

SYNTACTIC AFFIXATION

by

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1983

Submitted to the department of
Linguistics and Philosophy
in partial fulfillment of the
requirements for the degree of

DOCTOR OF PHILOSOPHY

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 1984

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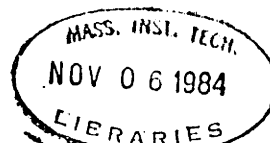
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ABSTRACT

In this thesis we extend Case-theory, and the associated notion of 'visibility', to cover the distribution of modifiers, of predicates, and of different morphological realizations of verbs. We claim that the internal structure of a phrase is related to its distribution, in particular, whether or not it is Case-marked will determine whether it has any internal structure.

We suggest that by a simple extension of the X-bar rewriting rules words should be constructed in the syntax, if their internal structure satisfies the Projection Principle. We show that certain affixes, including but not only the inflectional 'agreement' affixes are assigners of structural Case, and govern their stems at S-Structure. We argue in addition that 'synthetic compounds' are constructed in the syntax.

We discuss the mapping between S-Structure and the phonological representation of words at PF. We account for the fact that in English words constructed in the syntax do not undergo word-phonological ('+' boundary) rules.

Thesis Supervisor: Noam Chomsky

Title: Institute Professor

ACKNOWLEDGEMENTS

My first debt is to my thesis committee. I would like to thank Noam Chomsky, Wayne O'Neil and Luigi Rizzi for helping me get here; their advice, criticism and encouragement has been indispensable.

The idea which developed into the thesis, that verbs need Case, was developed jointly with Ian Roberts in the fall of 1983. Without Ian's contribution, I would not have written this particular thesis.

Paul Kiparsky originally suggested that I work on synthetic compounds. I would like to thank him for this suggestion, and for his early encouragement of my efforts.

I have spent a fair amount of time in the last four years hanging around UMASS Amherst, and have profited much by discussing many of the ideas in this thesis with people in that linguistics department. In particular, Tom Roeper has been an enthusiastic critic of this material, and his own work has inspired much of this research. Emmon Bach suggested, fruitfully, that the distribution of modifiers might be subsumed under Case theory.

While writing this thesis, I have had useful discussions with Morris Halle, Mike Hammond, Judy Kegl, Beth Levin, Mario Montalbetti, Malka Rappaport, Mamoru Saito, Peter Sells, Peggy Speas, Richard Sproat, Lisa Travis. In the last four years I have been taught by more or less everybody officially or unofficially in the MIT linguistics department; thanks to you all.

Diana Archangeli has been writing her thesis at the same time, and often in the same room, as I wrote mine. She has provided good conversation, and good advice about the word processors.

In the first two years that I was in the USA I was sponsored as a Harkness Fellow by the Commonwealth Fund; to them many thanks. In the last two years I have been financed by the MIT linguistics department; again, many thanks. Also it was very nice, and appropriately technological, to write this thesis on a word processor, generously provided, and just in time, by the Department of Linguistics and Philosophy.

The department has been a very pleasant place to be in. For this, I must thank Jay Keyser, who runs it; and the staff, particularly Maggie Carracino, Nancy Peters, Jackie Miles, and Sharon Ponder. Ron Wilson kindly sorted out computer problems.

Am I still on? Hi to the folks back home; mum, dad and Greg. Hi Jesse and Dawn. Thanks to the people who wined and dined me, Tova, Maya and Wayne, Lisa, David and Alice.

For all the good times... Debbie Satz, Peter Sells, Peggy Speas.

This thesis is dedicated, Xmax, to Janet Neilson.

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Chapter 1

Introduction

We begin by giving a brief overview of the thesis. We then present the approach to syntax taken by Government-Binding theory. The main purpose of this second section is to fix the rules and principles which we will use in the thesis. We define the fundamental notion of government, formalize a notion of 'bar-projection', incorporating X-bar theory, and formalize theta-assignment as a coindexing relation. In the third section we discuss some of the special properties of words, in particular the bar-projection relations in words.

1.1 Introduction

This thesis merges two lines of research. We are concerned with the nature of phrase structure - the constraints which hold syntactic constituents together, and we are also concerned with the difference between structures which are built in the lexicon and structures which are built in the syntax.

Problems of phrase structure have always been a central concern of linguists. Since Chomsky (1970) there have been increasingly wide-ranging accounts of phrase structure

which place the emphasis on very general well-formedness constraints on structural relations rather than specific rewriting rules. Working in the EST framework [1], Jackendoff (1977) proposed that phrase structure rewriting rules could be made non-category-specific; Stowell (1981) showed that rewriting rules could be simplified even further, with many conditions on syntactic structure being stated in terms of the theory of abstract Case.

In this thesis we extend Stowell's use of Case theory as a constraint on syntactic structures. For Stowell, Case theory was a constraint on head-complement relations when the complement was an NP. We extend Case theory such that it becomes a constraint on head-complement relations also when the complement is an AP or VP or PP; we will use it to account also for the structural locations and internal phrasal structure of modifiers; we will suggest that the predicate-subject relation should be thought of in terms of Case theory.

The distinction between syntactic constructs and lexical constructs was first made by Chomsky (1970). The basic idea is that structures can be built in one of two places - in the syntax or the lexicon. The constraints which hold on structures in the syntax are not the same as the constraints which hold on structures in the lexicon. Structures built in the syntax must obey certain conditions - the Projection Principle, visibility conditions, and so on - which do not hold for lexical structures. We discuss words - both affixed words and compounds - which are constructed in the syntax. Here the two strands of the thesis come together;

1. A similarly radical account of structural relations, outside an EST framework, is provided by Hudson (1976).

we suggest that one of the crucial factors that makes a word syntactic is that it is internally Case-marked. The syntactic affixes are in general Case-markers.

Thus we first (chapters 2 and 3) discuss certain conditions on syntactic representations, and then (chapters 5 and 6) examine words whose internal structure meets those conditions.

In chapter 2 we discuss NPs and verbs and their inflectional affixes. In chapter 3 we discuss adjectives and prepositions, and the Case-marking which involves them. In chapter 4 we discuss synthetic compounds, and also consider the problem of the syntactic or lexical nature of adjectival passive. In chapter 5 we discuss derivational affixation which might take place in the syntax.

1.2 Syntax

1.2.1 Structural Relations

Given a list of primitive syntactic units - let us say lexical items - of a language, certain combinations of the primitive units are well-formed ('grammatical') for that language, and other combinations are ill-formed ('ungrammatical'). For example, "John ate the fish" is a well-formed sentence of English, while "fish the John ate" is an ill-formed sentence of English. We wish to predict which combinations are well-formed and which combinations are ill-formed; if we are able to make this prediction, we are on the way to discovering what the mind is doing when it judges a certain combination as ill-formed and another as well-formed.

We do not wish to determine grammaticality simply by

stating possible relations between the lexical items. This would be an unperformable task, as we would have to mention every possible combination involving every lexical item of the language.

Instead, we state well- and ill- formedness in terms of abstract descriptions of combinations of lexical items (annotated phrase-markers). These abstract descriptions are assigned to the combinations, largely based on specified properties of the lexical items.

The description is made up of nodes of different parts-of-speech and different bar-levels; assigned to these nodes are indices of various kinds, Case-features, theta-grids containing theta-roles, etc.

The types of relation which hold between the nodes which are syntactic constituents can basically be divided into four kinds: 'bar-projection', 'c-command', 'precedence' and 'adjacency'. In the next two sections we will discuss the relations of 'bar-projection' and 'c-command'.

1.2.2 bar-projection

In this section, we follow and adapt research by Chomsky (1970), Jackendoff (1977), on X-bar theory.

The structural description of a sentence consists of a 'skeleton' of nodes each of which is labelled with one of the parts of speech - verb, noun, adjective, preposition, adverb, INFL, COMP, determiner, conjunction. In addition to having a part-of speech label, the node has a 'bar-level' label, of which there are three, 0, ', and ". The node thus is assigned a composite label, consisting of the part of speech and the bar level; for example, labels for nodes are Adv", INFL', V⁰, etc.

Nodes which dominate only a lexical item are

normally $\circ$ nodes; $\circ$ nodes are what we call words. $\circ$ nodes may also be constructed in the syntax, when they dominate syntactically built affixed words and compounds. ' and " nodes are normally built only in the syntax

$\circ$, ', and " nodes are related by 'bar-projection', as defined below.

(1.1) BAR-PROJECTION

- (i) x may be a bar-projection of y if x and y agree in category and x is of the same bar level as y, or is one bar-level higher than y, where ' is higher than $\circ$, and " is higher than '.
- (ii) the bar-projection relationship between vertically adjacent nodes must be one to one

We define two nodes as being in a relationship of vertical adjacency if one immediately dominates the other.

We define a derivative notion, 'maximal projection'. The maximal projection of a node is the highest bar-projection of the node. A maximal projection may be of any bar level. A node may be its own maximal projection if it has no higher bar-projection.

The constraint on adjacent bar-projections, that they must be one to one, rules out bar-projections of eg the following kind:

(1.2)



We will have more to say about this constraint in section 3 of this chapter, when we discuss word structure, where the constraint is in some peril.

It has been proposed (Jackendoff 1977) that there should be another intermediate bar-level, additional to X' . It has also been proposed (Travis, forthcoming) that there is no

intermediate bar-level. These questions do not appear to be relevant for this thesis; as such, we retain the conservative and fairly commonly accepted hypothesis that there are ϕ , ψ , and χ .

As a notational convention, we will write XP instead of X" in many cases. X_{max} refers to the maximal projection.

We take S (the sentence node) to be the ϕ bar-projection of INFL ^{ϕ} , an abstract inflectional element, thus $S = \text{INFL}^{\phi}$. INFL may contain a bundle of features (tense, Case etc), referred to as AGR ('agreement').

1.2.2.1 Percolation

A bar-projection provides a path along which something may move. This movement up to and down from a bar-projection is called 'Percolation'. We may think of the constraint that "x may be a bar-projection of y if x and y agree in category" as being derived by making part-of-speech a feature which obligatorily percolates. Other things which we will claim percolate are (unmatched) theta-grids, and (unmatched) theta-roles, and (unmatched) Case features.

Percolation also takes place between a mother and a daughter which are not related by bar-projection; the only case of this which we discuss in this thesis is percolation of an external theta-role.

1.2.3 Government, and c-command

The notion 'maximal projection' is central to the definition of the relations of c-command and government. Our account of these relations is based on Aoun and Sportiche (1983).

C-command and government differ from bar-projection

in being relations which may, other conditions being satisfied, hold between x and y , where x is not y and does not contain and is not contained by y . (On the other hand, bar-projection is an identity or containment relationship). Thus while bar-projection is a 'vertical' relationship, c-command and government are 'horizontal' relationships, which are defined not in terms of precedence or adjacency, but in terms of structural relations. The point is roughly that any two nodes may be in a c-command or government relationship, except that a maximal projection acts as a barrier. C-command and government differ in whether a maximal projection is always a barrier; roughly (continuing our up-down image of a structural description of a sentence, where the root S node is at the top), a maximal projection is always an upward barrier, but is a downward barrier only to government.

We define these notions below.

(1.3) **C-COMMAND**

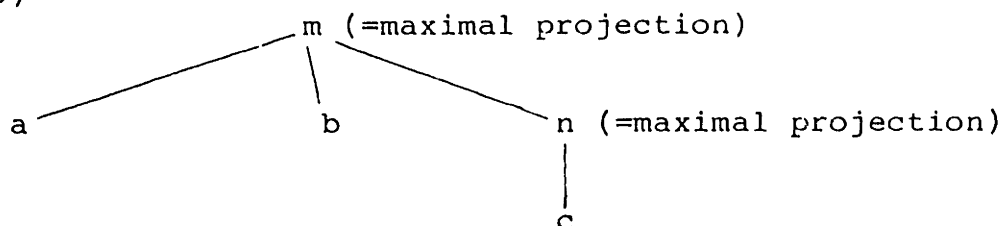
" x c-commands y " = every maximal projection that dominates x also dominates y

(1.4) **GOVERNMENT**

" x governs y " = every maximal projection that dominates x also dominates y , and every maximal projection that dominates y also dominates x

We illustrate these notions below:

(1.5)



m is not c-commanded, and does not c-command
 m is ungoverned, and does not govern

a, b, and n c-command each other
 a, b, and n govern each other

c is c-commanded by a, b, but does not c-command
 c is ungoverned, and does not govern

The relationship between c-command and government is "x governs y = x c-commands y and y c-commands x". Aoun and Sportiche say, "in a sense, government is the symmetrized version of c-command".

Our definition of c-command is the same as that of Aoun and Sportiche (1983, p.228). However, our definition of government differs from theirs in that we do not specify anything about the governor. Aoun and Sportiche's definition (slightly reworded for the purpose of exposition) is as follows:

(1.6) Aoun/Sportiche's definition of government (p.228):

x governs y iff
 (i) x is an X^0 (+AGR, if $x = \text{INFL}^0$), $y = Y$,
 and
 (ii) every maximal projection that dominates x also dominates y, and every maximal projection that dominates y also dominates x

We have discarded clause (i) of Aoun and Sportiche's definition, for the following reasons. First, we allow government of an X^0 node, which their definition does not.

Second, we take it that a predicate governs its subject; a predicate is normally an X", and Aoun and Sportiche do not allow X" to govern. Third, a moved NP governs its trace, in a sentence like 'Who [t left]'; this is known as 'antecedent government'.

A problem for our formulation, however, is that PRO will be governed, because it is the subject of a predicate. In some versions of Government-Binding theory (eg Chomsky 1981), PRO must not be governed. PRO must not be governed because it is both a pronominal and an anaphor, and so by the Binding Theory (Chomsky 1981, p.188), PRO must be both bound and free in its governing category - these are contradictory requirements, and the solution is to say that PRO has no governing category, which can be derived if PRO is not governed. However, as we have seen, our definition of government makes PRO governed. Thus we must use a slightly different definition of government for the purpose of defining a governing category - a governing category would be defined not in terms of government, but in terms of government by V^0 , P^0 , N^0 , A^0 , or tensed $INFL^0$.

We have not stated government and c-command in terms of precedence. However, certain relationships based on government, such as Case-matching and theta-matching, will be stated using precedence.

1.2.4 Theta-assignment

An argument-taking lexical item is an open function which requires arguments of specific semantic types to satisfy it. In Government-Binding theory we represent this syntactically as follows. (The use of coindexing follows Rouveret and Vergnaud (1980), p.161; Stowell (1981), p.382; see also Jaeggli (1982))

1.2.4.1 The theta-grid

An argument-taking node carries a 'grid' of theta-roles. This grid is lexically associated with X^O . The grid of theta-roles consists of a list of theta-roles, each of which may be marked as 'optional' (we indicate this by placing the role in () brackets), and one of which may be marked 'external' (we indicate this by a symbol '-E'). A theta-role is a semantic relationship of one of the following kinds: agent, source, theme, goal, experiencer, proposition, location at, location to, instrument, time at (etc.). A grid may not contain two identical roles (eg two agents). Some sample verb theta-grids are:

(1.7)

GIVE
agent-E
theme
goal

(1.8)

EAT
agent-E
(theme)

(1.9)

HIT
agent-E
theme

1.2.4.2 Theta-assignment

Every role which is not optional must be assigned; this is called 'theta-assignment' and takes place as follows.

(1.10) **THETA-ASSIGNMENT**

- (i) A theta-role T is assigned to a node Y when T and Y are theta-indexed.
- (ii) Y may be theta-indexed with a theta-role T when T is part of a grid associated with X and X governs Y.

If Y and T are theta-indexed, they form a theta-chain.

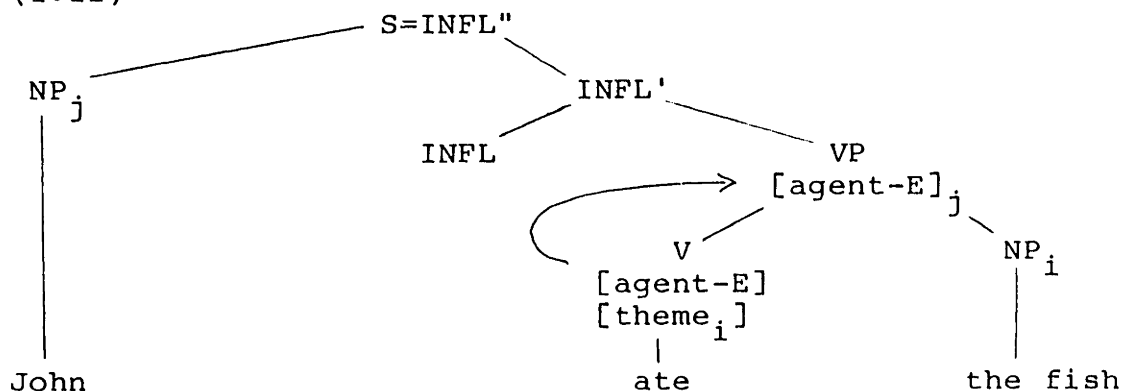
Theta-roles may be assigned by a node of any bar level; the grid is lexically associated with X^0 , however, and only one role in the grid may percolate to a bar-projection of X^0 . The purpose of the marker -E is to indicate which role in the grid may be percolated to a bar-projection of the node carrying the grid. Thus consider the following sentence:

(1.11) [[John] [[ate] [the fish]]]

In this sentence, 'ate' is lexically associated with a theta-grid; the role marked -E may percolate to the maximal projection of the V node dominating 'ate', and the other role must remain on V. The roles are matched in these positions.

The following example illustrates theta-assignment:

(1.12)



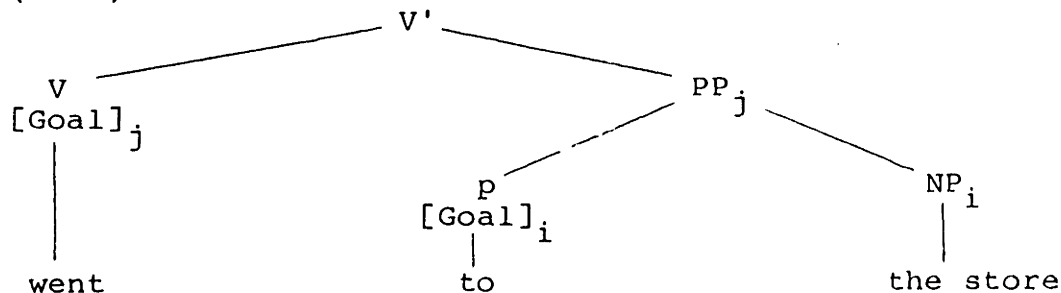
'Arguments' - the things which are assigned theta-roles - are maximal projections of N, and clauses. In addition, theta-assigners take PP complements, as in the following examples:

- (1.13) it was constructed [by unicorns]
- (1.14) I went [to the store]
- (1.15) The destruction [of the city]
- (1.16) a gift [to Mary]

While many PP complements should be construed as modifiers, because they are optional and not selected by specific lexical items, there are some cases (eg the above examples) of selected argument PPs. These are problematic, because it is not clear how theta-indexing takes place; does the PP get a theta-role? is there theta-indexing between the verb and the NP in the PP? We propose the following account of PP complements.

A theta-assigner may assign a theta-role to a PP. The preposition which heads the PP may assign a theta-role to an NP complement. If the PP is assigned a theta-role, that theta-role must be identical to the theta-role assigned by the preposition. Thus in 'went to the store' there are two theta-indexings, between 'went' and 'to the store' and between 'to' and 'the store'. We show this below:

(1.17)



Similarly, in 'constructed by unicorns', 'constructed' assigns agent to the PP 'by unicorns', and the P 'by' assigns agent to the NP 'unicorns'. 'Destruction of the city' we analyze by saying that theme is assigned to the PP 'of the city', and 'of' assigns theme to 'the city' [2].

2. This is a somewhat controversial claim; it is standardly assumed that 'of' has no thematic function, but exists only as a Case-marker. For arguments that 'of' assigns a theta-role, see Rappaport (1983), also Higginbotham (1983).

We formalize this agreement constraint as follows:

(1.18) P/PP ROLE AGREEMENT

If P carries a theta-role of type A, then if PP is theta-indexed, PP must be part of a theta-chain which carries a theta-role of type A.

1.2.4.3 'Compositional assignment' of the external argument?

We have said that the external argument originates as part of the theta-grid of the lexical item, where it is marked -E, and percolates to X_{max}, where it is assigned. We will now consider how our approach relates to the claim made in Chomsky (1981, pp.103-5) and Marantz (1981, pp.47-51), that the external theta-role is assigned 'compositionally' by the verb and its objects.

Chomsky points out that the theta-role assigned to 'John' in the following two examples differs depending on the composition of the VP; in the first example, 'John' is agent, and in the second example 'John' may be theme.

(1.19) John broke the window

(1.20) John broke his arm

How could we formalize this difference? It is difficult to see how the theta-role assigned to 'John' could be determined post-lexically, after constructing the VP - this would be a process which we can not deal with, given our approach to theta-assignment. Moreover, it would violate the Projection Principle (stated later in this section), which requires that argument structure is projected from the lexical entry. What we will instead say is that 'break' may be associated with different theta-grids. One theta-grid, that involved in 'John broke the window' contains agent-E and theme, and the other theta-grid, that involved in 'John broke his arm' perhaps

contains only theme (ie 'break' here is ergative, 'John' is theta-indexed with 'break', and 'his arm' is a secondary predicate of some kind, or possibly an anaphoric element.).

Marantz provides further examples to illustrate that a verb may assign different external theta-roles, (and in most of the examples below, also different internal theta-roles). These examples, some of which we give below, indicate that a verb may be associated with alternative theta-grids.

- (1.21) he threw a baseball
- (1.22) he threw a fit
- (1.23) he threw a party
- (1.24) he threw support behind a candidate

1.2.4.4 The external argument

The theta-role marked external in a theta-grid is optional, but must be assigned in just one situation - when the predicate projected from the node carrying the grid would otherwise not have a thematic subject. Consider the VP predicate in a clause. The subject of this VP might be a pleonastic element, or an argument of the verb. We stipulate that pleonastic elements are used only as a last resort (formulated as the principle 'Avoid Pronoun'); hence if the subject can be assigned a theta-role by the verb, it is assigned a theta-role by the verb. This will be the external theta-role. However, if the external theta-role is carried by a node which is not projected to a predicate, as in an NP, or the subject of the predicate gets a theta-role by some other means than direct theta-assignment, as in passive, then the external theta-role of the verb need not be assigned. If it is assigned, the external theta-role may be assigned through a preposition, eg 'by', or to the specifier position of an NP.

To summarize - the theta-role marked -E in a

theta-grid is understood to be optional. It must be assigned only when required to by the principle 'Avoid Pronoun'.

1.2.4.5 The Theta-Criterion

Constraints on theta-indexing are expressed by the 'Theta-Criterion', which we state as follows.

(1.25) **THETA-CRITERION**

- i) a role may be theta-indexed with at most one node
- ii) an argument must be theta-indexed

Some versions of the theta-criterion have another clause, stating "a node may be theta-indexed with at most one role". However, this appears to be too strong, as (a) a single node may be assigned more than one theta-role by different modifiers, as in "the old grey horse", where 'horse' is assigned one theta-role by 'old' and another by 'grey'; and (b) a secondary predicate may assign a theta-role to a node assigned a theta-role by a primary predicate, as in "John hammered the meat flat", where 'the meat' gets a theta-role from the primary predicate 'hammered' and also a theta-role from the secondary predicate 'flat'. Hence we do not include this clause in our statement of the theta-criterion.

1.2.5 Predication

Predicates are one place functions. The subject of a predicate is the argument which saturates the function (for discussion, see Rothstein (1983)). Predication is a syntactic relation (it may hold between a predicate and a 'pleonastic' subject which has no semantic content), and is independent of theta-assignment.

Predicates are maximal projections which are not

themselves assigned theta-roles. Rothstein suggests that a maximal projection must be either an argument or a predicate. We formulate the following conditions on predication, based on Rothstein's, without incorporating her specification of directionality.

(1.26) PREDICATE-LINKING

- (i) X may be predicate-linked to Y where X governs Y.
- (ii) Every non-theta-indexed XP must be predicate-linked at S-structure.

Rothstein distinguishes between primary predicates and secondary predicates. Primary predicates form a clausal (headed by INFL) or small clausal (a bar-projection of the predicate) constituent with their subject; this predicate+subject constituent is denotative, and can refer to propositions, events, facts, etc. Secondary predicates have as their subjects (a) non-maximal projections, which are not the subjects of primary predication, or (b) arguments which are independently assigned a theta-role, either by virtue of being a subject of a primary predicate, or by virtue of being an internal argument. Adjunct predicates do not form a constituent with their subject. Examples of primary and adjunct predicates follow ([] brackets the predicate, ' ' brackets the subject):

PRIMARY:

- (1.27) 'he' [ate the chicken]
- (1.28) 'I' [am happy]
- (1.29) I saw 'John' [leave]
- (1.30) I consider 'John' [a fool]
- (1.31) 'Johns' [leaving]

SECONDARY:

- (1.32) John eats 'carrots' [raw]
- (1.33) 'He' arrived [tired]
- (1.34) they painted 'the house' [red]
- (1.35) the [happy] 'man'

[3]

The subject of a VP predicate has a theta-role in all but a few cases. This is forced by the 'Avoid Pronoun' principle, which makes pleonastic (without theta-roles) pronouns highly marked. 'Pleonastic' subjects are found only with verbs which can not assign a theta-role to the subject position, such as 'seem':

(1.36) 'it' [seems that John is not here]

The subject-predicate relation is thus not a theta-relation. However, the subject often has a theta-role.

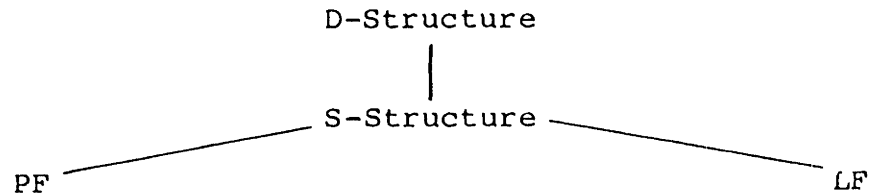
1.2.6 Levels of representation

In this section we will present the claim made by Government-Binding theory that a given surface string is associated with several different but related structural descriptions.

We say that a syntactic combination has four representations. These are (a) its PF (Phonetic Form) representation, which is the interface with the production/reception system; (b) its D-structure representation, where the argument structure in terms of matched theta-roles is represented; (c) its LF (Logical Form) representation, where scope is represented - we might call this the interface with the conceptual structure; (d) an intermediate representation, S-Structure. The four representations are represented diagrammatically as follows:

3. We will suggest that some of Rothstein's secondary predicates are actually controlled clauses.

(1.37)



The representations differ from each other in several ways, eg (a) the order of constituents, (b) co-indexing relationships, (c) we discuss the S-Structure PF mapping in chap.5.

1.2.6.1 Differences in the order of constituents

We will first consider an example of a difference between levels in the order of constituents. D-Structure is a representation of argument structure with all arguments in place; that is, the theta-criterion as we have defined it must hold at D-Structure - every argument node must be assigned a theta-role. However, the PF output is not directly fed by the D-Structure. The following example is a well-formed D-structure, as the internal theme argument is governed by the theta-assigner; however, this is not an acceptable PF form:

(1.38) [] was eaten the fish by the man

In order to make this D-Structure into a grammatical PF, the NP 'the fish' must be moved to the initial position:

(1.39) the fish was eaten by the man

We will see in chap.2 that the reason that 'the fish' must be moved is that if it was not moved it would violate a 'visibility' condition at S-Structure.

Another example of a difference in constituent order can be shown in the following PF example:

(1.40) every man loves a woman

This sentence is ambiguous; it may mean that there is just one woman who is loved by all the men, or it might mean that for every man there is a woman (not necessarily the same one) that he loves. This ambiguity is represented by saying that there are two sentences, which sound the same (ie are identical at PF), but have different representations at LF. The different representations are:

(1.41) a woman y , every man x , x loves y

(1.42) every man x , a woman y , x loves y

Thus at LF the constituents differ in order (indicating their relative scope), and the LF representations of both differ from their PF representations.

The difference in order between representations is derived by a rule 'move alpha', which moves any constituent, and is subject to certain well-formedness conditions.

1.2.6.2 Move alpha

Move-alpha moves a constituent, leaving behind a trace, which is coindexed with the moved constituent; we say that the moved constituent 'binds' the trace. The trace and moved item form a chain. If the item is moved to a position which is characteristically assigned a theta-role (ie is governed by a node which is at least sometimes a theta-assigner, such as VP or V), the chain is called an A-chain ('Argument-chain', because the position is an argument-position). If the item is moved to a position not assigned a theta-role eg an adjoined position, or COMP, the chain is called a Non-A chain (Non-argument chain/A-bar chain).

There are several constraints on the construction of chains, only two of which are directly relevant to this thesis. These two constraints are as follows:

(a) We specify that an argument chain (and also a non-argument chain) must contain one and only one theta-indexed node.

(b) a locality constraint derived from Binding Theory, which requires that a trace bound from an A-position (that is, a trace which is an anaphor) must share a 'Governing Category' with its binder. This means that the trace and its binder must be contained within the smallest projection that contains the trace, a governor of the trace, and an appropriate nominal element (the 'SUBJECT' in a very specific sense). (For further discussion, see Chomsky (1981), p.211ff).

(c) A constraint which states that the trace must be 'properly' governed, which is defined as being governed by an V^0 or P^0 (possibly also by A^0 or N^0), or by an antecedent.

1.2.6.3 Constraints on the relations between levels

An important constraint is the Projection Principle, which states that the theta-criterion must be met at every syntactic level (ie S-Structure, D-Structure, LF, but not PF). This means that if an argument is moved from a position where it is assigned a theta-role, it must be linked by a chain to that position. In fact, the Projection Principle as we will state it is stronger than this; it requires not only that argument structure be satisfied at every level, but also that a theta-grid must remain exactly as it is specified in the lexical entry of the lexical item where it originates. That is, a role may not be optionalized or deleted or assigned some special feature by any constituent in the syntax. This strong

version of the Projection Principle is stated as follows (Chomsky, 1981 p.29):

(1.43) THE PROJECTION PRINCIPLE

Representations at each syntactic level (ie LF, and D- and S-Structure) are projected from the lexicon, in that they observe the subcategorization properties of lexical items.

By 'subcategorization properties' we understand 'theta-grid'. Following Stowell (1981, p.29), we state subcategorization properties in terms of the theta-grid of a lexical item. Thus we may restate the Projection Principle in terms of the theta-grid, as follows:

(1.44) THE PROJECTION PRINCIPLE (revised)

Representations at each syntactic level (ie LF, and D- and S-Structure) are projected from the lexicon, in that they satisfy the theta-grid of lexical items.

1.3 Word formation

1.3.1 Word formation

Words (nodes of o level) are formed in the following ways.

(a) a word combines with another word (to form a compound).

(1.45) trigger-happy, gun-smith, love-boat, sun-rise

(b) an affix (suffix or prefix) combines with a word to form a word. An affix differs from a word in that the affix is bound; that is, the affix may not head a phrase, and obligatorily selects for a word of a specific type, and/or a

root either to the right or to the left.

(1.46) en-close, clos-ing, brother-hood, rudiment-ary

(c) a suffix or prefix combines with a root to form a word. Roots resemble affixes in that they are unable to head a phrase. We distinguish roots from affixes in that roots are manifested in a very few words, while affixes are found in many words.

(1.47) malle-able, li-able, seg-ment, grate-ful

We will argue in this thesis that many types of (a) and (b) words are formed in the syntax.

1.3.2 Bar-projections in a word

1.3.2.1 A revision of the bar-projection rule

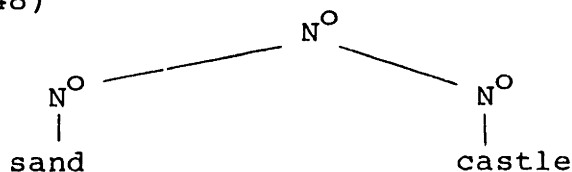
Words present a problem for our Bar-projection rules, reproduced below.

(1.1) BAR-PROJECTION

- (i) x may be a bar-projection of y if x and y agree in category and x is of the same bar level as y, or is one bar-level higher than y, where ' is higher than o, and " is higher than '.
- (ii) the bar-projection relationship between vertically adjacent nodes must be one to one

Consider, for example, a compound like 'sand castle'. This has the following structure:

(1.48)



By clause (i) of the bar-projection rule, the mother node is a bar-projection of both of the daughter nodes, as both daughters agree in category and bar level with the mother. However, this violates clause (ii) of the bar-projection rule, as the bar-projection relationship between vertically adjacent nodes is not one-one; the mother is vertically adjacent to two daughter nodes.

Clause (ii) thus requires us to pick out one daughter as being in a bar-projection relation with the mother, and specify that the other daughter is not in a bar-projection relation with the mother. Thus we must supplement clause (i) of the rule.

The supplementary condition comes from Williams (1981, p.248), who proposes a 'Righthand Head Rule' ('RHR'): "we define the head of a morphologically complex word to be the righthand member of that word". We do not use the term 'head', but we may simply adapt this rule, as:

(1.49) "Restated RHR"

- (a) Only one daughter of X^0 may be non-maximal
- (b) The righthand daughter of X^0 is non-maximal

Only a non-maximal bar-projection can be in a bar-projection relationship with the node which dominates it; as such, clause (a) will restrict clause (i) of the bar-projection rule, such that a compound may not violate clause (ii) of the bar-projection rule.

Consider again example (1.48); the restated RHR requires that the N^0 'sand' be maximal. This is an example of a 0 level node being its own maximal projection. These non-heads in compounds are like phrasal maximal projections in that they may be freely associated with a Case feature (see chap.2), and may be assigned a theta-role (see chap.4).

We split the right-hand head rule of Williams into

two clauses, (a) and (b), because (a) is inviolable - a word node is never projected from two nodes -, while (b) has exceptions.

Two kinds of exception to (b) are: First, a few compounds in English are not projected from either daughter, as we see from the fact that there is no agreement of part-of-speech. We give some examples below. Similarly, some prefixed words are projected from the prefix (the lefthand node), as we see from the fact that the prefix determines part-of-speech eg words in en-, examples given below:

(1.50) [sun_N-rise_V]_N, [off_P-color_N]_A

(1.51) [en-close_V]_V, [en-dear_A]_V, [en-chain_N]_V

The right-hand head rule applies at least to English. It is not clear whether it is a universal rule. (For some additional discussion, concerning the righthand head rule in Japanese, see Namiki (1982)).

We will now restate the Bar-projection rule, incorporating these revisions.

(1.52) **BAR-PROJECTION (revised)**

- (i) **x may be a bar-projection of y if x and y agree in category and x is of the same bar level as y, or is one bar-level higher than y, where ' is higher than o, and " is higher than '.**
- (ii) **Only one daughter of X^o may be non-maximal**
- (iii) **The righthand daughter of X^o is non-maximal**
- (iv) **the bar-projection relationship between vertically adjacent nodes must be one to one**

1.3.2.2 The status of affixes

Suffixes in general, and occasionally prefixes, project to an X^o node. By the bar-projection rule, this means that they must either be themselves of bar level o, or (as

proposed by Selkirk (1982)) are of a level lower than σ . We will assume the former; that affixes are of σ level.

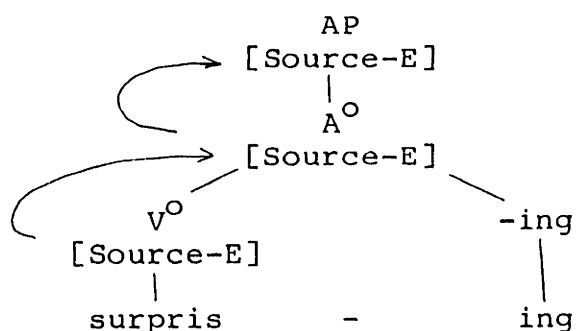
We will see that affixes are like words in that they may be assigned theta-roles, may assign Case, and so on.

1.3.2.3 Percolation inside a word

A feature may percolate from X to a bar-projection of X; for example, from an affix to the word node. Thus part-of-speech percolates from the affix to the word.

Features associated with a stem may also percolate to the mother, despite the fact that the stem is not in a bar-projection relation with the mother node. The only example of this that we will discuss is percolation of the external theta-role. The external theta-role, part of the theta-grid of a verb stem, may be percolated out of a derived word, and up to the phrase level:

(1.53)

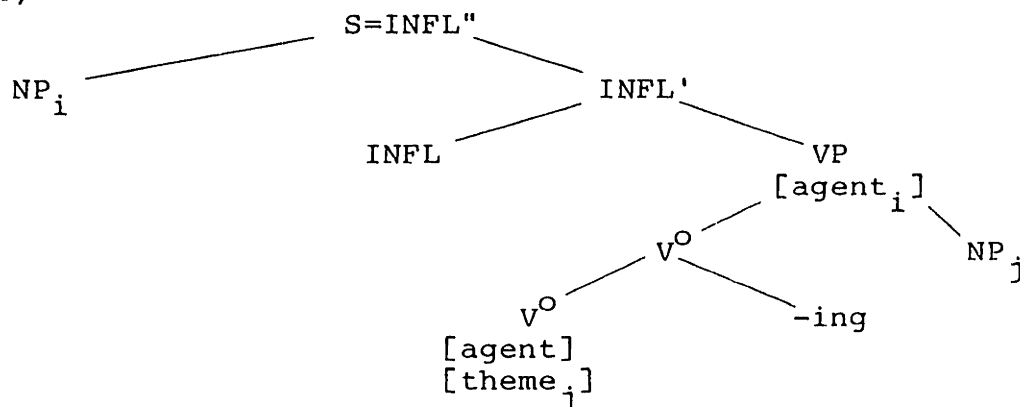


Here, the A node is not a bar-projection of V; nevertheless, the theta-role [Source-E] may percolate from V to A.

There is no need for internal theta-roles to percolate from a V stem to a derived word, as they may be assigned directly from the V stem to any position inside the phrase; no maximal projection intervenes. For example, consider an inflected verb 'eat-ing'. The external theta-role

(agent) associated with 'eat' will percolate from the stem up to the VP node; the internal theta-role 'theme', however, may be matched with an NP object in the VP without being moved from the stem:

(1.54)



1.3.3 Syntax and Lexicon, preliminary remarks

It is often assumed that the division between syntax and lexicon may be stated as follows:

Constituents of o level are constructed in the lexicon; constituents of ' and " level are constructed in the syntax.

We contest this claim, that word-formation takes place only in the lexicon. We suggest (following eg Dowty (1979)) that productive and regular word-formation processes are generally syntactic processes, while derivations whose output must be listed take place in the lexicon. Thus we emphasize the lexicon's status as a list.

In this thesis, we will distinguish lexical and syntactic word-formations by the following signs.

Signs of a syntactic word-formation process:

the process is productive
the output is predictable in all its properties

the process takes syntactic constituents as its input
syntactic relations (eg theta-indexing and Case-indexing)
hold between the parts of the word. Crucially, the
word does not violate the Projection Principle.

Signs of a lexical word-formation process:

aspects of the output must be listed
the output undergoes lexical processes

We will return to the issue of the distinction
between the syntax and the lexicon in chap.5.

Chapter 2

Inflection and Case theory

In section 1 we discuss a condition on overt NPs which are arguments, that they have to be in lexically selected, 'Case-marked' positions at S-Structure. In the second section we extend this condition to verbs which assign theta-roles - these, too, have to be in lexically selected, Case-marked positions; we introduce a notion of Case for verbs. In section 3 we consider the fact that verbs and NPs share an inflectional suffix, -s, and consider the similarity in function of verbal and nominal -s.

2.1 The 'Visibility' of NPs

2.1.1 *NP positions

In chapter 1 we saw that some D-structure configurations may not be directly realized as S-Structure (and then PF) configurations; an NP must be moved from a position P_1 where it is assigned a theta-role to another position, P_2 . We show some examples of this below, giving (a) the D-structure, with the NP in P_1 , then (b) the ungrammatical S-structure with the NP in P_1 (the S-structure in these examples can not be improved by adding a pleonastic subject),

and then (c) the grammatical S-structure, after the NP has been moved to P_2 .

- (2.1) (a) [] seems John to have left
 * (b) (it) seems John to have left
 (c) John seems t to have left

- (2.2) (a) [] was washed Patty
 * (b) (it) was washed Patty
 (c) Patty was washed t

In both cases, P_2 is the subject position of a tensed sentence; P_1 is the subject of a tenseless sentence in the first example, and the object of a passive verb in the second example.

We can generalize, to say that (in English) the first object of a passive verb is never overtly realized after the verb. The subject of a tenseless sentence can be overtly realized (in place) in some cases, but not in others, as we see below:

- (2.3) * [**John** to leave] was stupid
 (2.4) [for **John** to leave] was a good idea
 (2.5) I believed [**John** to have left]

The key to this distribution is the governor of the NP. An NP governed by an active verb may remain in place, but an NP governed by a passive verb must move. An NP which is governed by a tensed INFL (ie the subject in a tensed sentence) may remain in place, but an NP which is governed by a tenseless INFL (ie the subject in a tenseless sentence) must either move, or be governed (across $S=INFL$) by 'for' or 'believe' (or certain other active verbs). If an NP moves it must move to a position which is governed by tensed INFL, or 'believe' etc, or 'for'.

We capture this by saying that the governed domain of certain types of X^0 is a domain in which NP is 'visible',

and NP must be visible at some level after D-Structure. Hence if an NP is generated at D-Structure in a position where it is not visible, it must be moved by move-alpha to a position where it is visible.

The kind of X^0 whose governed domain is a visible position for NP are active verbs, prepositions, the complementizer 'for', tensed INFL. The governed domain of nouns, adjectives, tenseless INFL, is not a visible position for NP.

2.1.1.1 Government across S

Note that this requires an extension of government. By our definition of government, government across a maximal projection is ruled out. However, we wish to allow 'for' to govern across S (=INFL"), and 'believe' also to govern across S.

In fact, government across S is required also for antecedent-government, where an NP moved into COMP must govern its trace across an S boundary.

Thus we must add a rider to the definition of government, that S=INFL", despite being a maximal projection, is not a boundary for government.

2.1.2 'Having Case' and visibility

2.1.2.1 Case theory

We say that NPs are visible when they are assigned Case. A visible position is a Case-assigned position, and an X^0 that creates a visible position is a Case-assigner. We will now make a preliminary formulation of Case-assignment.

(2.6) Case-assignment (1):

An overt NP is assigned Case when it is governed by active V^O , P^O , INFL (+tense), or the complementizer 'for'.

(2.7) The Case-requirement:

An overt NP must be assigned Case at some level (not D-Structure).

2.1.3 Case-matching and passive

2.1.3.1 A second version of Case-assignment

As our theory stands, an NP has Case if it is in a particular position. We will propose a stronger requirement, which is that the NP has to carry a feature 'Cn' which is coindexed ('matched') with a feature 'Cn' on the Case-assigner; when coindexation takes place, the NP has Case.

Thus a Case-assigner, such as the verb 'eat', is able to assign nominal Case because it is lexically associated with a feature Cn. Thus Case-assigners will be lexically assigned one or more Cn features, depending on how many NPs they can Case-mark.

Any NF may be assigned Case; in fact, more specifically any Nmax may be assigned Case, as N^O which are maximal projections are assigned Case in compounds (see chapter 3). We capture this by introducing a rule by which a Cn feature may freely be associated with any Nmax:

(2.8) Cn ASSOCIATION

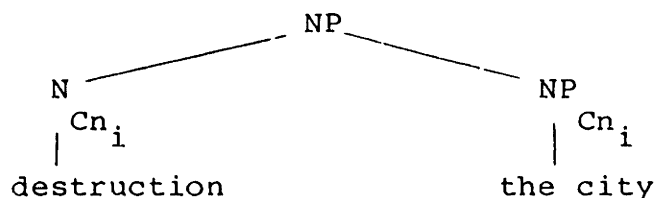
Associate Cn with Nmax

This rule must be a syntactic rule, as Nmax are constructed in the syntax.

Note that Cn is not freely associated with a non-maximal N^O . If this occurred, a noun would be able to assign nominal Case, which does not happen:

(2.9)

*



We formalize this Matching approach to Case, and give a second definition of Case-assignment, as follows.

(2.10) Case-assignment (2):

An overt Nmax is assigned Case when

- (i) it is governed by an X^O node, and
- (ii) the Nmax carries a Cn feature which is coindexed with a Cn feature on the X^O governor.

We will argue for this version of Case-assignment. It will allow us to state a one-one restriction on Case matching, which is that a C feature may be matched only once; this restriction will allow us to explain why a given Case-assigner may assign Case to only a certain number of arguments, and will also provide us with a neat account of 'Case-absorption' in passive.

We state the restriction as follows:

(2.11) One-one restriction on Case

A Cn feature may be matched with only one other Cn feature

2.1.3.2 A C feature may be matched only once

The following example shows that a C feature may be matched only once:

- (2.12) I gave [him] [a book]
 (2.13) * was given [him] [a book]
 (2.14) [He] was given [a book]

As we will show in the next section, English passive morphology 'absorbs' (makes unassignable) one Cn feature on the verb. The verb 'give' has lexically two Cn features. Thus in the active sentence, both 'him' and 'a book' are assigned Case. In the passive sentence, however, the verb loses a Cn feature, and so 'him' does not have Case, and so must move, but 'a book' does not move, which indicates that it does have Case. Thus the passive verb is able to assign Case to one NP; that is, the passive verb carries one Cn feature which is matched with the NP's Cn feature. If there was not a one-one matching requirement, the Cn feature on the passive verb could be matched also with the NP 'him':

- (2.15) [He] was given [a book]
 Cn_i Cn_i
- (2.16) * was given [him] [a book]
 Cn_i Cn_i Cn_i

Conjunctions however present a possible problem for the one-one matching requirement, in that conjoined arguments may each be assigned Case by a single Case-assigner, as in the following examples:

- (2.17)
 I ate [the fish] and [the chicken]
 Cn_i Cn_i Cn_i

(2.18)
 I believe [John to be home] and [Harry to be away]
 Cn_i Cn_i Cn_i

Thus we must make conjunctions exceptions to the one-one requirement. This might be because conjunctions are represented not linearly, but vertically to the syntactic string, 'three dimensionally', as suggested by Goodall (forthcoming); we would then state the one-one requirement in terms only of linear strings.

2.1.4 Passive and 'Case-absorbtion'

2.1.4.1 The three -en suffixes

We will now show that our Case-matching approach gives an interesting account of the Case-absorbing properties of the suffix -en.

Verbs of the form V+en are participles, either active or passive; in addition, there are V+en (passive) adjectives.

ACTIVE PARTICIPLE:

- (2.19) I have slept
- (2.20) I have departed
- (2.21) I have envied him
- (2.22) I have broken it

PASSIVE PARTICIPLE

- (2.23) He was given a book
- (2.24) It got broken

ADJECTIVAL PASSIVE

- (2.25) the toy seems broken
- (2.26) the shattered dreams

We will examine the active and passive participles here, and return to the adjectives in chap.4.

For a given verb, the active, passive and adjectival

passive (if the verb has all these forms) are identical, even in suppletions. This suggests that the three -en suffixes are related in some way (though they also differ; one -en suffix forms an active, another a passive, and the third an adjective). We will argue that they have the same properties with regard to Case. This is a significant claim, because the active participle assigns Case, while the passive participle does not. Thus, for example, the verb 'break' assigns an internal theta-role; the active -en participle may be followed by an overt NP, but the passive -en participle may not:

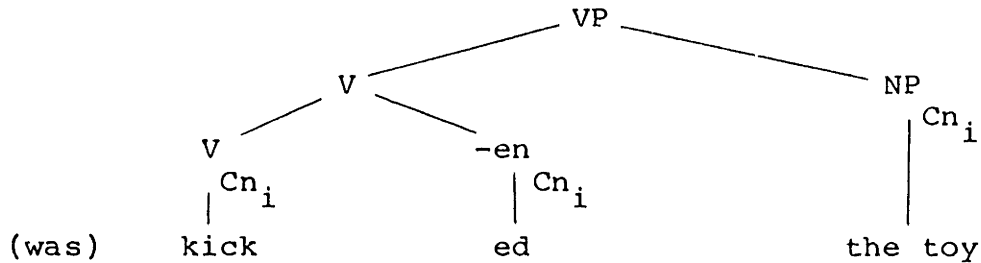
- (2.27) break the toy
- (2.28) have broken the toy
- (2.29) * is broken the toy

More specifically, the active participle assigns all the Cases which it is lexically specified to assign, while the passive participle assigns one less Case than it is specified to assign. Thus a verb which assigns two Cases when active will assign one Case when passive.

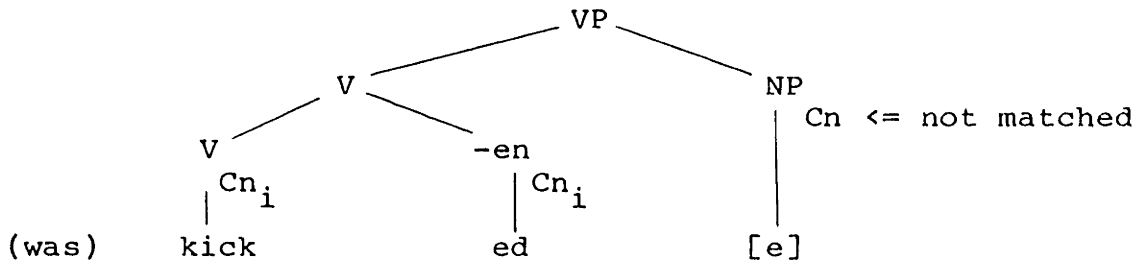
2.1.4.2 Passive V+en and Case

Why do passive verbs assign one less Case than the equivalent active verb? We suggest that -en makes a Cn feature on the verb unassignable, in the following way. -En is lexically associated with a Cn feature. Thus it is in a position where it may match Cn features with the verb stem, which it governs. By the one-one constraint on matching, the Cn feature on the verb can not also be matched with a Cn feature on an NP:

(2.30) * ..with NP matched



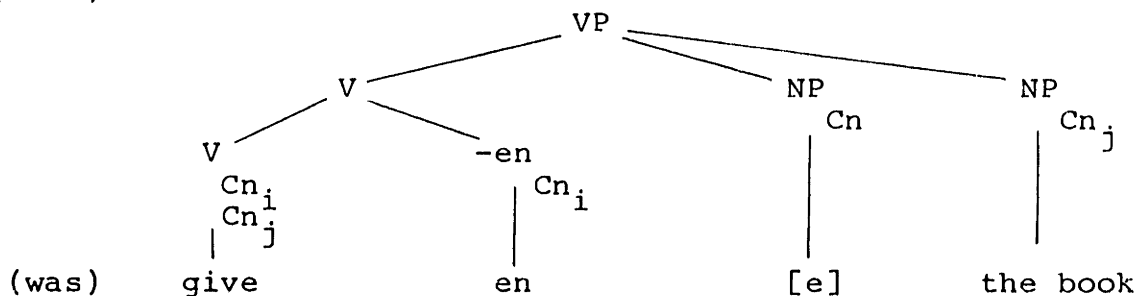
(2.31) ..with NP not matched, and so moved



This is how -en ('passive morphology') absorbs a Case-feature on the stem.

Note that if the stem is lexically associated with two Cn features (eg 'give'), one Cn feature may still govern/match with an NP, which is what we predict, as the affix has only one Cn feature, and so can 'absorb' only one Cn feature on the stem:

(2.32)



2.1.4.3 Active V+en and Case

Why is a Cn feature not absorbed in an active -en participle?

The active and passive participles are in complementary distribution; the active must be governed by (auxiliary) 'have', and only by 'have', while the passive is either governed by one of the following verbs: 'be', 'get', perception verbs, causative 'have', etc (but not auxiliary 'have'), or is ungoverned, as in an adjunct:

ACTIVE:

- (2.33) He has watched the pot
- (2.34) * He was watched the pot
- (2.35) * He saw the man watched the pot

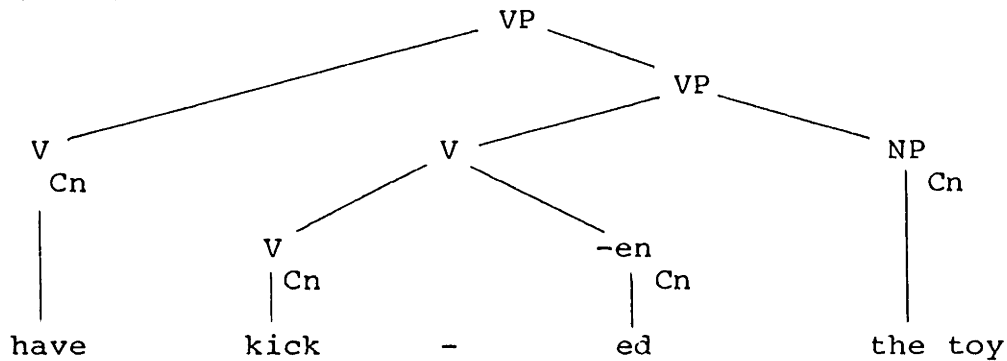
PASSIVE:

- (2.36) * The pot has watched by the policeman
- (2.37) The pot was watched by the policeman
- (2.38) The cooking got done
- (2.39) I saw the pot broken
- (2.40) I had the window cleaned
- (2.41) The watched pot

We suggest that a V+en participle is passive unless it is governed by auxiliary 'have', in which case it is active. We will deal with the aspectual difference between passive and active in section 2 of this chapter; we will now deal with the effect that 'have' has in restoring Case to the object NP.

The central idea is that 'have' is lexically associated with a Cn feature. This balances out the Cn features in the sentence, so that the object can be assigned Case.

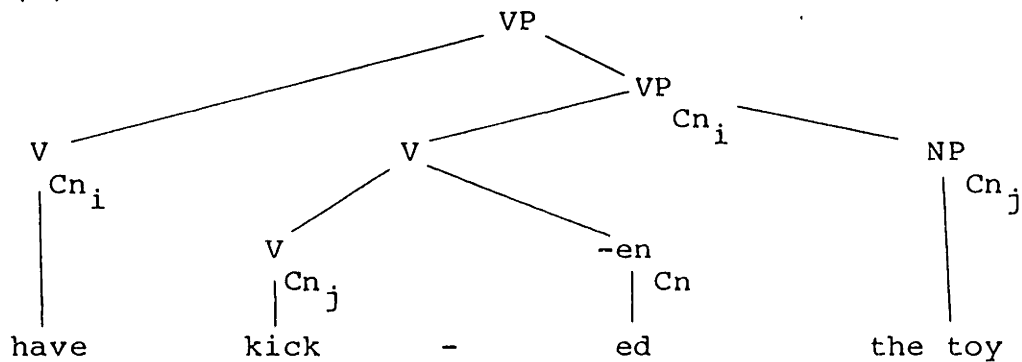
(2.42)



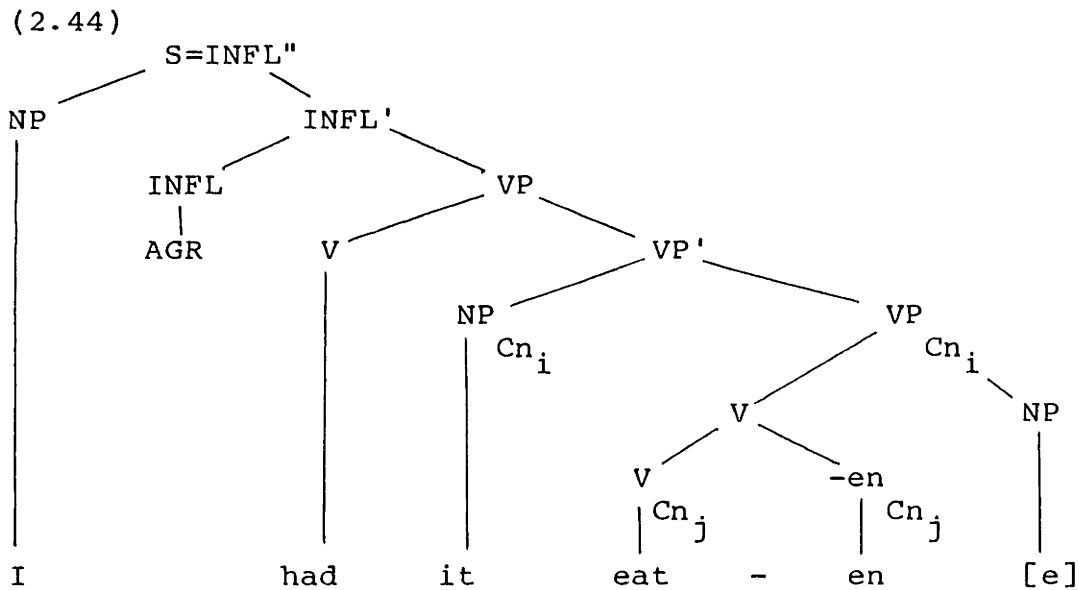
How does the Case-matching work here? 'Have' does not govern 'the toy', and so can not be matched with 'the toy'. Rather, 'have' is Case-matched with the feature percolated from the suffix to VP, and the Cn feature remaining on the stem is matched with the NP.

(2.43)

(a)



Note that causative 'have', like auxiliary 'have', is associated with a Cn feature, but here a V+en verb in the lower clause is not enabled to assign Case. The Cn feature is assigned not to the -en of the passive participle head of the complement clause of 'have', but to the subject of the embedded clause:



Thus we have suggested that auxiliary 'have' is able to restore Case because it is itself a Case-assigner. It is fairly natural that 'have' should have this property, as main verb 'have', which behaves like the auxiliary in some ways (eg in some dialects it can be inverted), is also a Case-assigner.

2.1.4.4 Preposition stranding

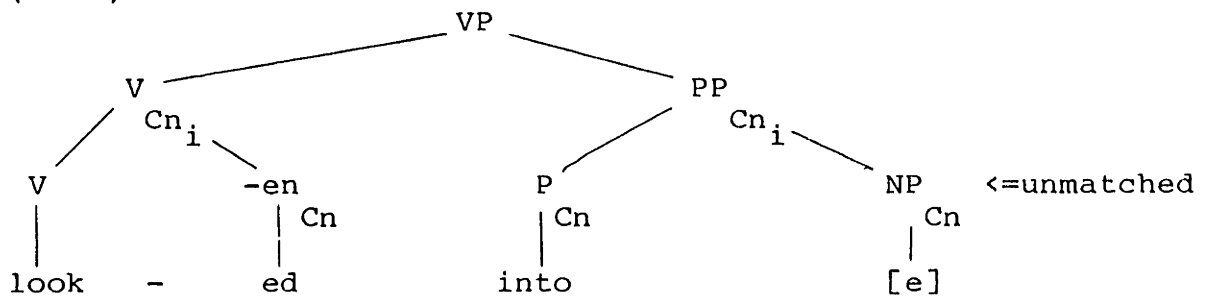
When a verb which takes only a complement PP is passive, the NP in the PP is deprived of Case, and must be moved, stranding the preposition. Our account of passive in terms of Case-matching will provide a neat account of this. Some examples are:

- (2.45) The children were read [to [e]]
 (2.46) I was looked [at [e]]
 (2.47) The bed was slept [in [e]] by many people

What is happening here is that the preposition has its Cn feature 'absorbed' by passive -en. The Cn feature lexically

associated with *-en* can not be matched with a Cn feature on the verb, as the verbs in these examples do not assign nominal case, and thus do not have a Cn feature. Thus the Cn feature is instead matched with the Cn feature associated with the P; thus this Case-feature can not be assigned by the P to the NP.

(2.48)



Our approach differs from the approach taken by Hornstein and Weinberg (1981), in that we do not use a rule which restructures the stranded preposition as part of the verb. We will see in chap.3 that the extraction differences between complement and adjunct PPs is not a consequence of reanalysis in the first case, but can be derived from the fact that adjunct PPs are embedded in control clauses.

2.1.4.5 Passive and Case-matching

Passive supports Case-matching, which involves a Case feature on both the assigner and the assignee. Possession of a Case feature means that the node in question could either be assigned Case or could assign Case. This is what we see in passive; the passive affix *-en* carries a Cn feature which may be linked with a governor, or may link with something which it governs. This Case feature can thus either be an assigner or an assignee feature.

2.1.5 The purpose of visibility

We have stated the following requirement.

(2.49) The Case-requirement: (repeated)

An overt NP must be assigned Case at some level
(not D-Structure).

We will now investigate why an overt NP must be assigned Case. There are two proposals in Chomsky (1981) as to the reason for Case. One is that Case makes an NP visible at PF; if an NP lacks Case it can thus not be overtly realized. The second proposal is that the Case-requirement is part of a larger requirement that arguments must be visible, and Case is a form (but not the only form) of argument-visibility.

For the most part, the two proposals overlap, as for the most part NPs are arguments and arguments are NPs. However, the proposals differ in some of their predictions, in that the PF visibility requirement claims that an NP which is not an argument must have Case, while the argument-requirement claims that an argument which is not an NP must have Case.

The PF visibility makes one right prediction, which is that pleonastic NPs must have Case. These NPs are (probably [1]) not assigned a theta-role, and so need not be assigned Case by the argument-visibility condition. However, pleonastic NPs must in fact be assigned Case:

(2.50) For [it to be true] would be a shame

(2.51) * [It to be true] would be a shame

We will return to this data in the next section, where we will

1. It was suggested in Chomsky (1981) that a pleonastic NP may form part of an argument chain, and for this reason needs Case

show that it can be handled without recourse to the PF filter.

The argument-visibility condition also makes a correct prediction. PPs in subject position which are assigned a theta-role must have Case:

- (2.52) For [under the stars] to seem the best place
to sleep, you have to be crazy
(2.53) * [under the stars] to seem the best place
to sleep, you have to be crazy

The argument-visibility condition also allows NPs which are not assigned a theta-role, eg NPs which are modifiers, to be without Case; these examples violate the PF visibility condition. Below, we see that 'the day before yesterday' and 'solid gold' are Caseless modifier NPs:

- (2.54) I saw him [the day before yesterday]
(2.55) The [solid gold] watch

Thus we see that the argument-visibility condition is a plausible one, but the PF visibility condition is problematic. We will show in the next section that pleonastic NPs fall under a different visibility requirement, relating to predication. As such, the PF visibility condition does no work for us, and so we will abandon it.

We state the argument-visibility condition as follows:

An argument chain must be visible. An argument chain is visible if one of its nodes is visible. A node is visible if it is Case-matched.

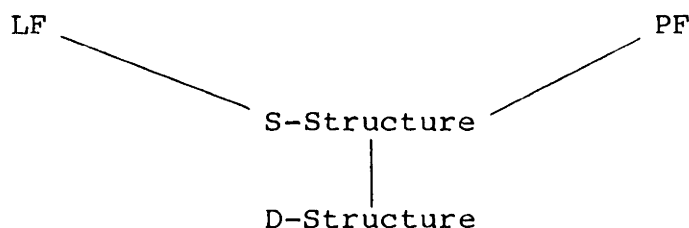
There is a phonologically empty NP 'PRO', which is never Case-matched; nevertheless, a chain consisting of PRO is visible. Thus we modify the last part of the condition to: "A node is visible if it is Case-matched or is PRO."

2.1.5.1 The level for argument-visibility

Arguments need not be visible at D-Structure. D-Structure is a pure representation of theta-relations, with arguments in the position where they are assigned theta-roles; these positions are not always visible positions, and hence the visibility condition does not hold at D-Structure. The following, for example, is a well-formed D-Structure, despite the theme argument not being visible:

(2.56) was seen [the book]

This representation can not be derived directly as a well-formed PF, which indicates that at some level after D-Structure, but before or at PF, the argument-visibility condition must rule it out. Consider the levels in the syntax:



At some point, NP movement changes (56) into the following:

(2.57) the book was seen [e]

NP movement takes place in order to satisfy the argument-visibility condition. If the argument-visibility condition applies at a particular level, NP movement must apply to produce a representation at that level.

If the argument-visibility condition held only for the LF representation, then movement need only take place between S-Structure and LF, and the S-Structure and PF

representations could be as in (56). This is not the case, however. We conclude that the argument-visibility condition does not hold only at LF, but must hold at least at S-Structure or PF.

If the argument-visibility condition held only at PF, NP movement need only take place between S-Structure and PF, and should be subject to very few constraints; the projection principle does not apply at PF, and so no trace need be left by movement, and hence NP movement would not be subject to the constraints of subadjacency and binding theory. As NP movement is subject to these constraints, we conclude that the argument-visibility condition does not hold only at PF.

Could the argument-visibility condition hold only at S-Structure? This seems more plausible; the appropriate syntactic constraints on NP movement are available at this level, and this level feeds into PF. Thus we conclude that the condition holds at least at S-Structure. It is possible (though we have no proof) that the condition holds also at LF.

2.1.5.2 Predication and visibility

Why should pleonastic NPs have to be visible? We suggest that this follows from a condition that predicates must be visible, and are visible as predicates only if they satisfy the following visibility condition:

(1.58) PREDICATE VISIBILITY

A predicate is visible iff its subject is visible

We take it that this condition, like the argument-visibility condition, holds at least at S-Structure. This implies that pleonastic elements are represented at S-Structure.

Note that this visibility is not a matter of Case-matching; hence there is no one-one restriction, and a single visible node may make more than one predicate visible, as in a combination like "old grey mare", where 'old' and 'grey' are both made visible by virtue of being predicated of the visible 'mare'.

This condition requires pleonastic subjects to be visible. Thus the first of the following sentences are ruled out, because the subject 'it' is not visible and hence the predicate is not visible. In the second example, 'it' is assigned Case by 'for'.

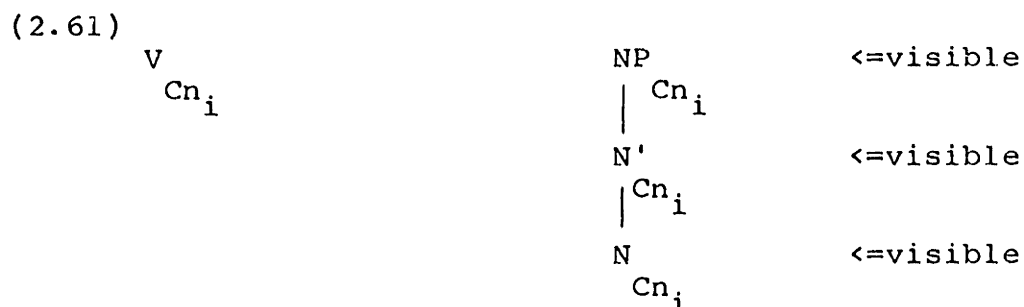
- (1.59) * It to seem worthwhile, we must pay full price
 (1.60) For it to seem worthwhile, we must pay full price

We can now dispense with the PF visibility filter.

2.1.5.3 The visibility of the head

The head of an NP may be the subject of predication by modifiers; if so, it must be visible. How does a head become visible?

We will derive the visibility of the head of the NP by virtue of its heading a visible maximal projection; we will say that if a bar-projection of X is visible then X is visible. This is the result of percolation; the matched Case-feature on the maximal projection percolates down to the head, forming a percolation chain, every part of which is visible.



Note that this percolation of a Case-indexed feature must not violate the one-one constraint on Case-matching. Like conjoined nodes, nodes in a bar-projection are exempt from this condition.

2.1.5.4 Summary: visibility

We summarize the visibility requirements:

An argument chain must be visible at S-Structure.

An argument chain is visible if one of its nodes is visible.

A predicate must be visible at S-Structure. A node is visible if it is Case-matched or is PRO, or is predicated of a visible node.

2.1.6 Additional restrictions on Case-matching

We will now consider two additional constraints relating to Case-matching, proposed by Stowell (1981). These constraints are (a) Case-matched nodes must be adjacent ("The Adjacency principle"), (b) where X is a Case-assigner, no projection of X may be assigned Case ("The Case-Resistance principle").

2.1.6.1 Adjacency

It is suggested in Chomsky (1981), and discussed in more detail in Stowell (1981) that Case is assigned only to an adjacent element. Stowell's basic argument in favor of this is that an unextraposed NP complement must precede a PP complement, and he points out that in English, adverbs may not intervene between a verb and the bare NP that follows it:

(2.62) * Paul removed from the trash can the books

(2.63) * Paul opened quickly the door

(2.64) * I prefer always my steak rare

We initially state the Adjacency Condition as follows:

(2.65) ADJACENCY (preliminary)

Where X and Y are Case-matched, a terminal node Z may not intervene between X and Y

We must modify this, to deal with verbs which assign Case to two NP objects:

(2.66) I give the man **the book**

(2.67) the man was given t **the book**

The second object is not adjacent to the verb, according to our definition. Thus we must modify adjacency as follows:

(2.68) ADJACENCY

Where X and Y are Case-matched, a terminal node Z may not intervene between X and Y, unless Z is Case-matched with X or with Y

Stowell suggests that the exact definition of 'adjacent' may vary across languages, as adverbs may intervene between Case-assigner and assignee in Italian:

- (2.69) Mario ha letto attentamente un libro
 (Mario has read attentively a book)

Thus Italian and English have slightly different definitions of adjacency; for Italian, adjuncts are not taken into account in determining adjacency.

Case-assignment to the subject position in English is also not subject to a strict adjacency condition, as adverbs may intervene between the subject and the Case assigner 'tensed INFL'.

Another problem with adjacency is raised by our story about passive. We claim that 'have' is Case-matched with a V node carrying a Cn feature derived from -en. However, adverbs may intervene between the Case-matched elements, as we see in the following example:

- (2.70) I have slowly destroyed all the manuscripts

Adjacency is thus a somewhat variable notion and does not always mean strict string-adjacency. We will bear it in mind as a possible constraint on Case-assignment.

2.1.6.2 Case-resistance

Stowell proposes that a node of a Case-assigning category (ie a projection of P, V or AGR) may not itself be assigned Case, and formulates a "Case-resistance principle":

- (2.71) CASE RESISTANCE
 Case may not be assigned to a category bearing
 a Case-assigning feature.

This means that PP, VP and a tensed clause (the latter is the projection of AGR) may not be in Case-marked positions at S-structure.

Stowell's evidence for this principle is as follows:

(1) PPs do not appear in the following Case-marked positions. Subject of a sentence with a Case-marking complementizer:

- (2.72) * It would be nice for on the counter top to
have a nice paint job
(2.73) * We talked about from the west

Affixed with /-s/:

- (2.74) * I protested in the park's having been chosen
for the rally

Undergoing 'of'-insertion:

- (2.75) * John's shooting of at the deer
(2.76) * the playing of with dice

To be set against these examples, Stowell concedes that PPs are found in the subject position of copular clauses, which is a Case-marked position in the following examples (the first two examples are from Stowell, p225):

- (2.77) **under the stars** is a nice place to sleep
(2.78) is **under the stars** a nice place to sleep?
(2.79) **Up the road** is the best place to fish,
but not good for sightseeing.
(2.80) we talked about **down the river** being the
best place to fish
(2.81) I approve of **under the bed's** being chosen
for our meeting place
(2.82) It is a bit dubious for **in the silo** to be
the chosen place for alterations

As such, the Case-resistance principle is not exceptionless in its application to PPs.

(2) Another Case-assigner is AGR, the realization of a tensed INFL, which has as its maximal projection a tensed clause. The 'to' head of an infinitival clause does not assign Case to the subject position; Stowell suggests that this is not because the 'to' element can not assign Case, but

rather because for independent reasons, the subject position of the clause can not take an overt NP. Thus Stowell allows both infinitival and tensed clauses to be projections of Case-assigning elements.

Thus infinitival and tensed clauses, as projections of Case-assigners, should not be assigned Case, by the Case-resistance principle.

Stowell derives from this various distributional facts about the distribution of clauses, for which we have no counterexamples. A problem with Stowell's formulation is that tensed clauses are now standardly assumed to be headed by COMP, and not by INFL/AGR; S' is headed by COMP, and S by INFL. On this formulation, S' is not a projection of a Case-assigner, and so should not be subject to the Case-resistance principle.

Thus there are problems with the Case-resistance principle; it does not apply to all PPs, and there are theoretical problems with its application to clauses. We conclude that the principle may not be correct; we shall not make use of it, and we will see in the next section that it gives rise to severe problems (in section 2 we propose that verbs (which are Case-assigners) are assigned Case).

2.1.6.3 Kinds of Case

In some languages, it seems clear that we should differentiate different Cases. However, there is only marginal evidence in English for positing three different Cases, nominative, genitive and accusative. The evidence for positing three kinds of nominal Case comes from the fact that pronouns show different morphological forms, eg 'I', 'me', 'my'. which may be determined by the Case feature which they carry. We propose that nominative Case 'Cn/nom' is assigned

only by tensed INFL. Accusative Case is the unmarked Cn, and is assigned by all other Case-assigners. We propose that 'genitive' is not a separate Case in English, but that -s assigns Cn to an NP, and there are some suppletions, of the form 'I+s=>my' etc.

2.1.6.4 Case-assignment and subcategorization

The Case-assigning properties of a lexical item are related to the argument-taking properties. For example, on the whole, a verb which takes a theme argument will also assign Cn. However, there are some mis-matches. Some 'ergative' verbs such as 'arrive' assign a theme theta-role internally, but do not assign Case. As Grimshaw (1979) has pointed out, not all verbs which assign a proposition theta-role may assign that theta-role to an NP; Pesetsky (1982) proposes that such verbs which do not take NP do not assign nominal Case.

Thus we must specify as part of the lexical entry the Case-assigning properties of a lexical item.

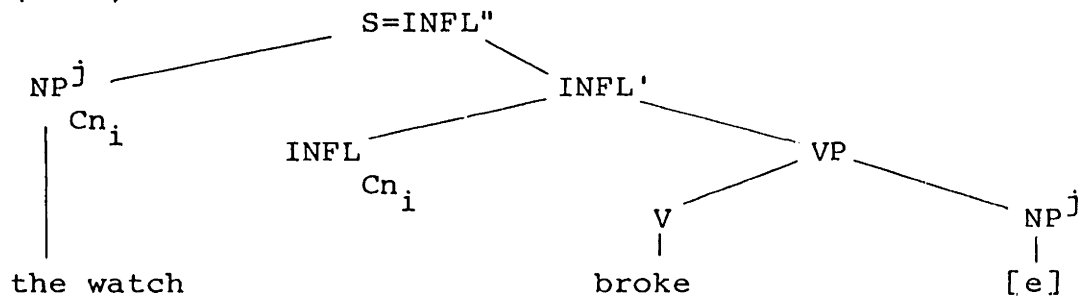
Pesetsky has suggested that the part-of-speech of an argument need not be specified; it is determined by the Case assigned to it. If a propositional theta-role is assigned to a node which does not have, and can not get, nominal Case, then it can not be assigned to an NP, and the node in question must be a clause.

2.1.7 A note on 'ergatives'

An interesting class of verbs, which we will occasionally refer to, are the 'ergative' verbs. The term is used in several senses; here we mean basically the intransitive 'change or state/location' verbs which assign a

theme theta-role. We follow Burzio (1981) in claiming that these verbs do not assign an external theta-role; rather they assign the theme theta-role internally, but the NP can not be overtly realized in this position, because these verbs do not assign Case. Thus the NP must be moved to the subject position, where it gets Case:

(2.83)



These verbs have properties similar to passive participles, and share some of the distribution of passive participles. Thus for example they form adjectives:

(2.84) the departed guests

(2.85) a fallen hero

In addition, they may take resultative adjuncts, which do not normally modify intransitives. Simpson (1983) has argued that resultatives modify only internal arguments, which suggests that the subject argument in the examples below actually comes from the post-verb position:

(2.86) It smashed to pieces

(2.87) He melted into tears

2.2 Verbs need Case

We propose to extend Case-theory such that it gives an account of the distribution and properties of different morphological realizations of verbs. We claim that verbs which assign theta-roles must be visible (ie need Case) and Case is assigned exactly as in the nominal Case system; a verb must be governed, either syntactically or by affixation, by a node carrying a matching Case feature.

Thus we will extend the visibility condition from being a condition on argument chains (ie on things assigned a theta-role) to being a condition on both the assigner and the assignee of a theta-role, that is, a condition on theta-chains. This extended visibility condition is as follows:

(2.88) VISIBILITY REQUIREMENT ON THETA-ASSIGNMENT

Every node in a theta-indexed chain must be visible

The theta-indexed chain consists both of the theta-assigner and the assignee; both must be visible.

2.2.1 The distribution of verbs

With a few exceptions, verbs appear in five morphological forms; in the STEM form, STEM+S, STEM+ED (the past tense affix, sometimes suppletive), STEM+ING, and STEM+EN (the passive/perfective, regularly realized as /-ed/ but named /-en/ to distinguish it from the past tense, and sometimes suppletive). For example:

(2.89)

I break	I walk
he breaks	he walks
he broke (suppletion)	he walked
he is breaking	he is walking
it is broken (suppletion)	he has walked

It has been proposed that what we are calling stems are in fact stems with phonologically null inflectional affixes. As the existence of these affixes remains to be proved, we do not adopt this hypothesis.

The V-ing and V-en forms of a verb may each be subdivided into what we shall call an aspectual and a non-aspectual form; that is, there is a progressive V-ing and a non-progressive V-ing, and a perfective (active or passive) V-en and a nonperfective V-en. For example:

(2.90)

I am eating	=progressive
I saw him eating	=progressive
Knowing the answer as I do	=nonprogressive
The eating lion	=nonprogressive

(2.91)

I have eaten	=perfective
It was eaten quickly	=perfective
I saw it eaten	=perfective
The departed guests	=nonperfective
The eaten meal	=nonperfective

The V-en forms may have two different argument structures, passive or active:

(2.92)

I have eaten	=active
It was eaten quickly	=passive
The eaten meal	=passive

(It is not immediately clear how we should classify intransitive V-en participles which premodify, as in 'the departed guests'; depending on one's definition of passive, these might be analysed as passive or active.)

Thus we might distinguish the following forms of a verb, based on morphological and syntactic/semantic differences:

(2.93)

1. Verb stem
2. Verb + inflectional affix, -s or -ed.
3. Verb + ing /progressive
4. Verb + ing /nonprogressive
5. Verb + en /active /perfective
6. Verb + en /passive /perfective
7. Verb + en /passive /nonperfective

These seven forms of verbs differ in distribution, both syntactically (ie when they head VPs) and inside words (when they are affixed or are part of a compound).

2.2.1.1 Lexical environments

Stems are distinguished from the other forms of a verb in that stems may undergo lexical processes, while participles and inflected verbs may not. Participles are found in synthetic compounds (which we will argue, in chap.4, are constructed in the syntax), but not in root compounds; participles may not be suffixed when verbal, and may be suffixed only by very productive (possibly syntactically attached) suffixes like 'ness' and 'ly' when adjectival. Stems, on the other hand, are found in many types of root compound, and are freely suffixable.

(2.94) flying saucer (* with initial stress,
showing that it is not a compound)

(2.95) break neck (initial stress)

(2.96) smoked meat (* with initial stress,
showing that it is not a compound)

(2.97) smoke meat (initial stress)

(2.98) * swimming-er

(2.99) swimm-er

(2.100) * broken-ive

(2.101) act-ive

Participles and inflected verbs, then, must participate in syntactic processes, and may not undergo lexical processes.

2.2.1.2 Syntactic environments

Different forms of a verb appear in different syntactic environments.

Perfective passive, perfective active and progressive must have their maximal projection governed by (and adjacent to) specific auxiliaries or causative/perception verbs.

Verbs carrying inflectional affixes must have their maximal projections governed by and adjacent to AGR.

Nonperfective and nonprogressive participles may premodify any noun; that is, they are not lexically selected for.

Stems head VPs which appear in the following environments:

(2.102)

- (a) Governed by and adjacent to AGR, except when AGR is +past or 3rd person singular indicative present.
- (b) Governed by and adjacent to 'to'.
- (c) Governed by and adjacent to 'but', 'except', 'rather..than'.
- (d) Governed by and adjacent to certain verbs.
- (e) In imperatives.

We take 'do' and modals to be manifestations of AGR, though they should perhaps be classed with the verbs.

The verbs which take as a complement the maximal projection of a stem are perception verbs ('see', 'hear') and causative or permission verbs ('help', 'make', 'have', 'let'). In these cases the maximal projection of the verb stem is a small clause, ie consists of an NP and a VP, where the VP is projected to a clausal node, VP'.

One position, and, we will claim, a significant one, where we do not find stems, but we do find other types of verb, is the premodifier position in an NP, a position governed only by a noun ('the running man', 'the eaten meal', *'the run man').

2.2.1.3 A visibility requirement for verbs

Note, then that [2] we find verb stems heading phrases which are adjacent to and governed by just the categories which are nominal Case assigners; AGR, verbs[3], possible prepositions, 'but', 'except', 'rather than' (inflectional 'to', which takes a stem complement may also be a preposition[4]).

We take courage from this observation, and construct a generalization about the location of verb stems by introducing a notion of Case for verbs. We claim that certain verbs, prepositions and AGR would be marked to assign 'verbal Case' to a verb stem (by assigning Case to the VP, which then percolates down to the head); and that a verb stem needs verbal Case (marked with a Cv feature).

This would explain why we do not get *'the run man'. Here, the verb is not governed by a Case assigner, as N

2. With the exception of imperative, which we take to have a zero-affix - an analysis supported by the fact that in German, too, the only possible candidate for zero-inflection is the imperative.

3. Modals and 'do' do not evidently assign nominal Case, though there are related and homophonous forms which do, as in "I did my homework", "I need some money", "I willed my own destruction".

4. In Old English, 'to' took a nominal infinitive and assigned it Case.

is not an assigner of verbal Case.

Verbs always require Case. There are probably no verbs in English which do not assign theta-roles (the equivalent of a pleonastic NP); hence the only visibility requirement needed is a theta-related visibility requirement. A possible example of verbs which require Case but may not assign a theta-role is the auxiliaries 'be' and 'have'; however, it is suggested in Fabb and Roberts (forthcoming) that auxiliaries do assign theta-roles of a special kind.

Verb stems which assign theta-roles are visible if governed/adjacent to -ing, -en, AGR, 'to', 'rather..than', 'except', 'but', and some causative and perception verbs. We suggest that these are all verbal Case-assigners, that is, are lexically assigned a verbal Case (Cv) feature. Parallel to the nominal Case system, as any Vmax may be assigned verbal Case, the feature Cv may freely be associated with any Vmax.

We extend the visibility requirement, from being a requirement that chains assigned a theta-role be visible, to being a requirement that both theta-assigner and assignee be visible. The extended visibility requirement is:

(2.103) VISIBILITY REQUIREMENT ON THETA-ASSIGNMENT

Every node in a theta-indexed chain must be visible

2.2.1.4 The matching system for verbal Case

We will now show how the matching system works to assign Case to verb stems. Consider first the clause 'PRO to eat the candy', as in

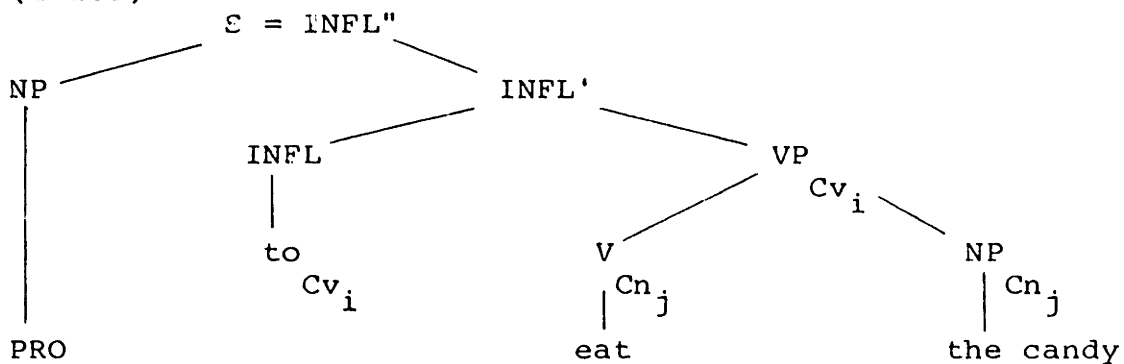
(2.104) I persuaded Bill [PRO to eat the candy]

Here, as 'eat' assigns a theta-role, it must 'have Case'. The VP headed by 'eat' is governed by 'to', which we suggest

carries a Cv feature which is matched with the Cv feature freely associated with the VP; the VP now has Case, and so (by the principle that if a projection of X has Case, then X is visible) 'eat', has Case.

In addition, 'eat' carries a Cn feature which is matched with the Cn feature on 'the candy', so allowing this NP to carry a theta-role. A diagram of the Case-matching which occurs is:

(2.105)

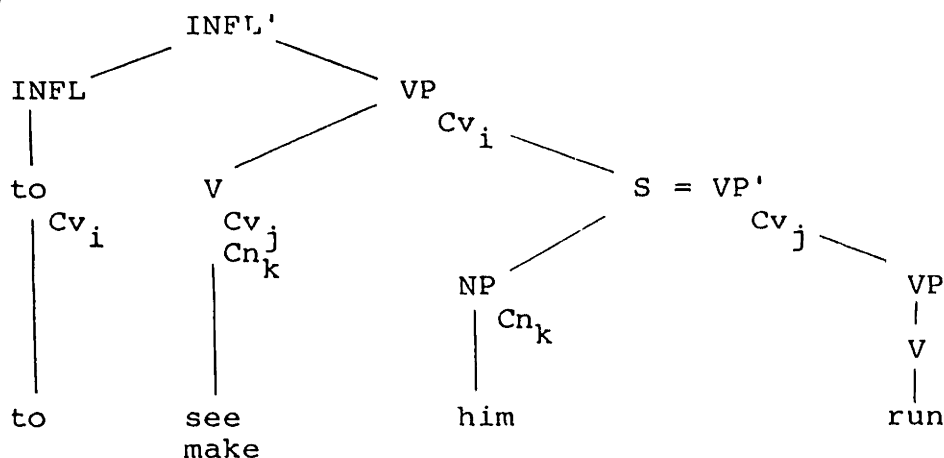


Consider now a small clause, eg [him run] in:

(2.106) PRO to see him run

'Run' must be visible, as it assigns a theta-role; its projection is governed only by the matrix verb. The following is a diagram of the Case-matchings:

(2.107)



This example suggests that perception and causative verbs are lexically marked to carry a Cv feature.

Note that passive perception and causative verbs may not take a VP' complement headed by a stem:

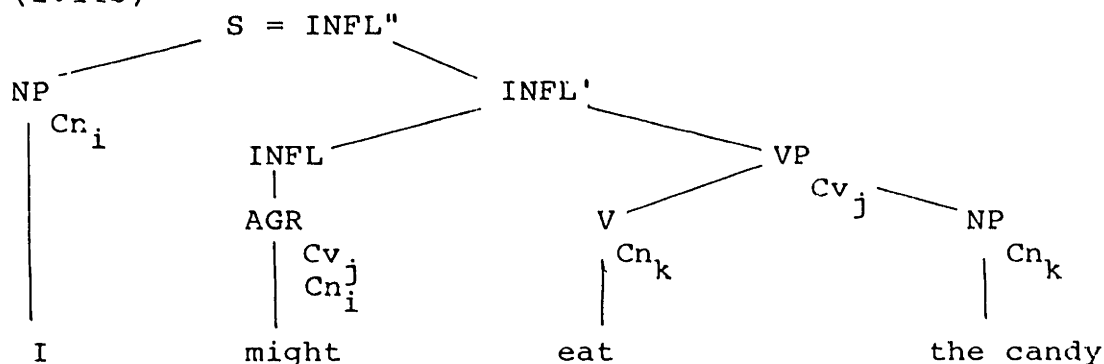
(2.108) I saw him run

(2.109) * He was seen run

The idea that verbs need Case is not a new one; Roeper and Vergnaud, in an unpublished paper (1980), suggested that stems are assigned Case by perception verbs, and the passive perception verbs can not assign Case, because passive morphology absorbs Case, and so the complement can not be headed by a stem. Our account of passive will not permit this solution, however, as only nominal Case and not verbal Case is 'absorbed' by the -en affix. This is because 'absorption' of Case is the result of Case-matching; -en carries a Cn feature which is matched with a Cn feature on the verb, thus absorbing nominal Case. However, -en does not carry an extra Cv feature and thus may not absorb verbal Case by matching with the Cv on the perception verb. As such, the above data must be accounted for in some other way (Higginbotham (1983a) has an alternative account).

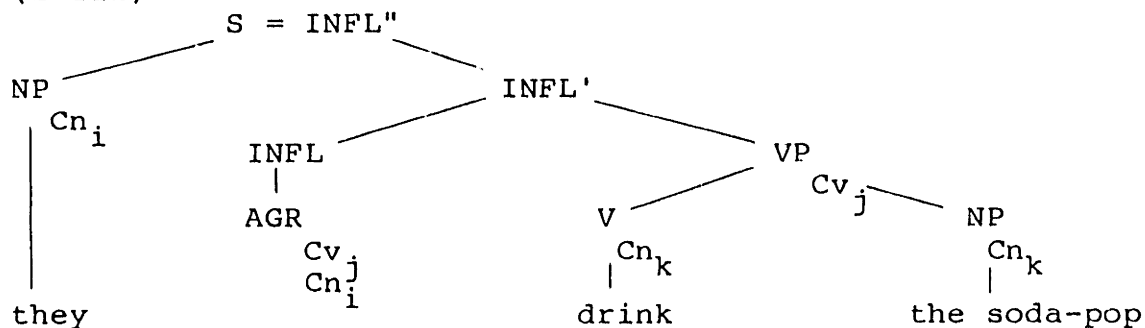
Another position in which we find stems is after a modal or 'do', (which we take to be manifestations of AGR). This indicates that modals and 'do' carry a Cv feature. As manifestations of AGR, they Case-mark the subject, and so also carry a Cn feature:

(2.110)



We also find stems heading VPs following AGR where AGR contains only person/number agreement features, in simple tensed clauses; [I AGR walk], [you AGR walk], [we AGR walk] etc. We deduce from this data that AGR may assign Case, that is, carries a Cv feature:

(2.111)



The structure is the same as that for modals and 'do'.

2.2.1.5 Case resistance

Note that the Case-Resistance principle, discussed in section 1, is apparently violated by our extending Case-theory to verbs, because verbs which assign Case are themselves assigned Case. We pointed out however, that this principle is problematic.

2.2.1.6 Moved verbs

A verb which assigns a theta-role must have Case. What happens when verbs are moved or co-ordinated?

We suggested in our discussion of passive that some verb-movement rules (those where a verb or VP is moved under identity) take place at PF, after Case-matching; these do not concern us. Other verb-movement rules, such as topicalization with 'though', take place at S-Structure, and in these cases, a trace of the moved V or VP is left behind; this trace is (verbal) Case-marked, and so the moved verbal element is part of a (verbal) Case-marked chain:

- (2.112) [eaten] though it was [t] by the elephants
 (2.113) [eaten by the elephants] though it was [t]

Note that if we are correct in moving VP at S-Structure, then we have evidence that a verb gets a verbal Case feature by percolation down from the VP node, rather than by direct government; in the VP movement example (2.113), neither 'eaten' nor a trace of 'eaten' is governed by 'was'; rather the trace of the projection of 'eaten' is governed by 'was'.

The only examples of verb movement in English appear to be movement to the verbal equivalent of an A' position. There are apparently no examples in English of movement of a

verb in order to get verbal Case.

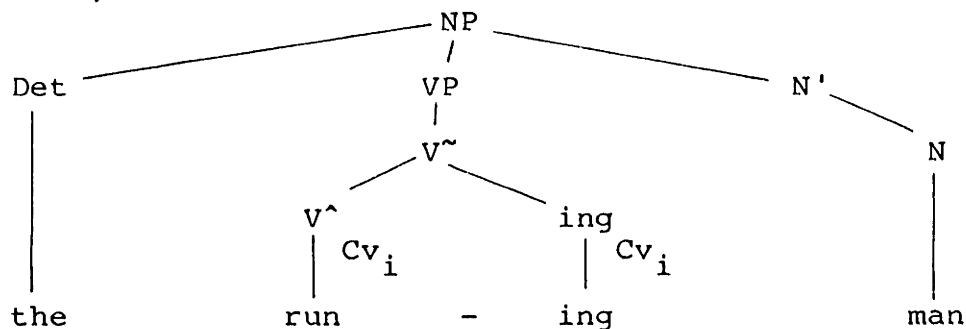
2.2.2 "Non-aspectual" -ing and -en

We have now considered the distribution of stems. In this section we will examine the distribution of "non-aspectual" -ing and -en participles. These participles are found in the following places:

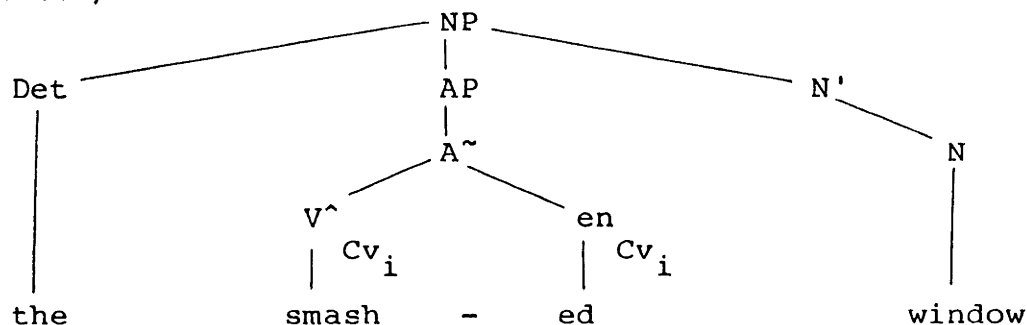
(2.114) -ING	
premodifier position	the running man
(heading synthetic compounds)	the meat-eating tiger
adjuncts	knowing the answer so well,...
(2.115) -EN	
premodifier position	the dug grave
(heading synthetic compounds)	the carpenter-built computer
adjuncts	widely loved, they lived alone
following 'seem', 'look' etc	it looks broken

It is often assumed that these participles are adjectives. The claim has some plausibility for V-en participles, but not for V-ing participles, which do not behave like adjectives in any way, except that they are premodifiers. Whether the participles are adjectives or verbs (we will for the moment assume that V-ing participles are verbs (further discussion, chap.5), and stative V-en are adjectives(further discussion, chap.4)) is for our present purposes immaterial, because the verb stem behaves as though it is Case-marked, in that all obligatory theta-roles must be assigned. Thus we conclude that the affix -ing or -en Case-marks the verb:

(2.116)



(2.117)



The affix lexically carries a Cv feature. The V node which it governs is maximal ($X^{\sim}$ is a projection of the affix, not the stem), and so may freely assume a Cv feature. The feature on the stem is matched under government with the feature on the affix.

Note that $V^{\wedge}$ has Case, and is thus visible, while $X^{\sim}$ ($A^{\sim}$ or $V^{\sim}$) does not have Case and so is not visible.

2.2.2.1 Visibility and 'theta-paths'

These premodifying participles do not take arguments (or adjuncts) in the VP or AP.

(2.118) * the [running guns] missionary

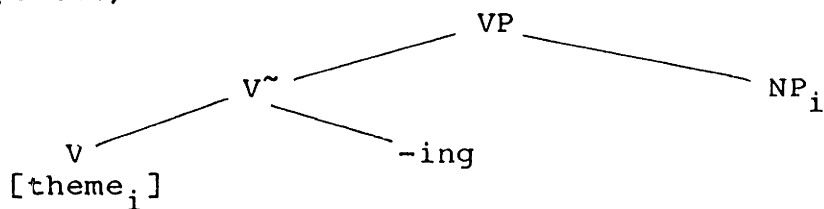
(2.119) * the [kissing the cat] child

(2.120) * the [given some money] tourist

This has been claimed to be the result of a filter, the "Head-Final Filter", which specifies that the head of a premodifier is the final node in the phrase.

We will derive this from Case theory. The crucial thing is that the $X^{\sim}$ node, the head of the phrase, does not have Case, and this node intervenes between the theta-assigner (the verb stem) and its phrasal arguments:

(2.121) *



Both the theta-assigner and the NP have Case; thus the requirement that "every node in a theta-indexed chain must be visible" is satisfied. We will account for the ungrammaticality of this theta-assignment by using a stricter notion than 'chain', which is the notion 'path'. A chain is any two nodes which are coindexed; a path is these nodes and every intervening node. We suggest that visibility is a constraint not on theta-chains, but, more strictly, on theta-paths.

(2.122) VISIBILITY REQUIREMENT ON THETA-ASSIGNMENT (revised)

Every node in a theta-indexed path must be visible

Now we can rule out 'the running guns man' etc., because an intervening node in the theta path between 'run' and 'guns' is not Case-marked, ie is not visible.[5]

5. The notion 'theta-path' may not be related to the notion of path used by Kayne and Pesetsky for binding relations. For example, theta-paths do not appear to obey containment restrictions.

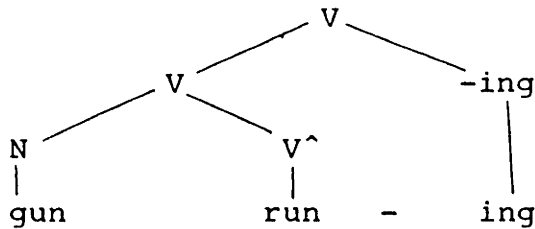
Note that the V stem may take arguments, but only in the domain of the Case-marking affix; that is, in a compound:

- (2.123) the gun-running businessman
 (2.124) the cat-kissing child
 (2.125) the rat-bitten poncho

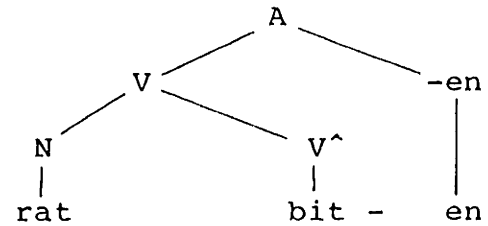
These compounds, we will suggest, have the structure below:

(2.126)

(a)



(b)



[6] V^ is Case-marked by the affix, and so may assign a theta-role.

2.2.3 The 'aspectual' affixes

2.2.3.1 Affix hopping

We have dealt with the distribution of verb stems, and the non-aspectual participles. In this section we will consider the participles formed with the three 'aspectual affixes', progressive -ing, perfective active -en, and perfective passive -en.

These affixes and the participles they form are very restricted in their distribution. The perfective active is found only governed by and adjacent to 'have', for reasons

6. We will propose in chap.4 that (b) additionally contains a trace

already discussed. There are three contexts in which the other two aspectual participles (perfective passive and progressive) are found: governed by and adjacent to an auxiliary, heading a small clause complement to a perception verb, and as restrictive post-modifiers of nouns.

-ING

(progressive)

(2.127) I am running

(2.128) I saw him running

(2.129) The man running down the road

(nonprogressive)

(2.130) Knowing the answer, I decided to speak

(2.131) The running man

-EN

(perfective)

(2.132) It was given me as a present

(2.133) It got broken

(2.134) I saw it smashed to pieces by John

(2.135) The man elected president

(nonperfective)

(2.136) The shattered glass

(2.137) The answer was widely believed

(2.138) Quickly eaten, the meal satisfied us

The core case, government by an auxiliary, has been traditionally dealt with in generative grammar by 'affix-hopping'.

Thus the auxiliary is generated as part of a complex with the relevant aspectual affix; have+en/perfact, be+en/prog, be+en/perfpas. The affix is then moved by a local rule [7] and adjoined to the verb which immediately follows the auxiliary/affix combination:

(2.139)

[[be] [-ing]] [V] => [[be] []] [[V] -ing]

7. Lasnik (1981) argues that affix hopping hops an affix only over an adjacent element.

The problem with an affix-hopping account of the co-occurrence restrictions between auxiliaries and affixes is that it will not account for the co-occurrence restriction between perception verbs and the progressive or perfective passive affix. In this case, the perception verb would be generated with an affix, which would be moved by a non-local rule to the verb which heads the small-clause complement:

(2.140)

```
[ [see] [-ing] ]      [ NP [ V ] ] =>
[ [see] [] ]      [ NP [ [V] -ing] ]
```

We are here dealing with a different kind of rule, not a local rule. The generalization which is missed in the account of affix-hopping is that the affix is attached to a V node which heads the VP governed by and adjacent to the auxiliary or perception verb.

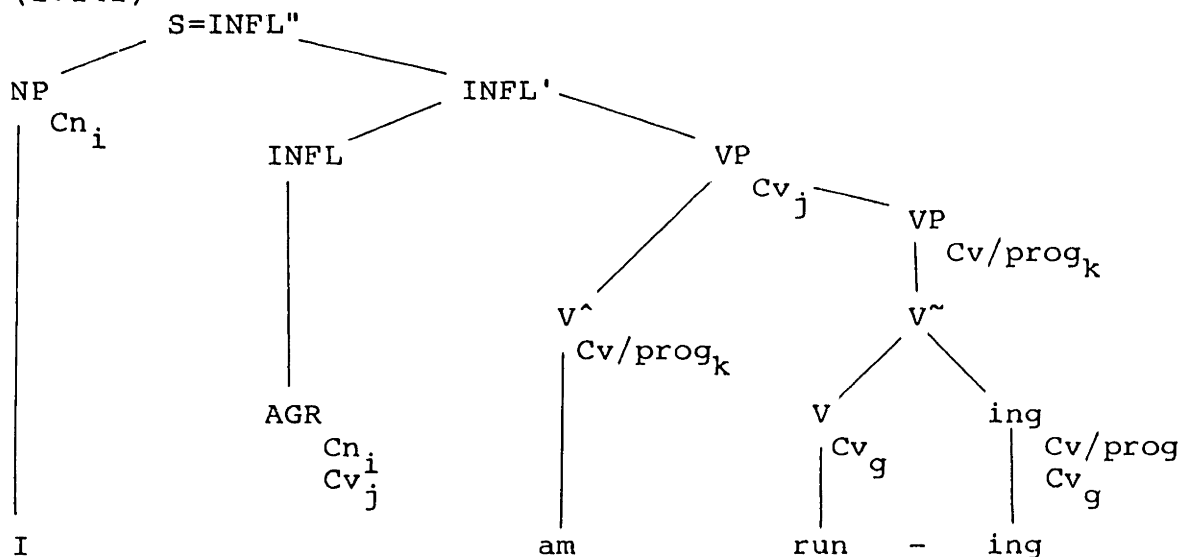
Our notion of verbal Case allows a different account of the co-occurrence restrictions, which will unify the auxiliary and perception verb examples. We will make 'progressive', 'perfective active' and 'perfective passive' Case features, like dative, or nominative, or genitive. Here we see the Case carried by a verb as having semantic significance, just as, in languages with extensive nominal Case-marking, the Case carried by a noun is sometimes linked with a particular theta-role which it carries.

The verbs which co-occur with aspectual affixes will be appropriately Case-marked. 'Be' will be lexically assigned either Cv/prog or Cv/perfpas; 'see', 'hear' etc. will be lexically assigned either Cv (as we saw in the previous section) or Cv/prog or Cv/perfpas; 'have' will be lexically assigned Cv/perfact.

The affixes will also be assigned appropriate Case features - Cv/prog for -ing, Cv/perfact or Cv/perfpas for -en. The affixes must in addition carry a Cv feature, which is matched with the Cv feature on the verb stem, so making the stem visible as a theta-assigner.

We illustrate the aspectual matching with a 'be-progressive' pair:

(2.141)



The Cv/prog feature percolates to VP, and is matched on that node with the Cv/prog feature carried by V[^], which governs it. The V[~] node is semantically interpreted as progressive, because it carries a governed/matched Cv/prog.

Our approach thus combines the functions of Case-marking and aspectual agreement. This non-hopping account of aspectual co-occurrence requires a Case-matching system, rather than a Case-assignment system. The difference between the two is that Case-matching requires the assignee to have a target feature, while Case-assignment does not require a target feature on the assignee. Note that 'be' does not simply assign a 'progressive' role to any verb which follows

it; the verb must be a V-ing:

- (2.142) * I am watched (* as progressive)
 (2.143) * I am watch

2.2.3.2 Aspectual affixes in restrictive relatives

Progressive and perfective passive participles may head restrictive post-modifiers:

- (2.144) The man reading the book was my friend
 (2.145) The student given the stipend was dutch.

Williams (1975) has claimed that non-progressive V-ing participles may also appear in this position, citing stative verbs (which do not normally form a progressive) which may postmodify in -ing:

- (2.146) The first man knowing all the answers
 will get the prize

We suggest, however, that the V-ing form is here progressive, and not stative; thus the participle may not co-occur with a stative predicate, as below:

- (2.147) * Everyone owning his own house is a fool
 (2.148) * The people knowing the answers live in Connecticut

These participles, because they are progressive or perfective passive must be governed by an adjacent node carrying a progressive or perfective passive Case feature. This might be (a) the adjacent head of the NP, or (b) it might be a node not realized at PF:

(2.149)

- (a) the [man] [reading the book]
 N VP
 Cv/prog_i Cv/prog_i
- (b) the [man] [] [reading the book]]
 N Xproj X VP
 Cv/prog_i Cv/prog_i

Option (a) is undesirable because it requires that every noun may carry a Cv/prog feature; this is unusual because a node does not, other than here, assign Case to the node which assigns it a theta-role. Moreover, Case features are not otherwise assigned lexically to all members of a given class; case-assigners are lexically specified (ie one verb will assign Case but not another); here we see an entire class (all nouns), each member being assigned a feature which allows it to assign Case.

If we for this reason take option (b) instead, what is the nature of the empty element X, and its projection Xproj? We see two options: (1) X might be a phonetically empty auxiliary, and thus V, with Xproj a VP, or (2) X might be a form of INFL, with Xproj INFL', or INFL" with an empty subject position. We will not decide between these options here. Such an Xproj could not be generated as a premodifier (ie with a progressive or perfective passive participle):

(2.150)

- the [] [reading the book]] [man]
 Xproj X VP N
 Cv/prog_i Cv/prog_i

Thus we have dealt with a problem for our 'matching' analysis of aspect by positing an empty node carrying an aspectual Case feature.

We will return to post-modifiers, which we claim to be clausal, in chap.3.

2.3 The affix -S

2.3.1 Noun phrasal -s

An NP in the specifier position of an NP must be suffixed with -s (or, if pronominal, is a suppletion for NP+s):

- (2.151) the man's coat
- (2.152) * the man coat
- (2.153) yesterday's lecture
- (2.154) * yesterday lecture
- (2.155) the city's destruction
- (2.156) * the city destruction
- (2.157) Our house
- (2.158) * Us house

-S has two properties; it is a Case-marker and sometimes marks possession.

(a) -S is clearly a Case-marker of NPs which are assigned a theta-role by the noun (ie are theta-indexed with the noun), as in the following examples:

- (2.159) Africa's renewal of its resources
- (2.160) The map's restoration by experts

(b) -S optionally marks possessor, even on an NP which independently has Case (as in the third example below)

- (2.161) John's book
- (2.162) Mary's nurse's uniform
- (2.163) That dinner party of Pierre's

In addition, -s attaches to NPs in determiner position which have an adjunct relation to the noun, as in the following examples:

- (2.164) yesterday's lecture
 (2.165) 1984's election

We take it that here the NP is a possessor in some sense.

We suggest, then, that -s is lexically marked to carry a Cn feature, which is matched with the Cn feature on an NP, so making the NP visible.

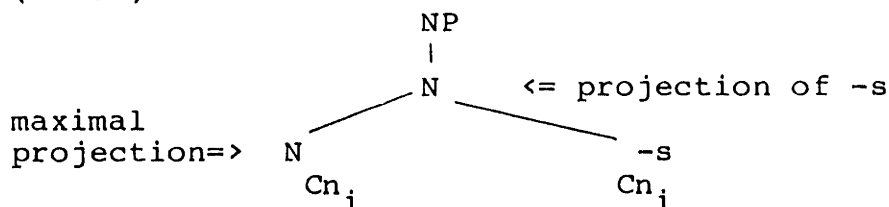
Note that -s is exceptional among affixes in English in that it is attached to phrases, both when it indicates possession and when it simply assigns Case:

- (2.166) [The man I know]'s hat
 (2.167) * [The man's I know] hat
 (2.168) [the capital of Italy]'s greatest hero
 (2.169) * [the capital's of Italy] greatest hero

As a marker of possession, it is possible that the affix assigns an argument theta-role; hence it must govern the NP. If it was attached to the noun, it would be a modifier rather than an assigner of an argument theta-role.

As a Case-assigner, the affix must be attached to NP rather than N because the NP must be visible. If -s was attached to the noun, the noun would be visible, but as the NP would then not be a projection of the visible noun, (it would rather be a projection from the affix), the NP would not inherit visibility by percolation. Thus the NP would not be visible:

(2.170)



For this reason, the affix must be attached to the NP in order to make the NP visible.

-S in its two functions should be distinguished as

two different suffixes. As a marker of possessor it is generated at D-Structure as it carries semantic (thematic) information (possibly it assigns a theta-role). As a Case-marker it is not required at D-Structure, as visibility is not a condition at D-Structure. Thus we suggest that there is a rule affixing -s (where -s has no semantic content, but carries a Cn feature) at S-Structure, stated as 'adjoin -s' (more generally, this will be a case of a rule 'adjoin affix'). -S assigns Case to an NP, but does so only in the specifier position of NP. (Other manifestations of -s are purely possessional, and it is not clear that -s assigns Case to NP in these). -S may not, for example, be inserted adjoined to an NP object of a passive verb, so giving that NP visibility in place:

(2.171) * It was destroyed the city's

We specify, then, that -s as a Case-marker may be adjoined to NP only in the NP/NP position.

It has often been argued that 'of' is a preposition with no semantic content, which exists solely for the purpose of assigning Case to an NP. We show in chapter 5, following Rappaport, that 'of' is a theta-assigner, and is present at D-Structure, and thus differs from Case-marking -s, which may be adjoined at S-Structure.

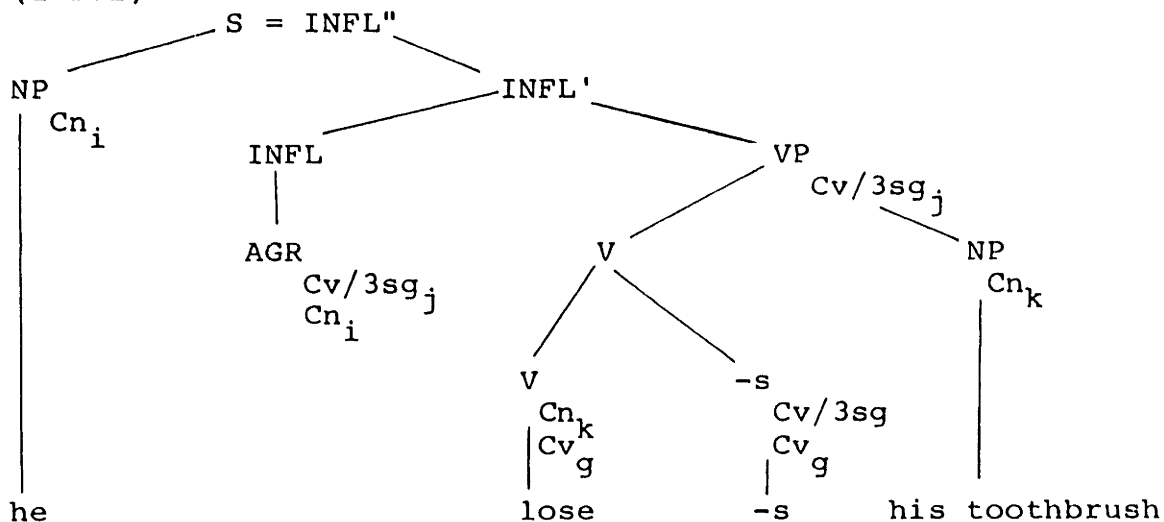
2.3.2 Verbal -s

A verb is manifested as [stem+s] only when governed by and adjacent to a third person singular indicative nonpast AGR. We suggest that this form of AGR assigns not Cv, but a different Case, which we will call Cv/3sg. Verbal -s will carry a Cv feature, which will be matched with the Cv feature on the verb stem, and in addition will carry a Cv/3sg feature

which will match with the Cv/3sg on AGR. Thus the Cv/3sg feature on -s will be matched only when governed by AGR with the relevant features. We specify that this Case feature must be matched.

We illustrate a sample Case-matching below:

(2.172)



AGR has the Case feature Cv except when AGR has the following feature combination:

(2.173)

[-1st/2nd person	]
[-plural	]
[-past	]
[-subjunctive	]

[8] Here, AGR may not carry a Cv feature, but is marked instead to carry a Cv/3sg feature. If this feature combination (ie all 'minus' features) is correct, we may hypothesize that AGR's Cv feature is related to other

8. We have arranged the features of AGR such that the least marked form of AGR - third person singular indicative present - is associated with only 'minus' features

features; specifically, an AGR with no + features will not have a Cv feature. When AGR has all minus features a default Case feature is introduced, Cv/3sg. Note that AGR must assign verbal Case; otherwise the verb following AGR in the sentence would not have Case, and so could not assign a theta-role, which would be ruled out by theta-theory; a verb would head a VP, but would not be thematically related to anything.

2.3.3 Unifying verbal and nominal -s

We now see a unifying factor for verbal third person /-s/ and nominal genitive /-s/; both affixes carry Case features.

Beyond this, the affixes differ; nominal -s carries a Cn feature, and may assign a possessor theta-role, while verbal -s carries Cv and Cv/3sg features, and does not assign a theta-role.

There is some evidence from the history of English that verbal and nominal -s may be related historically, with the relationship arising because both are Case-assigners. Analyzing genitive and third person /-s/ as related Case-assigning affixes provides an answer to a puzzle concerning the development of English inflectional morphology. The puzzle is that verbal /-s/ is not part of the verbal inflectional paradigm of Old English, but appears as one of the two inflectional affixes of Modern English (the other affix is /-ed/). We will propose an account for this which supports our story, that /-s/ is a Case marker for both NPs and verbs.

2.3.3.1 The development of English inflections

We will first examine the change in the inflectional paradigm which took place in the North of England. We take the following data from O'Neil (1978):

(2.174) Old English nominal affixation:

		strong masc.	strong fem.	weak (neut)
		('stone')	('gift')	('eye')
nom	sg.	stan	giefu	eage
acc		stan	giefe	eage
gen		stanes	giefe	eagan
dat		stane	giefe	eagan
nom	pl.	stanas	giefa	eagan
acc		stanas	giefa	eagan
gen		stana	giefa	eagena
dat		stanum	giefum	eagum

(2.175) Early Middle English (north of England),
nominal inflection:

nom	sg.	stan
acc		stan
gen		stan(e)s
dat		stan
nom	pl.	stan(e)s
acc		stan(e)s
gen		stan(e)s
dat		stan(e)s

(2.176) Old English verb inflection:

	strong	weak
	('bind')	('praise')
Infinitive	bindan	herian
1st sg present	binde	herie
2nd sg	bindest	herest
3 sg	bindeth	hereth
plural	bindath	heriath
1st sg past	band	herede
2nd sg	bunde	heredest
3 sg	band	herede
plural	bundon	heredon

(2.177) Early Middle English (north of England),
verbal inflection:

	strong	weak
Infinitive	bind	her(e)
1st sg present	bind(e)	her(e)
2nd sg	bindes	heres
3 sg	bindes	heres
plural	bindes	heres
1st sg past	band	herd
2nd sg	band	herd
3 sg	band	herd
plural	band	herd

The change in the nominal inflectional paradigm precedes the change in the verbal inflectional paradigm.

We interpret these changes as follows. The nominal Case system of northern middle English became simplified, with a single Case-affix -s being used for the Genitive. Later, the verbal Case system became simplified, with -s introduced as the Case-affix for all nonpast forms (except the first person singular). It might be that -s was introduced because it had come to be the only Case affix in the nominal system, and was extended as the basic Case-marker also in the verbal system. Alternatively, verbal -s may have some other source, but we might argue that the affix was introduced, and

survived, because of its resemblance, both phonologically and in function with the nominal -s.

Southern English was slower to lose its verbal inflections, and -s was introduced as a verbal inflection only in the sixteenth to seventeenth centuries, replacing -th as the third person singular affix. Again, the introduction of -s, and its survival are possibly due to the presence of -s as the only nominal Case inflection. It is unusual in the history of English for a change in northern English to precede and influence a change in southern English; as such the introduction of -s from north to south must have answered a need of the language, which we argue to be the simplification of the Case system, such that a single Case affix operates both as a nominal and a verbal Case-marker.

2.4 Further comments on Case

2.4.1 The place for Case

2.4.1.1 Syntactic affixal Case

In English, affixes carry a Case feature which may match the Cv or Cn feature on the node governed by the affix. Thus Case affixes are like any other Case-assigner in English. In this section we will ask whether these affixes are attached in the lexicon or in the syntax.

We take it that lexical structures are formed by a different set of rules from the rules that form syntactic structures. For example, it seems that lexical items do not have the relationship between their parts determined by theta-theory. Hence there is no LF visibility requirement for

parts of lexical items, and thus Case need not be assigned internal to a lexical item. Thus Case-assigning affixes are not required to attach inside lexical items.

We will make a fairly common assumption about the interaction between lexicon and syntax, which is that lexical rules may not take as part of their input a syntactically constructed item. Using this assumption, we will examine the Case-carrying affixes, to see whether they are attached in the lexicon or the syntax.

The first implication of the assumption is that if an affix is attached to a syntactic item, it must be attached by a syntactic rule, because syntactic items do not undergo lexical rules. Nominal *-s* is attached to NP, which is a syntactic item; hence nominal *-s* must be attached by a syntactic rule. Non-aspectual *-ing* and *-en* attach outside synthetic compounds (examples below), which we will argue in chap.4 are syntactically constructed items; hence these affixes must be attached by a syntactic rule.

- (2.178) [potato cut] *-ing*
 (2.179) [hand tool] *-ed*

'Aspectual' *-en* and *-ing*, and third person *-s* may marginally be attached outside synthetic compounds, and so may be attached by a syntactic rule:

- (2.180) ? He is gun-running in Colombia
 (2.181) ? He has been badly rat-bitten
 (2.182) ? He window-cleans

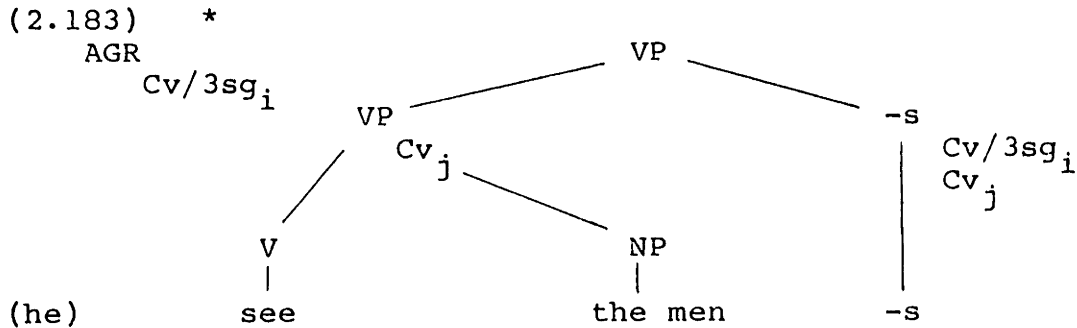
The second implication of our assumption is that if an item does not undergo lexical rules, it may be syntactic. None of the aspectual participles are affixable, which suggests that they are syntactically formed. Non-aspectual verbal *-ing* participles are not affixable. Non-aspectual ('adjectival') *-en* participles may sometimes take the productive affixes

-ness and -ly; this may imply that -en is optionally the input to a lexical rule, or -ness and -ly may themselves be syntactic affixes. We will return to this in chapter 5, where we will argue that -ness and -ly are attached in the syntax. Nominal -s is possibly found inside root compounds, such as 'Parkinsons disease'; however this may be a different morpheme, a 'linking' -s found also in words like 'kin-s-woman', 'town-s-people' (a linking morpheme which is also found in German).

We conclude that English affixes -s, -ing, and -en are attached in the syntax. However, no syntactic structure-building rule that we have allows us to do this. Thus we introduce an adjunction rule, 'adjoin affix', which will take a node of any bar level and create a new node of the same bar level, dominating the first node, and the affix.

2.4.1.2 The bar-level of affixation

We have seen that nominal -s is attached to NP, and may not be attached to N^0 . We need not specify the bar-level at which this affix is adjoined - the attachment to NP is independently derivable. However, verbal -s and the other verbal affixes must be specifically restricted to attach to V^0 , and not to VP. No principle of Case theory rules out attachment of these affixes to VP; they will assign Case to the VP, which will then percolate down to the head, and all visibility requirements will be satisfied:



Verbal affixes appear (at PF) only string-adjacent to verb stems. Thus we specify:

(2.184)

An affix which attaches to a projection of V must be string-adjacent to a V^O which it Case-marks.

This condition, which is language-specific, holds at least at S-Structure and PF. The condition can be shown to hold at S-Structure, because if for example -ing could attach to the VP node in a premodifier, the 'head-final' effect would not occur, and the head of the VP would be visible to take complements.

The adjacency restriction may not hold at LF. An interesting related matter involves the adjectival affixes -er and -est (degree modifiers), which we will show in chap.3 are string-adjacent to the adjective at S-Structure, but are adjoined to AP at LF.

2.4.2 Suppletions

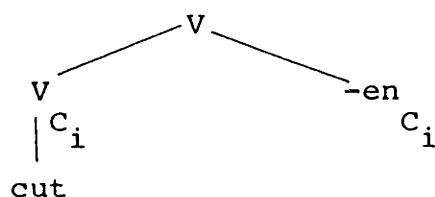
The affixes which we have discussed are Case-assigners. They must be present at every level where theta-chain visibility is checked, that is at least at S-Structure, and possibly also at LF.

Affixes are normally present in the PF output, but

government relations between affix and stem are not always present at PF. That is, while at S-Structure a passive participle must consist of a verb stem governed by -en, the PF representation of a passive participle is not necessarily of this form; the PF representation of the passive participle 'cut', for example, is merely a stem, with no governing affix, despite the fact that its S-Structure representation is 'cut-en'. The visibility condition is thus not satisfied at PF.

(2.185)

(a) LF:



(b) PF:

V
[cut]

Irregular forms of this kind we call 'suppletions'.

We suggest that word+affix pairs (for those affixes which are represented in the syntax) are represented as being in a government relation at S-Structure, and are replaced by single segments at PF. In English, in the regular case, a V+en structure is replaced at PF by a V+/d/ structure; for some verbs, a single suppletive morpheme replaces V+en. ('/-en/' is the name given to an affix which is in fact regularly realized as /d/. This participial affix is given the name /-en/ to distinguish it from the inflectional past tense affix, also regularly realized as /d/, which is called '/-ed/'.)

V-ing participles do not have any suppletive forms. Be+s is replaced with [is], and NP+s may trigger suppletions in a few cases ('I'+s=>[my], or [mine]). V+en triggers many

suppletions.

To conclude, there is no irregularity in the affix-stem relations at S-Structure, but irregularities in the form of suppletions may arise in the mapping rules between S-Structure and PF. Note that suppletive forms do not differ in syntactic properties from non-suppletive forms.

2.4.3 Summary

We have discussed Case in modern English. We have suggested that argument chains (which receive theta-roles), verb nodes which assign theta-roles, and all intervening nodes must satisfy a visibility requirement. The visibility requirements are as follows:

(2.186) VISIBILITY REQUIREMENTS

1. every node in a theta-indexed path must be visible
2. a predicate must have a visible subject

A node X is visible if

- (i) it is Case-matched
- (ii) it is PRO
- (iii) a projection of X is visible

By theta-indexed path we now include both assigner and assignee of a theta-role and all intervening nodes; both are theta-indexed, and both must be visible.

A C feature may be coindexed with only one other C feature. C features are associated with lexical items, as follows:

(2.187)

-ing	{ Cv (Cv/prog) }
-en	{ Cv (Cv/perfact or Cv/perfpas) } + Cn
-s	{ Cv + Cn/3sg }
have(aux)	Cv/perfact + Cn
be(aux)	{ Cv/perfpas or Cv/prog }
might	Cv
eat	Cn
give	Cn + Cn
see	Cn + { Cv or Cv/perfpas or Cv/prog }
about	Cn
while	Cv/prog

C features in addition may be associated in the syntax; Cn may be associated with Nmax, and Cv may be associated with Vmax.

Affixes which carry a Case feature are adjoined at S-Structure.

Our evidence in favor of Case-matching rather than Case-assignment comes from our account of Case-absorbing property of passive -en, and from our account of co-occurrence restrictions between auxiliaries and aspectual affixes.

2.4.3.1 Why verbs need Case

We have argued that the visibility requirement extends to verbs which assign theta-roles. By so doing, (1) we make auxiliary-affix co-occurrences parallel to the co-occurrences in overt Case-marking languages between certain verbs and NPs with certain Case affixes. (2) we account for the distribution of bare verb stems; in particular, we rule out *'the eat man'. We account for the fact that bare verb stems are found in roughly the same set of positions (in terms of adjacent governor) as bare NPs. (3) We provide an explanation for the survival of verbal -s, at one point not even part of the verbal inflectional paradigm.

Chapter 3

The visibility of AP and PP

In this chapter we extend the use of 'argument visibility' to account for the fact that APs and PPs in non-selected positions do not have internal arguments. We introduce a system of Case assignment to adjectives and to prepositions. We propose that post-adjuncts are embedded in clauses, where they are selected for and assigned Case by INFL, and that this is why adjuncts in NP can not be extracted from; they would violate subadjacency (specifically, they violate the CNPC).

3.1 Adjectival Case

3.1.1 APs: internal structure and distribution

In chap.2 we saw that the internal structure of a VP depends on whether the VP is assigned Case. If the VP is not assigned Case, visibility restrictions will not allow the head of the VP to take phrasal complements or adjuncts.

In this chapter we will see that adjective phrases and PPs have heads which take complements only if the PP or AP is assigned Case.

3.1.1.1 The internal structure of AP

The head of an AP may take theta-indexed arguments (examples (a) below), adverbial or PP adjuncts, bearing a thematic relation to the head (b), and degree modifiers such as intensifiers, and comparatives (c):

(a) A + argument

- (3.1) I am [happy WITH MY WORK]
- (3.2) They are [proud OF JOHN]
- (3.3) The children were [sick OF THIS MESS]
- (3.4) Jack is [fond OF ROVER]
- (3.5) they are [hard ON IMMIGRANTS]
- (3.6) I am [angry WITH THEM]
- (3.7) We are [happy TO BE HERE]
- (3.8) Mary was [certain THAT SHE WAS HOME]

(b) A + adjunct (predicated of A)

- (3.9) The film was [succesful IN SPAIN]
- (3.10) That invention seems [WIDELY appreciated]

(c) A + degree modifier

- (3.11) My magnet is [VERY powerful]
- (3.12) The situation is [CRYSTAL clear] [1]
- (3.13) This is [AS heavy AS AN ELEPHANT]

3.1.1.2 Where APs are found

We may distinguish the following five positions in which adjective phrases are found in English:

- (a) PREMODIFIER: dominated by NP, and before a noun,

1. We suggest that nouns may modify adjectives if the relationship involves comparison and intensification, as here; note that such combinations have level stress and so are probably not compounds.

(3.14) the happy man

(b) POSTMODIFIER: dominated by NP, and after a noun,

(3.15) a man proud of his children

(3.16) the officer responsible

(c) ADJUNCT: modifier of NP,

(3.17) He emerged sleepy

(3.18) Unhappy, John tried the refrigerator

(d) COMPLEMENT: dominated by VP, selected by one of a group of verbs (eg 'seem', 'look', 'become', 'be' etc.),

(3.19) He feels happy

(3.20) I consider him happy

(e) RESULTATIVE: a resultative adjunct dominated by VP,

(3.21) hammer the disc flat

(3.22) dance herself crazy

Resultative adjuncts can be AP, PP, sometimes VP. They have been discussed by Green (1972), Simpson (1983), Rothstein (1983). We will discuss the construction further in this chapter and in chap.4.

The internal composition of an AP depends on its position, in the following way: in certain AP positions, the head of the AP may not take complements or adjuncts. Degree modifiers are always acceptable. The positions in which the head of an AP may not take complements or adjuncts are premodifier and resultative position. We will now consider the relevant data.

3.1.1.3 Internal structure of premodifier

*Complement:

- (3.23) * the [proud OF HIS CHILDREN] man
- (3.24) * the [certain THAT HE IS RIGHT] man
- (3.25) * a [happy TO BE HERE] visitor
- (3.26) * a [sick OF LOBSTER] fisherman
- (3.27) * a [shy ABOUT STRANGERS] child

*Adjunct:

- (3.28) * the [popular IN AFRICA] novel

Degree modifier:

- (3.29) the [VERY happy] man
- (3.30) a [ROCK hard] candy

Here we see adjectives behaving like verbal participles, which also do not take complements or adjuncts.

Possible counterexamples to the claim that premodifying adjectives do not take complements or adjuncts are the following:

- (3.31) a [WIDELY believed] story
- (3.32) a [GENERALLY accepted] account

These adverbs are somewhat like degree modifiers, but they also appear to be thematically related to the head, in that they express agency. A possible approach, following Roeper and Siegel, is to analyse the modifier-head pair as a compound. Note that the Adv-A combination in this position has initial stress, characteristic of compounds. (However, though it is consistent with these combinations being compounds, this does not prove that they are compounds, as the syntactic, string-based 'rhythm rule' (Lieberman and Prince (1977)) gives this stress balance irrespective of structure).

3.1.1.4 Internal structure of resultative

*Complement:

- (3.33) * I danced myself [tired OF THE MUSIC]
- (3.34) * I drank the cans [empty OF BEER]
- (3.35) * I scrubbed the chicken [clean OF FEATHERS]
- (3.36) * I cried my eyes [blind TO THE SITUATION]
- (3.37) * I ate myself [sick OF STRAWBERRIES]
- (3.38) * I ate myself [full OF JUNKFOOD]

*Adjunct:

- (3.39) * I hammered the disc [flat IN THE MIDDLE]

Degree modifier:

- (3.40) I hammered the disc [flat AS A PANCAKE]

There are a few parallel cases with verbal -ing participles, showing that these too do not take complements in this position:

- (3.41) * I knocked him [flying THROUGH THE AIR]

The generalization that adjectives do not take complements or adjuncts when in resultative position is subject to certain possible counterexamples, which we will now consider.

(a) The following example is grammatical, and would appear to consist of an adjective with a PP complement:

- (3.42) I hammered the disc flat to the ground

We suggest, however, that here we have not an adjective-complement pair, but a combination of two resultative adjuncts. That is, 'flat' and 'to the ground' are both predicated of 'the disc'; double predication is allowed because the two adjuncts mean the same.

(b) When the AP is selected by 'make', in what appears to be a resultative construction, the AP may take

internal arguments:

- (3.43) I made him [happy WITH HIS WORK]
 (3.44) I made it [flat IN THE MIDDLE]

We propose that this is not a resultative construction, but a small-clause construction, with the NP and AP forming a clausal constituent. Note that 'make' takes a small clausal verbal constituent ("I made him eat").

(c) A possible counterexample is the following:

- (3.45) We combed her hair free of tangles

Here we have a resultative adjective 'free' which apparently takes a complement, 'of tangles'. We suggest that a parallel exists between 'free of tangles' and the 'swift of mind' type construction, where the NP in the AP is anaphorically related, in a part-whole relation, to the subject of the AP (in this case, 'her hair'). It is not clear in these cases that the NP in the AP is being assigned a theta-role by the adjective; rather the NP is licensed by standing in a part-whole relation to the subject predicated by the adjective. A similar case might be the type 'John broke his arm', where it might be argued that only one theta-role, patient, is assigned to 'John', and 'his arm' is related to 'John' not thematically but in a part-whole relation. If this is the right account of 'free of tangles', then 'free' does not assign a theta-role to 'tangles' and our generalization holds.

3.1.2 Case and adjectives

(a) A node theta-indexed with another node must be visible. Thus if an adjective takes a complement, the adjective must be visible. (b) A subject of predication must be visible; hence an adjective which is the subject of

predication by an adjunct must be visible.

An adjective which is not visible will not take either complement or adjunct. We propose that adjectives in premodifier and resultative position are not visible, and hence do not take complements or adjuncts, while adjectives in complement position, in postmodifier position and in adjunct position are all visible, and so may take complements or adjuncts.

We have seen that a node is visible if

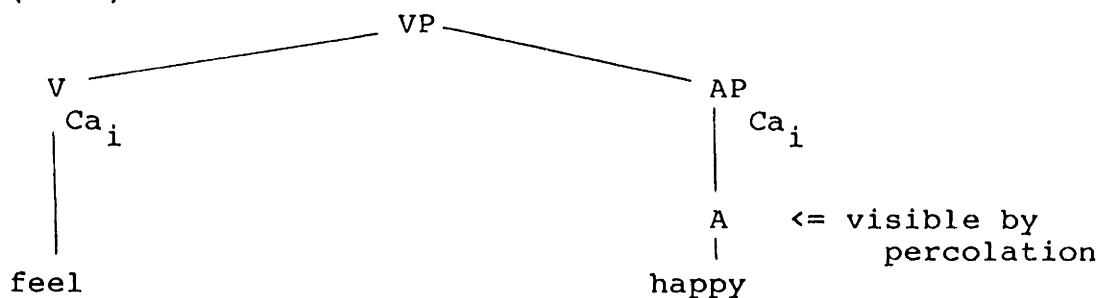
- (1) it is Case-matched,
- (2) it is PRO,
- (3) it is predicated of a visible node,
- (4) it heads a Case-matched node.

(We can exclude (2) as a visibility possibility for adjectives; adjectives are never PRO, which is an NP.)

We extend Case theory to cover adjectives, and introduce a new Case feature, Ca , parallel to Cv and Cn . The Case system is as for nouns and verbs. That is, lexical items which can assign Case to adjectives will be lexically associated with this feature. The adjectival Case feature Ca will be freely associated with A_{max} , just as Cn is associated with N_{max} , and Cv with V_{max} .

Verbs which take adjectival complements will assign adjectival Case. We illustrate with 'feel':

(3.46)



As the head of the AP is visible, it can take complements and

adjuncts:

- (3.47) He feels happy with his work
- (3.48) He feels happy at the office

Adjectives which head resultative and premodifier APs do not take complements or adjuncts, which suggests that these APs are not Case-matched. In the next two sections we will show that these APs are not in the kind of relation to a lexical item which is characteristic of Case-marking.

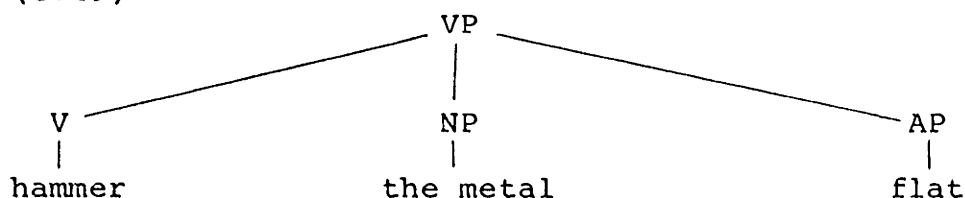
3.1.2.1 Premodifiers

A premodifier AP is not an argument of the noun which it takes for its subject. Thus the relationship is not characteristic of Case-matching, and we conclude that these APs are not assigned Case. These APs are visible as predicates, by virtue of being predicated of a subject with Case; however, the head of a visible predicate can inherit visibility only if the predicate node carries a matched Case feature, which is not the case in predication, and so the head of the AP will not be visible, and hence will not take complements or adjuncts.

3.1.2.2 Resultatives

Resultative APs (discussed by Simpson (1983)) "describe the state of an argument resulting from the action denoted by the verb". They are selected by contact verbs and change of state verbs, and are in a mutual c-command relation with the object of the verb, which they are predicated of:

(3.49)



Simpson suggests that the combinations of verb + resultative AP are idiosyncratic, with verbs choosing specific adjectives. For example, some combinations are acceptable while others are not:

- (3.50) I danced myself crazy
- (3.51) * I danced myself happy
- (3.52) I shot the tiger dead
- (3.53) * I shot the tiger sick
- (3.54) I cried my eyes red
- (3.55) * I cried my eyes sparkling

We suggest that these grammaticality differences are due, not to lexical selection of specific adjectives, but to a semantic restriction on resultative predicates, that they tend to express extreme resulting states, often final states (so result APs often express the destruction or exhaustion of the NP).

The verb-AP relationship is not characteristic of a Case-matching relationship in that (1) the AP is generally optional, and is not implied when absent (as optional NPs often are), (2) the verb and the AP are not adjacent.

Hence we conclude that there is no Case-matching of resultative APs, and hence these APs will not take internal arguments or adjuncts. We will see further support for this in chap.4, where we account for the fact that statal passives may not be resultatives (*'I hammered it broken'), based on the claim that resultative adjectives do not have internal complements.

3.1.2.3 Postnominal and adjunct APs

Postnominal APs have been discussed by Bolinger (1967), and adjunct APs by Rothstein (1983, pp.151-4). The heads of these APs may take complements, which suggests that the APs are Case-matched. However, these APs are not selected by any overt item in the sentence; Case-marking involves selection by specific items. This is something of a problem, which we will solve along the lines of our account of postmodifying 'aspectual' VPs.

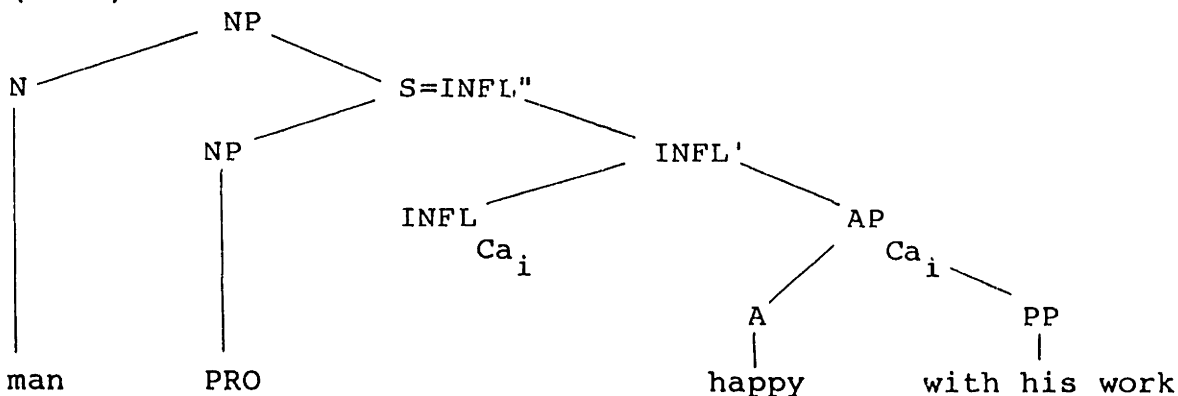
Recall that the problem with examples like the following was that aspectual (progressive and perfective passive) participles should be governed by an appropriate governor, such as an auxiliary or a perception verb:

(3.56) The man [running down the road]

(3.57) The woman [widowed yesterday]

We suggested that in fact these postmodifiers are clausal, with the VP assigned aspectual Case by a form of INFL, and containing a PRO which is controlled by the head of the NP. We propose the same solution for postnominal and adjunct APs (and later in this chapter will extend the solution also to PPs):

(3.58)



The PRO is controlled by the head of a noun phrase, if the clause is a postmodifier, and is controlled by an NP if the clause is a free adjunct.

In analyzing adjunct APs as clausal, with their own inflectional element, we follow Dowty (1972). Dowty proposes that sentential adjunct APs, which he calls 'temporally restrictive adjectives', such as 'young' in "the girl married young", are contained in their own clause, with a tense operator with the same time reference as the tense operator in the matrix (ie in our terms the INFL of the adjunct clause is anaphorically related to the INFL of the matrix). We extend this clausal analysis to cover post-nominal APs as well as sentential APs.

We will now provide justification for a clausal analysis of post-nominal APs and sentential adjunct APs.

(1) an adjective in one of these types of AP may be negated with 'not', which is normally taken to originate in INFL; other APs do not easily take 'not':

- (3.59) A man not proud of his work
- (3.60) The people not running down the street
- (3.61) he arrived not proud of what he had done
- (3.62) not happy with the results, they abandoned
the experiment
- (3.63) ? They appear not happy with the results
- (3.64) ? a not proud man [2]

A related matter, pointed out by Dowty, is that the sentential adjunct AP is negated by a c-commanding negation element in the matrix clause; this might suggest that the sentential adjunct is associated with an INFL of its own:

2. There is a systematic kind of exception to this, of the type 'a [not unhappy] man'; we propose that 'not un-' is a complex segment, and a degree modifier, not related to inflection.

- (3.65) John doesn't think the girl married young,
(he thinks she married old)

In addition to 'not', other sentential adverbs may appear associated with these adjectives:

- (3.66) A man evidently proud of his family
(3.67) Probably unhappy with the television,
they left the room

(2) As we pointed out earlier, progressive and perfective passive participles may appear as postmodifiers and adjuncts. We have suggested that progressive and perfective are verbal Cases, and require a governor. Hence this is supportive evidence that postmodifiers and adjuncts are clausal, as an INFL is required to assign progressive and perfective Case:

- (3.68) A woman widowed by war
(3.69) The vase broken into pieces is this one
(3.70) The men running into the store were detectives
(3.71) They arrived broken by the journey
(3.72) Reading a book, I turned the corner

(3) Adjuncts and postmodifiers describe a transitory state of the subject at the time defined by the tense of the main predicate (see Bolinger (1967), and Rothstein (1983)). In this they differ from premodifying adjectives which, in Bolinger's terms, express a 'characteristic state' of the subject which they modify. This transitoriness could be captured if it was made a property of an INFL element.

(4) It is not possible to extract from these adjunct APs (or for that matter from adjunct VPs or PPs), or to extract the APs themselves:

- (3.73) You saw [a man [happy with his work]]
(3.74) * [How happy with his work]_i did you see [a man —_i]
(3.75) You met [a man [proud of his children]]
(3.76) * [of whom]_i did you meet [a man [proud —_i]]

It has been proposed by Huang (1982) that it is not possible to extract from adjuncts because adjuncts are (defined as) not properly governed. Huang formulates a "Condition on Extraction Domains", which states that extraction out of X is possible only if X is properly governed. If proper government is defined structurally, as government by A, V, P, or N, then clausal adjuncts will not be properly governed; however, adjuncts in NP will be properly governed by N^0 , and so should be extractable from. Because adjuncts in NP are not extractable from, it is proposed that proper government is defined such that only complements are properly governed. Thus adjuncts are by definition not properly governed. However, our approach allows us to retain the purely structural notion of government which we proposed in chapter 1, which is blind to whether the governee is a complement or an adjunct. This is because we can predict by subjacency the ungrammaticality of extraction of or from an adjunct in an NP; thus we derive the island status of these adjuncts, rather than stipulating it as part of the definition of government. Our account is as follows. If adjunct APs are embedded in clauses then extraction of an AP in an NP or extraction from an AP in an NP will involve movement across an S and an NP; movement across two bounding nodes is ruled out by subjacency. Thus extraction from a postmodifying adjunct will be ruled out by a version of the 'complex noun phrase constraint' of Ross (1967):

(3.77)

* [How happy with his work]_i did you see [_{NP} a man [_S —_i]]

(3.78)

* [of whom]_i did you meet [_{NP} a man [_S [proud —_i]]]

(5) Certain adjectives are found only in the

premodifier position and not in the complement position:

- (3.79) A near miss
 (3.80) * The miss was near

These adjectives are not found as postmodifiers:

- (3.81) * A miss near

Similarly, certain adjectives are found as complements but not as premodifiers. This is the case for adjectives with 'a-':

- (3.82) * A fully awake man
 (3.83) The man seems fully awake

These adjectives are found as postmodifiers:

- (3.84) A man fully awake

Generally speaking, then, postmodifying adjectives are the kinds of adjectives which are found in complement position but not in premodifying position (for an account of the difference see Siegel, M. (1976)). This supports our analysis, where postmodifying adjectives are complements of INFL, predicated of an NP.

(6) A final argument concerns the direction of predication. 'Characteristic' (Bolinger's term) modifiers appear prenominally and not post-nominally. We say 'a happy man', but not (with the same meaning) 'a man happy'. The AP not be freely generated before or after the noun, but is restricted to prenominal position. We may account for this by a restriction on predication on nonmaximal projections, such that a predicate whose subject is nonmaximal must precede the subject. This could be formulated either as a constraint on the direction of predicate visibility or as a constraint on the direction of predication. If postmodifiers modified the noun directly, they would violate this constraint. Our

proposal is that these postmodifying adjectives are actually predicated of a maximal projection (PRO), and thus the constraint holds.

Thus we have argued that postmodifiers and adjuncts are clausal. We may not allow premodifiers to be clausal – if they were, premodifiers would be Case-marked and able to take complements. Clauses are not permitted in premodifier position; for control clauses, with which we are concerned, this may be because control by the noun to the PRO is ruled out here.

3.1.3 APs as predicates

APs always act as predicates.

Premodifying APs govern the noun which they modify; this noun must be visible, and will make the predicate visible. Note that the predicate AP node does not carry a feature which can percolate down to the head of the AP and so make the head visible; rather the AP node is visible by virtue of the predication relationship, and not by virtue of carrying a matched feature.

APs selected by INFL in clauses will be predicated of the PRO subject, just like VPs selected by INFL.

APs selected by verbs sometimes govern their subject, as in the following examples, where the AP heads a small clause:

(3.85) I consider [him [happy]]
 AP' AP

(3.86) he_i seems [t_i [happy]]
 AP' AP

However, there are a few cases where we analyze the AP as forming a complex predicate with the verb, such that the VP governs the subject of the verb and the AP:

(3.87) he [feels [happy]]
 VP AP

Here, the AP does not govern the NP 'he', despite the fact that it is predicated of the NP.

3.1.3.1 Headless NPs

Sometimes NPs have no overt head, but may contain a modifying AP:

(3.88) The poor

(3.89) The unhappy

We propose that the APs are here predicated of an N^0 which has no phonological content, but which is visible at S-Structure, by percolation from Nmax.

3.1.4 Case and the external argument of AP

3.1.4.1 A stipulation

In this section we will deal with the following problem. An adjective has one role in its theta-grid marked as external; this theta-role is always assigned, irrespective of whether the adjective is visible. For example, premodifier or resultative AP assigns a theta-role to the noun it modifies. This theta-role is the role marked as external in the adjective's theta-grid. But the adjective which heads a premodifier or resultative AP is not visible, because the AP is not assigned Case.

The internal theta-roles, as we have seen, are assigned only if the adjective is visible; we must explain why the visibility of the adjective is irrelevant to the

assignment of the external theta-role.

The phenomenon is specific to adjectives. A verb, for example, must itself be visible in order to assign its external theta-role. Compare the following examples:

(3.90) The [happy] man

(3.91) * The [run] man

In neither example is the head of the modifier visible; in the case of the adjective, however, the external theta-role may be assigned.

External theta-roles have a peculiar property, which is that they may be percolated and assigned from an Xmax node. A Vmax or Amax node is always a predicate, and must be predicated of a visible subject; thus a Vmax or Amax node will always be visible. The consequence of this is that we predict that the external theta-role can be assigned by the premodifying adjective; the problem is rather why the verb stem can not assign its external theta-role. The external theta-role of the verb should be able to percolate to VP; VP is visible by virtue of being predicated of a visible subject, and thus the external theta-role is assigned by a visible node, and 'the run man' should be grammatical.

Clearly, then, there is a difference in properties between adjective and verb with regard to the external theta-role. The external theta-role of the adjective can always be percolated to Amax, but the external theta-role of the verb can be percolated to Vmax only if the verb is suffixed.

We propose that in the lexical theta-grid of a verb stem one role is marked 'external', but that in order to acquire the properties (eg ability to percolate) of an external argument, the grid must be on a visible node. Thus the external theta-role of a verb will be percolated only from a

suffixed stem.

3.1.4.2 Support for the stipulation

We may perhaps find support for this stipulation in the behavior of adjectives in lexical compounding and lexical derivation. We know little about lexical processes, and so we can draw only tentative conclusions. Consider, however, the fact that the external theta-role of an adjective is always realized, in some sense, while internal arguments are often lost. The external theta-role of the verb does not have any special status during lexical derivations, on the other hand, and need not be retained. We take this as an indication that during a lexical derivation, the external theta-role of an adjective may percolate up irrespective of visibility, while the external theta-role of a verb is not fully active unless it is carried by a visible node (there is no visibility in the lexicon).

Consider first compounds. In A-N compounds the N is always the external argument of the adjective, and never the internal argument. This is the case even in metonymic, headless compounds like 'red-head'. In N-A compounds, either the external argument of the adjective is carried over to become the external argument of the compound, as in 'shock-resistant' or 'house-proud', or (in rare cases) the external argument of the compound bears some more distant relationship to the external argument of the compound, as in 'trigger-happy, 'head-strong'.

In adjective-to-verb derivation, the derived verb means 'make NP Adj, or 'become Adj'; the theta-role derived from the adjective and assigned to the noun is the external one, and not an internal one.

- (3.92) valid-ate, fecund-ate
- (3.93) western-ize, italic-ize, popular-ize, stabl-ize
- (3.94) solid-ify, simpl-ify
- (3.95) black-en, moist-en

In adjective-to-noun derivation, the derived noun expresses a state such that "the N of X", or "X's N" is related to "X is Adj"; again, it is the external argument which is carried over and not the internal argument.

- (3.96) happy-ness, detached-ness
- (3.97) sincer-ity, sever-ity, crud-ity
- (3.98) brav-ery
- (3.99) likely-hood, false-hood

In adjective-to-adjective derivation, the argument structure of the adjective is unchanged. (eg with -ish, -er, -est).

Thus the external argument of an adjective does indeed appear to have a special status, lexically, in that it must be realized; this might follow from its being in some sense inherently visible, while the internal arguments have to be made visible.

Compare verbs, where the external argument does not appear to have any special status.

Thus in many compounds a verb stem is (very rarely) thematically unrelated to the node which it is compounded with, or is (frequently) compounded with the internal argument, or with an adjunct:

- (3.100) go-cup, eaves-drop, leap year
- (3.101) bake-house, tow-path, mince-meat, call-girl

When verbs are adjectivalized, and nominalized, the argument structure of the verb is often carried over without modification (though arguments may be lost); thus the external argument of a deverbal adjective is the external argument of the verb (except with -able and -en). However, if we look at

the meaning of nominalizations we see that the external argument does not have priority; that is, the nominalization sometimes (perhaps more commonly) refers to an internal argument of the verb (a), and sometimes to the external argument (b):

- (a)
- (3.102) call, slice (zero-derived nouns)
- (3.103) recit-al, propos-al
- (3.104) break-age
- (3.105) pay-ee, employ-ee
- (3.106) continu-ation, organiz-ation, observ-ation
- (3.107) establish-ment, allot-ment, place-ment
- (3.108) read-er, broil-er (chicken), sampl-er
- (b)
- (3.109) cook, divide, guard (zero-derived nouns)
- (3.110) seep-age
- (3.111) defend-ant
- (3.112) visit-ation, introduct-ion
- (3.113) government, management, amusement, refreshment
- (3.114) sleep-er, trail-er, hear-er, kill-er

We conclude that lexical processes preserve and are generally sensitive to the external theta-role of an adjective, but are not sensitive to the external theta-role of a verb. We take this to provide support for our stipulation that the external theta-role of an adjective need not be made visible, while the external theta-role of a verb has only partial properties unless it is made visible.

3.1.5 Visibility and degree modifiers

An adjective may always take degree modifiers, even if the adjective is not visible by percolation. Does this mean that degree modification is not subject to visibility conditions? We suggest that degree modification requires its target to be visible, but the target is not the head of the AP, but the AP node itself, and that visibility is in this

case required only at LF. We suggest that at LF a degree modifier is raised (by move alpha) to be adjoined to AP; AP is visible because it is predicated of a visible subject. Degree modification we take to be like predication in that the degree modifier is visible if the thing it modifies is visible.

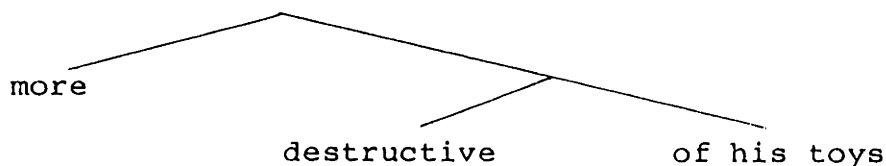
Degree modifiers (which are raised to AP) are:

- (a) very, fairly, relatively, enough, more, etc.
- (b) comparatives, eg 'as...as S/NP'
- (c) (comparative) nominal intensifiers eg 'crystal' in 'crystal clear', 'dog' in 'dog tired' etc.
- (d) the affixes -er and -est

We will now provide some evidence in favor of a QR approach to degree modifiers.

Degree modifiers have scope over an adjective and its complement. Thus 'more destructive of his toys' can be interpreted as: he was in a state of being 'destructive of his toys'; now he is more so. The phrase does not mean that he was in a state of being destructive, now he is more destructive, and he is more destructive specifically of his toys. At LF then a degree modifier has the following structural relationship to the phrase and complement:

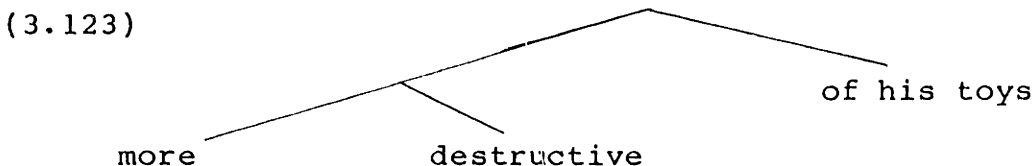
(3.115)



However, at S-Structure the degree modifier is bracketed as a constituent with the adjective (the argument is from Yagi (1977)). Thus for example the modifier+adjective may be topicalized, leaving the complement behind; we may see from the following examples that an analysis where the whole AP is topicalized and the complement then extraposed is not tenable (examples from Yagi(1977)).

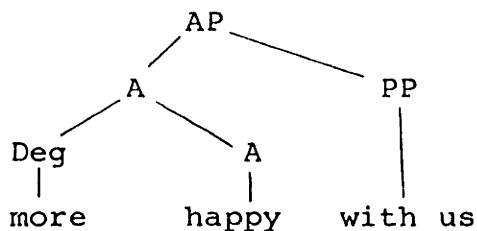
- (3.116) HOW PROUD he is [_ of his son]
 (3.117) SO BUSY have I been [_ with my work] that
 I feel exhausted now
 (3.118) HOW ENVIOUS he is [_ [of me] [for my success]]
 (3.119) You dont know HOW GREEDY he is [_ for money]
 despite his remarks to the contrary
 (3.120) HOW AFRAID do you think I was [_ of the dark]
 when I was a child
 (3.121) HOW KEEN does he seem [to have been [_ on
 football] in his schooldays]
 (3.122) VERY PROUD though you might think [I was
 [_ of my son] when he came back with a fortune], I was
 in fact rather disappointed.

Thus at S-structure, the degree modifier is in the following structural relation with the adjective and its complement:

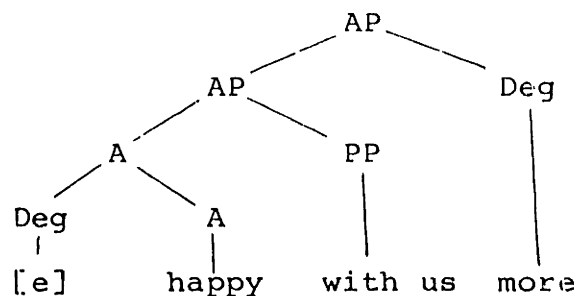


Thus the S-structure representation, determined by movement tests, and the LF representation, determined by intuitions about meaning, are different. This difference can be captured if we move the degree modifier in deriving LF from S-Structure, by the rule move- α which adjoins the degree modifier to AP at LF.

(3.124)
 S-Structure:



LF:

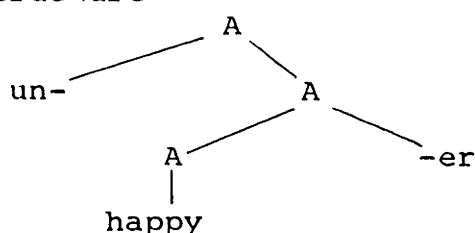


Pesetsky (1983) has suggested that the comparative

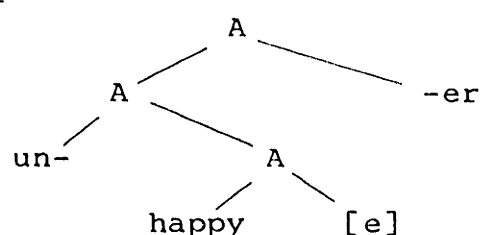
and superlative suffixes, which are degree modifiers, are not in the same position at S-Structure and at LF. He argues this for the following reason. -Er and -est do not attach to disyllabic adjectives, like 'unhappy'; hence 'unhappier' must, at the level where this restriction holds (Pesetsky suggests S-Structure), be represented as [un-[happy-er]]. But this is not the correct semantic representation of 'unhappier' which means 'more not happy' and not 'not more happy'; that is, semantically, -er has scope over the negative un-. For this reason, Pesetsky suggests that at LF -er is adjoined to the adjective, outside un-:

(3.125)

S-Structure



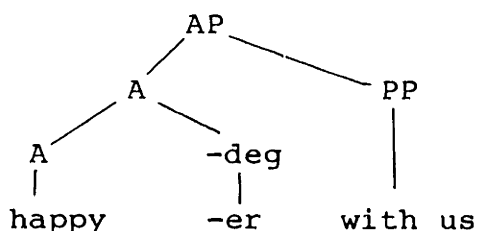
LF



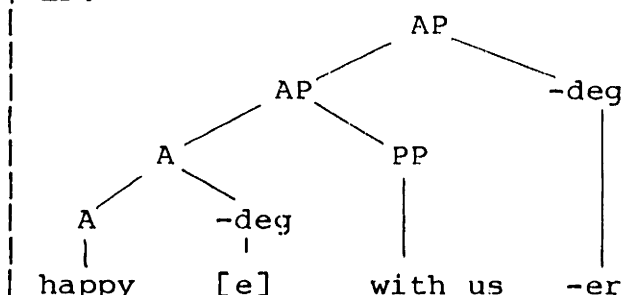
We suggest that -er is adjoined to AP rather than to A. Note that -er has scope over the adjective and its complement. Thus we give 'happi-er (with us)' the following S-Structure and LF representations:

(3.126)

S-Structure:



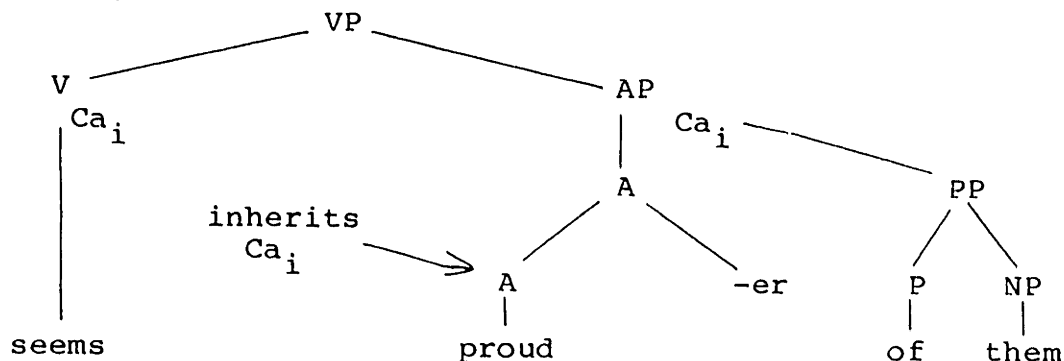
LF:



Note that an adjective can inherit visibility despite being suffixed with -er or -est. This means that a

matched Ca feature percolates down to the adjective stem rather than to the comparative/superlative suffix:

(3.127)



Thus the affix *-er* or *-est* is not in a bar-projection relationship with the mother *A* node; rather it is a maximal projection (like its non-affixal counterparts 'more' and 'most'). As the *-er/-est* suffix is not a head, it is an exception to the right hand head rule (see chap.1).

3.2 The visibility of PPs

We propose that prepositions are subject to the same visibility constraints as adjectives.

3.2.1 The distribution of PP

For the most part, PPs either consist of just a preposition (the PP is then called a 'particle'), or contain a preposition which has an NP complement. PPs are found in the same types of positions as APs are found; as complements, as postadjuncts in NP and VP, as sentential adjuncts, (possibly) as resultatives, and (perhaps some particles) as premodifiers:

Complement:

- (3.128) I swallowed it [down]
 (3.129) I put the book [on the table]
 (3.130) It floated [into the room]

Post-adjunct:

- (3.131) The man [in the park]
 (3.132) We decided [in the boat]

Sentential adjunct:

- (3.133) [In five years] we ate many pancakes
 (3.134) John arrived [in a flustered state]

Resultatives:

- (3.135) He drank himself [to death]
 (3.136) We pined ourselves [into the grave]

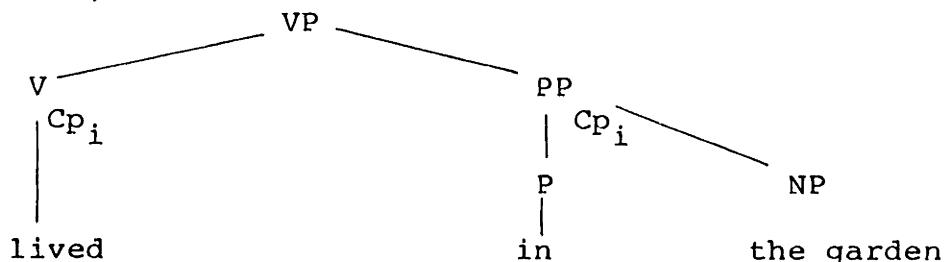
Premodifiers:

- (3.137) * The [under the table] book
 (3.138) An [up] escalator

We propose that prepositions are subject to the same visibility conditions as adjectives. That is, the preposition should take a complement just in case the PP is assigned Prepositional Case 'Cp' (which will percolate down to the preposition). This means that we should get P+NP combinations just in lexically selected positions.

Complement PPs may contain a complement NP, as we predict. Verbs which select for a PP will carry a Cp feature. We see an instance of this in the following diagram:

(3.139)



We will argue that adjunct PPs are selected by INFL and are embedded in clauses, just as in the case of APs.

We correctly predict that there are no premodifier P+NP combinations:

- (3.140) * The in the garden man
- (3.141) * The on the table newspaper
- (3.142) * The at the fair children

The premodifier PP is not selected, thus not assigned Case, and thus the head of the PP is not visible, and so can not take a complement. It is not clear whether the particles that are found in the premodifier position are genuine modifiers, or are simply combined in some kind of appositional relationship with the noun.

What about resultatives? We do find P+NP combinations as resultatives, but the resultative position is not a selected position, and so we would not expect to find a P+NP here. Our visibility hypothesis appears to make the wrong prediction.

Note, however, that the only PPs that are true resultatives are headed by 'to' or 'into':

- (3.143) I burnt it to a cinder
- (3.144) I drank myself to death
- (3.145) I hammered it into pieces

We propose that these PPs do not involve internal theta-assignment between the preposition and the NP. Note that NPs may not by themselves act as resultatives:

- (3.146) * I burnt it a cinder

We suggest that there is some incompatibility between the meaning of an NP and the meaning of a resultative, and what the preposition does is act as a function changing a referential expression into a result predicate. Only the preposition 'to' (and 'into') has this function. Thus the preposition does not assign a theta-role to the NP, and it

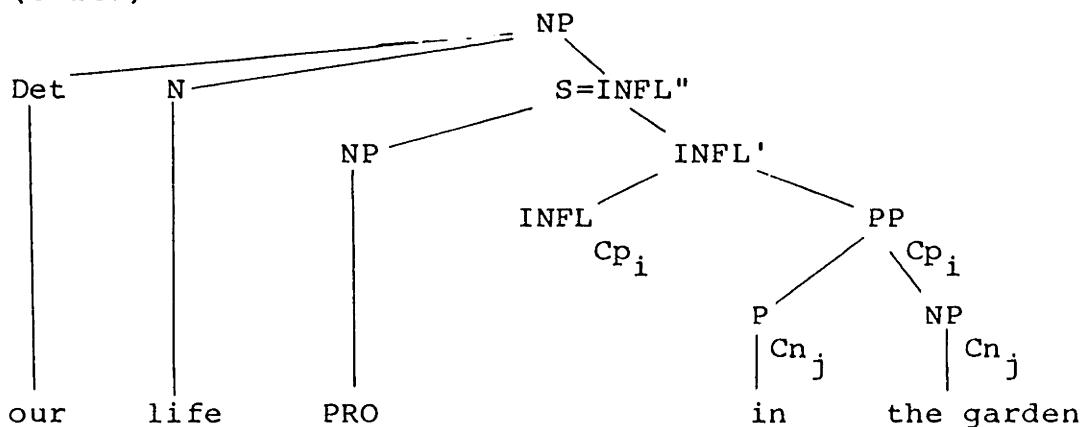
does not matter that the preposition is not visible.

Thus, in general, it seems plausible that PPs are subject to the same visibility conditions as APs, VPs, and NPs.

3.2.1.1 The clausal analysis of adjunct PPs

Along the lines of our analysis of adjectives, we propose that adjunct PPs, whether in a phrase or sentential, are embedded in a clause headed by a form of INFL which selects for a PP and assigns Cp_i .

(3.147)



In section 1 we provided evidence that adjunct adjectives are clausal. We use similar evidence for the clausal analysis of adjunct PPs.

(1) The PP can be accompanied by 'not', which is an inflectional element, and other sentential adverbs:

(3.148) The only book not on the floor

(3.149) The child not at school

(3.150) The unicorn possibly in the garden

(2) PP sentential adjuncts and postmodifiers describe a transitory state of the subject at the time defined by the tense of the main predicate, which is captured by

providing them with an accompanying INFL element.

(3) Extraction facts. PP adjuncts in NPs can not be extracted from, ruled out on our account by subadjacency.

(3.151) * Which table did you read [the book on]

(3.152) * Which garden did you have [a walk in —]

Note that PPs which are in VP, may be extracted from; here extraction does not go past an S and an NP node; moreover, the adjunct is properly governed by the verb, and thus the Condition on Extraction Domains is met:

(3.153) Which garden did you walk in

(4) If PPs in NPs are predicated of PRO, as we propose, and not of N, then the restriction on the direction of predication is retained.

3.2.1.2 'Adjunct' INFL

We have now made use of an INFL which heads controlled clauses in adjunct positions. This INFL may assign one of the following Case features. Cv/perfpas, Cv/prog, Ca, Cp. We see these four Case-matchings in the following four examples:

(3.154)

The man [PRO INFL [given the book]]

(3.155)

Cv/perfpas_i Cv/perfpas_i

(3.155)
The people [PRO INFL [running down the street]]
Cv/prog_i Cv/prog_i

(3.156)

A doctor [PRO INFL [proud of his bookcase]]

(3.157)

(3.157)

A trifle [PRO INFL [in the garden]]

Cp_i Cp_i

3.2.2 Kinds of prepositional Case

Pesetsky (1982) has suggested that subcategorization properties can be derived from the theta-grid and the Case-assigning properties of a lexical item. A lexical item often selects for a specific preposition. However, it is not clear that the selection for a particular preposition can be derived from the theta-grid, as the same theta-role may be associated with different prepositions, as in the following example:

- (3.158) proud of him
- (3.159) * proud in him
- (3.160) * pride of him
- (3.161) pride in him
- (3.162) fond of him
- (3.163) * fond for him
- (3.164) ? fondness of him
- (3.165) fondness for him

As such, we could make the selection for a particular preposition a part of the Case feature; thus there will be different kinds of prepositional Case, each associated with a particular preposition. In such a system, for example, 'give' would have the option of assigning Cp/to, and Cp/to is lexically associated with the preposition 'to':

- (3.166)
- give to charity
- Cp/to_i Cp/to_i

A problem with this approach is that INFL which selects for a PP selects for any kind of PP; if each preposition had its own Case feature, INFL would have to be able to assign any of the Cp/.. features. As such, we will not take an approach where different prepositions are associated with different Cp features. Rather we propose that

in general the preposition chosen depends on the theta-role involved, but there are some marked selections (eg 'pride' is marked to take 'in').

3.3 Further comments on visibility

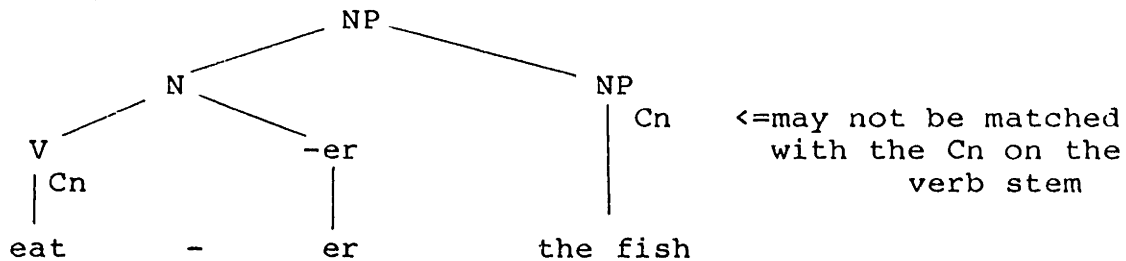
3.3.1 Adjacency

In chap.2 we mentioned a constraint on Case-marking which was proposed by Stowell, which is that the Case-marker and the node assigned Case must be adjacent. We will now consider the status of adjacency in our extended Case system.

Stowell proposed that when Case is assigned to an NP, the NP must be adjacent to the Case-assigner. Double object verbs are a superficial exception to this, as Case is assigned to two NPs, but only one is adjacent to the verb; we adapt the adjacency condition to say that the NP must either be directly adjacent to the Case-assigner, or may be separated from the Case-assigner only by an NP which is assigned Case.

In chap.5 we will see that the adjacency constraint enables us to prevent Case-assignment by the verb stem embedded in a derived nominal. For example, the noun 'eat-er' may not assign Case, which means that we must prevent the verb 'eat' from assigning Case. This is achieved by the adjacency condition, as the element -er intervenes between 'eat' and a complement NP. We illustrate this below:

(3.167) *



A possible problem for the adjacency constraint arises as a consequence of our account of the Case-restoring properties of auxiliary 'have'. Recall that our account of a sentence like the following involves Case-matching of Cn between 'have' and the VP:

(3.168) I have _{Cn_i} never [_{VP}seen it]_{Cn_i}

However, 'never' may intervene, as may any sentential adverb; the intervening elements are elements in INFL. 'Have' is also in INFL here; it is possible that 'have' is moved into INFL only at PF, and at S-Structure there is no adjacency violation.

Thus we would be able to retain the adjacency constraint for matching of Cn. It is not clear whether the adjacency constraint holds for other kinds of Case-matching.

Consider, for example, the assignment of prepositional Case to a PP. A Case-marked NP may intervene, just as in the assignment of nominal Case:

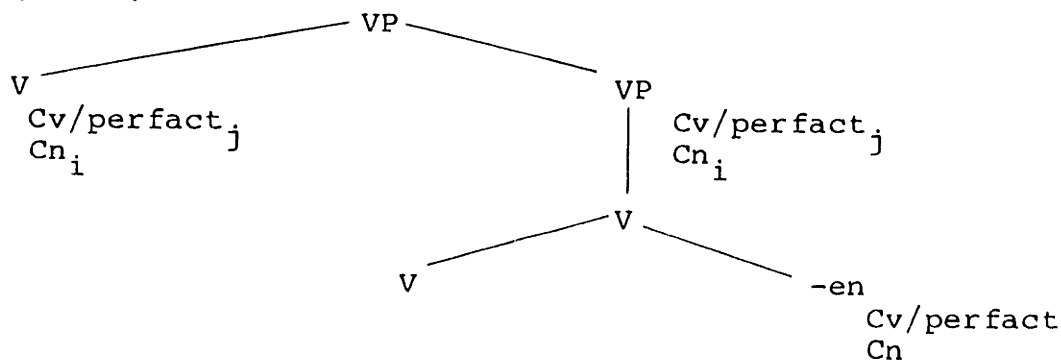
(3.169) I gave my picture [PP to her]
 $\begin{matrix} \text{Cp}_i \\ \text{Cn}_j \end{matrix}$ Cn_j Cp_i

At PF an adverb may intervene between the Case-assigner and the PP assignee, but this may be the result

projections in the syntax, they are associated with a projection of an appropriate category. Thus Cv is associated with Vmax, Cn with Nmax, Cp with Pmax, and Ca with Amax. A lexical item which carries Case as a lexical feature will select for a maximal projection carrying an appropriate feature. Thus the verb 'give' carries either two Cn features, or a Cn and a Cp feature, and in the first case will match with two NPs, and in the second with an NP and a PP.

Note however that there are occasional mismatches; a Cn feature is not necessarily carried by an Nmax. In one case, a Cn feature lexically associated with the affix -en percolates to a Vmax, and is matched there. Thus the auxiliary 'have' carries a Cn feature which is matched not with a feature on an NP but with a feature on a VP:

(3.174)



3.3.3 The 'Head-Final Filter' in German

A major aim of chapters 2 and 3 has been to provide an account of the 'Head Final Filter', proposed by Williams (1982). This filter states that a premodifier must itself be head-final; internal to a premodifier the head must be the rightmost item.

We have provided an account of the English data which is covered by the filter. A premodifier has a head

which is not visible which is why it can not take complements or adjuncts after the head. Our account predicts also that the premodifier will not have pre-head complements or adjuncts, a prediction difficult to test in English, as APs and VPs do not clearly take pre-head adjuncts and certainly do not take pre-head complements.

In support for our account, we have shown that 'head-final' effects appear also in resultatives, where the filter makes no prediction, but our visibility approach correctly rules out complements and adjuncts.

Thus as far as English is concerned, our 'visibility' approach enables us to dispense with the Head Final Filter. However, as Williams shows, premodifiers in German can take internal complements which precede the head of the premodifier. In the following examples we see first a head-final VP with an internal complement (this example from Williams), and then a head final AP with an internal complement:

(3.175)

der	seine Pfeife	rauchende	Mann
the	his pipe	smoking	man

(3.176)

ein	jedes Opfer	faehiger	Freund
a	of every sacrifice	capable	friend

These examples are predicted by the Head-Final Filter, but apparently violate visibility requirements, as the head of the premodifier should not be visible.

We propose that the head of the German premodifier is in fact visible, and is assigned Case by the affix which attaches to the premodifier. While an English premodifier is not lexically selected, a German premodifier is selected by one of a restricted set of affixes, which we claim are adjoined at S-Structure to the VP. Thus the structure of a

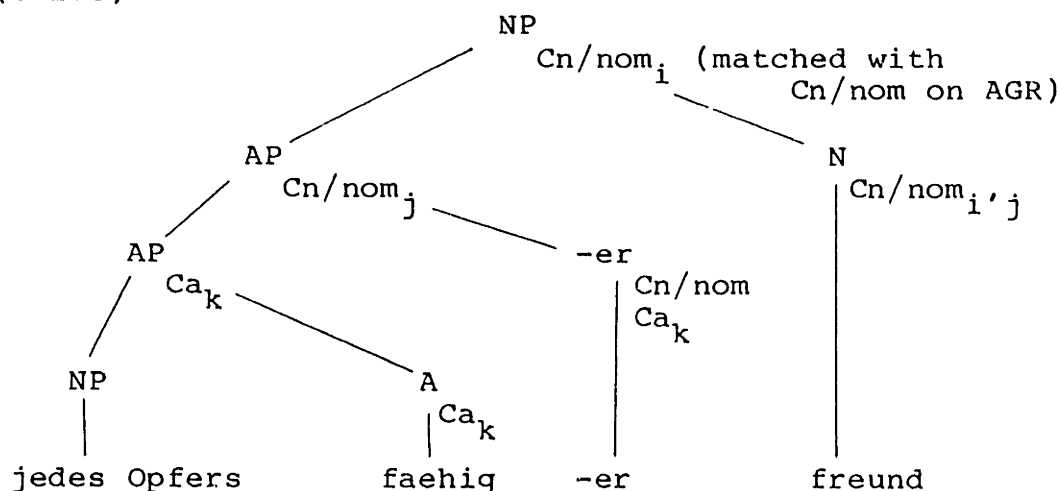
premodifying AP in German is:

(3.177)

ein [[jedes Opfer faehig] -er] Freund
 AP

We claim that -er governs and matches adjectival Case with the AP, much as nominal -s matches Cn with an NP in English. The matched Case percolates down to the head of the AP and thus the adjective can take complements. The primary function of -er is not to assign Ca, however; rather, -er is the overt manifestation of predicate visibility. In German, a predicate is visible when it is matched with a visible subject, and matching here (unlike English) involves the matching of C features. Thus if the head of the NP carries a Cn/dat, the AP must carry a Cn/dat as well, a feature which is lexically associated with certain AP affixes. we illustrate this below:

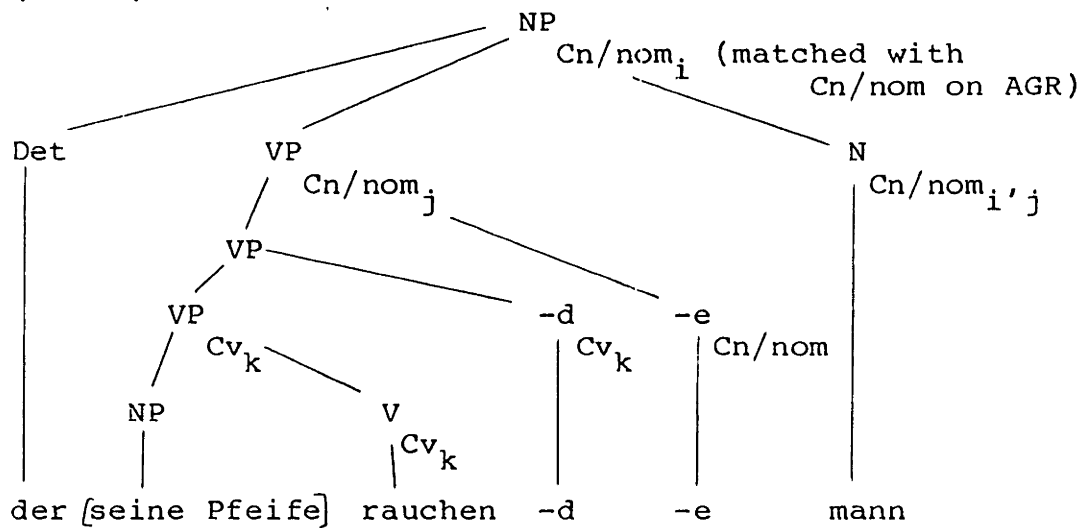
(3.178)



In the case of the premodifying verbs we appear to be dealing with a composite affix, as the V-en form of the verb takes a morpheme -d followed by an adjectival agreement affix, eg 'laufen-d-er'. We have not studied this in detail, but tentatively suggest that here the -d morpheme has the

function of assigning a Cv feature to the VP; the agreement marker can not do this, as the agreement marker does not carry a Cv feature. Thus in premodifying VPs we see the Case-matching with the premodifier and the Predicative Case-matching with the head of the NP as two separate processes, involving different morphemes:

(3.179)



Chapter 4

Compounds

In this chapter we examine a class of compounds - 'synthetic compounds' - discussed in detail by Roeper and Siegel (1978), which we argue are constructed in the syntax, with the relation between the parts dealt with by theta-indexing. We consider the place of visibility in the description of these compounds. We show that statal (adjectival) passive is formed by a syntactic affixation, and is often realized as part of a compound with a trace as the other part.

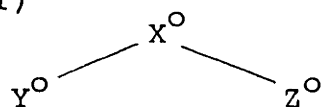
4.1 Synthetic compounds

4.1.1 Properties of compounds

4.1.1.1 Typical structure

An English compound typically has the following structure:

(4.1)



where X,Y,Z stand for any category

house	-	proud	[N A]	A
catch	-	penny	[V N]	A
proof	-	read	[N V]	V
match	-	stick	[N N]	N
child	-	prodigy	[N N]	N
nervous	-	system	[A N]	N
big	-	wig	[A N]	N
after	-	image	[P N]	N
swear	-	word	[V N]	N
sit	-	in	[V P]	N
sun	-	down	[N P]	N

4.1.1.2 Compound stress

In a two-word compound, the first word is more heavily stressed than the second [1]. This is a rule with few exceptions (for discussion of some apparent exceptions, see Fabb (1982)).

4.1.1.3 Endocentric and exocentric

A typical kind of compound structure is where the left hand word restricts the meaning of the right hand word, with the compound as a whole having that restricted meaning. These compounds are considered 'endocentric', that is, having a head - the right hand node being the head:

(4.2) ENDOCENTRIC COMPOUNDS

blood thirsty
proof read

1. We specify 'two-word': In a compound with the structure [X-[Y-Z]] Y carries the heaviest stress, eg in "cigar chain-smoker", 'chain' gets heaviest stress.

White House
 after image
 go cart
 nervous system
 spinning wheel
 nursery rhyme
 down cast

Other compounds, not having this structure, are 'exocentric', headless. Thus compare the first five compounds above with the following five; they have the same constituent structure, but the former are endocentric, the latter exocentric. The compounds below are exocentric by their semantics. That is, though the node on the right is the same category as the mother node, the mother is not semantically a projection of the righthand node:

(4.3) EXOCENTRIC COMPOUNDS

trigger happy
 eaves drop
 blue stocking
 under dog
 kill joy

4.1.1.4 A phrasal node in a compound

Sometimes syntactic fragments are found as the left node of a compound noun and what may be N' may also appear here:

- (4.4) a [ground to air] missile
- (4.5) a [shoot to kill] order
- (4.6) a [used car] salesman
- (4.7) a [green vegetable(s)] shelf

These compounds form an exception to the generalization that a syntactic item can not undergo a lexical process.

4.1.2 Synthetic compounds

4.1.2.1 Roeper and Siegel (1978)

Roeper and Siegel (1978) introduced a new kind of data into the discussion, initiated by Chomsky (1970), of transformational as against lexical word-formation processes. They pointed to a type of compound, the synthetic compound, (called 'verbal compound' by Roeper and Siegel, and by other writers also 'verbal-nexus compound'), whose internal structure echoes the internal structure of a phrase, that is, the parts of the compound have a head-complement or head-adjunct relation to each other. This type of word differs from the derived words discussed by Chomsky (1970), or Wasow (1977), in that syntactic principles appear to be operating between the parts of the word itself.

The synthetic compound is the clearest case in English of a word whose internal composition is in some sense syntactic. Synthetic compounds are syntactic in that they (unlike other compounds which, following Roeper and Siegel, we call 'root compounds') are fully productive, and have a semantically transparent internal structure, which mirrors the internal argument/adjunct structure of a verb phrase, either an active phrase, or, if the compound is headed by a passive participle, a passive phrase. Examples of synthetic compounds are:

- (4.8) the **nut eating** giraffe (the giraffe eats nuts)
- (4.9) the **house cleaning** should be done early
(clean the house)
- (4.10) the **dog killer** (kill the dog)
- (4.11) the **monkey bitten** tourist
(the tourist bitten by a monkey)

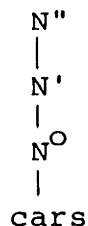
Roeper and Siegel proposed that a synthetic compound is the output of a transformation which operates on the subcategorization frame of a verb, taking the element which normally follows the verb, and placing it in a compound with the verb, at the same time adding an affix, -ing, -er or -en. Synthetic compounds, and Roeper and Siegel's solution, have been discussed in Allen (1978), Selkirk (1982), Lieber (1983), Botha (1981), Kiparsky (1982). While Roeper and Siegel's specific solution is rejected (largely because there are problems in taking a subcategorization frame as the input to a string-based transformation), most of the papers agree with the essence of Roeper and Siegel's proposal, that syntactic principles are at play in the construction of synthetic compounds.

4.1.2.2 The compound bar-projection relation

We will now show that all that is needed for compounds to be constructed in the syntax is to have an appropriate extension of the bar-projection rules. It is normally assumed that we have the following vertical relations among nodes at D-Structure:

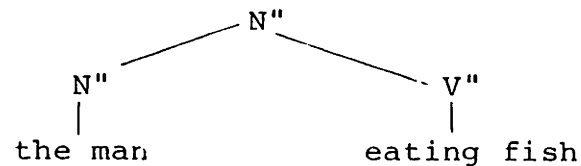
(a) The mother node is one bar-level higher than daughter node:

(4.12)



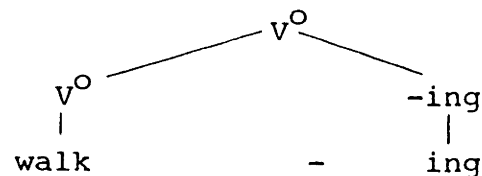
(b) X'' dominates X'' :

(4.13)



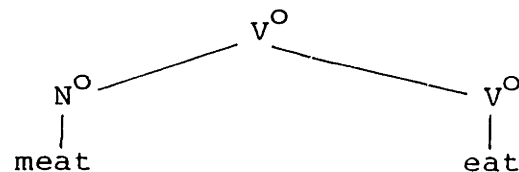
(c) We proposed in chap.2 that a possible D-Structure relationship is X^0 dominating Y^0 and an affix:

(4.14)



All that is required in order to generate compounds in the syntax is to allow X^0 to dominate two 0 level nodes. Thus the following is allowed to be a well-formed bar-projection relationship, with the mother projected from the righthand daughter:

(4.15)



If we take affixes to be 0 bar level items, then we need this bar-projection configuration independently, for affixed words.

4.1.2.3 Theta-assignment in a compound

The productivity and transparency of synthetic compounds is indicative that they are constructed in the syntax; these properties are characteristic of syntactic items. We propose that the verb which heads the compound

assigns a theta-role to the noun in the compound. Thus a theta-role is assigned to the left; in this, theta-assignment in a compound differs from theta-assignment in a phrase.

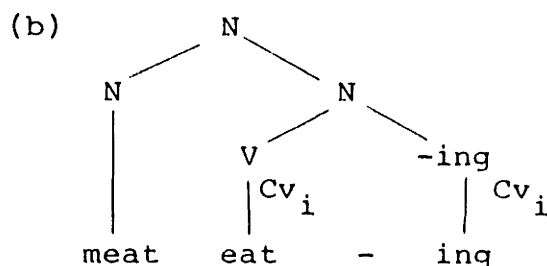
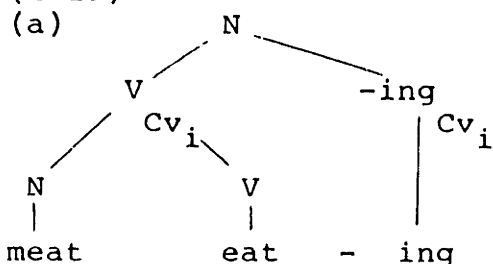
The noun in the compound will be made visible by being assigned Case by the verb (the noun is its own maximal projection; as N_{max} , it may assume a C_n feature). The verb must also be made visible. On the whole, synthetic compounds are not found in lexically selected positions; that is, they are not assigned verbal Case from outside. Thus the verb may be made visible only by the affix. Consider, for example, the following synthetic compounds:

- (4.16) A match-swallowing acrobat
 (4.17) Wall-wiping
 (4.18) The disc-cruncher

Here, the compound has no governing item with an unmatched C_v . However, the verb stem must be visible. Thus the affix must make the stem visible. We saw in chap.2 that verbal $-ing$ carries a C_v feature; the fact that compounds can be formed in the syntax with $-er$ and $-ing_N$ indicates that these affixes too must have a C_v feature to assign.

There are logically two possibilities as to where the affix is adjoined. We see these below.

(4.19)



In chap.2 we formulated a visibility requirement, according to which every node on the path between a theta-assigner and an assignee must be visible. This restriction enabled us to rule

out 'the running guns man'. The same restriction requires us to choose (a) rather than (b). In (b) there is an intervening node (the mother of the theta-assigner) which is not visible. This node is visible in (a).

For the above reason, this is the structure of all synthetic compound types.

4.1.2.4 Additional evidence for (a)

We will now give additional evidence in favor of (a), using the prefix 'un-'. The placement of /un-/ supports structure (a) over structure (b).

- (4.20) un-bitten by rats
- (4.21) * rat-un-bitten
- (4.22) un-rat-bitten

/Un-/, when attached to a stative, creates a form which means the absence of the state, eg 'happy', 'unhappy'; 'bitten', 'unbitten'. When attached to an action verb, the new verb means the reverse action, eg 'tie', 'untie'.

'Bite' is not a reversible action, and hence can not be prefixed with /un-/, but 'bitten' is a state, and so may be prefixed with /un-/. The fact that 'rat-un-bite-en' is ungrammatical indicates that 'bite-en' does not form a constituent, as in structure (a).

/Un-/ can be found inside a synthetic compound only when it has scope over the verb stem (ie is reversative), and not the participle:

- (4.23) an [[officer-[un-tie]]-d] hostage
(= officer unties hostage)

It has been suggested (by Pesetsky) that conjunction facts support (b) over (a):

- (4.24) the [meat and potato] eat-ing Scotsman
 (4.25) the potato growing and eating Englishman
 (4.26) * the [[meat eat] and [wine drink]]-ing Welshman

Both (a) and (b) structures allow the first example. The second will straightforwardly be admitted by (b), and will be admitted by (a) if we consider it an example of conjoined compounds, with the noun of the second one deleted under identity with the noun of the first:

- (4.27) the [[potato growing] and [_ eating]] Englishman

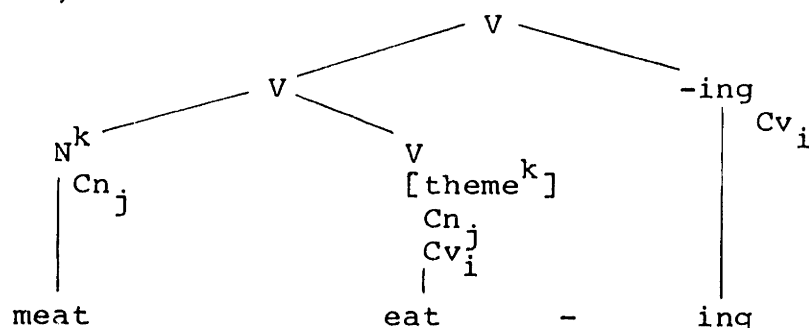
The third example is well-formed by our bar-projection rules. We must rule it out by a constraint that an affix must be string-adjacent to the verb stem which it makes visible. Thus the example will be ruled out because the lefthand stem is made visible by an affix which is not string-adjacent. This constraint is required independently, to rule out attachment of a verbal affix to a VP node in an example like the following:

- (4.28) I am [eat the meat] -ing

4.1.2.5 The S-Structure Representation of a synthetic compound

We give an example of the S-Structure representation of a synthetic compound below.

- (4.29)



The V 'eat' governs N 'meat' and they are theta-indexed; N gets nominal Case by virtue of being governed by V, and V gets verbal Case by virtue of being governed by -ing. Thus all of the theta-path is visible.

4.1.2.6 The status of the complement

We might now ask, whether the complement to the verb stem in the compound is in fact an X^0 ; could it be X' or XP ? There are some cases where the complement is itself modified:

- (4.30) a [used computer] seller
- (4.31) a [green grass] loving hitchhiker
- (4.32) a [happy enough] seeming workman
- (4.33) [american history] teacher

These examples indicate that N' or A' (perhaps even AP , depending on our account of the position of 'enough') may occupy the complement slot. The noun complement may however not take a specifier:

- (4.34) * a [the Bible] lover
- (4.35) * a [the Bronx] hating congressman
- (4.36) * an [every animal] eating dinosaur

This suggests that a referential NP may not occupy this in-compound position; even inherent determiners (as in 'the Bronx') are not allowed here.

4.1.2.7 Active synthetic compounds

Thus we have a straightforward account of compounds consisting of an N, a V, and an affix, where the affix is $-ing_N$, $-ing_V$, or $-er_N$. These are probably the most common synthetic compound types. Examples follow; new examples may freely be constructed (a mark of a syntactic process).

(4.37) NOMINAL -ING

computer-wrecking
 coke-snorting
 cloud-watching
 window-scratching

(4.38) VERBAL -ING

an acrobat-kicking elephant
 the bottle-smashing policeman
 a radiator-installing organization
 a sun-worshipping crocodile

(4.39) NOMINAL -ER

the chair-licker
 a screen-wiper
 a face-waxer
 the knot-cutter

4.1.2.8 AP as the complement in a synthetic compound

Roeper and Siegel suggested that synthetic compounds need not have a noun as the non-head; the non-head could also be an adjective, or adverb. (They point out that the preposition-verb type, 'in-growing', is unproductive and thus not truly a synthetic compound type.) The purported adverb-verb compounds which they cite have level stress; as such, these may not be compounds at all. Their analysis, whether compound or not, is unproblematic - the adverb assigns an adjunct theta-role to the verb which it c-commands.

Consider now the adjective-verb types:

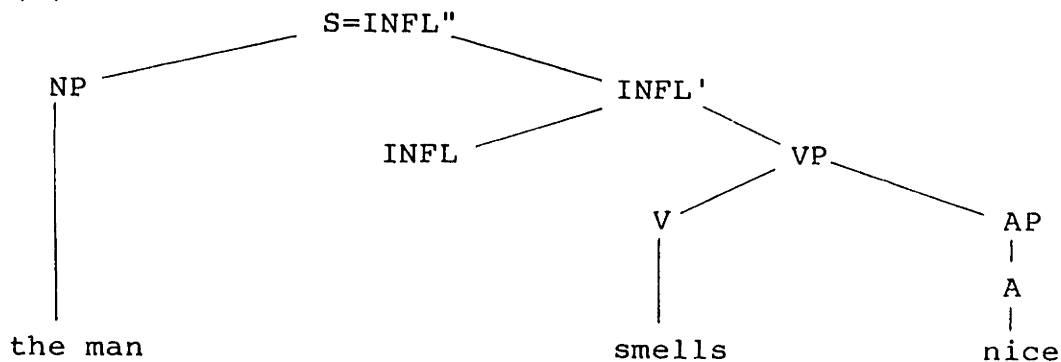
- (4.40) strange sounding
- (4.41) nice seeming
- (4.42) fresh smelling
- (4.43) happy looking
- (4.44) pleasant tasting
- (4.45) grim acting

If we are to accommodate these compounds under the thematic-role assignment approach formulated for other

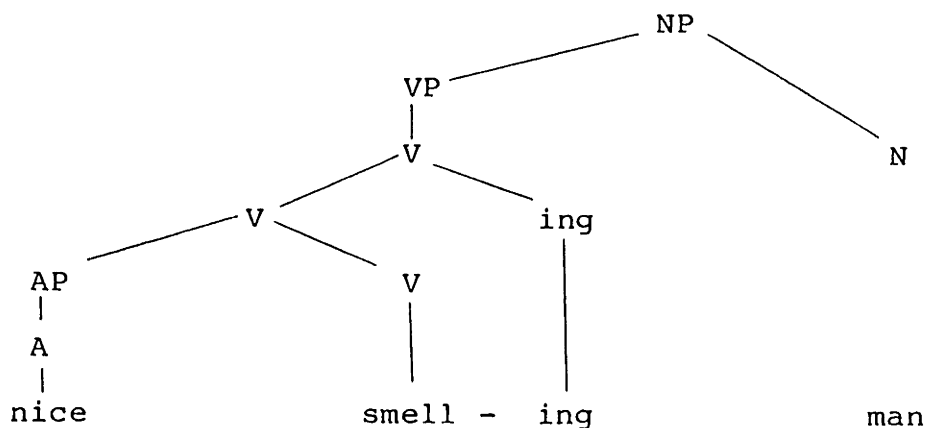
synthetic compounds, we must give them the structure in (b) below, parallel to the structure in (a) below; the thematic structures will, as required by the Projection Principle, then be the same for the compound and the phrase.

(4.46)

(a)



(b)



The phrasal structure of these complements is supported by the fact that the adjective can be modified by 'very', 'enough', or many other modifiers: The noun complement in a compound is not so freely modified.

(4.47) [pretty strange] sounding

(4.48) [happy enough] looking

4.2 Passive participles and their compounds

4.2.1 The two passives

The fourth type of synthetic compound, which we have not so far discussed, is the passive synthetic compound:

- (4.49) moth eaten
- (4.50) state owned
- (4.51) wind swept
- (4.52) hand finished
- (4.53) land based

When we discussed the 'active' synthetic compounds in $-ing_V$, $-ing_N$, and $-er_N$, we saw no reason to believe that the theta-grid of the verb stem in the compound was any different from the theta-grid of the verb stem when it heads a phrase. That is, the complementation properties of the verb were the same whether it headed a compound or a phrase.

However, passive synthetic compounds present us with a problem, which will require extensive discussion. The problem is that there are two clearly distinguishable types of passive participle - the verbal actual passive (what we have called 'perfective passive') and the adjectival statal passive; it is primarily the latter which is found in synthetic compounds.

- (4.54) The window got broken = verbal actual
- (4.55) I saw the window broken = verbal actual
- (4.56) The window seems broken = adjectival statal
- (4.57) The broken window = adjectival statal

These two kinds of participle, it has been argued (Wasow (1977), Williams (1981)), differ in their complementation

properties in that in the statal passive, the theta-grid of the verb is altered, while in the actal passive the theta-grid is unaltered. Such an alteration of the theta-grid violates the Projection Principle, and thus it is argued that the statal passive is constructed not in the syntax, but in the lexicon, where the Projection Principle does not hold. Specifically, the problem which this now standard approach causes us is: if the statal passive is constructed in the lexicon, we can not have an affix-outside account of the syntactically constructed synthetic compound; this might imply that passive synthetic compounds are not syntactic, but lexical.

Thus before dealing with passive synthetic compounds of the type 'rat-bitten', we must consider Wasow/Williams account of the lexical nature of statal passive. We will argue that statal passive is on fact constructed in the syntax, is associated with a trace (like actal passive) and does not violate the Projection Principle.

4.2.2 The differences between statal and actal passives

4.2.2.1 Semantic differences

Semantically, the difference between a statal passive and an actal passive is roughly the difference between an adjective and a verb, and we will see that in fact statal passive is an adjective and actal passive is a verb. An actal passive predicated of X expresses an event or act which involves X, while a statal passive predicated of X expresses a state which X is in.

A special property of statal passive, which distinguishes it from other adjectives, is that statal passive

expresses a resultant state, a state which arises as the result of an event or act. Thus statal passive often implies a prior event or act, and this influences its behavior. For example, statal passive is not normally able to take degree modifiers:

- (4.58) ? very broken
 (4.59) * very dropped

We follow Freidin (1975) in taking this to be an indication of the implication of an event which statal passives carry. Another indication of the difference between statal passive and other adjectives is that when un- is prefixed to a statal passive, the resulting form expresses not the absence of the state expressed by the statal passive, but more precisely the non-occurrence of an act which would give rise to the state expressed by the statal passive. Thus 'an unbroken vase' is not simply any vase that is not broken, but specifically a vase that one might have expected to have been broken, but which was not; un- indicates that the event of breaking did not take place.

4.2.2.2 Statal passive is an adjective

It has generally been assumed and argued that statal passives are adjectives (as far as I know, only Lightfoot (1981) differs on this point), while actal passives are verbs (Freidin (1975) argues that active passives too are adjectives). In this section we will examine the evidence that statal passive is an adjective.

Part-of-speech can be determined on the basis of three kinds of structural information: (1) the distribution of the maximal projection, (2) the complements, adjuncts and specifiers taken by the node in question, and (3) the affixes

which may be attached.

(1) The distribution of the maximal projection.

We find APs in five positions; of these, statal passives appear in premodifier, complement (to seem), adjunct, and postmodifier position, but not as resultatives.

- (4.60) the undiscussed papers
- (4.61) The books look torn
- (4.62) I like cookies broken
- (4.63) the papers undiscussed by the lawyers
- (4.64) * I hammered it broken

The position which most clearly shows that statal passive is an adjective is the complement-to-seem position. 'Seem' may take a clausal complement, or a predicate NP or PP or AP. If statal passive is a verb, then 'seem' would have to be able to take VP complements, but apart from statal passive, no verbs may appear here:

- (4.65) * He seems believing the answer
- (4.66) * He seems sleeping

Hence we conclude that 'seem' does not take VP complements, and that statal passive is an adjective, heading an AP.

In a later section we will show why statal passive is unacceptable as a resultative, using the fact that statal passive governs a trace.

(2) The internal structure of statal passive phrases

In terms of modification, statal passives are unlike other adjectives. Statal passives may only marginally be intensified, and may be modified by agentive adverbs like 'widely', which are poor with other adjectives:

- (4.67) he was very popular
- (4.68) ? he was very liked
- (4.69) ? he was widely popular
- (4.70) he was widely liked

These differences in modification do not indicate that statal passives are not adjectives. Rather they are a different kind of adjective, one which expresses a state arising from an action or event. To quote Freidin ((1975) p.399), "since events are not conceived of in terms of degrees, predicates referring to events will not take degree modifiers". Note additionally, that 'widely' does not appear with the (verbal) perfective passive: *'he was widely given books'. Hence the modification of statal passives indicates that they are adjectives rather than verbs.

The complement and adjunct structure of statal passives is much like the complement structure of perfective passives, except that a statal passive may not assign a theta-role to an NP complement:

- (4.71) I have been given the book
 (4.72) * I seem given the book

The fact that the statal passive may not take an NP complement can be derived if statal passive assigns no Case within the phrase, which would follow if statal passive was an adjective, as adjectives do not assign Case.

Another complementation property which makes statal passive somewhat unusual as an adjective is that it takes predicate complements, which underived adjectives do not appear to do. We take this to be a carry over of specifically verbal complementation features in the course of derivation.

- (4.73) Mick seems widely considered a fool
 (4.74) Ronnie seems generally thought insipid
 (4.75) * He is likely intelligent

We will discuss the complement structure of statal passive in more detail later in this chapter.

(3) Affixation of statal passive

Stative 'un-' [2] freely attaches to statal passives. We might say that stative un- attaches freely to any stative adjective or verb. This would rule out *'un-running', while allowing 'un-broken', but would however also allow *'un-believe' and *'un-know'. As such, it seems that un- does not attach to verbs. Hence the fact of un-affixation indicates that the statal passive is an adjective. Note that un-passives are different from un-adjectives in that they do not express the opposite of a state (as in 'un-happy') but rather express the state which exists when some event or act fails to occur. Thus 'an un-broken vase' is not just any vase which happens not to be broken, but is rather a vase which might have got broken but didn't. This semantic difference between unpassives and unadjectives is related to the semantic difference between statal passives, which express a state resulting from an event or act, and adjectives, which are not related to events or Acts.

-Ly and -ness attach sometimes to statal passives, though not very productively:

- (4.76) The brokenness of the toy
- (4.77) connectedness
- (4.78) detachedness
- (4.79) repeatedly
- (4.80) supposedly
- (4.81) resignedly
- (4.82) hurriedly
- (4.83) assuredly

The lack of productivity of these suffixes may be related to the semantics of statal passive. The fact that they attach at all is a strong indication that statal passives are adjectives.

2. Distinguished from the reversative un-, which we find in eg 'un-tie' see Siegel, D. (1973)

Interestingly, even when phonologically appropriate, and when otherwise intensifiable (marginally, by 'very'), statal passives do not take the comparative or superlative suffixes '-er' and '-est', which attach to monosyllabic adjectives (and to a very few disyllabic adjectives):

- (4.84) * cut-er (compare cute-er)
- (4.85) * hurt-er (compare curt-er)
- (4.86) * stuck-er
- (4.87) * spoilt-er
- (4.88) * lost-er

(Note that these passives may marginally be intensified; the interesting fact is that they may not be intensified with '-er': 'more cut', 'more hurt', 'more stuck', 'more spoilt', 'more lost'.). Possibly the reason that the suffixes do not attach is that the statal passive is represented as bi-syllabic (even in a case like 'cut') at S-Structure, and it is at this level that the phonological selectional restrictions of -er and -est must be satisfied (ie at S-Structure, according to Pesetsky).

We conclude on the basis of the above evidence that statal passives are adjectives, though they differ from other adjectives in that adjectives basically express a state, while statal passives basically express a state arising from an action or event.

Rouveret and Vergnaud (1980) proposed that passive participles were neither adjective nor verb, but rather were a neutralized category, between adjective and verb. This was achieved using a featural breakdown of category. Two features +/-N and +/-V are taken to define the four major categories. Verb is <+V,-N> and adjective is <+V,+N>. Rouveret and Vergnaud suggested that -N is the feature which enables a particular item to assign Case, thus verbs will assign Case because they have -N. They suggested that passive participles

(a) do not assign Case, and (b) display sometimes verbal and sometimes adjectival behavior, because passive participles have the feature composition <+V>, with no N feature. The lack of a -N feature means that the participle will not assign Case, and the fact that the participle is <+V> means that it may behave as a verb or as an adjective, as the +/-N feature which distinguishes verb and adjective is not present.

We do not adopt this approach, (1) because we have shown in chap.2 that the fact that passive participles do not assign Case can be derived, in our Case-matching theory, (2) because in fact passive participles are not neutralized verb/adjectives. Statal passives are adjectives, and actal passives are verbs.

4.2.2.3 Restrictions on the construction of statal passive phrases

Compared with actal passive, statal passives are restricted in several ways. Some verbs which have actal passives do not form statal passives; others form statal passives which must be accompanied in the phrase by an adverb or complement, or must be prefixed with un-. Furthermore, statal passives can not always take the complements which can be taken by actal passives.

First, consider the fact that not all the verbs which form actal passives will form statal passives. We show this using verbs which take one object:

- (4.89) the toy was broken
- (4.90) the broken toy
- (4.91) the treasure was buried
- (4.92) the buried treasure
- (4.93) the box was painted
- (4.94) the painted box
- (4.95) the door was locked
- (4.96) the locked door

(4.97) the president was elected
 (4.98) the elected president
 (4.99) the proposal was rejected
 (4.100) the rejected proposal
 (4.101) the knife was sharpened
 (4.102) the sharpened knife
 (4.103) the floor was polished
 (4.104) the polished floor

(4.105) the museum was built
 (4.106) * the built museum
 (4.107) the book was read
 (4.108) * the read book
 (4.109) the man was helped
 (4.110) * the helped man
 (4.111) the child was thanked
 (4.112) * the thanked child
 (4.113) the child was slapped
 (4.114) * the slapped child
 (4.115) the chicken was killed
 (4.116) * the killed chicken
 (4.117) the story was believed
 (4.118) * the believed story
 (4.119) the stove was cleaned
 (4.120) * the cleaned stove

The ungrammatical examples often become grammatical if the participle is modified by an adverb, or forms part of a synthetic compound, or is prefixed with un-:

(4.121) the recently built museum
 (4.122) the well read book
 (4.123) an un-read book
 (4.124) the sharply slapped child
 (4.125) the freshly killed chicken
 (4.126) the widely believed story
 (4.127) the hand-cleaned stove

Consider now the acceptability of different statal passive phrases as complements of 'seem', 'appear' and 'remain'. These phrases are Case-matched, and so the heads are visible; as such, we would expect to find statal passive phrases equivalent to all perfective passive phrases. In fact, statal passive phrases are subject to various

restrictions, such that the set of acceptable statal passive phrases forms a subset of the acceptable equivalent perfective passive phrases. The following statal passive phrases all have perfectly acceptable perfective passive equivalents (to see this, replace 'seem' with auxiliary 'be'):

NP:

- (4.128) * He seems given a warning
- (4.129) * I was unelected president
- (4.130) * They were unenvied their shoes
- (4.131) * They were unwritten a letter

By-NP:

- (4.132) It seemed challenged by the new findings
- (4.133) * It appears challenged by the lawyers
- (4.134) It appears unchallenged by the lawyers
- (4.135) ? the letter remained unwritten by the lawyers
- (4.136) ? the city seems destroyed by the enemy
- (4.137) the island seems inhabited by penguins
- (4.138) * It seems lived-in by John
- (4.139) ? seems convinced by John
- (4.140) seems convinced by John's arguments
- (4.141) ? It seems frequently polluted by the effluent from the factory
- (4.142) * It seemed complicated by John's departure
- (4.143) It seemed undetected by Sherlock Holmes
- (4.144) ? It seems painted by Renoir

BENEFACTIVES:

- (4.145) he seems aided by his ignorance of the subject
- (4.146) he seems helped by his experience

to-NP:

(to NP subcategorized:)

- (4.147) * It seems credited to the real author
- (4.148) It seems uncredited to the real author
- (4.149) It seems unexplained to him that table manners are necessary

- (4.150) ? It remains unnailed to the wall

(dative alternation:)

- (4.151) * It seems given to the school
- (4.152) * the language seems untaught to them
- (4.153) * the ball stayed unthrown to Rex
- (4.154) ? the letter remained unwritten to them
- (4.155) ? the letter remains unsent to them

(non-argument:)

- (4.156) He seems known to everyone as a crook

with NP:

(4.157) It seems polluted with oil

in NP:

(4.158) It seemed unreported in the press

among NP:

(4.159) * It seemed discussed among our friends

of NP:

(4.160) ? He seems accused of treachery

(4.161) ? He seems suspected of the deed

against NP:

(4.162) It seems adequately defended against rust

tensed clause:

(4.163) He seems convinced [that John will leave]

(4.164) He seems persuaded [that John will leave]

infinitival clause:

(4.165) * He seemed persuaded [PRO to take the trolley]

(4.166) * John seemed expected [t to be here]

(4.167) ? he seems widely expected [t to be wearing a hat]

(4.168) ? John seemed widely believed [t to be a fool]

gerund:

(4.169) * He seemed heard [t singing softly]

AP/predicate NP:

(4.170) Mary seems widely considered a fool

(4.171) Perry seems generally thought insipid

(4.172) * He seemed proclaimed happy

(4.173) * She seems proclaimed queen

(4.174) ? He remains unproclaimed king

It was proposed by Wasow that the restrictions on the formation of statal passive could be captured by constructing statal passive participles in the lexicon, and giving them idiosyncratic selectional properties.

We suggest that the restrictions are not on the

participle, but on the statal passive phrase, the predicate. [3]) The basic restriction is that an AP predicate must express a state; the bad phrases too strongly imply an act or event. Compare, for example, 'convinced by John' and 'convinced by Johns arguments'; the latter is a better AP because the agent is not expressed, and the former is acceptable if 'John' is not conceived of as an agent, if 'convinced by John' means 'found John convincing'. Again, compare 'considered' and 'proclaimed'; the expression of an act with an agent is stronger with the latter, hence 'he seemed considered a king' is better than 'he seemed proclaimed a king'.

Why does 'un-' prefixation make a statal passive more acceptable? What un- does is create a predicate which expresses a state arising because a certain act or event failed to occur. Thus 'the vase was unbroken' implies that the vase might have become broken; 'an unbroken vase' is not just any vase that happens to be complete, but is used for a vase that might have become broken, but failed to be. Hence 'unconsidered by the lawyers' is a better AP than 'considered by the lawyers'; the former expresses a state arising because an act did not take place, while the latter expresses a state arising from an act.

Williams and Wasow argued that a statal passive phrase was predicated only of a theme. This was said to indicate that statal passive was subject to lexical restrictions on its argument structure. In particular, they pointed out that benefactives could not be the subject of passive APs, and so benefactive verbs like 'help' and 'thank'

3. Maling (1983) suggested that the complement to 'seem' must be gradable. Un-passives however are not gradable (they may not take 'Very').

were unable to form statal passives:

- (4.175) * He seems helped
 (4.176) * He seems thanked

However, the generalization does not appear to be correct. The following examples show acceptable statal passives formed from benefactive verbs:

- (4.177) he seems aided by his ignorance of the subject
 (4.178) he seems helped by the experience

We suggest that the bad examples 'he seems helped' and 'he seems thanked' are unacceptable because they too strongly imply an act by a human agent.

Thus rather than a restriction on the formation of statal passive participles, we propose a restriction holding of APs in general, that they must express 'pure' states, without the implication of an act or an event.

4.2.3 Trace and statal passive

4.2.3.1 Williams' lexical account of statal passive

Williams (1981) adopts an account of actal passive which is compatible with the account of passive which we outlined in chap.2. This involves the -en affix depriving the verb of a Cn feature, with the consequence that the theta-role assigned to the first object position is carried by an NP in subject position at S-Structure. The external argument is optionally assigned through a 'by' phrase.

However, Williams gives a different account of statal passive. A statal passive participle for Williams is the output of a process in the course of which the theta-grid of the verb is altered. Specifically, the marker -E is

relocated from its original role to the theme role in the grid, and the original 'E' argument is made optional.

(4.179) eg formation of a statal passive from the verb 'love'

love	=>	loved
[agent -E]		[(agent)]
[theme]		[theme -E]

This process alters the theta-grid, and thus we suggest should be construed as violating the Projection Principle. As such the process can not be a syntactic one.

The surface effect in terms of argument structure is similar for the statal and the actal passive. In both cases, a theta-role is assigned to the subject position which would be assigned to the object of the active verb. The differences are that the statal passive assigns only theme to the subject position, while the actal passive may assign other theta-roles. Thus a verb like 'thank' which does not assign a theme theta-role (its object is a benefactive) will not form a statal passive:

(4.180)	He was thanked	=actal
(4.181)	* A thanked man	=statal

We will see, in fact, that this prediction of Williams' account is not correct.

Williams' approach requires two rules for passive - a syntactic affixation of -en and a lexical affixation of -en. In the next section we will take an approach where there is only one rule for statal and for actal passive. This approach builds on our claims concerning the syntactic construction of synthetic compounds.

4.2.3.2 A syntactic account of statal passive

We propose that the -en morpheme which forms perfective active, or actal passive, or statal passive, is attached always in the syntax, does not alter the theta-grid, and has one of three sets of features.

-En always carries the Case features Cn and Cv, but is either an adjective or a verb, and if a verb takes either the Case feature Cv/perfact or Cv/perfpas. The three sets of features are:

(4.182)

-en

(i)

verb
Cn
Cv
Cv/perfact

(ii)

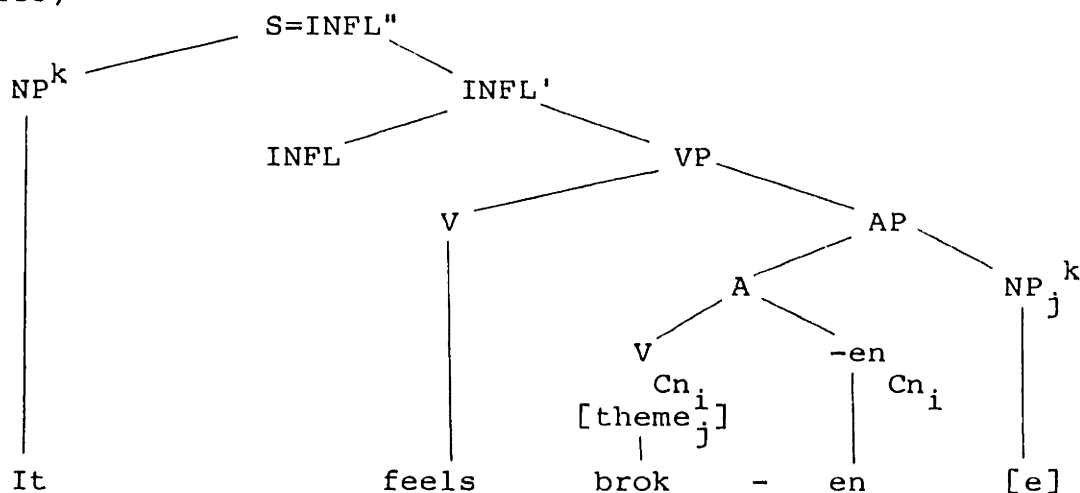
verb
Cn
Cv
Cv/perfpas

(iii)

adjective
Cn
Cv

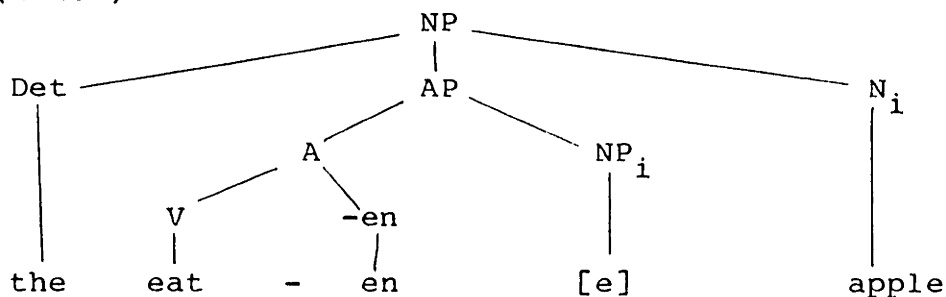
Because the adjectival -en affix carries a Cn feature, it will neutralize a Cn feature on the verb stem, and so the statal passive will be unable to assign Case to its internal argument, which must thus be moved to subject position. Thus statal passive is like actal passive:

(4.183)



The statal passive in complement position, as above, is unproblematic. However, the prenominal statal passive presents us with a problem; here there can be no trace in the AP, as the head of the AP is not visible, by our arguments in chap.3. Thus the following is ruled out, because the path from V to the complement NP is not visible as the A node is not visible.

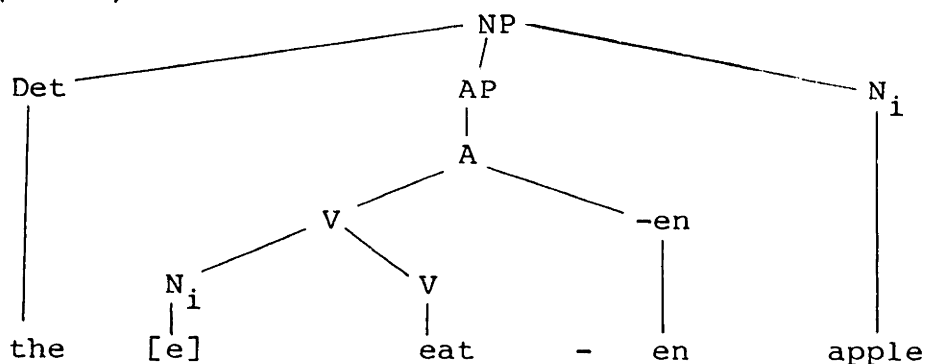
(4.184) *



As such, we propose that the trace is compounded with the prenominal passive participle. The trace is a complement assigned a theta-role by a verb stem, with the -en morpheme adjoined to the compound making the theta-path visible. This compound is constructed in the syntax, and is like the synthetic compounds discussed in section 1 of this

chapter, except that the argument node is phonologically unrealized:

(4.185)



The internal theta-role is assigned to the position governed by the verb, which does not have Case. This argument position must be licensed at LF and so must become part of an argument chain with a position which does have Case; it forms a chain with the modified noun, which thus gets the internal theta-role of the verb.

(Note that this is the reverse of the situation with clitics - a clitic is the head of its chain, and is under X^0 , with the foot of the chain outside X^0 ; in this case the foot of the chain is inside X^0 and the modified item which heads the chain is outside X^0 .)

The compound argument and the head of the NP will be freely coindexed. We will now consider the constraints which make this coindexing well formed, and which will rule out coindexation between the argument and any other node.

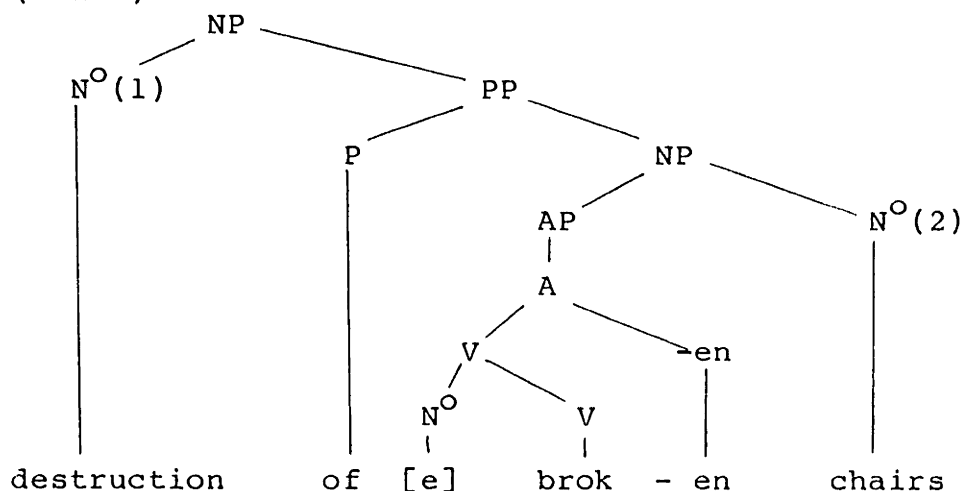
The coindexing forms an A-chain which has Case. If the argument in the compound did not form an A-chain with a Case-marked element, then that argument would form an A-chain without Case, which is ruled out by the visibility conditions.

First note that the argument in the compound is not

a referential expression; it may not take a specifier. Rather it is a common noun. We propose that an A-chain may not contain nodes of different semantic types - thus a common noun can not be part of an A-chain with a referential NP [4]. As such, the argument in the compound must be bound by N^O , and not by NP.

Binding involves c-command. A node in a premodifying compound will only be c-commanded by N^O either when the N^O is the head of the phrase modified by the passive predicate (this is the binding which occurs) - $N^O(2)$ below, or when the N^O c-commands the NP which contains the passive predicate (this binding must be ruled out) - $N^O(1)$ below.

(4.186)



The well-formedness of A-chains depends in part on whether they satisfy the Binding Theory; we will show that the choice of N^O binder must satisfy the Binding Theory.

The Binding Theory states that an anaphor (ie the argument in the compound) must be bound in its governing

4. Note however that a common noun can control a referential NP, as in "a [book_i] [PRO_i to be read]"

category, which means that the anaphor Y must be bound by binder X when both X and Y are contained in the minimal category containing Y, a governor of Y, and a SUBJECT accessible to Y. The 'SUBJECT' in this technical sense may be the NP/S of a sentence, or AGR, or a (possessor) NP/NP. We suggest that in addition, the head of the NP should be considered a SUBJECT. Note that this head is indeed a subject of predication, and fits the notion of SUBJECT as 'the closest nominal element'. (For detailed discussion of these matters, see Chomsky (1981), especially pp.211 ff).

This means that the anaphor in the compound has as its governing category the NP which immediately contains the passive predicate. This NP is the minimal category containing the anaphor, the anaphor's governor (the verb stem), and the head of the NP which is the accessible SUBJECT. Thus the anaphor must be bound in this NP, that is, must be bound by $N^0(2)$, in (186).

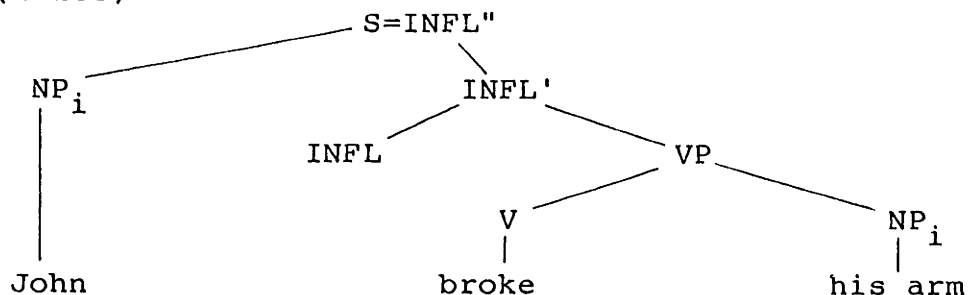
Finally, note that the anaphor in the compound must be phonologically null. For example, the following is ruled out:

(4.187) the apple_i-eaten apple_i

This does not appear to be ruled out by the Binding Theory. We suggest that there is a principle which states that an argument chain may have only one node which dominates phonological material. This principle may be language specific; that is, there may be languages where the principle does not hold. In fact, there are a few possible violations of it in English, involving part-whole relations. A possible analysis of "John broke his arm" would be that 'John' is assigned the internal theta-role of ergative 'break', does not get Case and so must occupy the NP/S position, and forms an A-chain with the NP governed by the verb. However, the

anaphor NP governed by the verb is phonologically realized (in violation of our principle), and is in a part-whole relation to 'John'.

(4.188)



4.2.3.3 Evidence for a trace

In the previous section we stated that a given A-chain may not consist of a referential expression (NP) and a common noun (N^0). This principle rules out a statal passive participle in resultative position, as we will now show, but only on our analysis of statal passive which involves a trace.

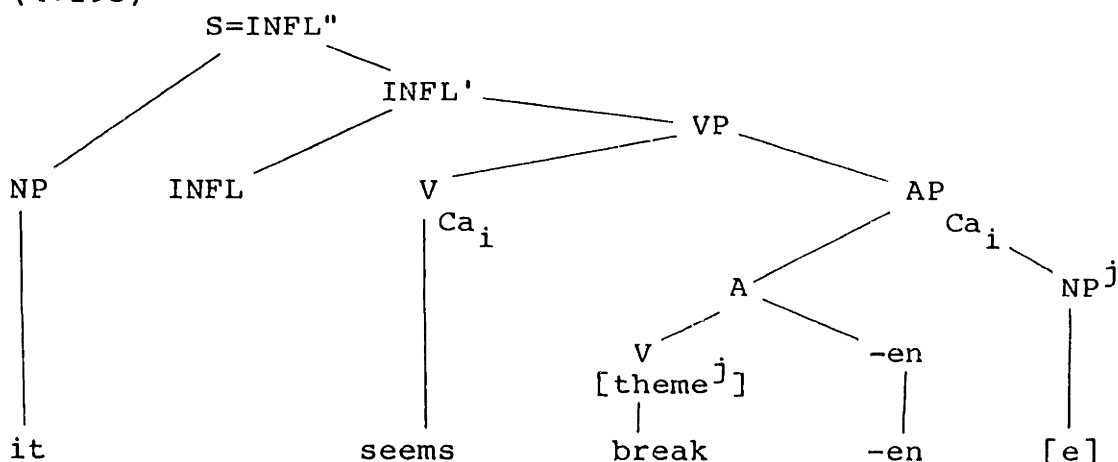
Consider the visibility of a statal passive complement to 'seem':

- (4.189) It seemed challenged by the new findings
- (4.190) the island seems inhabited by penguins
- (4.191) he seems aided by his ignorance of the subject
- (4.192) It seems uncredited to the real author
- (4.193) It seems unexplained to him that table manners
are necessary
- (4.194) He seems known to everyone as a crook
- (4.195) It seems polluted with oil
- (4.196) He seems convinced [that John will leave]
- (4.197) Mary seems widely considered a fool

As this data shows, statal passives in this position may take complements and adjuncts; this indicates that the head of the phrase is visible, which is what we expect, as the phrase node

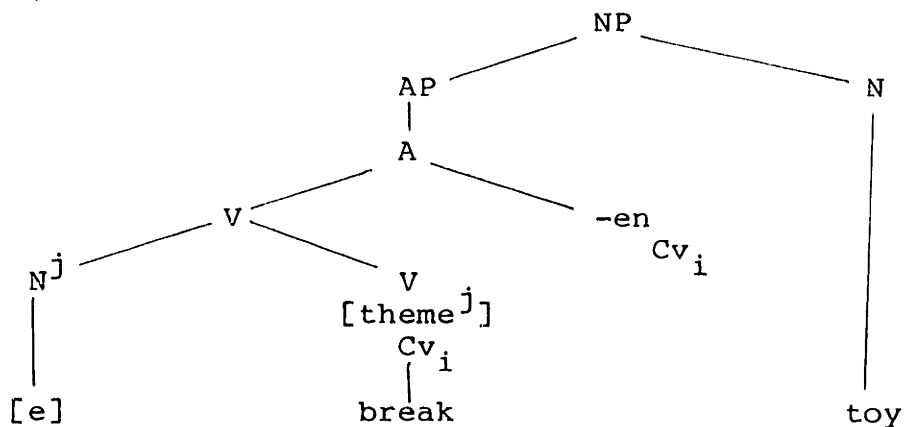
dominating the participle is Case-matched with 'seem'. The theta-grid associated with the verb stem will percolate to the (visible) participle node and roles may be theta-indexed with arguments (such as a trace) in the phrase:

(4.198)



Consider now a premodifying statal passive. The participial head of the AP will not here be visible, and so the theta-indexed grid may not percolate up from the stem. The V stem inside the participle is however visible, by Case-matching with -en, and so this node may carry a theta-indexed grid, which may be coindexed with a trace compounded with it:

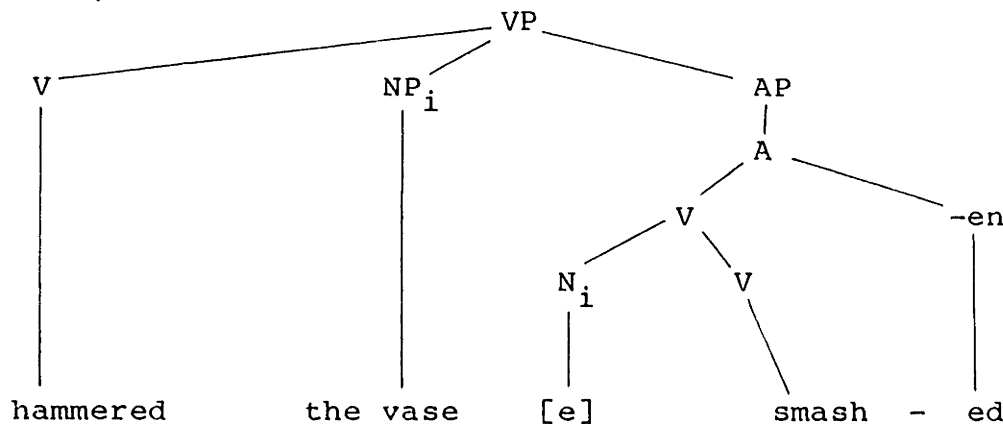
(4.199)



Notice that in the complement AP the trace is an NP, and is bound by an NP, while in the premodifier the trace is an N and is bound by an N. Thus our condition on A-chains is satisfied.

As we saw in chap.3, a resultative AP is not Case-matched, and so its head is not visible. Thus if a statal passive headed a resultative, it could not take a trace in the AP, but would have to be compounded with an N trace, as in the premodifier. However, the trace would be bound by the NP predicated by the AP - there is no other available binder; an N trace bound by an NP is ruled out, and hence statal passives do not form resultative predicates (despite their inherently resultative meaning):

(4.200) *



Our other evidence for a trace with statal passive also involves resultatives, though it is not related to the previous evidence. A resultative adjunct predicate must be predicated of an internal argument which it c-commands. Statal passives may take result predicates as adjuncts:

(4.201) It seems hammered [flat]

(4.202) It seems smashed [to pieces]

Since the result predicate, [flat] or [to pieces] must be

predicated of an object, there must be a phonologically null object in the AP:

- (4.203) It seems hammered [e] flat
- (4.204) It seems smashed [e] to pieces

Thus we have further evidence in favor of a trace with statal passive.

4.2.3.4 Evidence against a trace

Wasow and Williams provide the following evidence in favor of the lexical construction of statal passive, and against a trace analysis.

- (1) The statal passive is an adjective.

In the formation of statal passive, -en changes a verb into an adjective. Wasow argued that this change of category is a mark of a lexical rule. This was an appropriate argument in the context of the transformational approach to passive current at the time of Wasow's argument. However, it is unproblematic in our approach that the affix -en which is added in the syntax influences the category of its mother node.

- (2) Statal passive assigns only theme?

Williams and Wasow argue that the formation of statal passive is lexically restricted; statal passive must assign a theme theta-role, while actal passive may assign any theta-role. This does not appear to be a correct generalization, however, as statal passives may assign benefactive/goal theta-role in the following example:

- (4.205) he seems aided by his knowledge of German
- (4.206) an unaided survey
- (4.207) an unfairly helped pupil
- (4.208) I remain unthanked for my efforts

(3) No raising with statal passive.

Williams points out that an exceptional-Case marking verb, such as 'believe', takes a clausal complement, and assigns Case to the subject of that complement. When 'believe' is passive, and so does not assign Case to the subject of the complement, that subject NP is moved to the subject position of the clause containing 'believed', where it may get Case:

- (4.209) I believe [him to be a fool]
 (4.210) He was believed [[e] to be a fool]
 (4.211) It was believed [that he was a fool]

However, compare the statal passive. Here the subject of the lower clause may not be moved:

- (4.212) * He seems widely believed [[e] to be a fool]
 (4.213) It seems widely believed [that he was a fool]

Williams argues that the statal passive, unlike the actual passive, must be thematically related to the NP c-commanded by its maximal projection. 'Believe' is not thematically related to the subject of the lower clause, and so that NP is not moved to the position c-commanded by the statal phrase. Williams' account is incompatible with our account of statal passive.

We can provide no good account of this phenomenon, other than to suggest that it may be the result of a semantic restriction on the construction of the statal passive phrase, of a kind discussed earlier in this chapter. It should be pointed out that not all speakers find these raising cases ungrammatical.

(4) The affectives.

As evidence for the lexical idiosyncrasy of statal passives, Wasow pointed out that 'affective' statal passives (a class with many idiosyncratic properties, taking

experiencer objects) select for a variety of prepositions for their source PP (normally 'at'), while the actal ones tend to select 'by':

- (4.214) I was surprised at/by his claim
- (4.215) I was amused at/by his actions
- (4.216) They were distressed at/by the cost of living
- (4.217) She was shocked at/by the change
- (4.218) My parents were irritated at/by me

We suggest that 'at' is often used with affectives, because here the source is not agentive. The state expressed by the affective arises not through direct causation by the source, but arises in response to an event or act or state. Thus the selection for 'at' is not a consequence of lexical restrictions, but is rather an aspect of the semantics of the prepositions 'at' and 'by'.

(5) No violation of the Head Final Filter.

Williams (1982) suggested that statal passive was not associated with a trace to its right; if it was, it should be ruled out by the Head Final Filter, which requires that the head of a premodifier be the rightmost terminal node in that premodifier. We, however, are suggesting that the statal passive is associated with a trace to its left, and so Williams' argument is irrelevant to our claims.

We conclude that Wasow and Williams do not provide arguments which would force us to abandon the view that a statal passive is compounded with a trace.

4.2.3.5 Preposition stranding in a premodifier

In chap.2 we proposed an account of preposition stranding which did not involve a rule reanalyzing the verb and preposition as a single word. Rather, the preposition assigns a theta-role to its complement, but is unable to

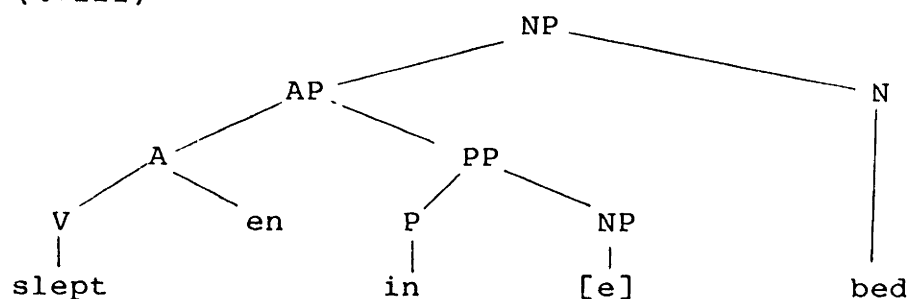
assign Case to its complement because it is Case-indexed with the Cn feature originating on passive -en. This can not, however, be the analysis in the case of premodifying preposition-stranding passives:

(4.219) a [marched through] field

(4.220) a [slept in] bed

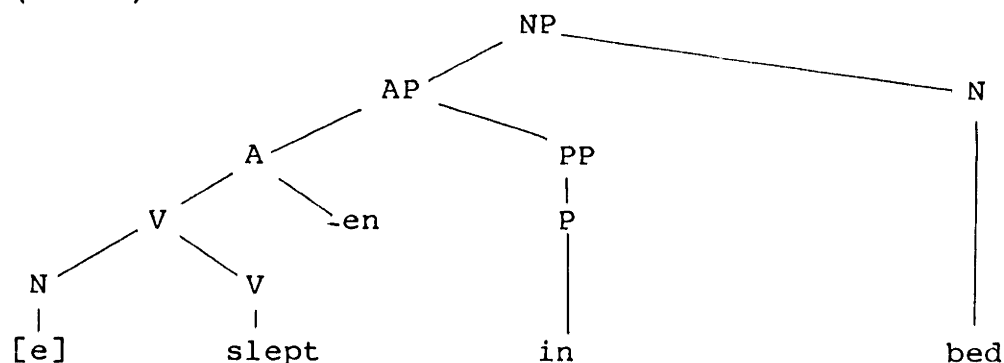
Here, the preposition can not be thematically related to the verb, as there is an intervening node (the head of AP) which is not visible:

(4.221) *



Moreover, the NP trace can not be bound by the N head 'bed'. The structure of these compounds must be as follows:

(4.222)

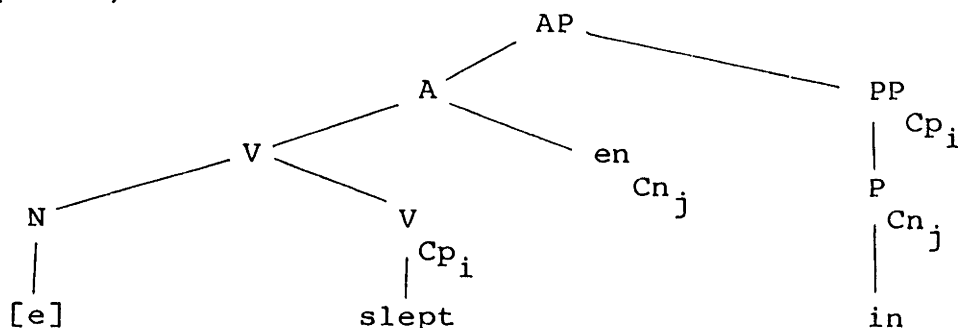


Here, 'sleep' assigns the location theta-role directly to the trace. The preposition does not assign a theta-role, and is not thematically related to the verb. Thus visibility is not violated. The question is, why is the preposition present,

since it has no thematic function.

The presence of the preposition might be taken to indicate that it has been reanalyzed as part of the verb. We do not take this approach. Rather we propose that the preposition is present because the verb carries a Cp feature, which must be assigned. Thus the preposition is present only in order to satisfy Case-assignment requirements. Note that the preposition also matches with the Cn feature from the -en affix.

(4.223)



4.2.4 Adjuncts and indirect objects in synthetic compounds

The synthetic compounds which we have considered consist of an affix -en, -ing_N, -ing_V, or -er, plus a verb stem, plus a noun, where the noun is a direct object, usually theme, of the verb. In this section we will examine synthetic compounds where the noun is not a direct object.

4.2.4.1 N = complement

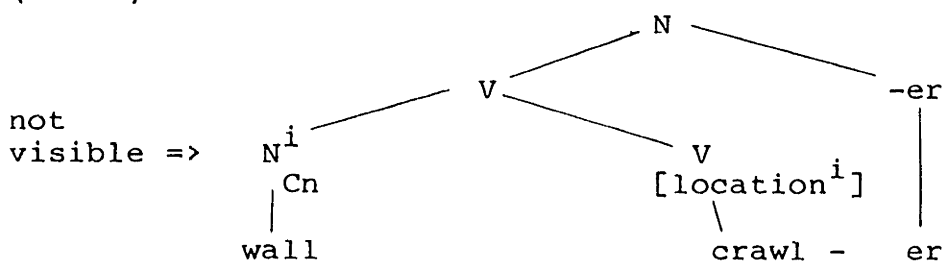
There are a few cases of synthetic compounds which parallel phrases where the complement of the verb is not an NP but a PP. For the most part the noun indicates location:

- (4.224) wall-crawler
 (4.225) cave dweller
 (4.226) church going

Visser says "these compounds can not be freely made and are met with only in literary language". It is significant that archaic words like 'dwell' are used here, and we find 'going' and 'goer', which are not independently found nouns, and take on a somewhat specialized meaning here, and are not very productively used. It is thus not fully clear that these are synthetic compounds (ie compounds made in the syntax), as they are not very productive.

In fact, these compounds prove to be underivable in the syntax, and we must construct them in the lexicon. The problem is that the noun, while it may be assigned a location theta-role by the verb stem, can not be assigned Case, because the verb does not carry a Cn feature. Thus just as these verbs can not take NP objects in phrases, so they should not be able to take N objects in compounds:

(4.227)



There are other compounds where the relation between the parts is not realizable by theta-theory:

- (4.228) type writer
 (4.229) steam roller
 (4.230) cliff hanger

These compounds, too, must be constructed in the lexicon.

4.2.4.2 N = adjunct

More common are synthetic compounds where the N is not assigned a theta-role by the verb. We find both active and passive compounds of this type:

(4.231)

ballroom dancing	night driving	street singer
water skiing	fly fishing	brush painting
pan fried	hand finished	coin operated
diamond cut	jet propelled	feather filled
blood stained	corn fed	
home cooked	factory packed	world renowned
heaven sent	trade linked	

The noun in these compounds is not selected by the verb, ie assigned a theta-role by the verb. Rather it has a modificatory relationship to the verb. We propose that the syntax allows interpretive rules which will allow a noun to modify a verb by expressing the location at or instrument with which the action or event occurs. We propose that this is a syntactic relationship because the compounds in question are productive and semantically transparent.

Some support for this rule comes from the fact that there is a productive process by which two nouns may be combined, with level stress (indicating that the combination is phrasal and not a compound), where the first noun indicates the location (in time or space) of the object referred to by the second noun. Here we appear to have a syntactic modificatory relationship between a noun and a noun, where the modifier expresses location. Some examples are:

(4.232)

country sausage	pocket hankchief	campus police
lawn tennis	market cross	ocean floor
household word	ghetto wall	church spire
fall colors	afternoon tea	evening star

midnight sun

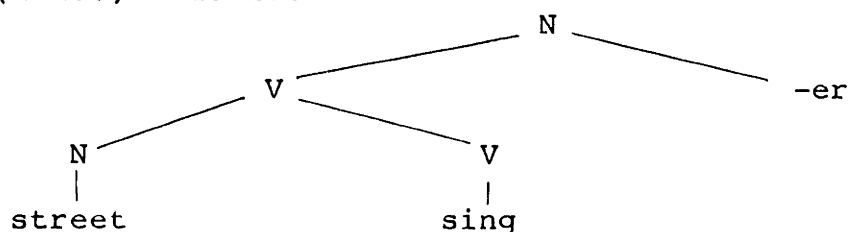
spring cleaning

wartime provision

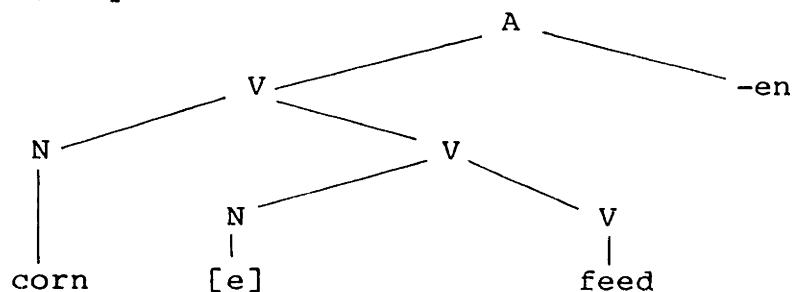
[5]

The structure of the modificatory synthetic compounds is:

(4.233) active



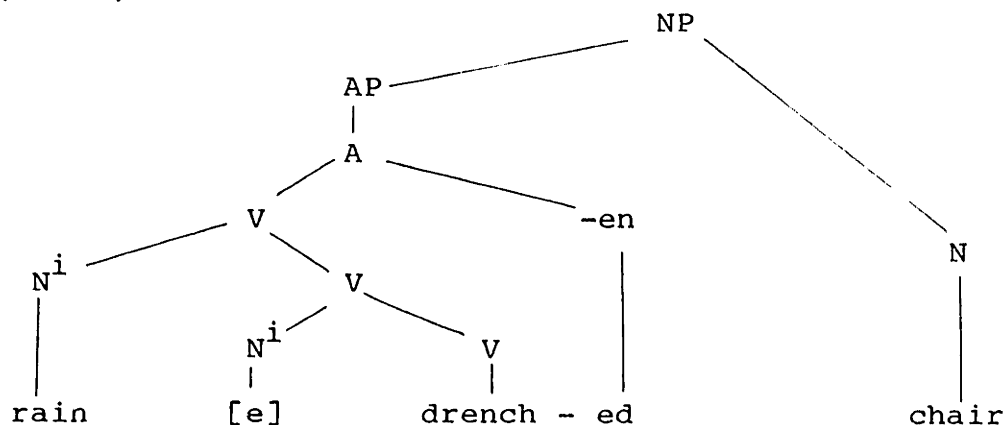
(4.234) passive



Note that the trace in a passive synthetic compound may not be bound by the adjunct noun inside the synthetic compound (like 'rain' in 'rain-t-drenched'):

5. We also find initial stress combinations with these relationships, eg 'nursery rhyme', 'sunday school'; since we propose that this relationship is a syntactic one, these compounds may (but need not) be constructed syntactically.

(4.235)



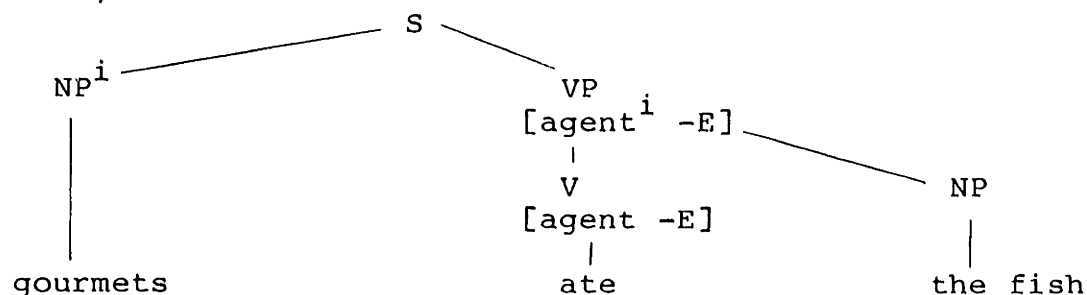
The adjunct may not form an A-chain with the trace because the adjunct is not in an argument position, which it would have to be if it was the head of an A-chain.

Note furthermore that the adjunct noun can not assign Case to the Caseless argument, despite the fact that the adjunct noun, as N_{max}, can assume a C_n feature. Case-assignment is not possible, because maximal projections can not assign Case, however, and the adjunct is a maximal projection.

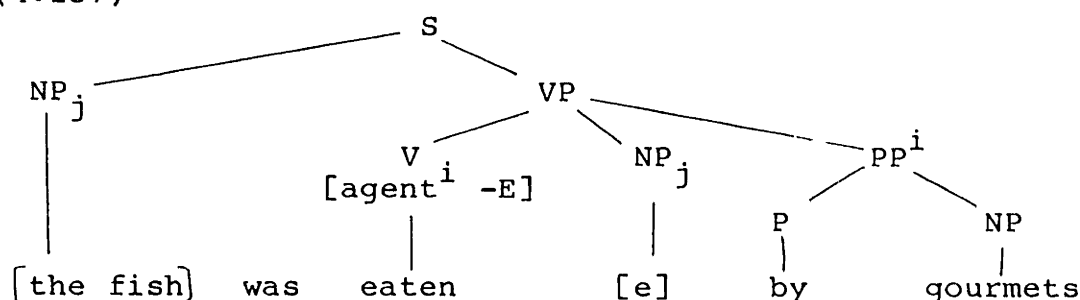
4.2.4.3 The external argument in a synthetic compound

The argument marked external in the theta-grid of a verb must be percolated to the predicate node dominating the verb, and assigned from there, unless (a) the subject of the predicate gets a theta-role from somewhere else (as in passive), or (b) the verb is contained in a nominal, and thus there is no predicate node for the external argument to percolate to. We see the alternatives in the following examples:

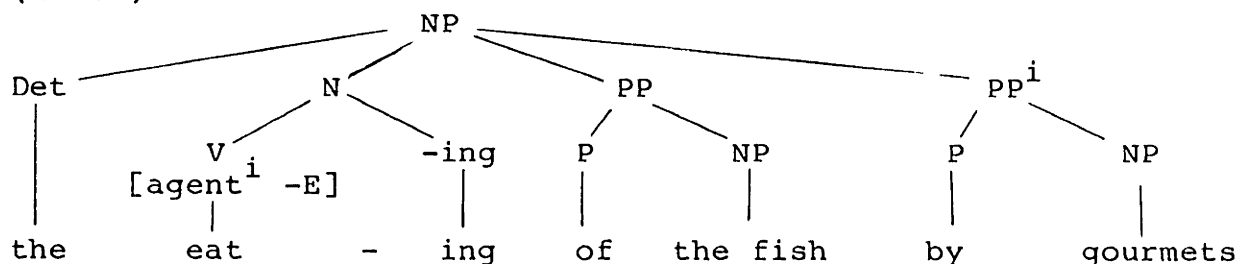
(4.236)



(4.237)



(4.238)



Of the four synthetic compound types, two contain a verb stem carrying an external argument which must be assigned outside of the compound. These are (a) the -ing_V type, where the external argument is assigned through the VP headed by the compound, and (b) the -er type, where (as we will see in chap.5) the external argument is assigned to the -er affix. Thus the following examples are ungrammatical because the external argument is illegitimately being assigned internal to the compound:

- (4.239) the tiger-eating explorer (* meaning that
the tiger is the agent)
(4.240) * the puppy-sleeping dogs
(4.241) * a state-owner of housing

However, synthetic compounds which are gerunds, or which are headed by passives, might in principle be able to have the external argument internal to the compound. This prediction is partially false, because only passive-headed compounds can include the external argument; compound gerunds can not.

- (4.242) Passive compounds with N = external argument

moth eaten	expert tested	
worker initiated	state owned	god forsaken
time honored	moon struck	sun dried

- (4.243) * Compound gerunds with N = external argument

- * the moth-eating of clothes
- * girl-swimming is allowed on sunday[6]

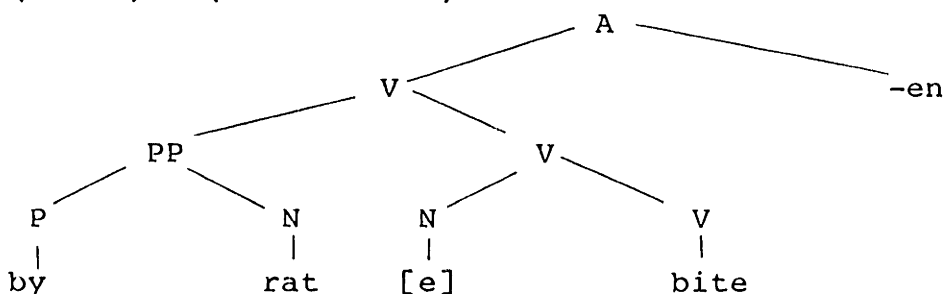
This phenomenon presents us with the following problem. We may rule out the compound gerunds by saying that the agentive noun in the compound would not be assigned Case, and so could not receive an external theta-role; however, this should also rule out the passive compounds, as here too the agentive noun would not have Case. Alternatively, we could admit the passive compounds by saying that the agentive noun is not a complement but a modifier, but this would admit also the compound gerunds, where the noun should also be permissible as an agentive modifier.

6. Roeper (pc) has pointed out that in fact forms like 'government-financing' are grammatical; these combinations, where the first item is the agent, do not have compound stress, however, and may be phrasal, with 'government' a modifier.

Selkirk (1982) provides a solution for this problem within the LFG framework which involves the claim that the agent theta-role of the gerund 'swimming' is realized only as a SUBJ (subject in LFG terms), and that a compound may not contain a SUBJ argument. The agent theta-role of a passive verb, however, may be realized as an oblique argument and so may be embedded in a compound. This in effect implies that in 'swimming by girls', the by-phrase is a SUBJ, while in 'eaten by girls' the by-phrase is an oblique argument (BY OBJ), which is inconsistent. Thus Selkirk does not have a principled account for the difference between passives and gerunds.

Our solution to this problem is as follows. If we take the agentive noun to be a complement, we could specify that a compound may contain a by-phrase, with the 'by' preposition obligatorily deleted at PF. The preposition would assign Case and an agentive/source theta-role to the noun:

(4.244) (S-Structure)



We would then stipulate that a noun can not contain a PP. This would rule out gerunds which have the above structure.

4.3 Compounds in the syntax and the lexicon

4.3.1 Synthetic and root compounds

4.3.1.1 Types of compounds

We have shown how a certain type of compound, the *synthetic compound*, may be generated by the syntax, given Government-Binding theory and the extension of the X-bar rules to include compounding. In this section we will ask why only the affixes -er, -ing (nominal and verbal) and -en, and no others, are involved in synthetic compounds. We will concentrate on the nominal affixes, -er and -ing, and then extend our findings to the participial affixes.

There is a great variety of compounds. We will concentrate here on the compound nouns, which form by far the largest and most productive group. We may distinguish four productive types of compound noun; (1) those, like "green-card" or "white-cap", having an adjectival modifier of a noun head, (2) those, like "table-lamp", consisting of two nouns, neither of them derived, (3) those, like "grain-storage", "delivery-boy", "earth-quake" and "punch-card", which have a deverbal noun (other than V-ing or V-er) or a verb stem as one of the members, and (4) the synthetic compound nouns, N-V-ing and N-V-er, "house-keeping" and "gun-runner".

Type (1) we will not be concerned with here; they might however plausibly be constructed in the syntax. Type (2) has been derived, by Lees (1960) and Levi (1978), by transformational rules which take clauses as their input and, by deleting the predicate (and other constituents), produce as their output these noun-noun compounds. These transformational rules aim to capture the fact that there are

restrictions on the relationship between the members of these compounds (see also Downing (1977), Warren (1978)). However, Government-Binding theory will not accomodate these rules of predicate deletion; if they take place at PF, they involve powerful rules which reorder and delete constituents, and if they take place anywhere else they violate the Projection Principle. As such we must delegate to the lexicon any rules which account for restrictions on the relationship between the parts of these compounds, and we must construct these compounds in the lexicon. We will refer to these non theta-role based relationships as 'appositional' and leave open the possibility that there is some way of describing the appositional relationship (perhaps according to some version of Levi's proposal).

Compounds of type (3) are often grouped with the synthetic compounds, because they have a similar composition. Roeper and Siegel consider type (3) to be root compounds, but Selkirk and Kiparsky include them under their synthetic-compound constructing rules. We will argue that type 3 compounds are constructed in the lexicon, while the synthetic compounds are constructed in the syntax.

4.3.1.2 "Type 3"

Some examples of type 3 compounds are as follows:

(4.245)

(a) N + V+affix
 task assignment
 dealer maintenance
 surface adherence
 dress rehearsal

(b) V+affix + N
 delivery boy
 cleaning lady
 eating apple

washer woman

(c) N + Vstem

sun rise
chimney sweep
sword play

(d) Vstem + N

search party
chatter box
draw bridge
kill joy
grind stone
think tank
leap year

Notice that V+ing and V+er may form the first member of a compound; these compounds, we will argue, are not synthetic compounds, but lexically constructed root compounds.

Kuiper (1972) proposed that verb stems were not found in compound nouns, and that what appeared to be verb stems were in fact zero-derived nouns; thus 'quake' in 'earth-quake' would be a noun, and not a verb. There are however many verb stems found in compound nouns which are not independently found as nouns, which argues against their being zero-derived nouns in the compounds. Some examples are:

(4.246)

hover craft
hang man
scrub woman
hack saw
make weight
grind stone

We conclude (contrary to Kuiper) that verb stems may be incorporated in compound nouns.

4.3.2 Synthetic compared with root compounds

4.3.2.1 The semantic structure of synthetic and root compounds

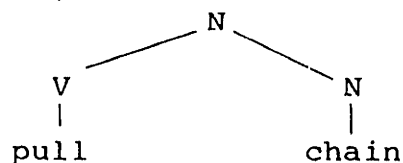
The compound nouns structured as N-V-ing and N-V-er are distinguishable from the group (3) compound nouns by having three properties: (a) the N is never the external argument of the verb, (b) the N is always thematically related, either as a complement or as an adjunct, (c) they are more productive. We propose that N-V-ing and N-V-er nouns are different in kind from the other compound nouns; only the former are constructed in the syntax.

We will now show that Government-Binding theory will in fact not allow us to construct in the syntax most of the group 3 compound types. The crucial problem is that these compounds fail visibility requirements.

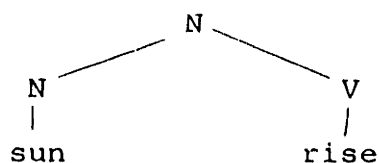
In the following compound types, the verb is not visible by having a visible projection, because it is its own maximal projection. The verb is not itself assigned Case. Thus the verb is not visible for the purpose of theta-assignment.

(4.247)

(a)

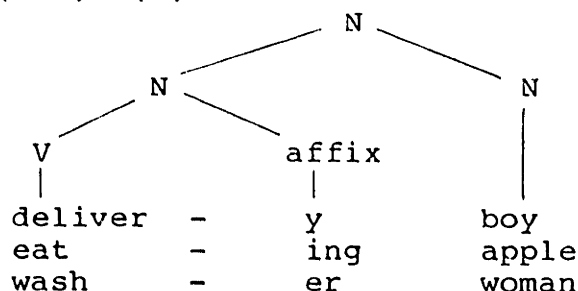


(b)



The compounds containing affixed verbs as their first member are structured as in (c) below:

(247) (c)

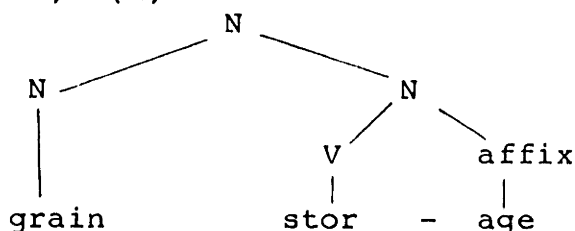


Here, even if the verb was made visible by the affix, the N dominating it is not visible, and so a visible theta-path could not be constructed between the verb and the noun.

Thus compounds containing verb stems or having a deverbal noun as the first element may not involve internal assignment of theta-roles. Thus the relation between the parts of the compound can not be accounted for syntactically, and so the compound must be constructed in the lexicon, where there may be constraints of a different kind which determine the possible relationships between the two parts.

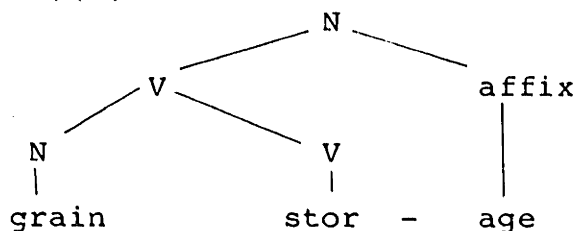
Let us now consider the compound nouns with a deverbal noun as the head of the compound. If these compounds had the structure in (d), they would violate visibility because the argument noun, here 'grain', would not be assigned Case; the noun 'storage' does not assign nominal Case.

(247) (d)



Thus we might ask whether affixes other than -er, -ing, and -en may be attached in the syntax, outside syntactically constructed compounds, as in (e):

(247)(e)



If this was the correct structure, the noun argument would now be visible, and if the affix in question carried a Cv feature, the verb would also be visible.

Are affixes like -age, -ment, -ion etc ever added in the syntax, outside synthetic compounds? There are certainly compounds with these affixes which in their argument structure resemble synthetic compounds:

(4.248)

consumer protectionION
 travel restrictION
 soil conservatION
 office manageMENT
 troop deployMENT
 property appraisAL
 slum clearANCE

We have seen that there are lexical forms of -ing and -er, which are occasionally found in lexically constructed compounds (eg 'cliff-hanger'). Other affixes are also found in compounds which must be lexical. We suggest that there is a significant difference between the freedom with which -ing and -er can be in lexical compounds, and the freedom with which other affixes can be in lexical compounds. The latter are much more commonly found.

Thus compare the two sets of compounds below; in both sets the noun is the external argument, which we argued in the previous section to be impossible in a syntactically constructed compound.

(4.249)

blood circulatION
 wind pollinatION
 subscriber payMENT
 bowel moveMENT
 jury triAL
 dealer maintenANCE

(4.250) * with N interpreted as source/agent

* blood circulat-ING/ER
 * wind pollinat-ING/ER
 * subscriber pay-ING/ER
 * bowel mov-ING/ER
 * jury try-ING/ER
 * dealer maintain-ING/ER

The problem, that we have compounds whose internal structure may not be described according to theta-theory (and thus must be constructed in the lexicon), arises again when we find compounds whose internal structure, though N-V, is not that of a direct argument to a verb. In the phrases corresponding to these compounds, a preposition is required, to mediate the relationship between the verb and the argument.

(4.251)

collision insurance	'against'
* collision insur-ing/er	'against'
smallpox vaccination	'against'
* smallpox vaccinat-ing/er	'against'
pansy specialist	'in'
* pansy specializ-ing/er	'in'
garbage disposal	'of'
* garbage dispos-ing/er	'of'
gallbladder operation	'on'
* gallbladder operat-ing/er	'on'
tax exemption	'from'
* tax exempt-ing/er	'from'

Consider, for example, 'gallbladder operation'. We say 'operate on a gallbladder', 'operation on a gallbladder', 'his operating on the gallbladder', but not 'gallbladder-operating' (the reading that comes to mind is of the gallblader as a

machine which is operated).

We conclude that nominalizing affixes other than -ing and -er may be found both in compounds that might be constructed in the syntax (248), and compounds that can not be constructed in the syntax (249),(251). -Ing and -er, on the other hand, are found predominantly in syntactic compounds. We propose that this difference indicates that the affixes -ment, -ion, -al etc are never added in the syntax, and that the apparently syntactic compounds (248) are in fact constructed in the lexicon.

4.3.2.2

In this section we will present additional data to show that compounds ending in V+ing/er differ from other compounds ending in V+affix.

We will apply the test of prefixation, using 'non-' which attaches to nouns but not to verbs. If 'non-' can be inserted before the V in a N-V-affix compound, the compound must have the structure [N [V affix]]. We have argued that this structure will not allow assignment of theta-roles because the N will not have Case. Where the affix is not -ing or -er, non- may (admittedly, rather marginally) be inserted:

(4.252)

grain non-importation
government non-intervention
subscriber non-payment
industry non-regulation
food non-spoilage
troop non-deployment

Comparable compounds in -er and -ing may not take non-:

(4.253)

* grain non-importer
* grain non-importing

- * industry non-regulating
- * food non-spoiler
- * troop non-deploying

This supports a difference in structure between the synthetic compounds and the other N-V-affix compounds.

Synthetic compounds may not have two overt non-head members, though they may contain three terminal nodes if one is empty; this may be explained by the principle of Case-adjacency; if there were two nouns, one would not be adjacent to the verb, and so would not be assigned Case, and so could not bear an adjunct or argument theta-role:

(4.254)

- * [street [ballad singing]]
- * [night [leaf crawler]]

Note that a synthetic compound may contain a compound as its non-head: '[[air-craft] carrier]'. Here there is only one argument node, 'aircraft' which needs Case.

However, N-V-affix compounds with affixes other than -ing or -er may (again, rather marginally) have two non-head members:

(4.255)

- [government [voter registration]]
- [school [meat delivery]]
- [dealer [vehicle maintenance]]

This indicates again that Case is not relevant for non-synthetic N-V-affix compounds, which fits with the claim that their internal argument relations are not determined in the syntax.

There is a further kind of data which has been claimed to be relevant. Sometimes, a constituent of a compound is not an independently found word. 'Goer' is an often cited example; 'monger' is another. This has been claimed (by Kiparsky) as an indication that the V+affix in a

synthetic compound does not form a constituent (which, of course, is also our claim). However, root compounds also contain words not found independently. We find for example 'wright' in 'wheel-wright', 'cart-wright', and so on. Nevertheless, there is a difference, which is that 'seer' and 'goer' and even 'monger' are involved in productive compoundings, while 'wright' is not. As such, we might cite this as further evidence that synthetic compounds have a [[N-V]-affix] structure. Note that there are no V+affix combinations among the other N-V-affix compounds which are not independently attested; these V+affix are all independently occurring words, which suggests that they are part of a [N-[V-affix]] structure.

4.3.2.3 -Ing and -er as syntactic affixes

-Ing and -er are Case-markers. We will specify that they may be attached in the syntax, like other affixes which carry a C feature (see chap.2). In support of this, we point to the fact that they may attach to syntactically constructed items (synthetic compounds).

Does the output of -er or -ing affixation ever undergo a lexical process? -er and -ing nouns are not suffixable. However, Lieber (1983) claims that an appositional relationship (ie one which we have characterized as a lexical relationship) may freely hold between a noun and a V+er, or V+ing in an N-V-affix (root) compound. We contest Lieber's data. There are a few such cases (cliff hanger, chain smoker, mercy killing), but Lieber's 'productive' example, where a 'truck-driver' could mean 'a driver who owns a truck' or 'a driver wearing a shirt with a truck' seems to us a very unlikely if not impossible reading. We conclude that with a very few exceptions, verbs taking -ing and -er

must be related to arguments or adjuncts in their compound in a syntactically grammatical manner. Thus it seems that -ing and -er must be attached in the syntax, as their output does not undergo lexical processes; we conclude that -ing and -er are affixes attached only in the syntax, like verbal -ing, -en and nominal and verbal -s.

Note that V-ing and V-er nouns appear inside root compound nouns, with an appositional relationship to the head noun.

(4.256)

flying corps
 asking price
 adding machine
 filling station
 feeding time
 boiling point
 smelling salts
 smoking jacket
 washer woman
 feeler gauge

This data does not force us to conclude that -ing and -er may be attached in the lexicon, however, as there is independent evidence that this position may contain syntactically formed items. Here we find level stressed modifier-head pairs, presumably N':

(4.257)

[liberal arts] college
 [frozen food] shelf
 [high water] mark

Other kinds of phrasal constituents are found here:

(4.253)

[lying in] hospital
 [time and motion] study
 [State of the union] message

Even clauses may be found here:

(4.259)

an [I turn the wheel of the universe] air
 a [take it or leave it] attitude
 a [love em and leave em] casanova

We conclude that syntactically constructed items may become lexicalized as a unit, as the non-head of lexical compound nouns.

4.4 Previous accounts of compounding

In this section we will discuss three important and representative accounts of compound structure, each manifesting a different approach; Lees (1960), Roeper and Siegel (1978), and Lieber (1982).

4.4.1 Lees (1960)

Lees' book, written in the "Syntactic Structures" framework, argues that nominalizations and compound nouns are derived transformationally from clauses.

Lees argues that we should derive noun-noun compounds transformationally rather than deriving them by "the simple concatenation of two nouns as a third nominal", because this latter approach would not account for the fact that eg 'flour-mill' and 'wind-mill' have different kinds of internal relationship between the parts; flour is the thing created by the mill, while wind is the thing which drives the mill. Thus Lees derives the two compounds from sentences by two different transformations, one incorporating the subject, the other incorporating the object:

(4.260)

the mill grinds the flour =>

(DELETE THE PREDICATE, COMPOUND OBJECT+SUBJECT) => flour-mill

(4.261)

wind powers the mill =>

(DELETE THE PREDICATE, COMPOUND SUBJECT+OBJECT) => wind-mill

Lees raises the possibility that the transformations may be formalized in terms of the deletion of a small group of possible predicates, so restricting the kinds of compound-relationships which may arise:

"In many such compounds the omitted verb itself is one only of a very small set, all similar in meaning, and it might be possible therefore to formulate the rules for generating these compounds in terms of one or a few individual verbs, such as 'make', 'yield', 'cause', 'produce', etc."

However, Lees is cautious - he suggests that not all compounds may be construed according to these predicates, and names 'hour-glass', 'gas-store', 'sun-flower', 'car-thief' as exceptions. It has however been proposed by Levi (1978) (who takes a Lees-ian approach to compounds) that compounds are in fact constructed by deleting a small number of predicates - CAUSE, HAVE, MAKE, USE, BE, IN, FOR, FROM, ABOUT. (and see Warren (1978) for a similar account of regularities).

Lees' approach has been criticized by Chomsky (1970). Chomsky is concerned with nominalizations, but we will extend the arguments to cover compounds. Chomsky suggests that we should distinguish between syntactically constructed items and lexically constructed items. Syntactic nominals (eg "Johns **reading** the book") and lexical nominals (eg "the enemy's **destruction** of the city") are distinguished by the following features:

- (1) Syntactic nominals are more productive
- (2) The relation of meaning between the syntactic

nominal and the associated proposition is quite regular, while there is not the same regularity in the case of a derived nominal

- (3) The syntactic relation between the syntactic nominal and its complements closely resembles the syntactic relations in the associated proposition.

We can see that according to these tests, only the synthetic compounds are syntactic; the other compound nouns are lexical. All items created by the syntax should be governed by the same group of rules and principles; the problem with Lees' account is that special transformations, involving predicate deletion, must be used in the derivation of a class of items, and are not otherwise used in syntax. It is quite possible that there are rules which determine the internal structural relations of compound nouns, but these are not syntactic rules. Syntactic rules which relate arguments and predicate depend on government and Case, and these are missing in non-synthetic compounds.

4.4.2 Roeper and Siegel (1978)

Roeper and Siegel's account is the model for our own. They account for the difference between synthetic and root compounds by deriving the former by a transformation, while the latter are derived by simply combining two words. However, Roeper and Siegel argue that their transformation is a 'lexical transformation' (they credit Vergnaud with the notion). In this section we will consider what they mean by this.

The crucial reason for their calling their transformation 'lexical' is that they derive synthetic compounds as the output of a transformation on the

subcategorization frame of a verb. "Because subcategorization frames form a string", they say, "we can state a transformation .. in terms of them"; that is, they have a string-based transformation which takes as its input a subcategorization frame and produces as its output a different subcategorization frame. Their compounding transformation - "Compound Rule" - is as follows:

(4.262)

Compound Rule

[[empty]	+ verb	+ affix]	[	+word]	W
1	2	3	4	5	
			X{+N}		
=> [[+word] + verb + affix] W					
		4	2	3	Ø 5

Where W ranges over subcategorization frames and X{+N} stands for lexical categories N, A, Adv.

Example: [[empty] + make + er] [coffee] W
=> [[coffee] + make +er] W

Roeper and Siegel say that "the Compound Rule is consistent with lexical principles and must therefore be a lexical rule". Their proof of this is:

(1) Phrases are excluded from synthetic compounds.

They cite:

(4.263)

* [good dark coffee] maker
* [home for the aged] maker

We dissent - while it is unusual for phrases to be found in synthetic compounds, we propose that it is possible; the following examples seem grammatical:

(4.264)

[old house] lover
[used book] seller
[wooden furniture] varnishing

[happy enough] looking

We have, in any case, shown that 'frozen' phrases are found inside lexical items.

(2) There are restrictions on the relationship between the head of the compound and arguments in the phrase headed by the compound. We will not discuss these restrictions in this thesis.

(3) The transformation changes syntactic category; its input is a verb or subcategorized complement; its output is a noun or an adjective. We have argued that syntactic rules may change syntactic category; an example is suffixation of -ing, which forms a noun from a verb.

(4) Synthetic compounds may be affixed, and hence must be formed in the lexicon, as suffixes may be added only in the lexicon:

(4.265)

[heart-rending]-ly
[slave-driver]-ish
[shop-keeper]-ish

We will argue in chap.5 that -ly may be an affix added in the syntax. The -ish cases indicate, however, that there is a tendency for synthetic compounds to take on extra connotations, as in 'shop-keeper'. Similar examples, pointed out by Roeper and Siegel, are 'home-maker' and 'tailor-made'. -ish attaches to some phrases, but again, phrases which have particular connotations, such as 'old-maid' ([old maid]-ish). It is possible that some synthetic compounds (and other phrasally constructed constituents) become idiomatized, entered in the lexicon, and so are available for limited suffixation.

Kuiper (1982) points out a similar phenomenon for the nominal N-V-ing compounds. 'Stage-acting' means something

rather different from 'acting on the stage'; it has taken on the meaning of 'acting AS IF on the stage', that is, has come to denote a characteristic way of behavior. He shows this with the following examples, and shows the same for 'sunday-driving':

- (4.266) * acting on the stage in the wings
- (4.267) stage-acting in the wings
- (4.268) * driving on sunday during the week
- (4.269) sunday-driving during the week

Similarly, Roeper and Siegel point out that a 'truck-driver' drives trucks for a living, and the compound is not normally used for someone who drives a truck once.

We conclude from these examples that synthetic compounds, though they may be constructed syntactically, are liable to be listed in the lexicon, and to shift in meaning.

(5) The different types of synthetic compound differ in productivity. Roeper and Siegel claim that -er compounds are somewhat less productive than nominal -ing compounds (my impression, backed by the lists in Dolby's word speculum, is that the -er are more productive than the nominal -ing). They say, "in general, differences in productivity are typical for affixation and other lexically governed processes"; that is, -er has properties which make it (according to R/S) less productive than -ing. We allow affixation in the syntax; thus the differences in productivity, if they are a fact of affixation, do not force the compound to be constructed in the lexicon.

These are Roeper and Siegel's arguments for constructing synthetic compounds in the lexicon. We have shown that their arguments do not force such a position. We use syntactic rules to construct synthetic compounds.

Our account of synthetic compounds does not require a special rule to account for their generation, such as Roeper

and Siegel's "Lexical Transformation". In general, we propose that there are no reordering transformations which operate over subcategorization strings.

4.4.3 Lieber (1983)

Lieber does not distinguish between synthetic and root compounds; for her, both obey the same principles. The crucial notion for Lieber is an "Argument-Linking Principle":

(4.270)

ARGUMENT-LINKING PRINCIPLE

(a)

In the configuration $\begin{bmatrix} \{V\} \\ \{P\} \end{bmatrix} X \begin{bmatrix} \{V\} \\ \{P\} \end{bmatrix}$ or $\begin{bmatrix} \{V\} \\ \{P\} \end{bmatrix} X \begin{bmatrix} \{V\} \\ \{P\} \end{bmatrix}$,

where X ranges over all categories,
 $\begin{bmatrix} \{V\} \\ \{P\} \end{bmatrix}$ must be able to link all internal arguments.

(b)

If a stem X is free in a compound which also contains an argument-taking stem, X must be interpretable as a semantic argument of the argument-taking stem, ie as a Locative, Manner, Agentive, Instrumental, or Benefactive argument.

(All obligatory arguments with the exception of subject are 'internal'. A stem is 'free' if it is left unlinked by an argument-taking lexical item.)

This principle makes the following predictions.

(1) compound types which do not contain a preposition or a verb should be more freely constructable than compounds which do contain a preposition or a verb. Thus NN, NA, AN, AA compounds should be more productive than other types (including the synthetic compounds). The reason for this is that there are no restrictions on the construction of compounds which do not obey the Argument-linking principle. The prediction as it stands is false, because AA compounds,

for example, are very rare, and the type is marginally productive only for colour terms like 'blue-green'. NA compounds (where the A is not deverbal) are uncommon; there are a few cases like 'trigger happy', and 'house proud', and some phrasal combinations where the noun intensifies the adjective, like 'crystal clear'. AN compounds and NN compounds are productive types, though it has been argued (by Levi, Warren) that there are restrictions on the construction of NN compounds; similarly, most AN compounds have the vestige of a modifier-head relation. The Argument-linking principle thus does not by itself make interesting predictions about productivity.

(2) The Argument-Linking Principle, when it applies to synthetic compounds, predicts that an intransitive verb should be able to take a subject argument in a N-V-ing compound, as in 'girl-swimming'; we have seen that this is not the case.

(3) The Principle states that in a Verbstem-Noun or Noun-Verbstem compound, the noun must be (a) the internal argument of the verb if the verb is obligatorily transitive; otherwise it must have (b) some other relation, such as agent, instrument, location, etc. Counterexamples to (a) are:

(4.271)

hang man
choke damp
punch line
reform school
tow truck
shuttle train
copy cat

In the above examples, an obligatorily transitive verb is compounded not with its internal argument, but with its subject.

We conclude that Lieber's analysis does not

adequately handle the data.

4.5 Further issues, and summary

4.5.1 Synthetic compounds as main verbs

It is unusual for synthetic compounds to head a clausal VP. Thus we do not often find synthetic compounds based on bare stems, governed by AGR, or taking inflectional affixes, or progressive -ing or perfective -en.

- (4.272) ? My uncle was watch-smuggling in Turkey
- (4.273) ? He house-paints for a living
- (4.274) * I have polo-played on occasion
- (4.275) * This carpet was rat-bitten during the winter

The passive (4.275) is ruled out because a noun trace in the compound is bound by a referential NP - the subject of the sentence. We propose that a similar mismatch makes the other compounds slightly odd; in the active compounds, the internal argument is a common noun and the external argument is a referential expression. We propose that this occurrence, where a theta-grid is coindexed with a referential expression and a common noun, is only marginally grammatical.

4.5.2 The directionality of theta-assignment

In phrases in English, theta-roles are assigned to the right. This must be specified, as a language specific property (for discussion, see Travis, forthcoming). We might state this as: 'phrases are head-initial'.

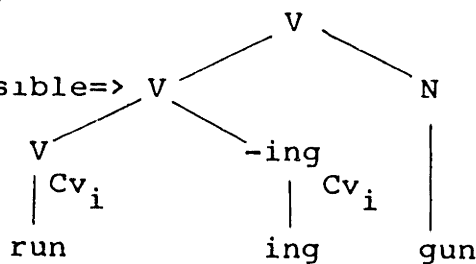
In compounds, on the other hand, theta-roles are

assigned to the left. This is required by the right hand head rule for English words (see chap.1), which states that an X^0 is projected from its rightmost daughter. However, the right hand head rule is not exceptionless; we can however independently derive the fact that in compounds the theta-role is assigned to the left. If the verb was the leftmost member of the compound, either (a) the path between theta-assigner and assignee would not be wholly visible, or (b) the affix would not be adjacent to the verb stem:

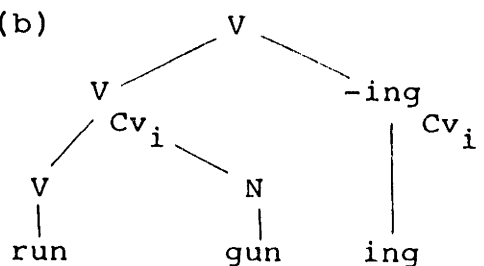
(4.276)

(a)

not visible=>

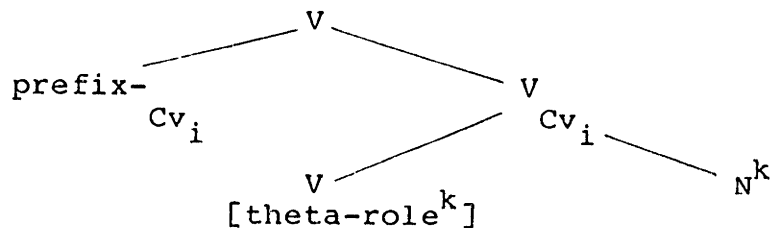


(b)



The only grammatical alternative would be to have a prefix as the verbal Case-assigner. This would allow the theta-assignment inside the compound to be rightwards. There are however no Case-assigning prefixes in English. The compound structure which we would expect is:

(4.277)



4.5.3 Summary: synthetic compounds

In this chapter we proposed that compounds are well-formed by the bar-projection rules at D-Structure, and

will be constructed at D-Structure just in case syntactic relations hold between the parts. Theta-role assignment and modification are the relations found internal to compounds. We saw that visibility is crucial notion in the description of syntactic as against lexical compounds.

We showed that constructing compounds at D-Structure gives us an account of adjectival passive by which adjectival passive is associated with a trace, and is constructed syntactically rather than in the lexicon.

Chapter 5

Derivational affixation

In this chapter we consider some general issues in the relationship between syntactic words and lexical words, and the relationship between the S-Structure representation of a syntactic word and its PF representation. We examine the Case-assigning syntactic affixes in terms of their satisfying the Projection Principle, and we consider other very productive derivational affixes also in this light.

5.1 Case-assigning affixes and the Projection Principle

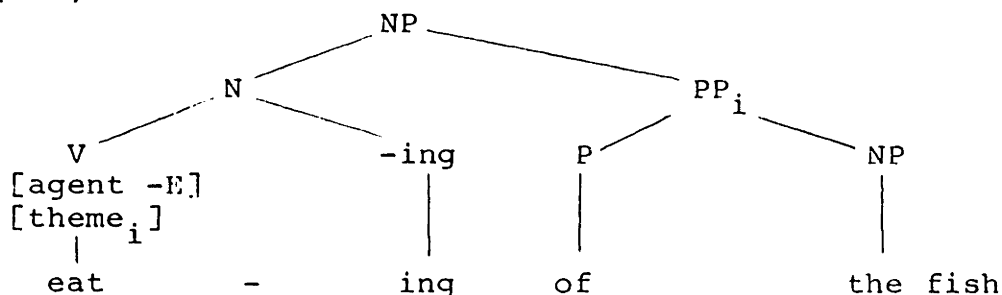
Certain affixes carry Case features. For the most part these are affixes which attach to verbs – the inflectional affixes -s, -ed, -en and -ing, and the nominalizing affixes -er and -ing.

Because these affixes are Case-indexed with verb stems at S-Structure, they must be represented at S-Structure as independent nodes. As such, these affixes may not affect the theta-grid of the verb to which they attach. The verb should be free to assign its theta-roles by coindexing out of the word. That is, these affixes must not violate the Projection Principle.

The Projection Principle states that a theta-grid

must be projected unchanged from a lexical entry. We take it that the Projection Principle holds at S-Structure, D-Structure and LF, that is in the syntax. (Roeper (1983) has proposed that the Projection Principle also holds for some lexical items; we do not hold this view.) Consider a word+affix pair, where the word carries a theta-grid. If the theta-grid of the derived word is unchanged and all obligatory roles are theta-indexed, then the Projection Principle is not violated. Note that since government is possible across a nonmaximal X^0 , the theta-indexing may be direct between the underived word and its complements. We see an example below, with the affix $-ing_N$:

(5.1)



Recall the special property of the external argument. The role in the grid marked -E (external) is optional in all contexts except when the grid is contained within the head of a predicate which would otherwise not assign a theta-role to its subject. That is, the external theta-role is obligatory only when contained within the head of an active VP or an AP. When the external theta-role is part of a grid contained within a noun, as in the above example, it is optional. Hence the above example accords with the Projection Principle in spite of the fact that the external theta-role is not assigned.

Similarly, the passive affix $-en$ does not alter the theta-grid; rather, for independent reasons, the external

argument need not be assigned to the subject position, and so is optional.

The inflectional affixes, -s, -ed and -ing_v do not affect the theta-grid of the verb. Thus they satisfy the Projection Principle. It is not at first as obvious that the nominalizing affixes -ing and -er also satisfy the Projection Principle, and we will now demonstrate this.

5.1.1 Nominalizing -ing and -er

5.1.1.1 Gerund -ing nominals

In the regular case, nouns formed by adding -ing to a verb express a process, as we see in the following examples:

- (5.2) The reading of books
- (5.3) The eating of an apple
- (5.4) The driving was not very pleasant
- (5.5) Their reluctant parting
- (5.6) The house-keeping
- (5.7) Window-cleaning

The role marked -E (external) in the theta-grid of the verb is assigned optionally by the -ing noun, and is carried if at all by an NP in specifier position or in object position, as we see in the following examples:

- (5.8) Their looking at pictures
- (5.9) The looking at pictures
- (5.10) The giving of the speech by John
- (5.11) The giving of the speech

The optionality of the external theta-role in these examples follows from the fact that the noun does not head a predicate, which if present would require the external theta-role to be realized.

On the other hand, the following examples show

(following Roeper (1983)) that non-external theta-roles are obligatory in the V-ing form if they are obligatory in the V:

- (5.12) The destroying of the city was terrible
- (5.13) * The destroying was terrible
- (5.14) The giving of money
- (5.15) * the giving

Thus process $-ing_N$ does not alter the theta-grid of a verb, either by optionalizing or by deleting any theta-roles.

In process nominals, the derived noun refers to the process described by the verb, and not the the result of the process or its originator. Not every nominal is a process nominal; $-er$ nominals are not, for example. This means that the property of being a process nominal depends on the affix. We take it that the affix $-ing$ is a function mapping from the verb to a process nominal.

$-Ing$ may not be assigned a theta-role, either an internal or an external theta-role, though it is nominal, and is governed by the verb, and as we will see, theta-assignment to an affix is not ruled out in principle ($-er_N$ is assigned a theta-role). Theta-assignment in this case is not ruled out by visibility violations, as both the verb and the affix are visible. Rather, we suggest that, by specification of incompatibility, theta-matching between the verb and the affix is ruled out because of the 'process nominalization' relationship which exists between the verb and the affix. Because the verb is an argument of the affix, the affix can not be an argument of the verb.

In conclusion, we see that gerund $-ing$ does not affect the theta-grid of the stem to which it attaches, and so does not violate the Projection Principle.

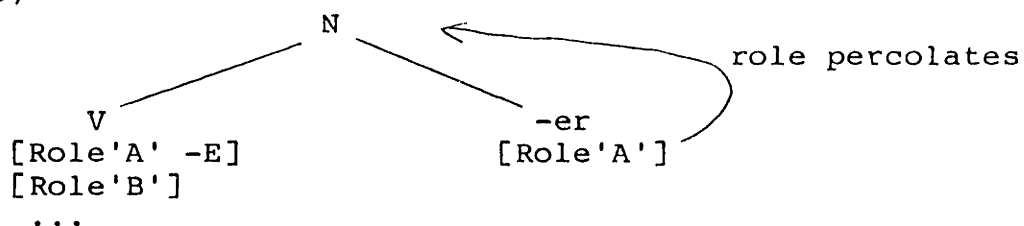
5.1.1.2 Nominal -er

-Er attaches to verbs and produces nouns; the derived noun has a relation to the verb characteristic of the relation between the external argument and the verb. For example, a 'warbler' is the agent - the external argument - of 'warble'. In the following examples we see that the V-er nominal denotes the external argument of the verb, whether that external argument is agent, source, theme or benefactor:

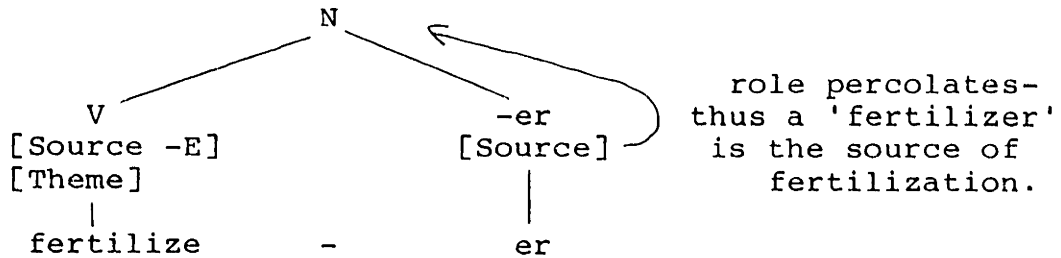
- (5.16) external argument is AGENT
 gambl-er, strik-er, warbl-er, march-er, race-er
 brew-er, lectur-er, plaster-er, teach-er, retriev-er
- (5.17) external argument is SOURCE
 gush-er, trail-er, creep-er
 silenc-er, fertiliz-er, thrill-er, cook-er, scrap-er
- (5.18) external argument is THEME (ergative verbs)
 twist-er, break-er, crack-er, vibrat-or
- (5.19) external argument is BENEFACTOR
 hear-er, learn-er, discover-er, inherit-or

The special meaning of -er nouns is derived from the -er suffix, in some way. We can not, however, simply say that the suffix is 'source' or 'agent', and percolate this property to the word, because whether the word is a source, agent or theme of an action depends on the theta-grid of the underlying verb. The suffix is 'agent' if the external argument of the verb is 'agent', and 'source' if the external argument of the verb is 'source', and 'theme' if the external argument of the verb is 'theme':

(5.20)



eg.
(5.21)



The external argument of the verb can not be phrasally manifested, by a 'by-phrase' for example. Here we see a difference between -er nominals and other nominals; in other nominals, eg those in -ing or -ion, the external argument of the verb can be manifested by a 'by-phrase':

- (5.22) * a dancer by Mary
 (5.23) the dancing by Mary
 (5.24) * the swimmer by/of the girls
 (5.25) the swimming by/of the girls

We may account for this by a semantic constraint, that a 'by-phrase' may modify only a process or result nominal. The absence of a 'by-phrase' is not specifically linked to the agent/source properties of -er; note that -ee nouns also do not take 'by-phrases', though here the external argument is not linked with the -ee affix:

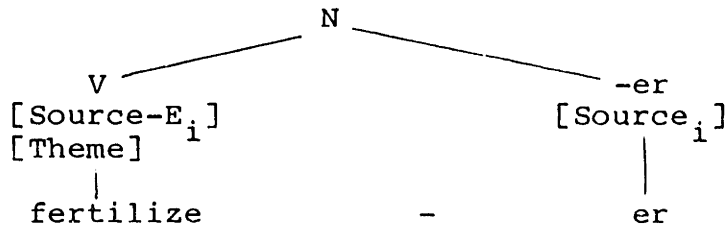
- (5.26) * a payee by the government

Thus the external argument of the verb is not only matched with the role of the suffix, but phrasally unrealizable. This kind of pre-emption of a theta-role fits with what we find in theta-indexing (theta-assignment); a theta-role, once matched can not be assigned again. Thus we suggest that the external theta-role is matched with the affix -er; that is, is assigned to the affix -er.

-Er is governed by the maximal projection of V (the

maximal projection of V is in this case V itself, as the node dominating V is not a projection of V), and so is in the correct position to be assigned an external theta-role. The role is assigned to -er (theta-indexed with -er), and then is assumed in some way by the projection of -er, the derived noun:

(5.27)



The V is visible as a theta-assigner, because it is assigned Case by -er. -Er is visible as a theta-assignee by percolation of a matched Cn feature down from the N node. V is visible as a predicate because -er is visible.

The relationship between -er and the noun which it heads may be compared to that between a noun and the NP which it heads. A (noun) 'runner' is the agent of running in the same way that (NP) 'a running man' is the agent of running. This is what we mean by 'role percolation'; it is probable that no feature is actually percolated.

Why does -er necessarily get the external theta-role? That is, why should a V-er noun necessarily denote the external argument of the verb?

There are in fact a few exceptions. We give below a few examples where the V-er noun denotes something other than the external argument.

(5.28)

respirator, howler, roaster, romper, confessor, merger

The fact that these exist show that there is nothing ruling out such nouns in principle. The point is that these

exceptions are very rare, and are presumably stored in the lexicon, as their meaning is underivable regularly.

We might specify that *-er* must be theta-matched (as some kind of extra visibility criterion for *-er*). As a specification this is however unique; no nouns or other affixes are such that they must be theta-matched. Thus we will propose an alternative.

Our alternative proposal to explain why *-er* must be assigned the external theta-role involves the following specification:

If a theta-role may be assigned in a particular configuration then it must be assigned.

Since *-er* is governed by the maximal projection of *V* (which is *V* itself), and may carry a theta-role, then *-er* must be assigned the theta-role.

-Er does not appear to affect the internal arguments in the theta-grid of the verb stem to which it attaches. There are a few apparent exceptions to this, where a verb which normally requires an object becomes an *-er* noun without an object. However, these verbs may appear without an object when they indicate a characteristic act, and it is this meaning which is carried by the *-er* nominal. Thus the theta-grid is carried over unchanged from a 'characteristic' verb to a 'characteristic' noun.

- (5.29) he loves
- (5.30) a lover
- (5.31) he throws
- (5.32) a thrower
- (5.33) he gives
- (5.34) a giver
- (5.35) It destroys
- (5.36) a destroyer

Verbs which require an object, and may never appear without

one, even to denote a characteristic act, may not appear without an object in the -er form.

(5.37) * he puts

(5.38) * a putter

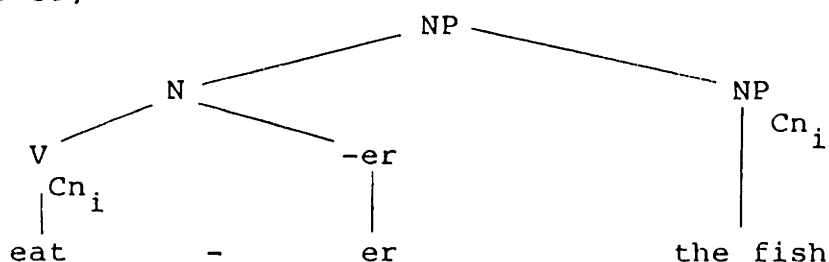
5.1.1.3

Thus we conclude that -er and gerund (process) -ing do not affect the theta-grid of the verb stem to which they attach, and thus observe the Projection Principle.

5.1.2 A note on Case-assignment

Given our definition of government, we might expect the verb inside a derived -ing or -er noun to assign Case to an NP object. In fact this does not occur:

(5.39) *

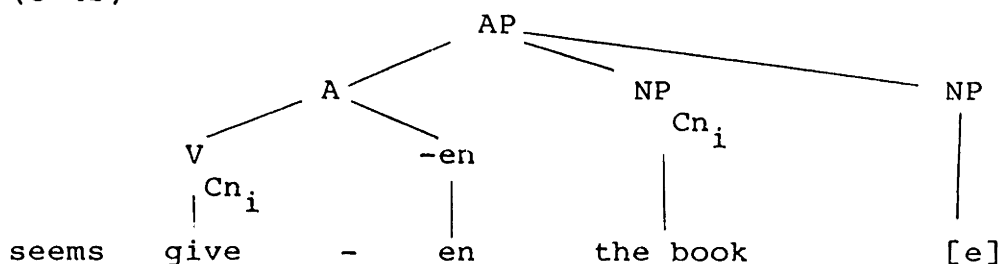


'Eat' carries a Cn feature, and governs 'the fish'. What prevents Case-indexing? It seems that the adjacency condition is here at work. That is, the nominal element -er intervenes between the verb and the NP, and thus the adjacency condition on Case-assignment is not met. -Ing blocks Case-assignment in the same way.

The same story should probably be told for adjectival -en. Adjectival passives can not take (second object) NP arguments, presumably because they are not able to

assign the NP Case. This is because the adjectival -en intervenes between the verb and the NP and prevents Case-assignment:

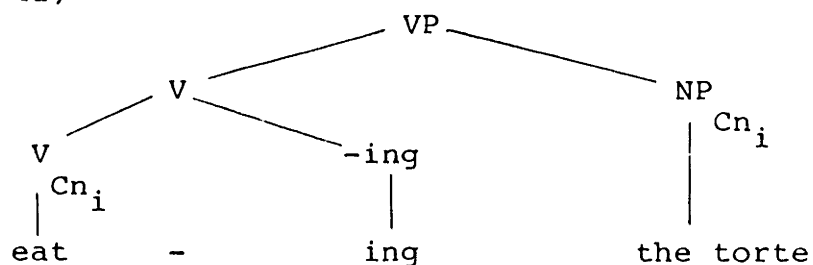
(5.40) *



It is however possible that these double object adjectival passives would be ruled out for the independent reason that they are not sufficiently stative.

While adjectival and nominal affixes cause adjacency violations such that Case can not be assigned, verbal affixes do not interrupt Case-assignment. Thus these affixes are invisible for the purpose of determining adjacency.

(5.41)



5.1.3 Syntactic affixes in the lexicon

In this section we will examine what appear to be syntactic items consisting of a verb stem and a Case-marking affix which have been entered in the lexicon. By 'entered in the lexicon' we mean an item which takes a lexical affix, or which has taken on some idiosyncratic property.

We will suggest that in each case a syntactic affix

has a lexical 'double'.

5.1.3.1 Adjectival V-ing

Non-progressive -ing participles are verbs. It has sometimes been claimed that they are adjectives because they appear in prenominal position:

- (5.42) an exercising runner
- (5.43) the sleeping man
- (5.44) a hurrying businessman
- (5.45) the gun-running man
- (5.46) a polluting oil-slick
- (5.47) a believing multitude

However, the -ing participles of these verbs do not appear to be adjectives for the following reasons:

They do not appear as a complement to 'seem':

- (5.48) * he seems sleeping
- (5.49) * the crowd appears believing
- (5.50) * The oil-slick seems polluting

Non-progressive V-ing may not take degree modifiers, nor modifiers which may accompany statal passive, such as 'widely':

- (5.51) * a very believing person
- (5.52) * a widely considering grandfather

Non-progressive V-ing may not be suffixed with -ness or -ly:

- (5.53) * believing-ly, hurrying-ly, considering-ly
- (5.54) * exercising-ness, flying-ness

Un- does not attach to nonprogressive V-ing:

- (5.55) * un-arriving, un-destroying

We conclude that these V-ing participles are not adjectives.

It appears, however, that there are genuinely

adjectival V-ing participles. We will discuss a large unified class of them, the affectives (eg 'surprising') in section 2, and will suggest that there is an adjectival -ing affix. There are however some V-ing participles which are not affectives, yet pass the adjectival tests, and so would appear to be adjectives.

(5.56)

(a)

appeal-ing	condescend-ing
domineer-ing	despair-ing
exact-ing	demand-ing
dar-ing	deserv-ing
everlast-ing	forgiv-ing
grat-ing	incriminat-ing
impos-ing	know-ing (about..)
lov-ing	will-ing
last-ing	menac-ing
mislead-ing	nourish-ing
promis-ing	presever-ing
reveal-ing	ravish-ing
search-ing	'intend-ing passengers'

(some semantic drift:)

tell-ing	patroniz-ing
understand-ing	invit-ing
fiödl-ing	forbid-ing
becom-ing	winn-ing
rambl-ing	

(b) compounds:

out-go-ing	over-bear-ing
pains-tak-ing	law-abid-ing
time-consum-ing	

These forms differ from the average V-ing participle in that they may take degree modifiers, may appear as the complement to 'seem' etc, and in some cases take adjectival suffixes.

In addition, there are -ing forms which have the surface appearance of participles, but are not based on verbs:

(5.57)

dispirit-ing	(cf dispirit-ed)
hearten-ing	(cf hearten-ed)
appetize-ing	(cf appetiz-er)
scath-ing	(cf un-scath-ed)

gall-ing	(cf gall)
enterpris-ing	(cf enterprise)
gruel-ing	
prepossess-ing	
excruciate-ing	

We shall introduce a lexical -ing which changes verbs and roots to adjectives. The affix must be lexically attached because its attachment is idiosyncratic, and does not preserve thematic roles (consider, eg 'fiddling'), thus violating the Projection Principle. It is probable that this affix should be identified with the 'affective' -ing affix, which we will discuss in section 2.

Thus we have proposed a lexical -ing, identical to the syntactic -ing except that it is adjectival and is added in the lexicon and not in the syntax. An alternative would be to add a lexical zero-suffix to the V-ing, which could change the verb into an adjective. However, this is an undesirable alternative as (1) it would involve the attachment of a lexical suffix to a syntactically constructed item, (2) the suffix would have to be restricted to attach only to V-ing forms, and not to verb stems (verb stems are not zero-derived to become adjectives).

5.1.3.2 Non-process -ing nominals

We have examined -ing gerunds, and seen that they obey the Projection Principle. There are, however, -ing nominals which do not obey the Projection Principle. These have a semantically different output from gerund -ing, in that they denote a noun related to the process described by the verb; we give some examples below:

- (5.58) I don't agree with this reading of 'Lear'
- (5.59) The experiment produced some interesting findings

The nominal may denote (a) the thing created by the process described by the verb, or (b) the instrument used (these two are the most common), or (c) the source or (d) the location, or (e) the patient.

(5.60) THE THING CREATED (RESULT)

trimming, cutting, scraping, shaving, paring
engraving, writing, painting, printing, casting
building, parting, shopping, saving(s), taking(s)

(5.61) THE INSTRUMENT

thickening, garnishing, stuffing, filling, sweetening
seasoning, topping, flavoring, glazing, frosting
roofing, waterproofing, fastening

(5.62) THE SOURCE

opening, swelling, hearing

(5.63) THE LOCATION

dwelling

(5.64) THE PATIENT

offering, gelding

These nominals do not appear to be produced productively. Thus the following words do not exist; not every process nominal could become a nominal of the above kind. The following -ing nominals, for example, do not have a result, instrument, etc. reading:

(5.65)

smuggling (*=patient of smuggling)
baking (*=thing created by baking)
sleeping (*=location of sleeping)
painting (*=instrument of painting)
burning (*=thing created by burning)

The restricted productivity of these nominals indicates that they are not formed in the syntax. As such, they can not be derived from V-ing process nominals by the lexical process of zero-derivation, as the latter are syntactically constructed items, and so will not undergo zero-derivation. Rather, they must be produced by the addition of a lexical -ing affix, which produces non-process nominals.

Result nominals violate the Projection Principle as

theta-roles are deleted from the grid. Consider, for example, 'build' which as a verb or a process nominal requires an object, but does not take an object when a result nominal:

- (5.66) We built the palace
- (5.67) * We built
- (5.68) The building of the palace is going well
- (5.69) * The building is going well
- (5.70) * That is the building of the palace over there
- (5.71) That is the building over there

Thus we see that non-process -ing nominals violate the Projection Principle, but can be independently shown to be formed not in the syntax but in the lexicon, and are thus not in the domain of the Projection Principle, which is a syntactic principle.

Again, a syntactic affix has a lexical double.

5.1.3.3 Lexical passives

In chap.4 we showed that statal (adjectival) passive is syntactic and not lexical. There are however certain lexical V+en forms.

Thus the following V+en participles do not have theta-assigning properties which are regularly derivable in the syntax; their meaning is idiosyncratic.

- | | |
|--------------|------------------|
| (5.72) | |
| assured | attached (to NP) |
| accomplished | accustomed to |
| devoted | dignified |
| detached | distinguished |
| deformed | disconnected |
| guarded | harried |
| hurried | informed |
| limited | misguided |
| refined | reserved |
| varied | |

In addition, there are forms which have the surface

appearance of V-en participles, but which contain roots - forms which may not head phrases - rather than verb stems. Sometimes these roots form the basis of other words.

(5.73)

dispirit-ed	(cf dispiriting)
hearten-ed	(cf heartening)
famish-ed	
addict-ed	(cf addict, addiction)
derang-ed	(cf derangement)
aggriev-ed	
deject-ed	(cf dejection)

The above forms can not be created in the syntax. Thus we suggest that there is a lexical double of -en.

5.1.3.4 Syntactic affixes in the lexicon

We have seen that for some syntactic affixes there are lexical affixes which resemble them. The lexical and the syntactic affixes are distinct, however. This is clear in the case of gerund -ing and result -ing, and in the case of adjectival -ing and verbal -ing, as here the lexical and syntactic affix differ in their output, as well as differing in whether they obey the Projection Principle.

It does not seem to be true for syntactic affixes that they can freely undergo lexical processes. Thus, the affixes -s, -ed, -ing_V, -en_V, -en_A, -ing_N, and -er must assign Case and must not violate the Projection Principle. They are not available for lexical processes, and as such will not be embedded in lexical items.

Why should this be? We suggest that the C feature(s) carried by these affixes must be assigned. This means that every occurrence of the affixes must be in the syntax, as Case-matching takes place only in the syntax. Thus the affixes are inherently syntactic because they are

obligatory Case-assigners.

Note that other Case-assigners are not obligatorily Case-assigners. Thus a verb stem, for example, need not assign Case if it embedded in a nominal.

We have seen evidence that at least the syntactic affix -en must always assign its Case-features; the evidence comes from passive. -En always 'absorbs' Case, even Case on a stranded preposition, because -en must match its Cn feature.

In section 3 we will discuss the general relationship between the syntax and the lexicon, and discuss why it should be that syntactically constructed items can not be embedded in lexical items. First, however, in section 2, we will consider some other affixes which have properties (primarily high productivity) suggesting that they may be syntactic affixes.

5.2 Other syntactic affixes

The suffixes discussed in the previous section must for independent reasons be represented in the syntax. In this section we will consider certain other suffixes which have properties (primarily high productivity) suggesting that they might be represented in the syntax. These are:

-able	
-ing	(adjectival, as in 'surprising')
-ness	
-ly	(adverbial)

We will see that it is often difficult to decide clearly whether an affix has a syntactic manifestation. This is because a given syntactic affix may have a duplicate lexical form which is involved in some lexical processes.

5.2.1 -Able

Kayne (1981) proposes that there are two kinds of -able adjectives, those associated with a trace (thus like statal passive), and those without a trace. In our terms, the former would be constructed with a syntactic affix and the latter with a lexical affix.

-Able may be freely attached to any transitive verb. We give some examples:

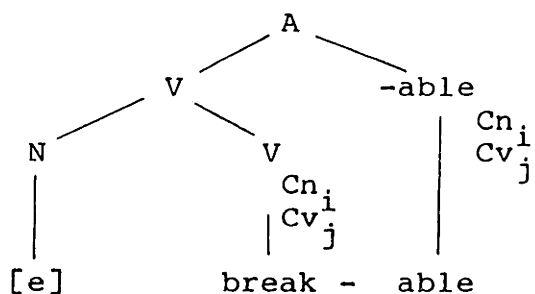
(5.74)

covet-able, shift-able, cit-able,
extradit-able, forfeit-able, burn-able, return-able,
tun-able, hear-able, wear-able, spar-able,
remember-able, enter-able, utter-able, conquer-able

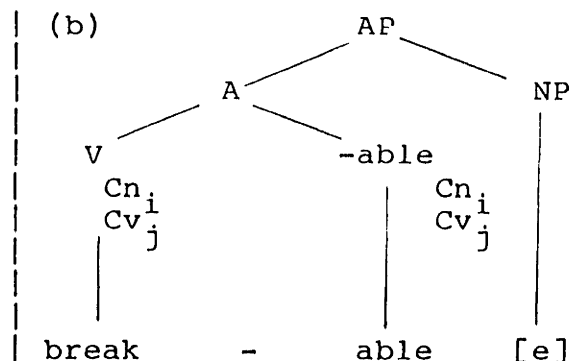
If the -able that we see here is attached in the syntax, it will have the same Case-assigning properties as adjectival -en (it carries a Cv feature, and a Cn feature) and will absorb Case on a stem. Because the Cn feature on the affix matches with the Cn feature on the verb stem, as in adjectival passive, the verb assigns a theta-role to a position without Case, and so to a trace; the trace may be to the left of the verb, in a compound (a), or to its right, in a phrase (b):

(5.75)

(a)



(b)



Whether the trace is assigned in a compound or in a phrase

depends, as with the statal passive, on whether the Amax projected from the -able word is Case-matched. Thus the trace will be assigned in the phrase ((b) above) if AP is the complement to 'feel', 'seem', or 'consider' etc., or in a floating adjunct. As a premodifier, the AP will not be Case-matched, and so the head will not have Case, and the trace must be assigned a theta-role in the compound.

The clearest evidence that -able words take a trace is that -able adjectives may take result predicates. It is shown by Simpson (1983) that result predicates are predicated only of an internal argument. Thus the fact that an -able adjective can take a result predicate, as we show in the following examples, indicates that there is an empty object (a trace) in the phrase, acting as the subject of the result predicate:

- (5.76) Trout is hammerable [e] flat
- (5.77) Beef is eatable [e] raw
- (5.78) it is burnable [e] to ashes

Thus we have some evidence that a trace is associated with -able.

For the most part, -able adjectives behave like adjectival passives, which supports our claim that -en and -able have similar properties. [1] It seems that -able, like -en, does not violate the Projection Principle.

There are, however some differences between -able and adjectival -en, which might indicate that -able is not a syntactic affix.

-Able adjectives typically have fewer realized

1. Kayne claims that -able adjectives do not have stranded prepositions, but this seems to be incorrect, as -able adjectives and adjectival passive both allow stranded prepositions in eg 'livable in', 'lived in'.

arguments than the corresponding adjectival passives. For example, -able does not normally give rise to synthetic compounds, and on the whole -able synthetic compounds sound rather strained in comparison with the equivalent passive compounds:

- (5.79) ? teacher-trainable
- (5.80) teacher-trained
- (5.81) ? cat-rippable
- (5.82) cat-ripped

Another possible problem for our syntactic account of -able is that the negative prefix in- fairly productively attaches to -able words. The output of in- prefixation in these cases is often clearly lexical; that is, the output has idiosyncratic properties. For example, we find semantic drift, as in 'irrepressible', and often the in- form is unable to take the complements which the unprefixated form may take:

- (5.83) reversable by the judge
- (5.84) * irreversable by the judge
- (5.85) corruptable by bribes
- (5.86) * incorruptable by bribes
- (5.87) reducable to ashes
- (5.88) * irreducable to ashes
- (5.89) curable with penicillin
- (5.90) * incurable with penicillin
- (5.91) digestable by babies
- (5.92) * indigestable by babies

These in-V-able words thus have properties suggesting that they are lexical, which implies that the -able words which they are based on must also be lexical.

A similar problem arises when -able words productively take the suffixes -ity and -ly, as in the examples below:

- (5.93) ABLE + ITY
- extendability returnability graspability
- bearability storability devisability

assessability
plantability

abusability
rentability

inflatability
quotability

(5.94) ABLE + LY

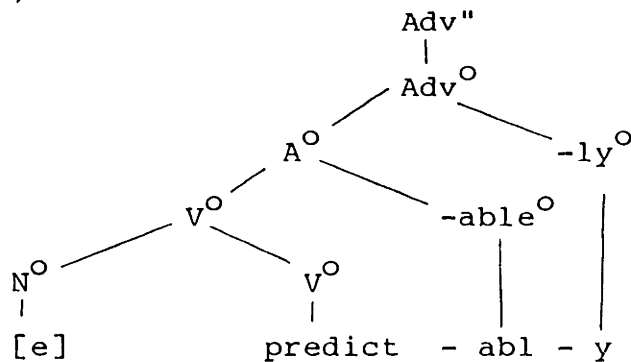
inescapably
enjoyably
identifiably
inexcusably

detectably
acceptably
certifiably
surmisably

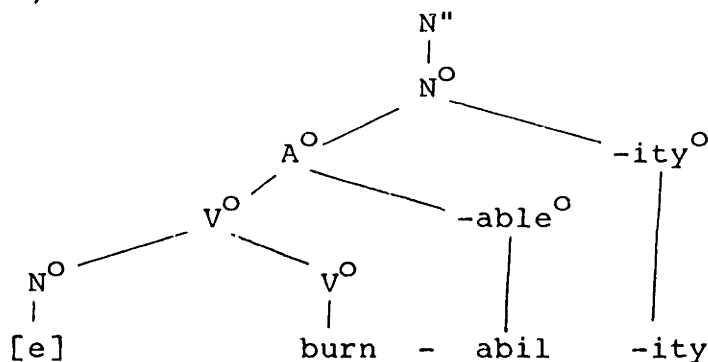
allowably
imaginably
recognizably
noteably

If -able is associated with a trace, as proposed above, then visibility will be violated when -ity and -ly are attached, as in the phrase headed by the derived noun or adverb there will be no appropriate Case-marked binder for the trace, except possibly the affixes -ity and -ly themselves. Recall that the trace governed by the verb must be bound by an X^0 node; the only governing X^0 node in these derivations is an affix. These affixes, however, are not in A-positions, and so should not be able to A-bind a trace.

(5.95)



(5.96)



Hence visibility is violated if -ably and -ability words are constructed in the syntax, and so they must be constructed in the lexicon. The implication is that the -able words on which they are based are also constructed in the lexicon.

Thus it seems that in some cases, -able words are constructed in the lexicon. The fact that -able words may take result predicates indicates that they may also be constructed in the syntax, with an associated trace.

We will now examine further evidence that a version of -able may attach in the lexicon.

5.2.1.1 Lexical -able

-Able is productively attached only to transitive verbs. However, there are words consisting of -able and an intransitive verb (very rare), or a noun or a root (both cases fairly numerous). We give some examples:

(5.97) INTRANSITIVE + ABLE

perish-able, vari-able

(5.98) NOUN + ABLE

palat-able, objection-able, duti-able, pension-able
marriage-able, comfort-able, treason-able, season-able

(5.99) ROOT + ABLE

vi-able, malle-able, ris-ible, plaus-ible,
solu-ble, feas-ible, dur-able, culp-able

Furthermore, there are V+able words where a preposition, which would be required by eg the adjectival passive, is lost. We give some examples:

(5.100)

profit-able	profit from
listen-able	listen to
live-able	live in
depend-able	depend on
laugh-able	laugh at
reli-able	rely on

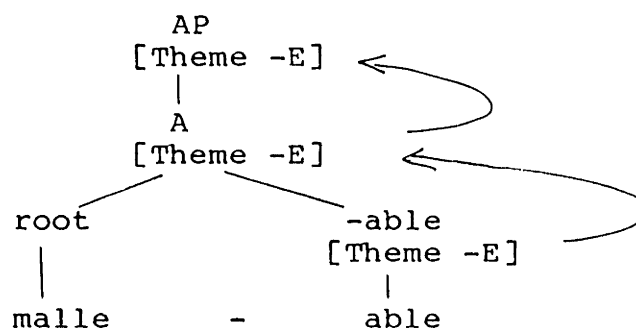
We suggest that all the above are constructed in the lexicon, because they are not part of productive groups - relatively few nouns, for example, may be affixed with -able. Furthermore, the above words do not appear to be associated with a trace. Thus, for example, they do not take result predicates, which indicates that there is probably no empty internal argument:

- (5.101) * it was flammable to ashes
- (5.102) * he is risible out of the room
- (5.103) * He was laughable out of the room
- (5.104) * this import is dutiable to worthlessness

Generally, then the argument-taking properties of the verb are not carried over, and the affix violates the Projection Principle.

What are the properties of lexical -able? As a lexical affix, it will not be a Case-assigner, because in the syntax it will not be represented separately from the node to which it attaches. The adjectives which it produce assign an external theta-role, 'theme', (possibly 'potential theme'). This theta-role is presumably not derived from the noun or root to which the affix attaches, as these items do not on the whole have theta-grids; thus we suggest that the theta-role is lexically associated with the affix. We illustrate this below; the role percolates from -able to A and from there to AP, where it is matched:

(5.105)



5.2.1.2 -Able at two levels

It seems then that -able is present both as a syntactic suffix and as a lexical suffix. The two suffixes differ in properties; the syntactic suffix carries a Cv and a Cn feature, and the lexical suffix carries no Case features, but has a theta-grid consisting of [theme].

5.2.2 Adjectival 'affective' -ing

'Affectives' is the name we give to a class of verbs which take experiencer objects, and theme subjects. These are sometimes called 'flip' verbs. Their properties (regarding in particular nominalization) have recently been discussed by Amritavalli (1980), and Rappaport (1983). Some examples follow:

- (5.106) Your behavior surprises me
 (5.107) What she said upset the doctor
 (5.108) This problem confuses our pupils
 (5.109) Their lateness disturbed John's mother

We give a fairly exhaustive list of the affective verbs:

- (5.110) AFFECTIVE VERBS
- | | | | |
|---------|-----------|---------|---------|
| absorb | astonish | astound | afflict |
| agonize | aggravate | alarm | amaze |

amuse	annoy	alienate	appal
baffle	bewilder	bore	beguile
captivate	charm	cheer	confuse
convince	crush	console	damage
degrade	depress	demoralize	disappoint
disarm	disconcert	discourage	disgust
dishearten	displease	disillusion	distress
disturb	dazzle	dismay	distract
embarrass	entertain	enlighten	encourage
exasperate	exhilarate	excite	exhaust
entrance	enchant	flatter	frighten
fascinate	gratify	horrify	humiliate
hurt	interest	infuriate	inspire
insult	irritate	invigorate	madden
mortify	move	nauseate	perplex
pleas	provoke	puzzle	reassure
refresh	revolt	relax	sadden
satisfy	shock	sicken	strike
stagger	startle	surprise	stun
stimulate	sooth	spellbind	tantalize
threaten	terrify	thrill	touch
tire	trouble	upset	unsettle
unnerve	vex	worry	wound
weary	sting	daunt	affect
bewitch	chill	entice	try
wither			

It is common for a verb both to belong to this class and also to have a non-affective manifestation, assigning different theta-roles and with different properties. Consider, for example, the following pairs, where the first is affective, and the second non-affective (the object is not an experiencer):

- (5.111)a Your behavior surprises me
 b The rebels surprised the approaching cavalry
 (5.112)a What she said upset the doctor
 b I upset my coffee

Affective verbs have unusual properties. Their behavior in nominalizations has been extensively discussed. We are here interested in the -ing participles of affectives.

Like other statal passives, the statal passives of adjectives are adjectival, and in fact fit better with the

adjectival tests than the average statal passive. What is particularly unusual about the affectives is that they regularly have adjectival V-ing participles. The V-ing participles of the affective verbs behave like adjectives, in the following ways:

The maximal projection is distributed like an AP, except in the resultative.

PREMODIFIER:

(5.113) A surprising discovery

COMPLEMENT:

(5.114) The fish tastes interesting

ADJUNCT:

(5.115) I like films exciting

POSTMODIFIER:

(5.116) [The claim alarming to me] is that he lied

RESULTATIVE:

(5.117) * I brewed it disgusting

(Why does affective V-ing not appear in resultative position?)

(5.118) * I cooked it disgusting

(5.119) * I brewed it soothing

(5.120) * She knocks herself frightening

(5.121) * He dances himself embarrassing

We can rule these out only on semantic grounds. It seems that resultative adjectives express a terminal (resultant) state. As evidence of this, consider the fact that resultative adjectives may not take intensifying degree modifiers:

(5.122) I laughed myself sick

(5.123) * I laughed myself very sick

(5.124) I shouted myself hoarse

(5.125) * I shouted myself very hoarse

(5.126) I froze the icecream solid

(5.127) * I froze the icecream very solid

We suggest that affective adjectives never express terminal states, but always express states which can be further

intensified. Hence they do not appear as resultative adjectives.)

As a final indication that affectives are adjectives, consider the fact that they are modified and intensified like adjectives.

- (5.128) I am very shocked to hear that
- (5.129) I feel fairly unsettled
- (5.130) It is very flattering
- (5.131) A very puzzling newspaper

Un-, -ly, and -ness attach to V-ing affectives, apparently rather idiosyncratically, with V-ing-ly being the most common

- (5.132) un-inspiring
- (5.133) un-convincing
- (5.134) disappointing-ly
- (5.135) astonishing-ly
- (5.136) exciting-ly
- (5.137) charming-ness
- (5.138) revolting-ness

We conclude that affectives may have adjectival V-ing participles. Since V-ing may be an adjective only when the stem is affective, we must introduce a new -ing affix, which attaches just to affective stems and produces an adjective.

The -ing affix might be syntactic or lexical. An indication that it might be syntactic is that it is attached productively to affective stems, with no lexical gaps. The few gaps which appear can be accounted for by the fact that an adjective in -ful, -ive, -some, or -ous, is listed in the lexicon, and this blocks the more productive -ing form, as in the following examples.

- | | | | |
|---------|-----------|-----------|--|
| (5.139) | | | |
| attract | -ive (A) | *-ing (A) | |
| bother | -some (A) | *-ing (A) | |
| delight | -ful (A) | *-ing (A) | |
| impress | -ive (A) | *-ing (A) | |

irk	-some (A)	*-ing (A)
nettle	-some (A)	*-ing (A)
offend	-ive (A)	*-ing (A)
outrage	-ous (A)	*-ing (A)
torture	-ous (A)	*-ing (A)
pain	-ful (A)	*-ing (A)
repell	-ent (A)	*-ing (A)
scare	-y (A)	*-ing (A)

All other affective stems will take -ing affixes. Thus by its productivity we might conclude that adjectival -ing is syntactic. However, the affix appears to violate the Projection Principle, as we will now see.

5.2.2.1 A violation of the Projection Principle

Affective verbs take an obligatory internal object, which is assigned an experiencer theta-role:

- (5.140) It surprises me that you left so early
- (5.141) * It surprises that you left so early
- (5.142) Your story astonished me
- (5.143) * Your story astonished

The adjectival -ing participle, however, may assign no internal theta-role:

- (5.144) It is surprising that you left so early
- (5.145) Your story is astonishing

The experiencer object, if realized, is realized usually in a 'to phrase', rather than in an 'of phrase':

- (5.146) * His claim seems surprising (of) me
- (5.147) His claim seems surprising to me

This 'to' adjunct appears to be a sentential adverb, rather than a modifier of the verb. Thus, compared with the verbal modifier by-phrase, it is freer in distribution:

- (5.148) ? by his claim I was surprised
 (5.149) to me his claim is surprising
 (5.150) * I have by his claims been surprised
 (5.151) His claims have to me been surprising

It seems then that the adjectival -ing either optionalizes or deletes the 'experiencer' internal argument in the theta-grid of the verb stem, which means that the affix violates the Projection Principle, and thus can not be syntactic.

We conclude that despite its productivity, adjectival -ing is a lexical affix, and not a syntactic affix.

5.2.3 -Ness

-Ness changes adjectives into nouns. It is a very productive suffix. Let us consider the possibility that it is added in the syntax, and is a function mapping from an adjective A to a noun having the meaning 'state of A'. We give some examples of -ness nouns:

- (5.152)
 aware-ness, dark-ness, new-ness, red-ness
 accurate-ness, pig-headed-ness, bare-faced-ness
 graceful-ness, gracious-ness, spacious-ness
 childless-ness, godless-ness, revengeful-ness

-Ness attaches to a few V-en words which are constructed in the syntax:

- (5.153)
 disconnected-ness
 broken-ness

Since we construct these in the syntax, and since -ness can be affixed to them, we may conclude that -ness is attached in the syntax, on the assumption that syntactically constructed

constituents do not undergo lexical processes.

The external argument of the adjective becomes optional in the nominal, as we see in the following examples.

- (5.154) The happiness that one feels
- (5.155) My happiness
- (5.156) Sickness is unpleasant
- (5.157) Johns sickness lasted for weeks

Nouns never have obligatory external arguments, and so without any special stipulation we can derive the optionalization of the external argument of the adjective.

There are very few adjectives which have obligatory internal arguments. However, the following example shows that when an adjective has an obligatory internal argument, it remains obligatory in the nominal:

- (5.158) She is fond of him
- (5.159) * Her fondness is surprising
- (5.160) Her fondness for him

Thus we suggest that -ness does not change the theta-grid of the adjective, and thus the Projection Principle is not violated.

Passive participles and -able adjectives are associated with traces; we predict that they are associated with traces also when they are embedded in -ness nominals. This fits with our claim that -ness does not change internal argument structure. Our prediction appears to be true; that is, -ness nominals which are based on passive adjectives or -able adjectives require an argument in the NP, which will bind the trace. We show this in the following examples:

- (5.161) * These mountains do not exhibit [any great
climbableness]
- (5.162) [The climbableness of these mountains] is their
best feature
- (5.163) * [Brokenness] is a bad state for it to be in
- (5.164) [The processor's brokenness] is disturbing

- (5.165) * [Collectableness] is desirable for a toy
 (5.166) [The collectableness of these toys] is amazing

As we see, passive and -able -ness words can not be abstracted away from their arguments as easily as can adjectives like 'happiness'. We suggest that this is because these adjectives have an obligatory internal argument (the trace) and -ness does not alter argument structure.

Thus it is quite possible that -ness is represented in the syntax as an independent affix.

5.2.3.1 -ity

An affix similar to -ness is -ity. -ity maps from an adjective to a noun. It seems that -ity attachment, like -ness attachment would not violate the Projection Principle. However, there are various independent reasons for saying that -ity is not attached in the syntax. These are as follows:

Some -ity words may refer not just to 'the state of Adj', but may refer as well to 'the thing which is Adj'. We see some examples below.

- (5.167) an obscenity
 (5.168) a divinity
 (5.169) an oddity
 (5.170) a nationality
 (5.171) a reality

Other -ity words do not have this alternative meaning. For example, 'a morality' is not a thing which is moral, 'a severity' does not refer to a thing which is severe. In that -ity can have this double meaning, idiosyncratically, -ity is like -ing_N, which can refer to a process or a result. Thus the double meaning of -ity could be reduced, as with -ing, to two different suffixes, one in the syntax (meaning 'state of Adj') and one in the lexicon (meaning 'thing which is Adj').

This is however a marked option; we might rather compare -ity with -ness. -Ness gives only nouns with the meaning 'state of Adj'. We conclude that the fact that -ity has the idiosyncratic possibility of creating 'thing which is Adj' nouns indicates that -ity is a lexical affix.

-Ity attaches only to latinate stems. We will further discuss this issue later in the chapter, and suggest that syntactic affixes do not have selectional properties of this kind. -Ness is not restricted in its attachment in this way, (-ness in fact attaches on the whole to native words, but this is because it is often blocked from attaching to a given latinate stem because an -ity form exists).

We conclude that -ity is probably not represented as an independent unit in the syntax, and -ness probably is represented as an independent unit. Our discussion has brought to light a problem, which is that in some cases it is difficult to apply a reliable discovery procedure to clearly distinguish lexical from syntactic affixes.

5.2.4 -Ly

-Ly attaches to adjectives and produces adverbs. It is a productive suffix, being attachable to most adjectives. On the whole the properties of the output are predictable (ie the adverb need not be listed), which points to a syntactically attached affix.

Since adjectives do not have obligatory arguments, it is difficult to assess whether -ly violates the Projection Principle. Arguments are never carried over, as we see in the following examples:

- (5.172) * John entered the room [happily with his children]
- (5.173) * He worded the letter [carefully with the titles]
- (5.174) * She dresses [proudly of her country]

This failure to assign theta-roles may imply that the theta-grid of the underlying adjective is altered, thus violating the Projection Principle. Alternatively, it might be the case that the head of an Adverb Phrase is never visible. It is difficult to choose between these possibilities. We conclude that there is no proof that -ly violates the Projection Principle.

5.2.4.1 Lexical -ly

In some cases, something additional must be said about the attachment of -ly. For example, most of the speaker oriented -ly adverbs are derived from adjectives which are speaker oriented, as we see from the following list:

(5.175)
 apparent-ly, certain-ly, evident-ly, fortunate-ly
 lucky-ly, natural-ly, obvious-ly, possibl-ly
 clear-ly, conceivabl-ly, definite-ly, plain-ly
 probabl-ly, patent-ly

However, there are a few -ly adverbs, such as 'happily' and 'hopefully' which are not derived from speaker-oriented adjectives. Other adjectives similar to 'happily' and 'hopefully' do not become speaker-oriented adverbs (though they may be ordinary adverbs), as we see below. Hence 'happily' and 'hopefully' must be marked as exceptions; to be constructed in the lexicon.

(5.176) SPEAKER ORIENTED:
 happily, hopefully
 (5.177) NON SPEAKER-ORIENTED
 confidently, pessimistically, gladly, joyfully

Thus we must allow -ly to be attached both in the syntax (for the productive cases) and in the lexicon (for the

irregular examples). Again, we appear to have a suffix which is both lexical and syntactic.

5.2.5 Conclusion

In this section we have considered four suffixes whose productivity led us to ask whether they might be attached in the syntax. We concluded that *-able* and *-ly* appear to have a syntactic and a lexical realization; *-ness* seems to be syntactic; and adjectival *-ing* seems to be lexical.

In the next section we will see that affixes which attach in the syntax must be attached to a stem which is visible. Hence if *-able*, *-ly* and *-ness* are syntactic affixes, they must also be Case assigners.

5.3 Word Formation and levels of representation

5.3.1 S-Structure, LF and D-Structure

Affixes which are present as terminal nodes at some syntactic level are present at least at S-Structure. It is at this level at least that visibility is required, and the syntactic affixes in general confer visibility.

Are affixes present at D-Structure? That is might a word have representation (a) at D-Structure but representation (b) at S-Structure, with the representations linked by an adjunction rule:

(5.178)

(a)

 x^o

(b)

$$\begin{array}{c}
 x^o \\
 / \quad \backslash \\
 x^o \quad -af
 \end{array}$$

D-Structure is the level at which theta-matching is represented; this is the main function of D-Structure. As such, we would expect D-Structure representations to include affixes if the affixes are theta-indexed with the stem. We have proposed only one affix which is theta-linked; this is $-er_N$. If indeed $-er_N$ is theta-linked with the external role on the verb stem, then this affix must be represented at D-Structure.

Other syntactic affixes change category. Thus $-ing_N$, and $-en_A$ change a verb to a noun and an adjective respectively; $-er_N$ changes a verb to a noun. Should these affixes be represented at D-Structure? Consider a noun like 'eat-ing'; this must head an NP at D-Structure, and if the $-ing$ affix is not present at this level, then the verb stem must head an NP. It is possible that in fact the representation of 'eating_N' at D-Structure is as follows:

(5.179)

$$\begin{array}{c}
 NP \\
 | \\
 N^o \\
 | \\
 V^o \\
 | \\
 eat
 \end{array}$$

The $-ing$ affix would be inserted at S-Structure. Thus category-changing affixes need not be represented at D-Structure, if we allow representations like the above.

We can argue, then, that only $-er_N$, and no other affix, need be represented at D-Structure.

Are affixes represented at LF? We have seen that the degree modifier affixes $-er_A$ and $-est_A$ are moved to be adjoined to AP at LF; as such these are represented at LF as well as at S-Structure. If visibility is a requirement at LF (we have seen no evidence either to indicate that it is or that it is not), then Case-assigning affixes must be represented at LF.

We conclude that affixes are represented at S-Structure, and some are represented at D-Structure and some are represented at LF.

5.3.2 S-Structure and PF

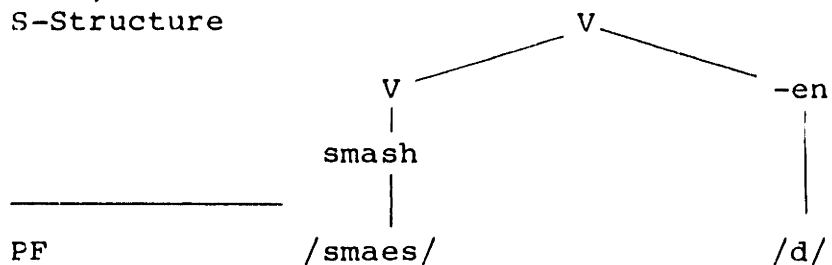
In this section we will consider the relationship between the syntactic and phonological representations of a word.

The terminal nodes in an S-Structure phrase marker will contain lexical items such as stems and affixes. These lexical items will then be paired with phonological representations. This pairing, we propose, takes place between S-Structure and PF.

In English, for the most part, the pairing is linearly one-one between terminal nodes and phonological representations. Consider, for example, the pairing for a regular passive participle like 'smash-en'.

(5.180)

S-Structure

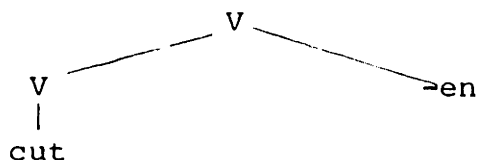


Here the affix is paired with a phonological representation and the stem is paired with a phonological representation.

Consider now a suppletion from English. The passive participle of the verb 'cut' is represented at S-Structure and at PF as follows:

(5.181)

S-Structure



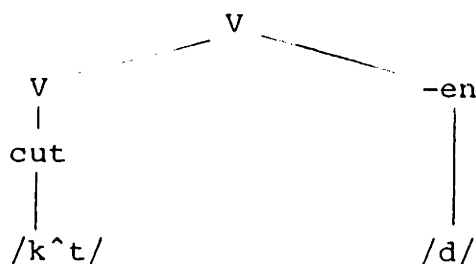
PF

/k[^]t/

It is possible that there is an intermediate phonological pairing /k[^]t+/d/, which is then realized, by an application of a blocking principle (eg see Kiparsky 1973), as /k[^]t/. Thus there is a one-one pairing between the terminal nodes of the syntactic tree and an intermediate phonological representation:

(5.182)

S-Structure



PF

/k[^]t/



Alternatively, the form /k[^]t/ may be paired at S-Structure with the non-terminal node dominating 'cut' and '-en'; it is an open question, however, whether non-terminal nodes are taken in this way as input to phonological representations.

Our account is similar to Anderson's (1982) "Extended Word and Paradigm model". For Anderson, however, the syntactic representation of syntactically complex word is a bundle of features carried by a single terminal node. Our proposal is that syntactically complex words are represented as trees, with government relations holding between the parts of the word.

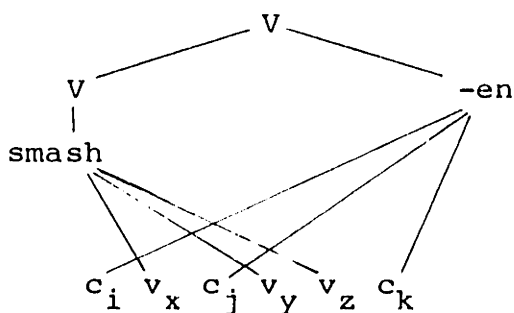
It is possible that only terminal nodes in a tree are taken as the input in constructing a phonological representation. This is straightforwardly realizable in a concatenative language like English; here, terminal S-Structure nodes are paired one-one and linearly with phonological segments. In a non-concatenative language, such as Arabic, the syntactic tree for a word will have its terminal nodes mapped autosegmentally to a phonological representation (for discussion, see McCarthy (1981), Anderson (1982)).

To illustrate this, we take a hypothetical case from some non-concatenative language. The S-Structure representation of 'smashed' might be identical to the S-Structure representation of English 'smashed'. However, the mapping from terminal nodes to the phonological representation might not be one-one or linear:

(5.183)

S-Structure

PF



(c, v_n stand for consonant and vowel phonemes)

5.3.3 No embedding of syntactic inside lexical

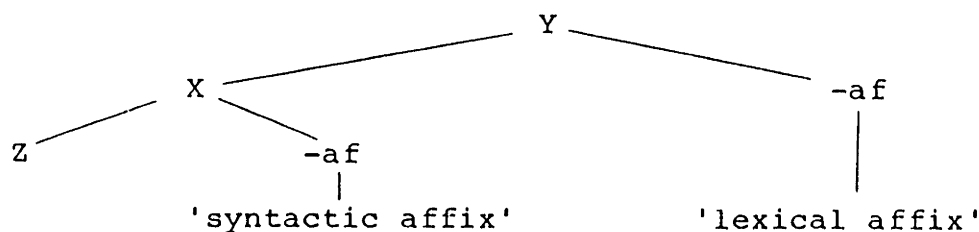
One of the tests which we have used to find out whether a word is formed in the syntax or the lexicon relies on the claim that syntactically constructed items are not embedded in lexically constructed items.

This is actually two independent claims.

One claim is that a lexical item is paired only with a terminal node in a syntactic tree. That is, a lexical item has no internal structure at S-Structure. This is a version of the familiar lexical integrity hypothesis. This claim may not be true. For example, idioms, and V-Prt pairs (like 'throw up' meaning vomit) may be lexical items which are paired with non-terminal nodes in the syntax.

The other claim is that - in English - an affix which is purely lexical cannot govern a syntactically constructed item. Diagrammatically,

(5.184) *



This is not ruled out by the lexical integrity principle. In discussing this type of example, we must characterize a 'syntactic' as against a 'lexical' affix.

The syntactic affixes either assign Case to the word they attach to, or (-er_A and -est_A) are exceptions to the right hand head rule, and allow the stem to inherit visibility from a phrasal node.

Thus the stem to which a syntactic affix attaches is

always visible. We will stipulate that at S-Structure an affix must attach to a visible stem; this is similar to the restriction that a predicate or a degree modifier must have a visible subject at S-Structure.

This means that at S-Structure, an affix will satisfy this constraint only if (a) it is not a head, or (b) it assigns Case to its subject. A suffix will be syntactic only if it carries a C feature or is an exception to the right hand head rule. These are the properties that make a suffix syntactic. If an affix does not have these properties, ie is 'lexical', as in the above diagram, then the stem to which it attaches will not be visible at S-Structure, and hence can not be a syntactically constructed stem.

Prefixes are not normally heads, and so will normally attach to visible stems. As such, we would expect prefixes in general to be attachable in the syntax. In fact, this is probably not the case. Un- is possibly attached in the syntax (it seems to have phrasal scope in phrases like 'un-contested by the lawyers'), but in-, for example, is probably not. We will see, however, in the next section that certain affixes are ruled out from being syntactic by virtue of selectional features. In- will be ruled out because it must attach to a stem with the feature {latinate}, and this feature is not available at S-Structure.

5.4 Syntactic Words and Phonological Rules

5.4.1 Stratum ordering and lexical phonology

We assume that Phonological rules take place at PF, applying to the strings of phonemes mapped by insertion rules from the S-Structure.

The output of certain affixation processes is the input to segmental rules (such as velar softening) and word-stress rules, while the output of other affixation processes is not taken as an input to such rules. The former class of affixes were marked in Chomsky and Halle (1968) with a + boundary symbol, and the latter class were marked with a # or (for inflectional affixes) = boundary symbol. The relevant phonological rules, which we will call 'word-phonological' rules, took place across + but not across # or =.

Siegel (1974) and Allen (1978) showed that + affixes are closer to stems than # (or =, which they collapse with #) affixes, and proposed there is a principle requiring that affixes whose output undergoes phonological rules are attached before affixes whose output does not undergo phonological rules. That is, all + affixes are added before # affixes; this is referred to as "Stratum ordering". + affixes are added at stratum 1, # are added at stratum 2, the word-phonological rules apply only to the output of stratum 1 affixation, and while the output of stratum 1 may be fed into stratum 2, the output of stratum 2 may not be fed into stratum 1.

In the theory of Lexical Phonology (Kiparsky (1982, 1982a, etc), Mohanan (1982), Pulleyblank (1983)), it is claimed that the word-phonological rules (stratum 1 in English) are restricted to words constructed in the lexicon, though they do not apply to all words constructed in the lexicon (ie English stratum 2 words may also be constructed in

the lexicon). That is, + affixes may not be added in the syntax. Kiparsky argues that words constructed with stratum 1 affixes are in some sense inherently more 'lexical', in that they are more liable to be idiosyncratic in meaning, and so on.

It is in fact true for English that the affixes which are added in the syntax do not have an output which is subject to word-phonological rules.

We will now suggest that this is derivable independent of the principles of stratum ordering or of lexical phonology. Our account will be specific to English; the facts fit with stratum ordering and lexical phonology, but in English can be shown to be completely derivable from another fact, which is that English affixes select for the features {native} and {latinate}.

We will now show that selection for these features is an important constraint on English word-formation.

5.4.2 Latinate/Native

5.4.2.1 Underived word plus affix

We may split the underived vocabulary of English into latinate and native words. Certain affixes attach only to latinate words (list (a) below), and certain affixes attach only to native words (list (b) below). The most productive affixes attach to both native and latinate words (list (c) below).

(5.185)

- (a) suffixes which attach only to latinate words
- | | |
|---------------------|--------------------|
| -al/ar (adjectival) | scrib-al/circul-ar |
| -age (denominal) | parent-age |
| -ance | annoy-ance |
| -ant | vari-ant |

-ary	moment-ary
-ate	saliv-ate
-ic	metal-ic
-ion (-ation..)	suspens-ion
-ity	seren-ity
-ive	expens-ive
-ize	stabil-ize

(b) suffixes which attach only to native words

-age (deverbal)	leak-age
-al	betray-al
-ed	hood-ed
-en	moist-en
-ful	thank-ful
-ment	bereave-ment
-some	fear-some

(c) 'neutral' suffixes which attach to both native and latinate words

-s	dissent-s (L)
	thank-s (N)
-ed	construct-ed (L)
	walk-ed (N)
-en	avoid-ed (L)
	brok-en (N)
-ing _V	expend-ing (L)
	marry-ing (N)
-ing _N	destroy-ing (L)
	run-ing (N)
-able	vari-able (L)
	love-able (N)
-er	offend-er (L)
	play-er (N)
-ly (adverbial)	severe-ly (L)
	soft-ly (N)
-ness	corrupt-ness (L)
	black-ness (N)
-ism and -ist	formal-ism (L)
	manner-ism (N)

[2]

2. -ism, and -ist, both tend to attach to latinate forms; 'manner' we take to be native because of 'manner-ed', and -ism also attaches to compound nouns which tend to be native. For these reasons, we take -ism to be a neutral suffix.

The labelling of a word as *latinate* or *native* does not always reflect the history of the word (ie words labelled *native* for the purpose of stating these constraints may in fact be derived from latin or french words). Rather, we use the labels as diacritics to indicate that the word may be suffixed from group (a) but not from group (b) or vice versa.

It seems to be a fact about English that words which take a group (a) suffix do not also take a group (b) suffix, or vice versa. Consider for example 'manage', not historically a *native* (ie old english) word; the verb takes -ment from (b) 'native', and -er and -able from (c) 'neutral', but no affix from (a) 'latinate' - *'manage-ive', *'manage-al'. Thus, while 'manage' may historically derive from *manch*, it is now marked as {native} for the purpose of suffixation.

Thus we specify that certain suffixes select for a node carrying the feature {native} and other suffixes select for a node carrying the feature {latinate}. Suffixes like '-able' will not select for these features; we will call these 'neutral affixes'.

Prefixes also select for the features {latinate} and {native}; of the negative prefixes un- and in-, un- attaches freely to *latinate* or *native* (ie is neutral), while in- attaches only to *latinate*.

5.4.2.2 Derived word plus affix

We have shown that the attachment of some affixes to an underived word depends on whether the underived word carries the feature {latinate} or {native}. These features are relevant also in determining how affixes will attach to derived words. Thus for example -ity will attach to deverbal adjectives in -al, but not to deverbal adjectives in -ful:

- (5.186) technic-al-ity, ration-al-ity, confidenti-al-ity
 (5.187)* hope-ful-ity, respect-ful-ity, mourn-ful-ity

Clearly, -ity selects for the feature {latinate}, and a derived word like 'technical' has this feature. The feature might percolate from the latinate stem, or the affix -al may carry a {latinate} feature in addition to selecting for a latinate feature, and this feature may percolate from the affix to the derived word.

The simplest account would be that the feature {latinate} percolates from the stem. The problem with this account would be that it would predict that the sequence

[[[stem_{latinate}]-affix_{neutral}]-affix_{latinate}]

would be well formed, as the {latinate} feature would percolate to the neutral-derived word, and so the derived word would be latinate. However this sequence is attested only for the neutral affixes -able, and un-, which may be accounted for otherwise. As such, we conclude that the feature {latinate} is associated with affixes as well as with stems, and is carried by a derived word only if it is carried by the last affix; some kind of adjacency condition may be involved.

There are constraints on affixation sequences. Some suffixes combine frequently, and other combinations are rare or unattested. The logically possible combinations are:

- (5.188) * LATINATE AFFIX inside NATIVE AFFIX
 * satir-ize-ment, vulgar-ize-ment
 * offici-ate-ment, valid-ate-ment
 * magnet-ize-al, acid-ify-al
 * know-ledge-ful, provision-ful

- (5.189) LATINATE AFFIX inside NEUTRAL AFFIX
- | | |
|------------|----------------|
| N-ous-ness | spaciousness |
| V-ive-ness | attractiveness |
| V-ion-able | impressionable |
| A-ize-able | polarizable |

- | | |
|------------|-------------|
| A-ate-able | validatable |
| A-ate-er | liquidator |
| A-ize-er | fertilizer |
| A-ify-er | classifier |
- (5.190) LATINATE AFFIX inside LATINATE AFFIX
- | | |
|-----------|-----------------|
| V-ion-al | educational |
| V-ion-ary | revolutionary |
| N-ous-ity | porosity |
| N-ic-ity | historicity |
| V-al-ize | intellectualize |
| N-ic-ize | dramaticize |
| N-ate-ion | pollenation |
| A-ize-ion | westernization |
| N-ify-ion | classification |
- (5.191) * NATIVE AFFIX inside NATIVE AFFIX
- * propos-al-ed, cleav-age-ed, pay-ment-ed
 - * surviv-al-er, coin-age-er, establish-ment-er
 - * recit-al-y, wreck-age-y, refresh-ment-y
- (5.192) NATIVE AFFIX inside NEUTRAL AFFIX
- | | |
|------------|---------------|
| V-ed-ness | pigheadedness |
| V-ful-ness | dreadfulness |
| A-en-er | strengtheners |
- (5.193) * NATIVE AFFIX inside LATINATE AFFIX
- * hood-ed-ity, thank-ful-ity
 - * betray-al-ize
 - * portray-al-ary
 - * white-en-ion
- (5.194) * NEUTRAL AFFIX inside NATIVE AFFIX
- *creep-er-ed *puzzl-er-ful *gambl-er-some
 - *contented-ness-ed *jagged-ness-ful
 - *darwin-ism-ed *sex-ism-ful
- (5.195) NEUTRAL AFFIX inside NEUTRAL AFFIX
- | | |
|-------------|------------------|
| V-able-ness | capableness |
| V-en-ness | disconnectedness |
- (5.196) NEUTRAL AFFIX inside LATINATE AFFIX
- | | |
|-------------|---------------|
| in-[V-able] | incorruptable |
| V-able-ity | bendability |
| N-ist-ic | artistic |
| [un-A]-ity | unreality |

To summarize, native affixes do not attach to

derived words, latinate affixes attach to latinate-derived words and neutral-derived words, and neutral affixes attach to all kinds of derived words. We illustrate this with the following table:

		affix		
		native	latinate	neutral
affixed stem (derived or underived)	native	*	*	yes
	latinate	*	yes	yes
	neutral	*	yes	yes

We will now examine the combinatory constraints, to illustrate how our system deals with them.

5.4.2.3 Latinate suffixes are not added outside native suffixes

This generalization covers the following combination:

* NATIVE AFFIX inside LATINATE AFFIX

The combination is ruled out because the stem to which the latinate affix would attach does not carry a latinate feature; it will not get the feature from the native affix, or from the native word to which the native affix attaches.

5.4.2.4 Native suffixes are not added to derived words

This generalization covers the following combinations:

- * LATINATE AFFIX inside NATIVE AFFIX
- * NATIVE AFFIX inside NATIVE AFFIX
- * NEUTRAL AFFIX inside NATIVE AFFIX

We will rule these out by the following stipulation:

The feature {native} does not percolate

If this feature does not percolate, it will never be carried by a derived word, and so a native affix will never be able to attach to a derived word.

Native suffixes may be added to compound nouns (and lexicalized phrases).

(5.197)

[well intention]-ed, [pig head]-ed
 [left wing]-er, [moon light]-er [3]
 [open air]-y
 [Queen Anne]-ish

Why may native affixes attach to compound nouns? Note that latinate affixes do not attach to compounds, but neutral affixes do, even to compounds which contain a {latinate} word like 'intentioned' in 'well-intentioned'. We will specify that when a compound noun is listed in the lexicon, it will be assigned the feature {native}.

5.4.2.5 Neutral affix plus latinate affix

This phenomenon does not appear to be common. There are certain combinations, however, where a latinate affix attaches to the output of neutral affixation.

-Able words may productively take the latinate

3. this is not agentive -er, which attaches to verbs, but an -er which attaches to nouns

suffixes *in-* and *-ity*. We propose that *-able*, though it has no selectional features (ie it is itself neutral), carries a {*latinate*} feature, and can thus take a *latinate* affix. Thus we derive examples like 'incorruptable' and 'bendability'.

-ist, which is a neutral suffix, may be followed with *-ic*. It is possible that *-ist*, like *-able*, carries a {*latinate*} feature; however, it is also possible that there is a composite suffix *-istic*.

The *un-A-ity* examples (like 'un-corruptabil-ity') are standardly considered to involve first affixation of (neutral) *un-* and then affixation of (*latinate*) *-ity*. We suggest, however, that *-ity* is added first, and then *un-* is added. As such, *un-A-ity* words are not examples of *latinate* affix attaching to the output of neutral affixation. The issue is the selectional properties of *un-*. It is normally assumed that *un-* does not attach to nouns, and so could not attach to a form *A-ity_N*. We propose, however, (following Allen (1978)) that *un-* does attach to nouns; specifically, to nouns which express states. Thus *un-* will attach to nouns in *-ness* and *-ity*, which map from an *Adj* to a noun meaning 'state of *Adj*'. Other nouns to which *un-* attaches are:

(5.198)

un-dismay	un-alarm
un-concern	un-promise
un-balance	un-bias
un-belief	un-charity
un-embarrassment	un-employment
un-involvement	un-fulfilment
un-ostentation	un-compassion
un-acceptance	un-being

(Note an interesting problem. While 'unemployment' is a state, the same can not be said for 'employment'; the situation is similar to that which arises for (passive) 'unread' which is a state, and (passive) 'read' which is not.

In these examples, un- creates a stative form.)

On the other hand, un- will not attach to deadjectival nouns which do not express a state, but rather refer to an object which is in a state. Thus 'curiosity' may refer to an object, but 'uncuriosity' may not. (The only exception to this is 'untruth' which refers to something which is untrue.) This supports our account of the selectional properties of un- in semantic rather than simply part-of-speech terms.

Thus we see that there is only one true case where a latinate affix attaches to the output of neutral affixation; this is with the affix -able. We propose that -able carries a {latinate} feature.

5.4.2.6 Affixation and selection

We have accounted for the following generalizations

1. A word may be alternatively suffixed by more than one suffix; however, a given word is marked to take either one of the latinate suffixes or one of the native suffixes. We do not find word X in both configurations $X+suf_{\text{latinate}}$ and $X+suf_{\text{native}}$.
2. native affixes do not attach to derived words (but may attach to compounds).
3. latinate affixes do not attach outside native affixes.

We have accounted for these generalizations by the following stipulations: (a) affixes select either for {native} or for {latinate} or have no selectional restriction. (b) the feature {native} does not percolate.

5.4.3 Native/Latinate and word-phonological rules

The affixes which select for {latinate} are the same as the affixes whose output undergoes word-phonological rules. That is, they are the + (stratum 1) affixes.

The affixes which select for {native} or which have no selectional restriction are the same as the # or stratum 2 affixes.

Note that we thus have an account of the fact that + affixes are not in general added to the output of # affixation and at the same time we have an account of the exceptions, (which are problematic for stratum-ordering) where we find # inside +. # affixes are native and neutral. + affixes, because they select for latinate, will not attach to the output of native # affixation. + affixes will attach to the output of neutral affixation only when the neutral affix carries a {latinate} feature, as in #able+ity.

Why are the + affixes exactly the affixes which select for {latinate}? It may be that only words which have a feature {latinate} are visible to word-level phonological rules. This is an attractive hypothesis, (and one which coincides with the 'visibility' theme of this thesis); it has a problem, however, which is that an -able word should be {latinate} but such a word does not undergo word-phonological rules (We will shortly provide a solution to this.).

Consider now the question which led us into this discussion of the selection for {latinate} and {native}. Words formed in the syntax do not undergo word-level rules. We can add to this another generalization, which is that words are formed in the syntax only with neutral affixes. Note that these two generalizations are not necessarily connected. That is, a word might be formed in the syntax with a + ({latinate})

affix, but because it is syntactic might not undergo the word-level rules associated with the + affix.

We can connect them by saying that the features {native} and {latinate} are not visible in the syntax. Thus a stem which takes a syntactic affix will not be {native} or {latinate} and thus will take only affixes which do not select for these features, ie neutral affixes.

Words formed by neutral affixation do not undergo word-level rules. Thus words formed in the syntax do not undergo word-level rules. Moreover, if we retain the hypothesis that word-level rules apply only to words which carry a visible {latinate} feature, then word-level rules would never apply to a syntactically constructed word, as a syntactically constructed word would not have a {latinate} feature.

Consider now the fact that -able words do not undergo stratum 1 phonological rules. Let us retain the hypothesis that word-level rules apply to all words which carry a latinate feature. It is possible that most -able words do not undergo word-phonological rules because the words are constructed in the syntax, where the feature {latinate} will not be visible; thus the word-level rules will not apply to them. Note that some -able words do undergo word-level rules; 'irreparable' is an example. We suggest that these are constructed in the lexicon, where their {latinate} feature is visible, and so will undergo the word-level rules.

To conclude, in English, words formed in the syntax do not undergo word-level phonological rules. This might be derived from the lexical phonology hypothesis that word-level rules are restricted to a subset of the lexically constructed words. We have suggested, however, that it is derivable from the fact that {native} and {latinate} are not features which are visible in the syntax, and the word-level phonological

rules apply only to words with a visible {latinate} feature. Thus the fact that the word-level phonological rules are restricted to lexical words is a derived fact rather than a fundamental fact, and may be an accident of English.

Chapter 6

Conclusion and Summary

In this thesis we have considered two issues concerning syntactic representations. These are, (6.1) the constraints which allow phrases to be generated in certain positions, and (6.2) the generation of words in the syntax.

6.1 X-bar theory and Case

X-bar theory, as developed by Jackendoff (1977), had as its aim the simplification of rewriting rules by making them head-neutral for part of speech. An illustration of this kind of simplification is the following:

instead of	V'	=>	V ⁰	NP	PP
	N'	=>	N ⁰	NP	PP
	A'	=>	N ⁰	NP	PP
Jackendoff has	X'	=>	X ⁰	NP	PP

Stowell (1981) simplified the rewriting rules further. Where Jackendoff was concerned with heads, Stowell was concerned with complements. Stowell suggested that the specific complements need not actually be spelled out; the complements which a head will take are determined by the theta-grid of the head, and thus need not form part of the

rewriting rule. The order of complements, and whether a complement was realized as an overt NP or as an NP-trace, was determined by Case theory. Case theory determines whether an NP is overtly realized, because overt NPs must have Case. The order of complements falls out from part of Case theory which specifies that Case-marker and node assigned Case must be adjacent, and from an additional specification that nodes of certain categories may not occupy Case-marked positions. Stowell would simplify the above rewriting rules as follows:

Jackendoff has $X' \Rightarrow X^0 \text{ NP PP}$

Stowell has $X^n \Rightarrow \dots X^{n-1} \dots$

In English a head precedes its complements

The basic claim of Case theory is that a node may be Case-marked if it is in a lexically selected position, and that certain nodes must be Case-marked at some syntactic level.

We have further developed the use of Case theory. We have also suggested that the head rewriting rule should be expanded to:

$$X^n \Rightarrow \dots \left\{ \begin{array}{c} X^{n-1} \\ X^n \end{array} \right\} \dots$$

Thus a head need not be a bar-level lower than its mother. This expansion of the X-bar rules (which we refer to in this thesis as bar-projection rules) permits words to be constructed in the syntax.

We have seen that words are in fact constructed in the syntax. These words are (a) synthetic compounds, where the head word assigns a theta-role to, or is modified by, the non-head word, (b) word + Case assigning suffix, (c) adjective + degree modifier suffix, (d) possibly, un- words. Words are

well-formed by our revised X-bar rules. They must also be well formed with respect to various syntactic principles, such as, crucially, the Projection Principle.

We have extended the use of Case theory to determine distribution. Stowell's account is concerned only with complement NPs, clauses and PPs. We account also for modifiers, and for the distribution of various morphological manifestations of verbs. Our account aims to show why the internal structure of a modifier depends on its position; if a modifier is not assigned Case, it will not have internal complements or adjuncts; thus we account for the 'Head-Final Filter' of Williams (1982).

In our account of the distribution of adjunct APs and PPs we were forced by our Case-based account to suggest that post-head APs and PPs are embedded in clauses. We saw that this is independently justified in that it allows us to subsume the failure of extraction from these adjuncts under the 'Complex NP Constraint'.

Our extension of Case theory brings us to the statement of Case theory in the following terms. 'Having Case' is the primary way in which a node may be 'visible'. At S-Structure, nodes which assign theta-roles, nodes which receive theta-roles, and all intervening nodes in the theta-path, must be visible. A predicate must be visible, and is visible only if it has a visible subject (this latter constraint explains why pleonastic NPs must have Case, and replaces a visibility condition at PF).

6.2 Syntactic and lexical words

Lees (1960) argued that many kinds of derived word and compound could be generated in the syntax, by transformational rules. Chomsky (1970) suggested that there are two places where words may be constructed, the syntax and the lexicon, and that different constraints hold in the two places, such that words built in the syntax will have properties different from words built in the lexicon. Our research takes Chomsky's hypothesis as a guide; we propose that certain affixations and compoundings take place in the syntax. Other affixations and compoundings take place in the lexicon. Syntactic word-formation obeys the Projection Principle, is productive, and is not an input to lexical word-formation.

In particular, we propose that what are traditionally considered to be inflected words are constructed in the syntax, thus genitive NPs, verbs with agreement morphemes, and comparative and superlative adjectives. We add to this list also process gerunds, and -er nouns. Un- may be an affix added in the syntax. We have taken issue with Wasow (1977), and Williams (1981), in that we argue that the statal (adjectival) passive participle is constructed in the syntax.

We have argued that a class of compounds, the synthetic compounds, are constructed in the syntax (rather than, as suggested by Roeper and Siegel (1978), in the lexicon).

Our concern has been only with words constructed in the syntax. These words obey the Projection Principle, and obey a strict percolation convention, according to which

features are percolated only from the head (ie along bar-projections); the only exception to this is the external theta-role, which may be percolated to X_{max} from a non-head of X_{max}. Words which are constructed in the lexicon do not obey the Projection Principle, and, though we have not discussed this, probably obey a weaker percolation convention. We have seen that English words constructed in the syntax do not undergo word-phonological rules, a phenomenon for which we have given an English-specific account.

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