pattern, we must allow coordinated DPs to be be parsed into a single prosodic phrase, possibly as the result of an 'early' restructuring rule which erases φ-boundaries between conjuncts. This rule as such would render first-conjunct agreement optional, with agreement with the entire coordinate subject as an alternative. The patterns found in Frisian and Tegelen Dutch (only first-conjunct agreement) versus West Flemish (only full agreement) may be accounted for, as van Koppen suggests, by a preference for using an overtly inflected complementizer if possible. In Frisian and Tegelen Dutch, any complementizer except the one carrying second person singular lacks an overt morpheme; in West Flemish there is again a single overtly inflected complementizer, one use of which is for the third person plural. The latter, of course, is the feature specification of a coordinate subject.

There is one context in which we expect the entire coordinate subject to be obligatorily parsed as a single prosodic phrase. As noted in Chapter 6, there is a strong tendency for a modifier and the material it modifies to be combined in a single φ. Thus, if the coordinate subject as a whole is modified, the prosodic structure in (28b) is favoured over the one in (26b).

(28)   a. $[_{CP}$ C $[_{IP}$ [Modifier [DP and DP]] $[_{VP} \ldots]]]$
        b.   {C Modifier DP and DP} { . . .

Hence, modification of the coordinate subject should block first-conjunct agreement. Van Koppen shows that this is the case in Tegelen Dutch (the prediction cannot be tested in Frisian for independent reasons; see Chapter 6, footnote 5):

(29)   Ich dink det/*de-s   auch doow en ich ôs kenne
        *I   think that/that-*2sg *also you   and I   us can*
        treffe.   [Tegelen Dutch]
        meet
        'I think that you and I can meet.'

One more assumption is necessary to capture the data uncovered by van Koppen (2003). It is a striking property of first-conjunct agreement in Frisian and Tegelen Dutch that it only occurs with complementizers. A fronted verb must agree with the entire coordinated subject, even if it appears to its immediate left:

(30) a. *Ha-st do en Marie dit wykein   yn Rome west? [Frisian]
          have-2sg *you and Mary this weekend in Rome been*
          'Have you and Mary been in Rome this weekend?'

      b. *Ontmoet-s doow en   Marie uch   voor de
          meet-2sg   *you   and Mary each.other for   the*
          kerk?   [Tegelen Dutch]
          church
          'Will you and Mary meet in front of the church?'

As van Koppen points out, these data can be understood if verbal agreement is necessary to license the subject, either directly or because it is required for nominative case assignment. (That licensing a single conjunct is not sufficient follows from the visibility condition, which requires that the entire subject is made visible for θ-role assignment.) As a consequence, a verb that carries the features of only the first conjunct will fail to license the coordinate subject. Complementizer agreement does not have the licensing capacity that verbal agreement has: in languages with complementizer agreement, it is still the inflection on V that licenses the subject. Hence, complementizer agreement is free to target the first conjunct only.

7.3 TRACES AT PF AND THE COMPLEMENTIZER-TRACE PHENOMENON

In the previous section we argued that a subject can check features against an adjacent complementizer. In this section we will argue that this hypothesis offers new insights into complementizer-trace effects, as familiar from the literature on long-distance movement (see Chomsky and Lasnik 1977, Lasnik and Saito 1984, 1992, Rizzi 1990, Grimshaw 1997, and others).

The account is based on the assumption that it is not possible to move an XP from a position that allows checking against a head H to another position in which XP and H enter into an actual checking relation. It is plausible that such movement is not triggered. The condition in (31) expresses this. It must hold at PF, since agreement checking can be conditioned by prosodic as well as syntactic domains.

(31)   Let α_i and α_{i+1} be links of the same chain, such that α_i c-commands α_{i+1}. If agreement checking involves α_i and β, then α_{i+1} cannot be in a configuration that would allow agreement checking between it and β.

Violations of (31) may arise in cases of successive cyclic movement out of CP. Suppose that the cyclic nature of long-distance extraction is forced by the syntactic requirement that CP be transparent for features of the extracted element. For concreteness, we adopt a version of Chomsky's (2001) phase impenetrability condition (see also van Riemsdijk's (1978) head constraint). Chomsky suggests that only the head and the left edge of a phase are accessible to phase external relations. We propose that the condition is stricter, in that phases are transparent for features of their head only. However, features of a specifier can be made accessible in an indirect way, namely through an agreement relation with the head:

(32)   a.   Only the head of a phase is accessible to phase-external operations.
         b.   A specifier can be made accessible by agreeing with the head.

Consider what this means for a wh-expression that is to be extracted from a CP (the only phase relevant for what follows). Given (32), such extraction will be possible only if the wh-expression at some point of the derivation enters into an agreement relation with C. In many languages, including English, this agreement relation will be purely formal: C contains an underspecified feature bundle, as in (33a), rather than a specific set of features shared with an extracted element. If a phrase moves to the specifier of C, specifier-head agreement allows such an underspecified feature bundle to be identified with features of that phrase, as in (33b).[8] This has the consequence that the features of the phrase become accessible, so that a link can be established with an antecedent external to CP, as in (33c).

(33)   a.   C $\langle \ \rangle$
         b. $[_{CP}$ WH $\langle F_1 \ F_2 \rangle_i \ [_{C'}$ C $\langle \ \rangle_i \ldots$
         c.   WH $\ldots [_{CP}$ WH $\langle F_1 \ F_2 \rangle_i \ [_{C'}$ C $\langle \ \rangle_i \ldots$

---

[8] Various languages show overt reflexes of this type of abstract 'wh-agreement' between an extracted element in Spec-CP and a head in C. This morphological reflex can manifest itself on a complementizer in C (as in Irish; see McCloskey 2001, 2003), on a verb in C (as in Chamorro; see Chung 1994, 1998), or, when C is empty, on the element next to C (as in Ewe; see Collins 1993).

If the extracted element in (33) is an object or adjunct, no problem with respect to (31) will arise. The specifier of C is the only link in the chain whose position allows for an agreement relation with C.

However, the combination of (31) and (32) does make subject extraction across a complementizer problematic. The subject's base position is one that allows for a PF agreement relation with C. At the same time, the condition in (32) demands that subject extraction, like object and adjunct extraction, proceeds through Spec-CP, as in (34a). The features of the extracted element must be accessible in syntax in order to establish a link with the antecedent, and this is not something that can be achieved by application of a PF checking rule. Hence, in order to satisfy (32) a syntactic checking configuration must be created. This, however, implies that at PF the condition in (31) will be violated. In (34b) C is in an agreement relation with the wh-expression in its specifier, while at the same time it is in the same prosodic domain as the trace in subject position, so that this trace is in a potential checking position. (Note that this presupposes that the syntactically established agreement relation between Spec-CP and C is visible at the PF interface.) The result is that subject extraction across a complementizer, as in (34c), is ruled out.

(34)   a.   WH $\langle F_1\ F_2 \rangle_i \ldots [_{CP}$ WH $\langle F_1, F_2 \rangle_i\ [_{C'}\ C\ \langle\ \rangle_i\ [_{IP}$ WH $\langle F_1\ F_2 \rangle_i \ldots$

       b.   WH $\langle F_1\ F_2 \rangle_i \ldots \{$WH $\langle F_1\ F_2 \rangle_i\}\{C\ \langle\ \rangle_i$ WH $\langle F_1\ F_2 \rangle_i\} \ldots$

       c.   *Who do you think that t has sold out completely?

Several predictions follow from this analysis of the complementizer-trace effect. First, when the subject is not merged in a position that allows checking against C at PF, the complementizer-trace effect should disappear. Thus, if an adjunct intervenes between the complementizer and subject, so that the latter two no longer form a prosodic phrase, extraction of the subject across the complementizer should be possible, even in a language that does not normally allow such extraction. This is correct, as is noted by Culicover (1993) for English:

(35)   a.   WH $\langle F_1\ F_2 \rangle_i \ldots [_{CP}$ WH $\langle F_1\ F_2 \rangle_i\ [_{C'}\ C\ \langle\ \rangle_i\ [_{IP}$ AdvP $[_{IP}$ WH $\langle F_1\ F_2 \rangle_i \ldots$

       b.   WH $\langle F_1\ F_2 \rangle_i \ldots \{$WH $\langle F_1\ F_2 \rangle_i\}\{C\ \langle\ \rangle_i$ AdvP$\}$ $\{$WH $\langle F_1\ F_2 \rangle_i\} \ldots$

       c.   Who do you think that, for all intents and purposes, has sold out completely?

A second configuration in which the base position of the subject does not end up in the same prosodic phrase as the complementizer is found in pro

drop languages like Italian. In such languages, the subject can be merged in a position following the VP:

(36)   Ha   parlato Italiano Gianni.
        has   talked   Italian   John
        'It is John who talked Italian.'

If merged in this position, long-distance extraction of the subject cannot give rise to a complementizer-trace effect, as argued originally by Rizzi (1982). In the present approach this follows because the subject's base position is not in the same prosodic domain as C, and hence not in a configuration that allows PF checking:

(37)   a.   WH $\langle F_1\ F_2\rangle_i \dots$ [$_{CP}$ WH $\langle F_1\ F_2\rangle_i$ [$_{C'}$ C $\langle\ \rangle_i$ [$_{IP}\dots$ [$_{VP}\dots$]
             WH $\langle F_1\ F_2\rangle_i$]]] $\dots$

        b.   WH $\langle F_1\ F_2\rangle_i \dots$ {WH $\langle F_1\ F_2\rangle_i$}{C $\langle\ \rangle_i\dots$}{$\dots$} {WH $\langle F_1\ F_2\rangle_i$}

        c.   Chi credi   che ha   parlato Italiano t ?
             *who think-*2SG *that has-*3SG *spoken   Italian*
             'Who do you think has spoken Italian?'

Third, when the complementizer is deleted in the mapping from syntax to PF, no agreement relation between it and the subject can be established at the latter level. (This situation must be contrasted with non-spell-out of the complementizer in the mapping from PF to phonology; compare footnote 8.) Hence, it is predicted that (31) will not be violated if a specifier-head agreement relation is established between the subject and C in syntax, while C is subsequently deleted. Indeed, as is well known, subject extraction across an empty complementizer position is allowed:

(38)   a.   WH $\langle F_1\ F_2\rangle_i \dots$ [$_{CP}$ WH $\langle F_1,\ F_2\rangle_i$ [$_{C'}$ C $\langle\ \rangle_i$ [$_{IP}$ WH $\langle F_1\ F_2\rangle_i \dots$
        b.   WH $\langle F_1\ F_2\rangle_i \dots$ {WH $\langle F_1\ F_2\rangle_i$}{ø WH $\langle F_1\ F_2\rangle_i$}{$\dots$
        c.   Who do you think has sold out completely?

Note that deletion of the complementizer is only required if the subject trace immediately follows it. Complementizers whose specifier hosts an inter-mediate trace are never in a configuration that potentially violates (31), and hence they need not be deleted in the mapping to PF:

(39)   Who do you think [t that Bill said [t ø [t has sold out completely]]]?

Fourth, if a language has agreeing complementizers, the set of features in C is not underspecified. Rather it consists of the same phi-features as those carried by the subject. Consequently, even if no specifier-head agreement relation is

established in syntax, the subject's features are accessible at the CP level. This means that in these languages subject extraction need not proceed through the specifier of C (or, if it did, no agreement relation needs to be established between the specifier of CP and C). Thus, there is no movement from a position that allows checking against C to a position in which checking against C takes place.

The prediction that complementizer agreement circumvents violations of the complementizer-trace filter is borne out in various languages. For example, long-distance subject extraction in Flemish and Frisian is grammatical in the presence of an agreeing complementizer (see Law 1991, de Haan 1997, and van Craenenbroeck and van Koppen 2001):

(40) a. WH $\langle F_1 \ F_2 \rangle_i \dots [_{CP} [_{C'} \ C \ \langle F_1 \ F_2 \rangle \ [_{IP}$ WH $\langle F_1 \ F_2 \rangle_i \dots$
      b. WH $\langle F_1 \ F_2 \rangle_i \dots \{C \ \langle F_1 \ F_2 \rangle_i$ WH $\langle F_1 \ F_2 \rangle_i\} \{\dots$
      c. de venten da   Jan   peinst dan   dienen boek gekocht
          the men   that John thinks that-PL *that   book bought*
          een   [Flemish]
          have
          'the men that John thinks bought that book'

      d. Do tink   ik datst   moarn   komme silst.   [Frisian]
          you think I that-2SG *tomorrow come   will*
          'It is you that I think will come tomorrow.'

The same reasoning accounts for the *que–qui* alternation in French (compare Pesetsky 1982 and Rizzi 1990). The peculiarity of this language is that it sanctions insertion of an agreeing complementizer, *qui*, precisely when it is needed to license subject extraction across C, in the way just outlined. If this is the correct analysis of the phenomenon, only the C that immediately precedes the extraction site of the subject should show up in its agreeing form. As before, no other complementizer will be in a configuration that potentially violates (31): although its specifier forms a link in the extraction chain, there is no trace to its immediate right. Indeed, only the lowest complementizer undergoes the *que*-to-*qui* rule:[9]

(41)   l'homme [_{CP} ø que [_{IP} je pense [_{CP} qui [_{IP} t a   été
       the-man   that I think   that-AGR *has been*
       arrêté t]]]]
       arrested
       'the man that I think has been arrested'

---

  [9] This analysis would seem to imply that the *que*-to-*qui* rule need not apply when an adverb separates the complementizer and the subject trace. This prediction seems to be incorrect. As Rizzi (1997) points out, the anti-adjacency effect typical of English subject extraction is absent

The above account of *that*-trace phenomena is not inherently related to extraction of subjects. As we have argued in the previous section, there is reason to believe that phi-feature agreement can be established only if the agreeing phrase is in an A-position, but there is no reason to assume that the same holds for agreement with an underspecified feature set. This means that in languages in which the *that*-trace filter holds, long-distance extraction of any element that obligatorily follows C may only cross this node if the complementizer is deleted. An example of this from English involves constructions with locative inversion. In such constructions, the locative phrase rather than the subject follows C, and indeed extraction of the locative phrase gives rise to a *that*-trace effect (see Bresnan and Kanerva 1989, Bresnan 1994, and Pesetsky and Torrego 2001):[10]

(42)   a. I think that in such cities can be found the best examples of this cuisine.

        b. In which cities do you think t (*that) t are found the best examples of this cuisine?

---

in French. An analysis is suggested by another observation of Rizzi's; namely, that in English the anti-adjacency effect seems to disappear if an object is fronted to a position between the complementizer and the subject trace:

(i)   *A man who I think that, this book, t_{who} knows t_{book} very well.

We do not need to complicate our analysis of the *that*-trace phenomenon to explain this fact. We can simply say, in terms of Rizzi 1990, that the fronted object counts as a closer potential antecedent governor for the trace of the subject, and hence that the sentence violates relativized minimality. The implication is that only base-generated material, such as the adverbs discussed in the main text, can be used to circumvent the *that*-trace effect: a base-generated XP will on the one hand be irrelevant to relativized minimality, while on the other it will avoid a violation of (31). If this analysis is on the right track, the lack of anti-adjacency effects in French can be accounted for by assuming that any material preceding the subject in this language must have ended up in its surface position through movement. For an example like (ii) the implication is that the subject is extracted from a position preceding the adverb (this, in fact, echoes Rizzi's analysis; see his (118)).

(ii)   Voici   l'homme que je crois   qui, l'annee prochaine, pourra   nous aider
        here-is the man who I believe that, next   year,   will-be-able us   help
        'Here is the man who I believe will be able to help us next year.'

[10] Culicover and Levine (2001) argue that the *that*-trace effect observed in (42b) is not due to the trace of the preposed PP, but to a trace left behind by heavy-NP shift of the subject. This is part of their argumentation against an analysis of the fronted PP as occupying Spec-IP, at least for a subset of locative inversion structures. Although we agree with this conclusion, we do not think that (42b) is ungrammatical because of heavy-NP shift of the subject. As we will argue below, short subject extraction does not induce *that*-trace effects, because it is movement *internally* to the CP phase. It is well known that heavy-NP shift is extremely local. Hence, the only plausible offending trace is the one left behind by the (nonsubject) PP.

If the locative phrase were a subject itself, as argued by Bresnan amongst others, this would be another instance of the pattern we encountered before. However, unlike 'regular' subjects, fronted locative phrases turn the clause into a topic island, which indicates that they are in an A′-position. Thus, extraction of the 'real' subject in examples like (42a) is impossible, whether *that* is omitted or not (Bresnan 1994):

(43)   *What cuisine do you think t (that) in this city can be found t ?

A more general instance of the pattern in (42) can be found in Yiddish. This language has verb second in embedded clauses, even when these are introduced by a complementizer like *az* 'that' (see (44a)). This means that if an element is extracted from an embedded clause and the position in front of the finite verb is apparently empty, there must be a trace in this position. This trace is right-adjacent to the C-position, and hence stands in a potential PF-checking position with this head. Therefore, the *that*-trace effect, which can be observed for subjects (see (44b)), extends to object and adjunct extraction, as illustrated in (44c) and (44d) (see also Branigan 1998, from which these examples are taken).

(44)   a.   az   morgn   vet dos yingl zen a kats
            that tomorrow will the boy   see a cat
            'that the boy will see a cat tomorrow'

       b.   Ver hot er moyre t (*az) t vet   kumen?
            who has he fear   that   will come
            'Who does he fear will come?'

       c.   Vos hot er nit gevolt t (*az) t zoln   mir leyenen t ?
            what has he not wanted   (that)   should we read
            'What did he not want us to read?'

       d.   Ven hostu   gezogt t (*az) t hot Max geleyent dos bukh t ?
            when have-you said   (that)   has Max read   the book
            'When did you say that Max read the book?'

The analysis of *that*-trace effects developed above implies that there should be a difference between long-distance extraction of the subject and movement of the subject to a local Spec-CP position. Only in the former case is it necessary that properties of the subject are accessible at the CP level through agreement with C. In cases of short movement, the head of the chain in Spec-CP need not agree with C; hence the condition in (32) does not apply. In turn, this means that the condition in (31) will never be violated by short movement of the subject, as such movement does not target an agreeing

position. In principle, then, this type of movement is compatible with the presence of a complementizer in C. In many languages, the doubly filled COMP filter rules out this configuration independently, which makes it impossible to test the prediction. As it turns out, however, Norwegian has complementizer-trace effects, but does not show these with short subject movement. In particular, long-distance extraction of the subject across the complementizer *som* is impossible, but in cases of short movement this complementizer is in fact obligatorily present (see Taraldsen 1986 and Keer 1999):

(45)   a.   Hvem tror   du t (*som) t vant?
            who   think you that   won
            'Who do you think won?'

       b.   Jeg vet   hvem *(som) t vant.
            I   know who   that   won
            'I know who won.'

Although the analysis does not explain why *som* cannot be omitted in (45b), it does explain why its presence does not lead to a complementizer-trace effect.

Of course, not all languages with non-agreeing complementizers show complementizer-trace effects. We have nothing special to say about this; the cross-linguistic distribution of the phenomenon, apart from the areas discussed above, has not been linked successfully to an independent factor, as far as we know. For instance, within Germanic *that*-trace effects are found in English, Swedish, Danish, and Yiddish, but not in German, Icelandic, or the variant of Swedish spoken in Finland (see Branigan 1998). In Norwegian, there is even a difference between the complementizers *som* 'that' and *att* 'that': only the former gives rise to *that*-trace effects. Apparently, individual complementizers can have an idiosyncratic property that renders subject extraction across them felicitous.

One way to account for this property would be to rely on empty complementizer agreement. This approach might be supported by languages like Frisian. As we have seen, Frisian displays no *that*-trace effects in the presence of an agreeing complementizer. However, *that*-trace effects are also absent when a subject is extracted that does not trigger overt agreement on C. A straightforward analysis of this situation would be to assume that Frisian has a full paradigm for complementizer agreement, with only the second person singular being realized overtly.

But the Frisian data can be interpreted in a different way as well. It may be that only some feature combinations show overt agreement, because

the grammar specifies that other feature combinations do not allow PF checking to begin with. For those feature combinations, no problem with (31) will arise, as subject extraction does not leave a trace in a potential checking position. This approach can perhaps be generalized to those languages that do not display *that*-trace effects at all, if we assume that their grammar never allows complementizers to enter into PF agreement relations.[11]

Given the above account of the role of complementizer agreement in the explanation of the *that*-trace effect, a precise answer can be given to the question of whether or not traces are present at the PF interface. Any theory must assume that traces are deleted at some point at the interface between syntax and phonology; that is, at PF. A prosodic account of checking phenomena relies on the presence of traces at the point of checking. At the same time, the allomorphy rules introduced in the previous chapter are not sensitive to traces (only to the φ-boundaries induced by them). Thus, traces are deleted after the application of checking rules, but before the application of allomorphy rules. We can therefore extend the schema of ordered PF processes as given in (3) in Chapter 6 as follows:

(46) a. Linearization of syntactic terminals
      b. Initial prosodic phrasing, on the basis of syntactic information

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[11] A different issue is that for some languages it is not clear whether or not they display *that*-trace effects. Consider Dutch. A substantial group of speakers reject examples in which a complementizer is string-adjacent to the finite verb as a result of subject extraction. At the same time, they allow subject extraction if the complementizer is separated from the verb by an object, a modifier, or even a nonfinite verb:

(i) a. *Wie denk je   dat is gekomen?
         who think you that is come

     b. Wie denk je   dat gekomen is?
         who think you that come   is
         'Who do you think has come?'

     c. *Wie denk je   dat snoept uit   de koekjestrommel?
         who think you that snacks from the cookie-tin

     d. Wie denk je   dat uit   de koekjestrommel snoept?
         who think you that from the cookie-tin   snacks
         'Who do you think secretly takes cookies from the cookie tin?'

Holmberg (2000) suggests that cases like those in (ib,d) involve stylistic fronting of the particle and the PP, respectively)', even though Dutch does not normally use this operation. Stylistic fronting is a PF operation that shifts an arbitrary constituent to the left edge of the clause in the absence of an overt subject. If this analysis is correct, the resulting representation will not violate (31), because the subject trace will not be parsed into the same φ as the complementizer.

    c. Application of checking rules
    d. Deletion of traces
    e. Application of context-sensitive allomorphy rules
    f. Spell-out of terminals

From the order of PF processes in (46) a prediction follows for those dialects of Dutch that have different paradigms for complementizer agreement and verb agreement. As argued in section 7.2, such dialects have the same PF agreement checking rules as other languages with complementizer agreement, but in addition they have a context-sensitive allomorphy rule that determines the form of the agreement ending, repeated in (47) for convenience. (Recall that F stands for feature that indicates that a form from the complementizer agreement paradigm should be used.)

(47)   *East Netherlandic Agreement Allomorphy*
      {[C (Prt$_i$) (Add$_j$) (Plr$_k$)] [D (Prt$_i$) (Add$_j$) (Plr$_k$)]} $\rightarrow$
      {[C (Prt$_i$) (Add$_j$) (Plr$_k$) F] [D (Prt$_i$) (Add$_j$) (Plr$_k$)]}

Consider what this implies for cases of long-distance extraction of the subject of an embedded clause across a complementizer. As argued above, such extraction is allowed in such dialects because C contains a fully specified set of phi-features and movement need therefore not proceed through Spec-CP to make these features syntactically visible on CP (see (48a)). This fully specified set of phi-features is checked at PF against the subject's trace, as in (48b). The trace is deleted, however, before the allomorphy rule for complementizer agreement can apply, as illustrated in (48c). Consequently, the complementizer, which does actually carry phi-features, will not bear an overt ending from the complementizer agreement paradigm in such dialects when the subject is extracted.

(48)   a. WH $\langle$F$_1$ F$_2\rangle_i$ ... [$_{CP}$ [$_{C'}$ C $\langle$F$_1$ F$_2\rangle$
       [$_{IP}$ WH $\langle$F$_1$ F$_2\rangle_i$ ...   syntax
    b. WH $\langle$F$_1$ F$_2\rangle_i$ ... {C $\langle$F$_1$ F$_2\rangle_i$ WH
       $\langle$F$_1$ F$_2\rangle_i$} { ...   PF checking
    c. WH $\langle$F$_1$ F$_2\rangle_i$ ... {C $\langle$F$_1$ F$_2\rangle_i$} { ...   PF trace deletion

This is corroborated by examples from the Hellendoorn dialect (see van Craenenbroeck and van Koppen 2001, who quote Jan Nijen Twilhaar, personal communication). In cases of long-distance extraction an uninflected variant of the complementizer is used:

(49)   a. WIEJ déénkt Jan   dat t die pries ewönnen hebt, nie ZIEJ.
      we   thinks John that that prize won   have, not they
      'It is us that John thinks won the prize, not them.'

b. Wiej vrög Jan zich   of   of die pries ewönnen hebt?
    who   asked John himself PRT *if that prize won   have*
    'About who did John wonder whether they won that prize?'

One may wonder why the complementizers in (49) do not carry an ending
from the verbal agreement paradigm (as in the Flemish and Frisian examples
in (40)). We speculate that this has to do with the way the two inflectional
paradigms are specified. Suppose that forms from the verbal agreement
paradigm can only attach to verbs in dialects with two paradigms—it is likely
that any non-context-sensitive paradigm is specified for the category it
applies to. Then, phi-features on C cannot be spelled out using an affix from
this paradigm. As we have just seen, they cannot be spelled out by a form
from the complementizer agreement paradigm either. As a result, these
features cannot be spelled out at all, and therefore the default form of the
complementizer is used.

7.4 CASE CHECKING

The features involved in verbal agreement are not the only ones that need to
be checked, and therefore not the only features that could be checked in
prosodic domains. In this section, we discuss the checking of case features
and how this gives rise to case adjacency in VO languages.[12] Other potential
cases of PF feature checking are briefly discussed in the following section.

    Let us begin by considering the conditions under which thematic selection
can take place. As mentioned above, we assume that linearization is the first
step in the mapping from syntax to phonology. This implies that there is
no such thing as linear order in syntax proper and hence that linear order
cannot condition thematic selection. In other words, from the perspective of
θ-theory, both (50a) and (50b) are admissible linearizations of a structure
involving direct θ-role assignment. The fact that (50a) does not surface in
English, while (50b) is ruled out in Dutch, must be explained through the
process of PF linearization.

(50)   a.   [$_{VP}$ DP V]
        b.   [$_{VP}$ V DP]

It is often assumed that there is a one-to-one relation between thematic roles
and the syntactic configurations they can be assigned in (as stated in Baker's

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[12] This section is based on earlier work by Neeleman and Weerman (1999), and Neeleman
(2002). Here, we only give a sketch of the proposal, leaving out discussion of particle con-
structions, secondary predication, and double object constructions.

(1988) Uniformity of Theta Assignment Hypothesis or UTAH). The motivation usually given for a principle like UTAH is that it results in a more restrictive theory of syntax than principles that allow a looser relation between syntactic and thematic structures. This argument is problematic: in any modular theory the overall restrictiveness of the grammar is what is relevant, not that of individual components or individual mapping principles between two components. Whereas UTAH makes the mapping between thematic structure and syntax simpler, it leads to complications within syntax proper. Any two structures that are thematic paraphrases must have a common underlying source, and be related by movement. This may require qualitative extensions of the theories of movement and phrase structure. Examples of pairs of sentences that are thematic paraphrases but for which it is not unproblematic to assume they are related by movement include the following: middles and their active counterparts (see Fagan 1988 and Ackema and Schoorlemmer 1995), double object constructions and dative shift constructions (see Jackendoff 1990*b*), clauses headed by denominal verbs like *shelve* and verbs taking a nominal complement (see Jackendoff 1997), morphological causatives and their periphrastic counterparts (see Fodor 1970), and structures with and without object scrambling (see Neeleman 1994 and Williams 2003). In Chapters 2 and 3 we have already argued that a similar point can be made with respect to English synthetic compounds like *truck driver* and their syntactic counterparts *drive trucks* and *driver of trucks*.

On the other hand, the relation between thematic and syntactic structure is not completely arbitrary either. In what follows, we will assume the condition in (51) (compare Roberts 1997*a*; for a derivation of why (51) must hold, see Neeleman and van de Koot 2002*b*).

(51)   An argument α can be thematically associated with a predicate π iff α c-commands π and π m-commands α.

If syntax is flexible in this way, several structurally distinct positions are available for a given argument. In particular, an object can be merged as a sister to the verb, but it can also occupy a position higher in VP. This is illustrated by the structures in (52), where the second element contained in VP is an adverbial.

(52)   a. $[_{VP}$ AdvP $[_{V'}$ DP V$]]$
        a'. $[_{VP}$ DP $[_{V'}$ AdvP V$]]$
        b. $[_{VP}$ $[_{V'}$ V DP$]$ AdvP$]$
        b'. $[_{VP}$ $[_{V'}$ V AdvP$]$ DP$]$

This freedom with respect to word order, which is in principle allowed by the syntax, does not show up in every single language. This is because case

features, which are a prerequisite for thematic interpretation, must be checked. Conditions on checking select a (possibly singleton) subset out of the set of potential argument positions.

Two factors come into play. First, case checking has directionality effects. In a given language, arguments whose case is checked either precede or follow the verb, thus ruling out either (52a,a′) or (52b,b′). Second, case checking is local. Its domain can coincide with the VP, but it can also be defined more narrowly, with the result that of the various object positions in (52) only some may be used. We will argue that there is an implicational relation between the domain and the direction of case checking: checking to the left implies a larger domain than checking to the right. The direction of case checking is directly related to the distinction between checking in syntactic and in prosodic domains, with the latter giving rise to the smaller domain.

More precisely, we hypothesize that in general elements which enter into a checking relation must be in the same phrase, where 'phrase' can be defined syntactically (as XP) or prosodically (as the prosodic phrase, ϕ). The choice between these options where case checking is concerned is what constitutes (at least part of) the traditional OV/VO parameter:

(53)   A head α may check the case of β iff (parametric choice)
   a.   the first XP that dominates α dominates β and vice versa.
   b.   the first ϕ that dominates α dominates β and vice versa.

As we will now explain, the choice of domain has consequences for the linear order of head and argument. We first discuss English, a language characterized by (53b). In other words, in English case is checked in prosodically defined domains.

Consider the example in (54a), which is mapped onto the prosodic structure in (54b).

(54)   a.   [[A friend of [Mary's]] [has [given [a book] [to [Sue]]]]].
       b.   {A friend of Mary's} {has given a book} {to Sue}.

There is a crucial difference in the prosodic representations assigned to head-initial and head-final structures. In a simple transitive sentence, verb and object will only be in the same ϕ if the former precedes the latter. (54b), for example, contains the prosodic phrase *has given a book*. If the verb were to follow the object, however, the latter's right edge would trigger ϕ-closure (objects being maximal projections). Consequently, there is no corresponding prosodic phrase consisting of object and verb in the ungrammatical example below.

(55)   a.   [[A friend of [Mary's]] [has [[a book] given [to [Sue]]]]].

         b.   *{A friend of Mary's} {has a book} {given to Sue}.

So, if (53b) is taken to characterize English, the ungrammaticality of (55), with its OV order, can be attributed to the fact that *a book* and *given* are not in the same checking domain.

In contrast, Dutch is a language characterized by (53a): case is checked in syntactically defined domains. As just argued, the object and the verb are not contained in the same prosodic phrase in head-final structures. Hence, checking in prosodic domains is incompatible with OV order:

(56)   a.   dat [[een vriend van [Marie]] [[aan [Susan]] [een boek]
            that   a   friend of Mary   to   Susan   a   book
            gegeven heeft]]
            given   has
            'that a friend of Mary's has given a book to Susan'

         b.   {dat een vriend van Marie} {aan Susan} {een boek} {gegeven
            that a   friend of Mary   to   Susan a   book given
            heeft}
            has

What, then, determines the order of object and verb in Dutch? Much work in the minimalist program assumes that case checking in syntax requires a particular order: an XP must precede the head against which its features are checked. This is not stated directly. Rather, the case-marked XP is required to occupy the head's specifier position (in Chomsky 2000, 2001 this is forced by the presence of an EPP feature on the case-assigning head). Specifiers in turn are ordered to the left of the head that projects them. We adopt the general insight, but assume that the relevant condition does not make reference to specifiers:

(57)   If a head α checks a feature of a maximal projection β in the syntactic representation, then β precedes α in the phonological representation.

If (57) is correct, the object must precede the verb in languages characterized by (53a). In the ungrammatical Dutch example below the verb *geven* 'give' checks the case of *een boek* 'a book', but the linearization of the structure is not in accordance with this.

(58)   *dat een vriend van Marie aan Susan gegeven heeft een boek
        that a   friend of Mary to   Susan given   has   a   book

To summarize, the parameter in (53) (in conjunction with (57)) relates the linearization of object and verb to the domain in which case is checked. In languages like English case is checked in prosodically defined domains, which is compatible with VO order only. In languages like Dutch case is checked in syntactic domains, which is compatible with OV order only.

The setting of the parameter in (53) determines which of the argument positions allowed by θ-theory can be realized. The parameter orders object and verb (ruling out (50a) in English and (50b) in Dutch). In addition, it imposes a condition of case adjacency in VO, but not OV languages (ruling out (52b′) in English, while allowing (52a′) in Dutch). Consider how these latter results obtain.

If an adverbial intervenes between verb and object in English, as in (59a), a prosodic structure results that does not allow for the case of the object to be checked. The checking domain is defined prosodically in English, but in (59a′) *read* and *the book* are not part of the same φ. This problem does not arise if the adverbial appears to the right of the object, as in (59b,b′), or precedes the verb, as in (59c,c′):

(59) a.   [[John] [[read [slowly]] [the book]]].
      a′. *{John} {read slowly} {the book}.
      b.   [[John] [[read [the book]] [slowly]]].
      b′. {John} {read the book} {slowly}.
      c.   [[John] [[slowly] [read [the book]]]].
      c′. {John} {slowly} {read the book}.

That the adjacency between verb and object is an effect of case checking is corroborated by the observation that the condition does not extend to complements that need not enter into a case checking relation with the verb, such as PPs. Elements that triggers φ-closure can intervene:

(60) a.   The director looked at the telegram pensively.
      b.   The director looked pensively at the telegram.

The relation between VO order and case adjacency is not a quirk of English. It can also be observed in the mainland Scandinavian languages, for example. In VO languages with V-to-I movement (such as Icelandic), case checking relies on the verb's trace, so that the moved verb and the object need not be adjacent (recall that checking rules apply before traces are deleted). However, if one controls for V-to-I, adjacency of verb and object does indeed seem to be required, as illustrated by the Icelandic examples below (from Vikner 1994):

(61) a.   {Jón} {hefur lesið bækurnar} {rækilega}.
            John has   read   the-books   thoroughly

b. *{Jón} {hefur lesið rækilega} {bækurnar}.
   John   has   read thoroughly   the-books

In Dutch, the checking domain is defined syntactically, in terms of mutual m-command. Since m-command is insensitive to linear intervention, more of the object positions allowed by θ-theory can actually be used. Objects must be situated within VP, but they do not have to be adjacent to the verb. The structure in (62a) is ruled in, as is the one in (62b). This, we believe, explains the existence of scrambling in OV languages (see Neeleman 1994 for a base generation analysis of scrambling).

(62)   a.   [dat [Jan] [$_{VP}$ [langzaam] [[het boek] las]]]
            that John   slowly   the book read

       b.   [dat [Jan] [$_{VP}$ [het boek] [[langzaam] las]]]
            that John   the book   slowly   read

Again, the relation between OV order and the possibility of scrambling seems to hold true cross-linguistically (see Corver and van Riemsdijk 1997).

   In the case of scrambling, the syntactic checking domain of Dutch allows more thematic positions to be realized than the phonological checking domain of English. This is not always the case, however. In some constructions, checking in prosodic domains is more permissive in this respect. As is well known, the subject of an embedded infinitival clause may be case-marked by a particular class of matrix verbs in English:

(63)   a.   John sees [Mary dance the tango].
       b.   John expects [Mary to read Shakespeare].

These data follow straightforwardly if case is checked in prosodic domains. The alignment rule that governs initial prosodic phrasing has the consequence that the matrix verb and an exceptionally case-marked subject are part of the same φ. Hence, the case of the embedded subject is licensed:

(64)   a.   {John} {sees Mary} {dance the tango}.
       b.   {John} {expects Mary} {to read Shakespeare}.

It is correctly predicted that if an adverbial intervenes between the embedded subject and the verb, checking is blocked, even when that adverbial is part of the complement clause:

(65)   a.   [John [expects [tomorrow [Mary [to leave]]]]].
       a′. *{John} {expects tomorrow} {Mary} {to leave}.

b.   [John [expects [Mary [to leave tomorrow]]]].
b′.   {John} {expects Mary} {to leave tomorrow}.

Since the subject of an embedded clause is not in a relation of mutual m-command with the matrix verb, exceptional case marking should be impossible in a language that checks case in syntactic domains. Indeed, the phenomenon is normally excluded in OV languages like Dutch:[13]

(66)   *dat Jan   [Marie t$_i$]   verwacht [Shakespeare te lezen]$_i$
          that John Mary   expects   Shakespeare   to read
        'that John expects Mary to read Shakespeare'

There is one revealing exception. In so-called verb-raising constructions a process known as clause union takes place (see Evers 1975, 2003). The embedded clause and the matrix clause behave as a single syntactic domain for a number of clause-bound phenomena. Apparently, verb raising renders the boundaries of the embedded clause transparent. It cannot be a coincidence, then, that verb raising is required if a case checking relation between a matrix verb and an embedded subject is to be established (see Reuland 1982):

(67)   dat   Jan   [Marie de tango t$_i$]   [ziet dansen$_i$]
          that John Mary   the tango   sees dance
        'that John sees Mary dance the tango'

In conclusion, the assumption that some languages check case in prosodic rather than syntactic domains provides an account of the cross-linguistic correlation between VO, case adjacency, and (the option of) exceptional case marking, and between OV, scrambling, and the (near) impossibility of exceptional case marking.

7.5 POSSIBLE EXTENSIONS

Complementizer agreement and case checking are not the only instances of checking which can be argued to take place at PF. We will briefly discuss three further apparently syntactic adjacency phenomena that can be understood in terms of feature checking in prosodic domains: adjacency between

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[13] In (66), the infinitival complement to the matrix verb *verwachten* is extraposed, stranding the subject. This does not interfere with the argument. Even when the subject is pied-piped under extraposition, the sentence is still ungrammatical (**dat Jan verwacht Marie Shakespeare te lezen* 'that John expects Mary Shakespeare to read').

degree heads and adjectives, adjacency between the head of a prenominal modifier and the noun, and adjacency between the parts of verb clusters in Germanic OV languages.

7.5.1 Degree Heads

Corver (1997*a*,*b*) observes that, in Dutch, certain degree expressions must be adjacent to the head of their AP complement (see also section 4.4). In general, prepositional complements of adjectives can either follow or precede the head:

(68)   a.   dat Carlo afhankelijk van zijn vader is
              that Carlo dependent   of   his   father is
              'that Carlo is dependent on his father'

        b.   dat Carlo van zijn vader afhankelijk is
              that Carlo of   his   father dependent is

When the AP is modified by a degree expression like *minder* 'less', the same possibilities exist; in addition, the complement may precede the degree modifier:

(69)   a.   dat Carlo minder afhankelijk van zijn vader is dan van zijn
              that Carlo less   dependent   of   his   father is than of   his
              hypotheekadviseur
              mortgage-advisor
              'that Carlo is less dependent on his father than on his mortgage advisor'

        b.   dat Carlo minder van zijn vader afhankelijk is dan van zijn
              that Carlo less   of   his   father dependent is than of   his
              hypotheekadviseur
              mortgage-advisor

        c.   dat Carlo van zijn vader minder afhankelijk is dan van zijn
              that Carlo of   his   father less   dependent is than of   his
              hypotheekadviseur
              mortgage-advisor

However, when the AP is modified by a degree expression like *te* 'too' the adjective cannot be separated from the degree expression by a PP complement:

(70)   a.   dat Carlo veel   te   afhankelijk van zijn vader is
              that Carlo much too dependent   of   his   father is
              'that Carlo is much too dependent on his father'

b. *dat Carlo veel   te   van zijn vader afhankelijk is
    that Carlo much too of his father dependent   is

c. dat Carlo van zijn vader veel   te   afhankelijk is
    that Carlo of his father much too dependent   is

As noted before, adjacency is a concept alien to syntax and hence the
ungrammaticality of (70b) (versus the grammaticality of (69b)) seems hard to
explain in syntactic terms. We only know of one syntactic account, namely
that of Corver (1997*a*,*b*). Corver argues that the extended adjectival projec-
tion includes two functional heads, Deg and Q. He further argues that PPs
can be generated on either side of the adjectival head:

(71)
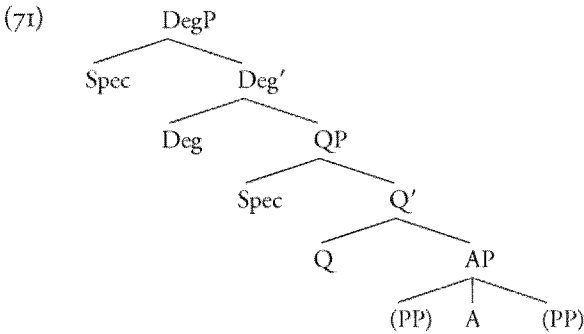
Degree heads like *te* are generated in Deg. A raises to Q because of a con-
dition that requires this position to be filled. As a consequence, any PP
contained in AP will follow the raised head, as required. In contrast, degree
heads like *minder* are generated in Q and raise to Deg. Consequently, the
adjective does not raise in this case, so it can be preceded by PPs. Data as
in (69c) and (70c) indicate that PPs can be moved leftward within the
extended adjectival projection, to either Spec-DegP or an adjoined position
to DegP. This implies, however, that the adjacency condition is not
accounted for after all: movement of PPs to Spec-QP or an adjoined position
to QP must be ruled out, but why this should be so is not clear.

Neeleman, van de Koot, and Doetjes (2004) argue that the difference
between degree expressions like *te* and *minder* is that the former are func-
tional heads that must combine with an AP, while the latter are modifiers
that can combine with any semantically suitable expression. Thus, there is a
contrast between (72a) and (72b).

(72) a. dat Jan [vp minder [vp de verstrooide   professor speelt]]
          that John less   the absent-minded professor plays
          dan Karel
          than Carl
          'that John plays the absent-minded professor less than Carl'

b. *dat Jan [_DegP_ te [_vP_ de verstrooide   professor speelt]] om
   that John   too   the absent-minded professor plays   for
   serieus genomen te worden
   serious taken   to be
   'that John plays the absent-minded professor too much to be taken seriously'

Making this distinction does not as such account for the adjacency effect. However, the fact that Deg heads can only combine with AP complements can be encoded in terms of categorial feature matching, that is to say, as a checking relation involving categorial features (for general discussion of feature matching in extended projections, see Grimshaw 2000, 2003). Like other checking relations, the one between Deg and A can be prosodically conditioned. If so, it follows that PPs cannot intervene between Deg and A, neither as a result of movement nor as a result of base generation. Thus, in an example like (70b), the right bracket of the PP triggers φ-closure, so the degree head and the adjective are not in the same prosodic domain. This problem does not arise in either (70a) or (70c), where the PP does not intervene between Deg and A. The prosodic phrasing of the examples in (70) is given in (73).

(73) a. {dat Carlo} {veel te afhankelijk} {van zijn vader} {is}
          that Carlo much too dependent   of his father is

      b. *{dat Carlo} {veel te van zijn vader} {afhankelijk} {is}
          that Carlo much too of his father dependent   is

      c. {dat Carlo} {van zijn vader} {veel te afhankelijk} {is}
          that Carlo of his father much too dependent   is

In the case of degree modifiers like *minder*, no adjacency effect is to be expected, because there is no relation of categorial feature matching between a modifier and the category it attaches to.

   Another advantage of the prosodic checking account is that it provides an explanation for a further difference between the two types of degree expression. Degree modifiers allow extraction of the category they combine with, but degree heads do not. Note that extraction of a PP complement to the adjective is allowed in both cases. The relevant data are given in (74).

(74) a. Van zijn vader afhankelijk is Carlo minder *t* dan Piet.
          of his father dependent is Carlo less   than Pete
          'Dependent on his father, Carlo is less than Pete.'

b. *Van zijn vader afhankelijk is Carlo *t* te *t* om een eigen zaak
    of   his   father   dependent   is   Carlo   too   for   an   own   business
    te beginnen.
    to   start
    'Dependent on his father, Carlo is too much to start his own
    business.'

c. Van zijn vader is Carlo minder afhankelijk *t* dan Piet.
    of   his   father   is   Carlo   less   dependent   than   Pete

d. Van zijn vader is Carlo *t* te   afhankelijk *t* om een eigen zaak
    of   his   father   is   Carlo   too dependent   for   an   own   business
    te beginnen.
    to   start

These data are analogous to those illustrating the complementizer-trace
effect. If DegP qualifies as a phase, the analysis given in section 7.3 extends to
these cases. The features of the extracted AP must be syntactically visible on
DegP, and this requires movement through Spec-DegP in order to allow for
specifier-head agreement between the AP and Deg. However, the AP moves
from a position in which it checks features against the degree head, which
means that movement through Spec-DegP violates the condition in (31). No
such problem arises when the extracted category does not originate in a
potential checking position, as is the case when either the extracted category
is a complement of the adjective rather than of the degree head (see (74d)) or
the AP is not a complement of a degree head in the first place (see (74a)).[14]

7.5.2 The Head Final Filter

In English, prenominal modifiers cannot contain a complement. Williams
(1982) describes this in terms of a 'head final filter': a prenominal modifier
must end in its lexical head. Postnominal modifiers are not subject to the
same restriction:

(75)   a. [_DP_ a [_NP_ [_AP_ proud] man]]
        b. *[_DP_ a [_NP_ [_AP_ proud [_PP_ of his children]] man]]
        c. [_DP_ a [_NP_ man [_AP_ proud of his children]]]

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[14] In the case of the *that*-trace effect, complementizer agreement could be used to cir-
cumvent the phase impenetrability condition in (32). A similar way out is not available in the
case of extraction across a degree head. Although degree heads contain adjectival features, they
do not contain a separate set of features that refer to their AP complement. Hence, their
features cannot be said to make the complement visible for extraction. (Thanks to Joost
Kremers for raising this issue.)

There is a second difference between prenominal and postnominal modifiers. In Dutch and German dialects that have an agreement paradigm for attributive as opposed to predicative APs, only prenominal adjectives show the relevant type of adjectival inflection. For example, Dutch adjectives are declined according to the gender, number, and definiteness of the noun if in prenominal position: prenominal modifiers carry a schwa unless the noun is a neuter singular indefinite (see (76)). In postnominal position, there is no agreement (see (77)).

(76) a. de   heel trots-e   man
          the.NONNEUT *very proud*-DECL *man*

      b. een heel trots-e   man
          a   very proud-DECL *man*

      c. het   heel trots-e   meisje
          the.NEUT *very proud*-DECL *girl*

      d. een heel trots-φ meisje
          a   very proud   girl

(77) een man zo trots(*-e)   dat hij bijna opstijgt
      a   man so proud-DECL *that he almost ascends*

We suggest that the two differences between prenominal and postnominal modifiers are linked (see also Evers 1991 and Kester 1996). The agreement between a prenominal modifier and a noun is indicative of a checking relation between the two, while apparently there is no checking with postnominal modifiers. If the checking relation is conditioned by prosodic domains, the adjacency effect is expected, as explained previously. The only difference with the earlier cases is that the phrase that checks its features against the head precedes rather than follows this head. At first sight, this might seem unexpected, as the right edge of a phrase usually implies that it is not in the same φ as a head that follows. However, we suggested in the previous chapter that prosodic boundaries induced by a modifier can be erased when the modified material is part of the next φ. With this in mind, consider what the prosodic structures associated with (75a) and (75b) will be. (75a) will initially be phrased as in (78a), but since *proud* is a modifier of *man* the φ-boundary induced by it can be erased, resulting in (78b). Hence, prosodic checking between adjective and noun is possible. (For related discussion, see Sadler and Arnold 1994.)

(78) a. {a proud} {man} →
      b. {a proud man}

The structure in (75b) will give rise to the initial prosodic phrasing in (79). Note that here the φ-boundary after *children* is not only motivated by the right edge of the complete modifying AP *proud of his children*, but also by the right PP-bracket of *of his children* and the right DP/NP-bracket of *his children*. Since these are not modifiers of the noun, erasure of the relevant φ-boundary is not allowed. As a consequence, the features of the adjective cannot be checked against the noun, and the structure is ruled out.

(79)   *{a proud of his children} {man}

Given that postnominal modifiers do not carry attributive agreement, as illustrated in (77), the position of the adjective internally to its extended projection is irrelevant in this case.

The claim that the head final filter is related to prosodic checking is strengthened by certain parallels between the elements that induce violations of this filter and the elements that lead to violations of case adjacency in English. Particularly interesting in this respect are particles. Unmodified light particles can separate object and verb in English, but heavy particles or particles accompanied by a specifier or complement cannot (compare Kayne 1985). For reasons we cannot go into here, light particles do not obligatorily trigger φ-closure, but others do (see Neeleman and Weerman 1999 for discussion).

(80)   a.   {Johanna} {looked up the information} {this morning}.
        a′.   *{Johanna} {looked right up} {the information} {this morning}.
        b.   {They} {ran up the flag} {this morning}.
        b′.   *{They} {ran up the pole} {the flag} {this morning}.
        c.   {Henry} {put out the garbage} {yesterday}.
        c′.   *{Henry} {put outside} {the garbage} {yesterday}.

It turns out that the judgements in (80) are mirrored exactly by those in (81), where the particle intervenes between the head of a prenominal modifier and a noun.

(81)   a.   {some recently looked up information}
        a′.   *{some recently looked right up} {information}
        b.   {a recently run up flag}
        b′.   *{a recently run up the pole} {flag}
        c.   {some recently put out garbage}
        c′.   *{some recently put outside} {garbage}

The prosodic account does not predict that prenominal modifiers cannot have any complements. If the complement can precede the adjective, it will

not trigger a φ-boundary that blocks feature checking between adjective and noun. This is corroborated by data from Dutch. As we have seen in the previous subsection, PP-complements can either precede or follow an adjectival head. The head final filter holds for Dutch as well, as illustrated in (82a). However, when the PP precedes the adjective, the AP can appear prenominally, as in (82b).[15]

(82) a. *{een trots-e   op zijn kinderen} {man}
          a   proud-DECL of his children   man

      b. {een op zijn kinderen} {trots-e   man}
          a   of his children   proud-DECL man

7.5.3 Cluster Creepers

It is a stricking property of the Germanic OV languages that bare infinitival complements are not licensed in their base position. Their head has to raise to the matrix verb, in some languages with the option of pied-piping other material. If just the verb raises, this process is known as verb raising (see Evers 1975), if more material is taken along it is referred to as verb projection raising (see Haegeman and van Riemsdijk 1986). An example of verb raising, from Dutch, is given in (83a). The West Flemish example in (83b) illustrates verb projection raising.

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[15] Pre-adjectival PP complements in prenominal APs also lead to a problem for the analysis. As in English, prenominal APs can be stacked in Dutch. Suppose that there are two prenominal APs. It turns out that agreement checking between the first adjective and the noun is not blocked by the presence of a PP complement in the second AP:

(i)   een oud-e   op zijn kinderen trots-e   man
      a   old-DECL of his children proud-DECL man
      'an old man who is proud of his children'

In contrast, a PP complement of the first adjective does block checking. The head of each prenominal AP must be final in its extended projection:

(ii) *een trots-e   op zijn kinderen oud-e   man
       a   proud-DECL of his children old-DECL man

Another remarkable fact about examples like (i) is that they necessarily require a reading of the prenominal adjectives as coordinated. This is not a general property of stacked prenominal modifiers, which also allow readings in which a preceding modifier takes scope over the ones that follow it. This is suggestive of a multidimensional analysis of examples like (i), with each dimension assigned a separate PF representation that overlaps in the determiner and the noun. These are then linearized in phonology proper. We will not develop this idea here. (For detailed discussion of multidimensional analyses of coordination, and further references, see de Vries 2002.)

(83)   a.   dat   Cecilia [PRO de   kraanvogels t$_i$] zag   overvliegen$_i$
              that Cecilia   the cranes   saw   over-fly
              'that Cecilia saw the cranes fly across the sky'

        b.   da   Valère [PRO t$_i$] ee   willen [Marie dienen boek geven]$_i$
              that Valerie   has want   Mary   that   book give
              'that Valerie wanted to give Mary that book'

The trigger for the restructuring process is usually said to be the lack of an
independent tense feature in the infinitive. For instance, Bennis and
Hoekstra (1989) argue that a 'tense chain' must be formed that links the
infinitive to the finite inflection of the root clause. In the present framework,
this can be implemented as a checking relation between an unspecified
feature in the infinitive and the tense feature of the matrix verb. (As before,
checking is a relation of identification.)

We suggest that the difference between languages that allow verb projection
raising and languages that do not concerns the domain in which tense
checking must take place. As we have argued for case, it can be a parametric
choice whether a particular checking relation is conditioned by syntactic or by
prosodic domains. Suppose the same is true for tense checking: a language
allows checking either if the two verbs are in the same syntactic phrase or if
they are in the same prosodic phrase. Consider what the consequences of this
choice are.

No matter how the parameter is set, checking is impossible when the
infinitival verb remains in its base position. In this position, the infinitival
verb is neither in the same syntactic phrase nor in the same prosodic phrase as
the matrix verb:

(84)   a.   [$_{VP}$ ... [$_{VP}$ ... V$_{INF}$] V$_{FIN}$]
        b.   { ... V$_{INF}$}{V$_{FIN}$}

Suppose a language opts for syntactic tense checking. As noted in connection
to exceptional case marking in section 7.4 (and as is well known from the
literature), both verb raising and verb projection raising lead to clause union,
that is, to the pruning or transparency of the maximal extended projection of
the infinitival verb. As a result, the two verbs are in the same syntactic phrase,
and tense checking is possible. A language of this type therefore allows
optional pied-piping when the infinitival verb raises to the finite verb. This is
essentially the pattern attested in West Flemish and Swiss German (see the
data in Haegeman and van Riemsdijk 1986). (Note that there are no lan-
guages in which pied-piping is obligatory: verb raising is always an option
next to verb projection raising.)

If a language opts for prosodic checking, however, the two verbs must end
up in the same ɸ. As a consequence, if the infinitival verb pied-pipes any

material that triggers φ-closure, checking will be impossible. Consider for instance the prosodic structure associated with a verb projection raising example like (83b):

(85) {da Valère} {ee willen Marie} {dienen boek} {geven}
      that Valerie has want Mary   that   book give

The pied-piped objects induce a φ-boundary that separates *geven* 'give' from the finite verb. Hence, if a language checks tense in prosodic domains, verb projection raising is ruled out. In contrast, in the prosodic structure associated with the example of verb raising in (83a), the two verbs do end up in the same φ, so checking is possible:

(86) {dat Cecilia} {de kraanvogels} {zag overvliegen}
      that Cecilia the cranes   saw over-fly

Dutch is a language of this type, as indicated by the ungrammaticality of verb projection raising in (87).

(87) a. *dat Cecilia [PRO t$_i$] zag [de kraanvogels overvliegen]$_i$
          that Cecilia   saw   the cranes   over-fly
      b. *{dat Cecilia} {zag de kraanvogels} {overvliegen}

If this is the correct approach, a precise prediction is made as to which elements *can* be pied-piped in a language like Dutch: precisely the same elements that do not lead to violations of the head final filter or case adjacency in English. Indeed, Dutch allows light particles to be pied-piped under verb raising, but not particles accompanied by a specifier or complement, or particles that are prosodically heavy (compare sections 7.4 and 7.5.2). This is illustrated in (88).

(88) a. dat Bertus de trui   (helemaal) uit zal halen
          that Bertus the sweater completely out will take
          'that Bertus will unpick the sweater completely'
      b. dat Bertus de trui   zal (*helemaal) uit halen
          that Bertus the sweater will completely out take
      c. dat Bertus de trui   uit (elkaar)   zal halen
          that Bertus the sweater out each-other will take
          'that Bertus will take the sweater apart'
      d. dat Bertus de trui   zal uit (*elkaar) halen
          that Bertus the sweater will out each-other take

e. dat Bo zo'n   opmerking beter achterwege kan laten
    that Bo such-a remark   better away   can let
    'that Bo had better not make such a remark'

f. ?*dat Bo zo'n   opmerking beter kan achterwege laten
    that Bo such-a remark   better can away   let

In conclusion, the fact that exactly the same elements do or do not count as interveners with respect to adjacency requirements that hold of relations as different as case assignment, prenominal modification, and tense chains indicates that these relations are conditioned by the same factor. It seems very hard to find a syntactic generalization that covers all these cases. In contrast, a prosodic generalization, based on right-alignment of prosodic and syntactic phrases, is straightforward.

7.6 CONCLUSION

This chapter concludes our investigation of the role of interface conditions on the well-formedness of complex words. We have argued that inside the syntactic macromodule there is a submodule that is responsible for the generation of morphological structure. Of course, the grammaticality of words depends on the principles that hold in this submodule and in the syntactic macromodule. But in many cases the well-formedness of the products of the morphological submodule is determined by its interaction with other components of the grammar. We have discussed five types of interaction that are relevant.

First, there is competition between the morphological submodule and the submodule that deals with the generation of phrases. Under certain circumstances, a morphological representation, which is perfectly well formed as such, is blocked by the existence of a syntactic alternative. One such case consists of semantically transparent root compounds. These are ruled out in isolation, but may be part of a larger morphological structure.

Second, the products of the morphological submodule are connected to products of the syntactic submodule by means of insertion. We have argued that insertion involves matching the features of the top node of one representation with the features of a node in another representation. Two types of insertion are relevant for the well-formedness of words: insertion of syntactic representations in morphological terminals and insertion of morphological representations in syntactic terminals. The first accounts for the option of phrasal compounding and derivation. The second has consequences for which subparts of words can enter into a grammatical dependency with an element in the syntactic host structure (the relevant generalizations are usually referred to as 'lexical integrity').

Third, the well-formedness of words is codetermined by the principles that constrain the mapping between structures of the syntactic and phonological macromodules. It is possible that even a word whose morphosyntax and morphophonology are grammatical may be ruled out since the mapping between the two violates one or more of these principles. An example is the general ungrammaticality of non-head-final phrases that are input to suffixation.

Fourth, a word can assume an unexpected form as a consequence of a PF allomorphy rule. Such a rule may, for instance, alter the feature content of a syntactic terminal node prior to spell-out (mapping from PF to the phonological macromodule). PF allomorphy rules are sensitive to the local presence of a 'triggering element', so that the form of a word can depend on its position in the linear string. An example is provided by Modern Standard Arabic: the form of the finite verb depends on whether it is immediately followed by the agreeing subject. If it is, number agreement is no longer expressed.

Finally, certain inflected words can be licensed only if a second expression with shared features is part of the same local PF domain. An example is complementizer agreement, as discussed in this chapter.

These five types of interaction, plus our argumentation for a separate morphological submodule, suggest the following elaboration of the model of grammar we started out with in Chapter 1:

(89)

LEXICON		
↕	↕	↕
SEMANTICS	SYNTAX	PHONOLOGY
Phrasal Semantics	Phrasal Syntax	Phrasal Phonology
↓	↓	↓
Phrasal semantic structure	Phrasal syntactic structure	Phrasal phonological structure
INSERTION ↔	INSERTION COMPETITION ↔	INSERTION
Word semantic structure	Word syntactic structure	Word phonological structure
↑	↑	↑
Word Semantics	Word Syntax	Word Phonology
↕	↕	↕
PF		
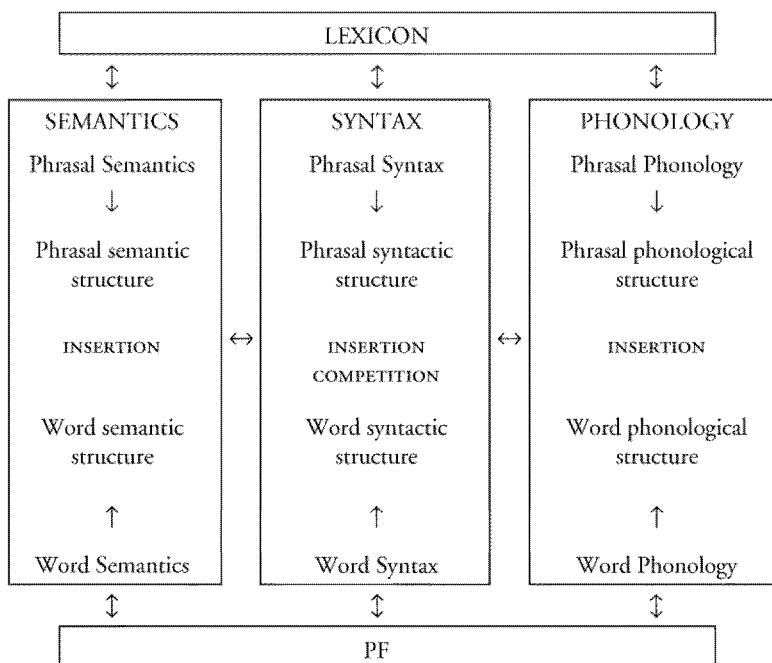
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