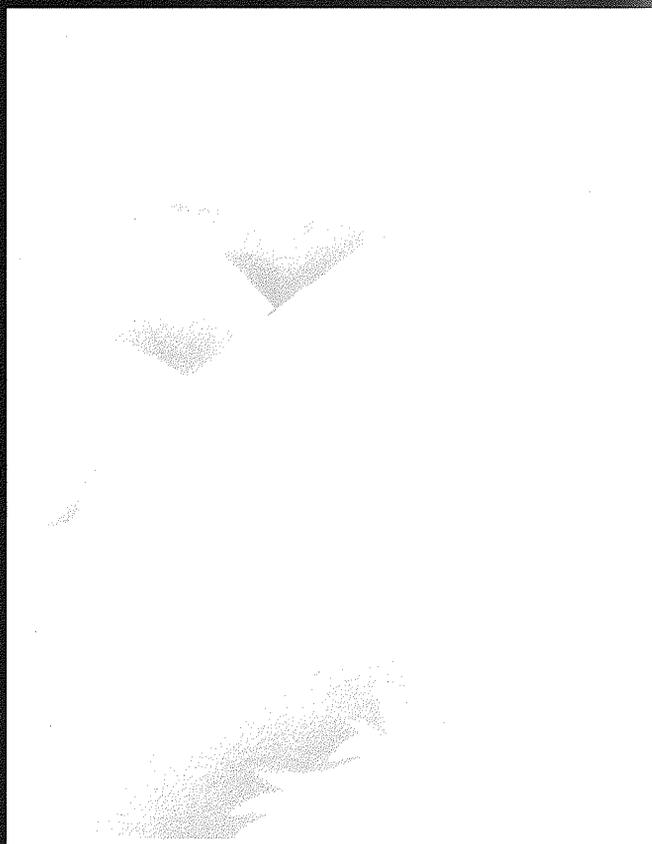


Sjef Barbiers

The Syntax of Interpretation



HIL

HOLLAND INSTITUTE OF GENERATIVE LINGUISTICS

The Syntax of Interpretation



The Syntax of Interpretation

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*Voor mijn vrouw,
mijn kinderen,
en mijn ouders*

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1.0 Economy of interpretation

The sole goal of building a syntactic structure is to form a complex meaning out of a number of simple lexical meanings of morphemes. If principles of economy are fundamental to language design, then each step in the derivation of a syntactic structure should be a direct step towards this goal. That is, every part of a syntactic structure should directly contribute to the semantic interpretation of that structure. This book offers an explicit theory of the correspondence between syntactic structure and semantic interpretation that satisfies this economy of interpretation requirement.

If minimalism and economy (MPLT; Chomsky 1993) are taken as a guideline, three desiderata for a theory of the correspondence between syntactic structure and semantic interpretation can be formulated. First, the number of different syntactic relations that are relevant for semantic interpretation should be as small as possible. Secondly, the number of different semantic relations should be as small as possible. Thirdly, the mapping of a syntactic relation onto a semantic relation should be one-to-one or uniform: a particular syntactic relation should always express the same semantic relation.

In a minimal theory, then, there is only one syntactic relation that corresponds to only one semantic relation. Current generative syntactic theory is not close to this ideal. One and the same syntactic relation can express different semantic relations. The syntactic relation between a head and its complement can express, among others, a semantic relation between a predicate and an argument (e.g. a verb and its internal argument), a functor-predicate relation (e.g. the relation between a determiner and a noun), or the semantic relation between an auxiliary and a main verb. Similarly, the semantic interpretation of the syntactic notion of specifier is not uniform. Whereas an X' , the syntactic sister of a specifier, is commonly assumed to assign a compositional theta-role to the specifier when X is

lexical, there does not seem to be such a semantic relation for the specifier of a functional projection.

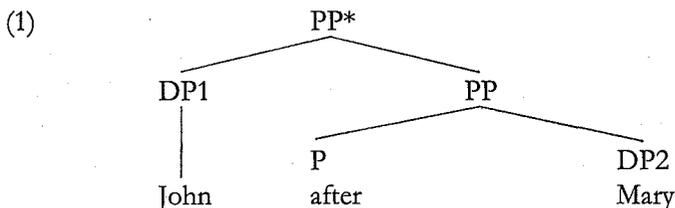
There is one property of current generative syntactic theory that makes it particularly uneconomical, namely the fact that X-bar structure itself does not contribute to the semantic interpretation. Although semantic relations require certain local syntactic relations, these local syntactic relations themselves do not establish the semantic relations. For example, when a verb assigns the theta-role patient to its object-argument under sisterhood, it is this theta-role that establishes the semantic relation between the verb and the object, not the syntactic sisterhood relation itself. The latter is just a condition on the semantic relation.

Put differently, an X-bar structure determines a set of syntactic relations between nodes, but it does not determine a set of semantic relations between these nodes. These semantic relations are established by inherent properties of the lexical items in the tree, such as the ability to assign theta-roles. It would be more economical if the syntactic relations determined by X-bar structure directly corresponded to semantic relations. After all, the *raison d'être* of X-bar structure is to form a complex meaning out of a number of simple lexical meanings. The core of the present proposal is therefore that instead of inherent lexical properties such as theta-roles, X-bar structure directly determines all semantic relations between nodes.

1.1 Relations and qualifications

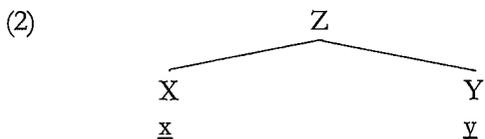
When it is not possible to use an inherent property of a lexical item, such as lexical relational information, to establish a semantic relation between two nodes, there are two alternatives. First, we could define a syntactic relation R and stipulate that if R holds between two nodes X and Y , i.e. $R(X,Y)$, then there is a semantic relation S between X and Y , $S(X,Y)$. An example would be that if X is adjoined to Y ($R =$ adjunct of), X modifies Y ($S =$ modifier of).

The second alternative is to assume that the nodes themselves establish the syntactic and semantic relations. That is, in $R(X,Y)$ we not only substitute a node for X and Y as in the first alternative, but we also substitute a node for R . No additional syntactic relation R corresponding to a semantic relation S needs to be stipulated. Since this alternative is more minimal, it is adopted here. The syntactic primitive for semantic interpretation is $R(X,Y)$, where R , X and Y are nodes. The structure in (1) illustrates this relation. (The question of whether or not this structure actually occurs in English is irrelevant here.)



In (1), P establishes a semantic relation between DP1 and DP2: $P(DP1, DP2)$, meaning that there is an after-relation between John and Mary. Hence, the syntactic nodes P, DP1 and DP2 form a semantic relation, and the terminals of these nodes determine the semantic content of that relation.

Putting aside for the moment the obvious fact that the paraphrase 'there is an after-relation between John and Mary' does not yield the full interpretation of the string *John after Mary*, we should raise the question whether something like (1) is the syntactic and semantic atom. If the primitive for interpretation is $R(X, Y)$, where R, X and Y are nodes, then why is the structure in (2) not the syntactic and semantic atom? The structure in (2) is more basic than the structure in (1) and consists of exactly three nodes, which is the number of nodes required to establish a relation.



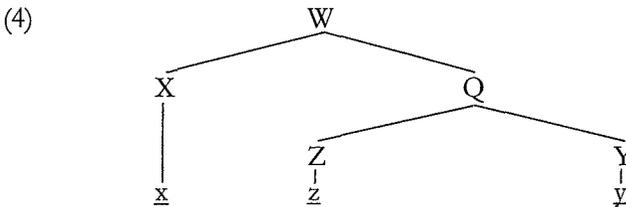
The problem with the structure in (2) is that it cannot receive the interpretation 'there is a z-relation between \underline{x} and \underline{y} ' in the same way as the structure in (1) can. In (1), it is crucial that P has its own terminal, such that this terminal determines the content of the semantic relation: 'after'. Z in (2), however, does not have a terminal node independently from X and Y, hence it cannot determine the content of the relation between \underline{x} and \underline{y} . More generally, for the nodes X, Y and Z to form one semantic relation, each of them must have its own terminal node, independently of the others. These considerations can be summarized in the condition in (3):

- (3) The nodes X, Y and Z can constitute a semantic relation if there is no dominance relation between any of these nodes

In (2), Z could only establish a relation between \underline{x} and \underline{y} if we ascribe some property to Z. There are two possibilities. First, it could be assumed that Z inherits certain properties of X or Y (e.g. theta-assigning properties), and that these properties establish the relation between X and Y. With this

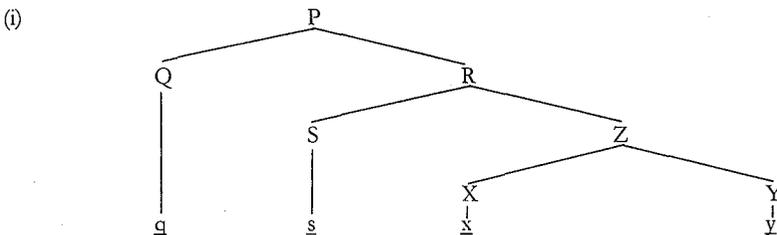
assumption, we would be back to a situation in which inherent properties of lexical items (in this case of \underline{x} or \underline{y}) establish the semantic relations between those items. Secondly, it could be assumed that a node Z that immediately dominates X and Y (as in 2) establishes a semantic relation S between X and Y. As discussed above, this would yield a less minimal theory, since it requires the assumption of a particular syntactic relation, immediate dominance, corresponding to a particular semantic interpretation.¹

In the atom in (1), no properties have to be ascribed to the nodes, since the nodes do the work by themselves. If three nodes X, Y, Z occur in a configuration such as (1), they constitute a semantic relation, and the meaning of the terminal of Z establishes the content of the semantic relation between the meaning of the terminal of DP1 and the meaning of the terminal of DP2. Therefore, I take (4), the abstract counterpart of (1), as the syntactic and semantic atom R(X,Y).



Like any relation, syntactic and semantic relations are fundamentally ternary in that they require three elements: the relation and the two objects of which the relation holds. In (4), the syntactic relation that establishes the semantic relation consists of three nodes: the syntactic relation Z between

¹ Importantly, the assumption that Z in (2) does not establish a semantic relation between X and Y does not imply that the node Z is always irrelevant for interpretation. On the contrary, if (2) is embedded in a structure such as (i) and Z enters into a relation with Q and S, the node Z does have terminals that are independent of the nodes that it is related to.



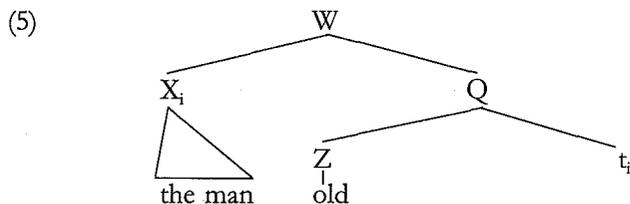
As is argued in chapter 2, there are also configurations in which a Z dominating X and Y establishes a relation between two other nodes U and W.

X and Y establishes the semantic relation \underline{z} between \underline{x} and \underline{y} .

If it is correct that (4) is the syntactic and semantic atom, a problem arises with respect to the example in (1). The structure in (1) is interpreted as 'there is an after-relation between John and Mary', and this is not the full interpretation of the string *John after Mary*. The full interpretation of *John after Mary* is asymmetric: it means 'John is after (Mary)', not 'Mary is after (John)'. Thus, the paraphrase 'there is an after-relation between John and Mary' must be supplemented with 'and John is after'.

The question is how in the present theory syntactic structure can express the meaning component 'John is after' in the interpretation of the string *John after Mary*. The problem is that we seem to have a semantic relation here between *John* and *after*, i.e. between just two elements instead of the three elements required by the present proposal. In a Government-and-Binding-style theory, a solution would be that the meaning component 'John is after' corresponds to the lower PP in (1) assigning a theta-role to the constituent in specPP, but the present minimal theory of interpretation does not allow relations such as theta-role assignment.

The more general question is how a theory that has only nodes and ternary relations between nodes can express seemingly binary relations such as the relation between *after* and *John* in (1), or between an adjective and the noun that it modifies, or between an adjunct-PP modifying a VP, or between a small clause predicate and its subject. If $R(X,Y)$ is the only available syntactic and semantic relation, the only way to express a binary relation is to reduce $R(X,Y)$ by making X and Y identical, as e.g. in (5):

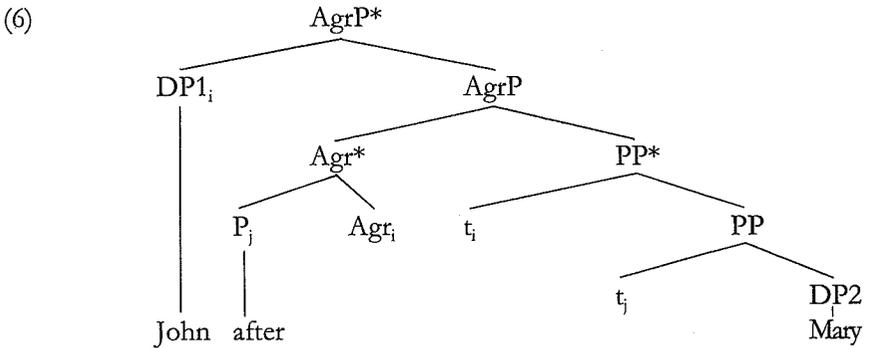


In (5), Z establishes an *old*-relation between X_i , *the man*, and t_i . Since t_i is coindexed with or a copy of X_i , X_i and t_i are identical. Z therefore establishes an *old*-relation between *the man* and *the man*. My claim is that attributing a property to a constituent always involves reducing a ternary relation to a binary relation, e.g. by the syntactic configuration in (5).

I call these seemingly binary relations **qualification relations**, and the node that attributes the property (e.g. Z in 5) the **qualifier**. The notion of qualifier is taken in a broad sense, such that it captures the examples mentioned above: a small clause predicate qualifies its subject, an adjective qualifies the noun it is adjoined to, a preposition such as *after* in (1) qualifies

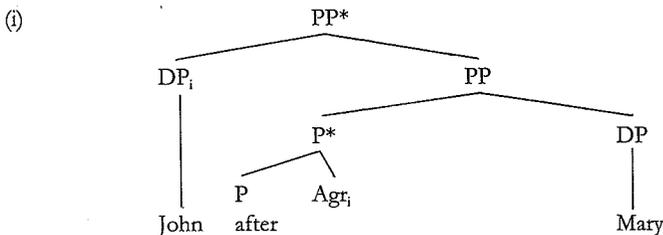
John as being after and an adjunct-PP qualifies the VP it is adjoined to. In this view, binary relations are a special case of the ordinary ternary relations and it is not necessary to stipulate a new syntactic and semantic relation to capture them.

It will be clear that the structure in (1) cannot express both the *after*-relation between *John* and *Mary* and the qualification relation between *after* and *John*. Two semantic relations are involved, hence two syntactic atoms are required. There are several ways to execute this technically. Since the example in (1) is only an illustration of the more abstract problem and it is not the aim of the present discussion to provide a full analysis of the structure of PPs, I limit myself to one possible execution, without necessarily claiming that the structure in (6) really exists.



In (6), the triple $P_j(DP1_i, Agr_i)$ is a syntactic and semantic relation. Since Agr_i , by definition, has the same features as the DP in its specifier, $DP1_i$ and Agr_i have the same index and can be considered as identical. Hence, the triple $P_j(DP1_i, Agr_i)$ is a binary relation interpreted as P_j qualifying $DP1_i$, i.e. 'John is after'. The theory proposed here opens an interesting perspective for the explanation of the presence of agreement in natural language: agreement is necessary to reduce ternary relations to binary relations.²

² The question as to whether Agr is the head of an independent projection or an (abstract) suffix on P (cf. Chomsky 1995 for discussion) is irrelevant here: if Agr is inflection on P in (1), the result is still a triple $P(DP1_i, Agr_i)$:



1.2 The proposal

We now have a minimal theory of the correspondence between syntactic structure and semantic interpretation. X-bar structure directly establishes a set of semantic relations between nodes. The terminals of these nodes determine the semantic content of the relations. Since a relation minimally consists of three elements, i.e. the relation itself and the two objects of which the relation holds, the syntactic and semantic atom consists of three nodes. The seemingly binary qualification relation is a special instance of a syntactic and semantic atom, namely an atom that effectively is reduced to two nodes by making the objects of which the relation holds identical to each other. Syntactically, this is achieved by local movement as in (5), or by coindexation of two nodes, such as DP1 and Agr in (6).

Under the assumption that syntactic and semantic relations are local, that X-bar structure is binary branching (Kayne 1984) and antisymmetric (Kayne 1994; cf. chapter 2 for discussion), the main hypothesis of this thesis is formulated as in (7).

(7) Principle of Semantic Interpretation (PSI)

- I. A node Z establishes a **S(EMANTIC)-RELATION** between a node X and a node Y iff X immediately c-commands Z and Z immediately c-commands Y
- II. A node Z is a **QUALIFIER** of a node X iff Z establishes a S(ematic)-relation between X and Y, and X and Y are coindexed

Clause I of the PSI yields the syntactic and semantic atom in (4), clause II yields the reduced syntactic and semantic atom in (5). Since the PSI requires a c-command relation between X and Z and between Z and Y, it captures the condition in (3) that says that X, Y and Z can only enter into a semantic relation if none of them dominates one of the others. By definition, if X c-commands Y it does not dominate Y.

The PSI has at least three important consequences. First, it ranges over all nodes. This implies that functional projections contribute to semantic interpretation in the same way as lexical projections do. Secondly, a constituent that moves to another position will get involved in new semantic relations in its landing site, i.e. movement has semantic import. Thirdly, interpretation is taken to be the trigger of movement: a movement operation as in (5) occurs to reduce a ternary relation to a binary relation, i.e. to establish a qualification relation.

As I argue in chapter 2, the need to establish a qualification relation is the only trigger of movement. This is shown to follow eventually from the PSI

and the Principle of Full Interpretation. Here, I state it as in (8).

- (8) Movement is triggered solely by the need to establish a qualification relation

In view of this, the minimalist hypothesis that movement to functional heads is a purely mechanical process triggered by the need to check morpho-syntactic features is incompatible with the present proposal. My claim is that the present proposal is more economical than MPLT in this respect. If the sole goal of building a syntactic structure is to form a complex meaning out of a number of simple lexical meanings, and if every step in the building process is a step towards this goal, we neither expect mechanical checking operations nor functional projections that do not contribute to the interpretation of the structure.

Despite its incompatibility with mechanical feature checking, the present proposal has a minimalist spirit because it is highly economical and requires a minimal number of stipulations. The PSI fits nicely into the minimalist program if it is taken to be a condition on LF-representations, as it is in this thesis. An important minimalist assumption is that lexical relational information such as theta-roles does not play a role in generating a syntactic structure. The computational system selects morphemes from the lexicon and projects them to an X-bar structure. Lexical relational information is not important until LF. At LF, the syntactic context must satisfy the relational requirements of a lexical item. For example, if a lexical item that requires two arguments has only one argument at LF, the structure is not fully interpretable. With the PSI as a condition on LF-representations, this minimalist assumption can be reformulated as follows. X-bar structure determines a set of semantic relations between nodes. If at LF the lexical relational information associated with the terminals of a node (whatever the shape of that lexical relational information may be) is not (fully) compatible with the semantic relations determined for that node by X-bar structure, the structure is not (fully) interpretable. This specific view on Chomsky's (1986) Principle of Full Interpretation is stated in (9):

- (9) **Principle of Full Interpretation** (revised)
At LF, a node is fully interpretable iff the lexical relational information associated with the terminals of that node is fully compatible with the semantic relations determined for that node by X-bar structure

1.3 Preview

This thesis consists of a chapter in which the proposal is made technically precise (chapter 2), and three cases studies in the syntax and semantics of Dutch (chapters 3-5). The case studies can be read separately, even without reading chapter 2 if the reader takes the revised definition of c-command developed there for granted.

In chapter 2 the proposal is integrated into a syntactic theory that has Minimalism (Chomsky 1993) and Antisymmetry (Kayne 1994) as its basis. Kayne's definition of c-command is modified such that segments can enter into c-command relations, multiple adjunction is possible and c-command out of PP is captured. I then present four configurations that, according to the PSI, determine a qualification relation: (i) a head as the qualifier of its complement, (ii) a head as the qualifier of another head, (iii) an Agr-head as the qualifier of another head, (iv) an adjunct as the qualifier of the phrase that it is adjoined to. In the final section of this chapter a number of consequences for the theory of movement are discussed. It is shown that the properties of head-movement (Head Movement Constraint, Travis 1984; Mirror Principle, Baker 1985) directly follow from the PSI, and that Agreement is crucial to facilitate minimality-violating movement.

Although the four qualification configurations play a role in the three case studies, it is impossible to fully elaborate each of them. For instance, the questions that the PSI raises with respect to the interpretive import of functional projections and movement to functional projections (qualification configurations (ii) and (iii)) constitute a research program of their own. Similarly, full substitution of theta-theory by the PSI (qualification configurations (i) and (ii)) is far beyond the scope of this thesis. Therefore, I have restricted myself to giving a brief indication in chapter 2 of the direction in which such subtheories can be developed.

In chapter 3, which presents a case study on the syntax and semantics of focus particles, I concentrate on qualification configuration (iv), qualification by an adjunct. The primary aim is to show that the semantic and syntactic properties of focus particles are straightforwardly explained by the PSI. It is shown that scalar focus particles are not lexically ambiguous, but that their different meanings are the result of the interaction between their simple lexical meaning and their syntactic position, in a way predicted by the PSI. Another interesting result is that focus particles can be stranded in a way very similar to floating quantifiers (Sportiche 1988) and therefore can be used as a diagnostic for movement. In the last section of chapter 3, this diagnostic is applied to two empirical domains: the Dutch middle field, and the nature of successive cyclic movement. Stranded focus particles confirm the structure of clauses proposed in Chomsky (1993), in which

there are two positions for the subject and for the object, and crossing takes place. They furthermore confirm Chomsky's (1986) analysis of long A'-movement as involving adjunction to the matrix VP.

In chapter 4, another instance of configuration (iv), qualification by an adjunct, is investigated: PP-adjuncts and extraposition. An analysis of PP Extraposition is proposed in which VP or an extended projection thereof moves to [spec,PP] to establish the qualification relation between PP and (the extended projection of) VP. This analysis explains why PP Extraposition takes place, and it does not make use of rightward movement or right-adjunction. Thus, it solves a number of problems that PP Extraposition poses for Minimalism and Antisymmetry, and it explains the properties of PP Extraposition mentioned in the literature (cf. Rochemont and Culicover 1990). In particular, the mirror image effect observed by Koster (1974) follows directly from the PSI. The analysis also explains the distribution of focus particles in extraposition contexts. An unusual property of the proposed analysis is movement to the specifier of an adjunct. Independent empirical evidence for the existence of this kind of movement is provided. A previously unattested type of scrambling in Dutch is argued to involve exactly the same kind of movement.

Chapter 5 concentrates on modal verbs. It is argued that the distinction between epistemic and root modality must be refined. Semantically, two parameters yield four different modal interpretations. These parameters are the (non-)involvement of a switch of truth value, and the subject-orientation of the modal. The value of the first parameter is argued to be determined syntactically by the nature of the complement of the modal. Here, qualification configuration (i) is relevant, a (modal) head qualifying its complement. Another interesting result is that Dutch modals, as opposed to their English and French counterparts, allow a non-verbal complement, provided that this complement denotes a value on a bounded lattice (in most cases a linear ordering from 0 to 1).

The subject-orientation of the modal is determined syntactically by the relations established between the surface subject, the modal and a head that qualifies the subject as a source. Here, qualification relations (i) and (ii), and ternary semantic relations (as referred to in clause I of the PSI) are relevant. It is shown that the PSI explains many of the semantic and syntactic properties of modals that cannot be explained in terms of the traditional raising versus control analysis of the epistemic-root distinction. Just as in the case of focus particles, the ambiguity of sentences containing a modal is reduced to the interaction between the simple lexical meaning of the modal and the syntactic environment that it occurs in.

The final chapter, chapter 6, contains a summary of the major results and conclusions and a brief discussion of the perspectives for future research.

2 Technical implementation of the proposal

2.0 Introduction

In chapter 1, the hypothesis was formulated that every node in a syntactic structure contributes to the semantic interpretation of that structure, in the way stated in (1):

- (1) Principle of Semantic Interpretation (PSI)
- I. A node Z establishes a **S(EMANTIC)-RELATION** between a node X and a node Y iff X immediately c-commands Z and Z immediately c-commands Y
 - II. A node Z is a **QUALIFIER** of a node X iff Z establishes a S(ematic)-relation between X and Y, and X and Y are coindexed

According to this hypothesis, the syntactic relation mentioned in the PSI is the only syntactic relation that plays a role in the semantic interpretation of syntactic structure. There are no relations such as theta-assignment under sisterhood.

I will now make the PSI technically precise and, as far as possible, integrate it into a syntactic theory that combines MPLT (Chomsky 1993) with Antisymmetry (Kayne 1994). Kayne's Antisymmetry definition of c-command is problematic in three respects. First, this definition is not immediately compatible with the PSI. The problem is Kayne's assumption that segments do not enter into c-command relations (Kayne 1994:16). Since the PSI ranges over all nodes and c-command plays a crucial role in it, adopting Kayne's assumption would amount to saying that segments are invisible for interpretation, an undesirable consequence. Secondly, the Antisymmetry definition of c-command incorrectly rules out c-command of PP. Thirdly, it rules out multiple adjunction (Kayne 1994:22). As far as I know there is no empirical evidence against multiple adjunction.

Furthermore, as I show in chapter 4, a very simple analysis of (multiple) PP Extraposition can be offered if multiple adjunction is theoretically available.

For these reasons, in section 2.1 I modify Kayne's definition of *c-command* in such a way that (i) segments enter into *c-command* relations, (ii) DP *c-commands* out of PP and (iii) multiple adjunction is allowed. Under the modified version, *c-command* relations are still asymmetric, such that the Linear Correspondence Axiom can be maintained. A full discussion of all the problems involved in the definition of *c-command* is beyond the scope of this thesis, as is a reformulation of Kayne's theory in terms of the definition of *c-command* proposed here. I therefore simply assume that natural language is uniformly right-branching.

In section 2.2, I present four configurations that, according to the PSI, establish a qualification relation. The four configurations are: (i) a head as the qualifier of its complement; this configuration is important for the analysis of modal verbs in chapter 5; (ii) a head as the qualifier of another head; (iii) an Agr-head as the qualifier of another head; (iv) an adjunct as the qualifier of a phrase that it is adjoined to; this configuration plays a crucial role in the analysis of focus particles in chapter 3 and PP Extraposition in chapter 4.

Finally, in section 2.3 I discuss a number of interesting consequences of the proposed theory for the theory of movement. In particular, I show that the Head Movement Constraint (Travis 1984) and the Mirror Principle (Baker 1985) follow from the PSI if combined with the Principle of Full Interpretation. Furthermore, I show that Agr-projections are present to make minimality violating movement possible (cf. Den Dikken 1995 for similar results). In section 2.3.5, the consequences for rightward movement and right-adjunction are discussed.

2.1 C-command and immediate c-command

2.1.1 Kayne's definition of c-command

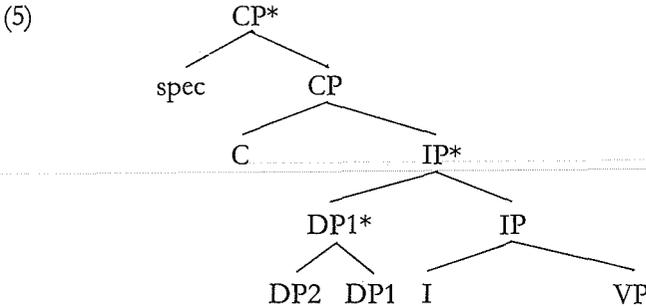
Kayne's (1994:16) definition of *c-command* is given in (2):

- (2) X *c-commands* Y iff
- (i) X and Y are categories
 - and (ii) X excludes Y
 - and (iii) Every category that dominates X dominates Y

Exclusion and dominance are defined as in (3) and (4) (Chomsky 1986:7,9):

- (3) X dominates Y iff every segment of X dominates Y
- (4) X excludes Y iff no segment of X dominates Y

As a perhaps controversial result of these definitions, in a configuration such as (5) the specifier DP2 of the specifier DP1 c-commands out of DP1*.



In (5), DP2 c-commands VP (and everything dominated by VP), since (i) DP2 and VP are categories, (ii) no segment of DP2 dominates VP and (iii) the only category that dominates DP2 is CP*, and CP* dominates VP. DP1* does not dominate DP2 since there is a segment of DP1* (i.e. DP1), that does not dominate DP2. Similarly, IP* does not dominate DP2 since IP does not dominate DP2.

As evidence for the claim that a specifier c-commands out of the phrase that it is a specifier of, Kayne provides the data in (6)-(7): a specifier A of a specifier B is able to bind a pronoun (6) or to license a polarity item (7) outside of B. I have added a Dutch example of each to show that Dutch behaves the same:

- (6) a Every girl's father thinks she's a genius
- b Ieder meisje d'r vader denkt dat ze 'n genie is
- every girl her father thinks that she a genius is

- (7) a Nobody's articles ever get published fast enough
- b Niemands artikel werd ook maar EEN keer gepubliceerd
- nobody's article was even just one time published
- 'Nobody's article was published a single time'

Since a specifier does not dominate its own specifier, Kayne's definition predicts that it is also possible for a specifier C of a specifier B of a specifier A to c-command out of C. This prediction is correct:

- (8) a Iedere man z'n vrouw d'r moeder denkt dat ie geniaal is
 every man his wife her mother thinks that he brilliant is
 'Every man's wife's mother thinks that he is a genius'
 b Niemands vaders boek werd ook maar EEN keer gekocht
 nobody's father's book was even just one time bought
 'Nobody's father's book was bought a single time'

Thus, c-command is left-recursive: parsing problems aside, a specifier that is exclusively "dominated" by specifiers can be embedded infinitely deep and still c-command out of the highest specifier dominating it.

As Kayne (1994:25) notes, without further qualification the examples in (9) are problematic for his definition of c-command:

- (9) a *Every girl's father admires herself
 b ?John's father considers John highly intelligent
 c *John considers John's father highly intelligent

If c-command out of the specifier of a specifier is possible, then why can *every girl* not bind the anaphor *herself* in (9a), and why is (9b) not a principle C violation just like (9c)? Kayne's answer to these questions is that the structure of a DP is more complex, namely as in (10). Only operators move to [spec,DP] at LF. By assumption, this position is invisible to conditions A, B and C of the Binding Theory (BT). In this way, the facts in (6)-(9) are explained: an operator in [spec,DP] can bind a pronoun or license a polarity item, but it is invisible to BT. Non-operators such as *John* in (10) remain in a position below D^0 , and therefore are not c-commanding anything outside DP.

- (10) [_{DP} ... D^0 [John [s book]]]

However, given the necessity of the stipulation that [spec,DP] is invisible to BT, it seems to me that the constituent *John* in (10) could equally well be in [spec,DP]. The DP *John*, not being negative or a quantifier, is not able to license a polarity item or to bind a pronoun, and since it finds itself in a position invisible to BT, no undesired binding effects would arise.

An alternative way to get the result that [spec,DP] is invisible to BT, at least to the principles A and B, would be to adopt the binding theory proposed by Reinhart and Reuland (1993). The impossibility of binding of the anaphor by the specifier of the specifier in (9a) immediately follows from their definitions, as given in (11) (Reinhart and Reuland 1993:670).

- c [CP [PP In [[DP elke schrijver] zijn boek]] [CP las Marie
 in each author his book read Mary
 dat ie huwelijksproblemen had]]
 that he marital problems had
 'In each author's book Mary read that he had marital
 problems'
- d [CP [PP Van [DP elke man]] [CP wist ik wat ie dacht]]
 of each man knew I what he thought
 'Of each man I knew what he thought'

Further (left-recursive) embedding is again possible, which suggests that we are dealing with the same phenomenon that we encountered in section 2.1.1.

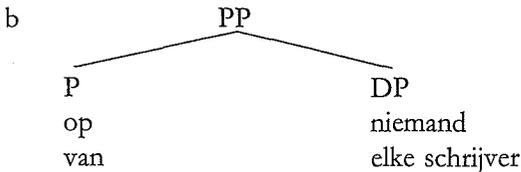
- (13) a Op niemands vaders feest viel ook maar EEN verkeerd woord
 at nobody's father's party fell even just one wrong word
 'At nobody's father's party did anyone speak a cross word'
- b Op elke jongen z'n vriendin d'r feest vertelde tante Marie
 at each boy his girlfriend her party told aunt Mary
 dat ie zich misdroeg
 that he SE misbehaved
 'At each boy's girlfriend's party aunt Mary told that he
 misbehaved'

Assume that the structure of the PP in (12a,c) is as in (14a), and that the structure of the PP in (12b,d) reads as in (14b):

- (14) a
-
- ```

graph TD
 PP --> P
 PP --> DP1_star[DP1*]
 P --> in1[in]
 P --> in2[in]
 DP1_star --> DP2i[DP2i]
 DP1_star --> DP1
 DP2i --- triangle(())
 triangle --- elke[elke schrijver]
 triangle --- niemand[niemand]
 DP1 --> D1
 D1 --> zijn[zijn]
 D1 --> s[s]
 DP1 --> XP_star[XP*]
 XP_star --> ti[ti]
 XP_star --> XP
 XP --> boek1[boek]
 XP --> boek2[boek]

```



According to the third clause of Kayne's c-command definition, for the DP *niemand* 'nobody' or *elke schrijver* 'each author' in (14a,b) to c-command a constituent outside PP, every category that dominates the DP should dominate that constituent. This is impossible, since the category PP only dominates the DP1 and everything contained in it, but nothing outside of PP.

A conceivable solution for this problem would be to assume that just as in the DP in (10), the specifier position of the PPs in (14) is an operator position to which *niemand* and *elke schrijver* move at LF. However, c-command by the DP-complement of P, as in (14b), differs from c-command out of a specifier in that it is visible to Binding Theory: the examples in (15) are principle C violations, the ones in (16) are cases of anaphor binding.

- (15) a \*We geven [<sub>PP</sub> aan hem<sub>i</sub>] een boek over Jan<sub>i</sub>  
 we give to him a book about John  
 b \*We hebben [<sub>PP</sub> voor hem<sub>i</sub>] Jans<sub>i</sub> spullen verkocht  
 we have for him John's things sold  
 c \*We hebben [<sub>PP</sub> bij hem<sub>i</sub>] Jans<sub>i</sub> vader ontmoet  
 we have at him John's father met  
 d \*We weten [<sub>PP</sub> van hem<sub>i</sub>] Jans<sub>i</sub> eigenaardigheden  
 we know of him John's peculiarities
- (16) a We geven [<sub>PP</sub> aan Jan<sub>i</sub>] een boek over zichzelf<sub>i</sub>  
 we give to John a book about himself  
 b We hebben [<sub>PP</sub> voor Jan<sub>i</sub>] een boek over zichzelf<sub>i</sub>  
 we have for John a book about himself  
 c We kregen [<sub>PP</sub> van Jan<sub>i</sub>] een boek over zichzelf<sub>i</sub>  
 we got from John a book about himself

On the other hand, c-command by the specifier of the DP-complement of P does not make anaphor-binding possible, nor does it give rise to principle C violations:

- (17) a \*Ik heb [<sub>PP</sub> aan Jans<sub>i</sub> moeder] een boek over zichzelf<sub>i</sub> gegeven  
 I have to John's mother a book about himself given  
 b Ik heb [<sub>PP</sub> aan zijn<sub>i</sub> moeder] Jans<sub>i</sub> spullen teruggegeven  
 I have to his mother John's things returned

Thus, a DP-complement of a P behaves as if the P is not there (cf. Pesetsky 1995). The DP itself c-commands out of PP, and this c-command is visible for the principles of the binding theory. A constituent in [spec,DP] within PP can license a polarity item or bind a pronoun outside PP, but is invisible to the binding theory. The plausible conclusion is therefore that c-command must be defined in such a way that it includes c-command out of PP.

### 2.1.3 A constraint on c-command out of PP

Before Kayne's definition of c-command can be modified to include c-command out of PP, the syntactic environments must be investigated that allow c-command out of PP. As the data in (18)-(24) show, when a PP is embedded in another constituent, there is no c-command out of this PP. In (18a), the operator *elke vriend* 'each friend' can bind the pronoun *z'n* 'his' in *z'n toespraak* 'his speech'. When the PP is embedded in AP, as in (18b), the operator does not c-command out of PP and pronoun binding is impossible.<sup>1</sup> The fact that the sentence in (18b) is grammatical if the pronoun *z'n* refers to a person in the discourse context shows that there is nothing wrong with preposing the AP including PP.<sup>2</sup>

<sup>1</sup> For ease of exposition, I adopt the traditional analysis in which the PP in [<sub>AP</sub> trots [<sub>PP</sub> op elke vriend]] is a complement of the adjective *trots*. In fact, the structure of *trots op elke vriend* is more complex. A full analysis of this structure presupposes the analysis of focus particles given in chapter 3 and the analysis of PP Extraposition in chapter 4, and will therefore be postponed until section 4.5.1. In both the analysis provided there and the simplified analysis given here, the crucial difference between the PPs in (18a) and (18b) is that the PP is dominated by one more node in the latter, and it is this node that blocks c-command.

<sup>2</sup> In the examples (18)-(24), the operator and the bound or licensed constituent is in italics. When a sentence is marked with \*, the indicated pronoun binding or polarity item licensing is impossible and the sentence is ungrammatical. All of the sentences with *z'n* 'his' are grammatical when *z'n* is interpreted as referring to some person in the context. When the polarity item *ook maar EEN* is not licensed, the sentence is grammatical with stress on *ook* instead of *EEN*. The meaning of *OOK maar een* is 'also only one'.

- (18) a [PP Op *elke vriend*] was Marie tijdens *z'n* toespraak trots geweest  
 on each friend was Mary during his speech proud been  
 'Of each friend, Mary was proud during his speech'
- b \*<sub>[AP</sub> Trots op *elke vriend*] was Marie tijdens *z'n* toespraak  
 proud of each friend was Mary during his speech  
 geweest  
 been  
 'Proud of each friend was Mary during his talk'

Similarly, licensing of a polarity item is possible out of the PP in (19a), but not out of the PP in (19b):

- (19) a [PP Op *geen enkel idee*] was ze *ook maar EEN* dag trots geweest  
 on no single idea was she even only one day proud been  
 'Of no idea had Mary been proud a single day'
- b \*<sub>[AP</sub> Trots op *geen enkel idee*] was ze *ook maar EEN* dag geweest  
 proud on no single idea was she even only one day been  
 'Proud of no idea Mary had been a single day'

The same holds when a PP is embedded within NP:

- (20) a [PP Aan *elke vriend*] had Marie tijdens *z'n* bezoek raad gevraagd  
 to each friend had Mary during his visit advice asked  
 'Each friend Mary had asked for advice during his visit'
- b \*<sub>[NP</sub> Raad aan *elke vriend*] had Marie tijdens *z'n* bezoek gevraagd  
 advice to each friend had Mary during his visit asked  
 'Advice of each friend Mary had asked during his visit'
- (21) a [PP Aan *niemand*] had Marie *ook maar EEN* keer raad gevraagd  
 to nobody had Mary even only one time advice asked  
 'Nobody had Mary asked for advice even a single time'
- b \*<sub>[NP</sub> Raad aan *niemand*] had Marie *ook maar EEN* keer gevraagd  
 Advice to nobody had Mary even only one time asked  
 'Advice of nobody Mary had asked even a single time'

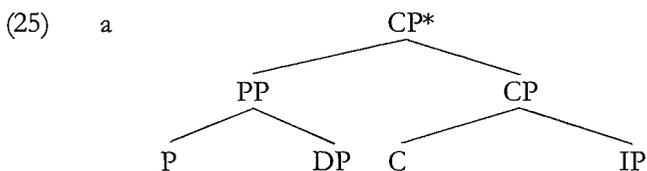
Embedding in a PP yields the same results:

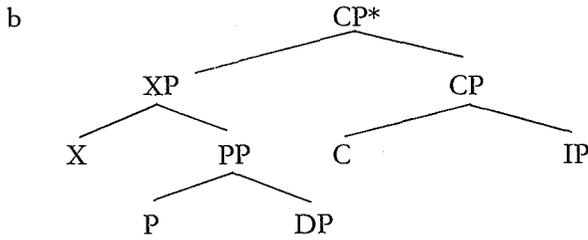
- (22) a [PP Aan *elke jongen*] is ze tijdens  $\zeta$ 'n bezoek voorbij gegaan  
to each boy is she during his visit over passed  
'She has passed over each boy during his visit'
- b \*[PP<sub>1</sub> Voorbij [PP<sub>2</sub> aan *elke jongen*]] is ze tijdens  $\zeta$ 'n bezoek  
over to each boy is she during his visit  
gegaan  
gone  
'She has passed over each boy during his visit'
- (23) a [PP Aan *niemand*] is Jan *ook maar EEN* keer voorbij gegaan  
to nobody is John even only once over passed  
'John has not passed over anyone a single time'
- b \*[PP<sub>1</sub> Voorbij [PP<sub>2</sub> aan *niemand*]] is Jan *ook maar EEN* keer  
over to nobody is John even only one time  
gegaan  
gone  
'John has not passed over anyone a single time'

Embedding the PP in AP, PP or NP also blocks c-command by the specifier of the DP-complement of P. To give one example:

- (24) a [PP Aan *niemands vriend*] had ze *ook maar EEN* keer raad  
to nobody's friend had she even only one time advice  
gevraagd  
asked  
'Nobody's friend had she asked for advice a single time'
- b \*[NP Raad [PP aan *niemands vriend*]] had ze ook maar EEN  
advice to nobody's friend had she even only one  
keer gevraagd  
time asked  
'Advice of nobody's friend she had asked a single time'

The contrasts between the a- and the b-examples in (18)-(24) correspond to the structural difference between (25a) and (25b); X in (25b) is A, N or P:

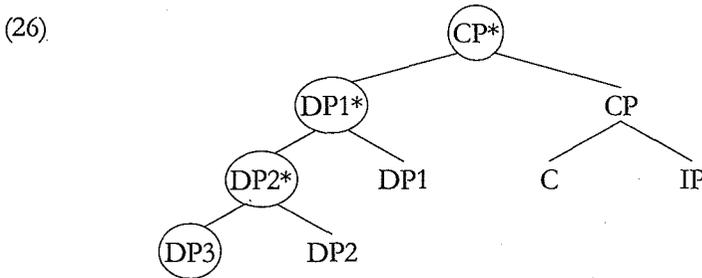




Apparently, XP in (25b) blocks c-command by DP out of PP.

### 2.1.4 A modified definition of c-command

To modify Kayne’s definition of c-command to include c-command out of PP, I make use of the notion of paths of left branches, very much in the spirit of Kayne (1984) and Bennis and Hoekstra (1989). Consider first the structure of left-recursive c-command out of DP:



As we have seen, DP1\*, DP2\* and DP3 in (26) can license a polarity item or bind a pronoun within IP, i.e. each of these DPs c-commands IP and everything dominated by IP. This can be captured by the statement in (27):

(27) **C-command** (first version)<sup>3</sup>

X c-commands Y iff there is a path of left branches from Z, the minimal node that dominates X and Y, to X

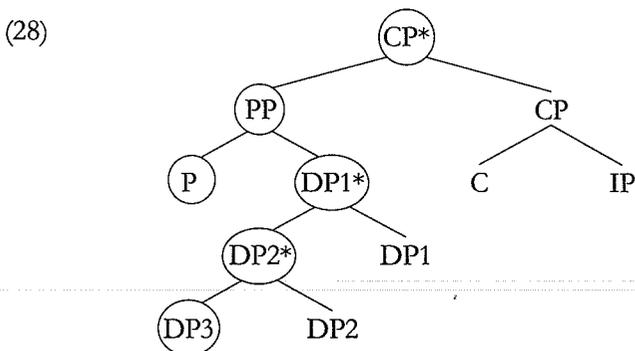
Each node that is a member of the relevant path of left-branches is circled in (26). The minimal node dominating IP and each of the DPs is CP\*, and

<sup>3</sup> I do not adopt Chomsky’s (1986) definition of dominance (cf. 3) which requires that all segments of X must dominate Y for X to dominate Y. Instead, I adopt the ordinary definition of dominance (Haegeman 1991: 75):

*Node X dominates node Y iff X is higher up in the tree than Y and if you can trace a line from A to B going only downwards.*

there is a path of left branches from  $CP^*$  to  $DP1^*$ , to  $DP2^*$  and to  $DP3$ . Hence, each DP c-commands IP and everything dominated by IP.

Next, we consider the structure relevant for c-command out of PP:

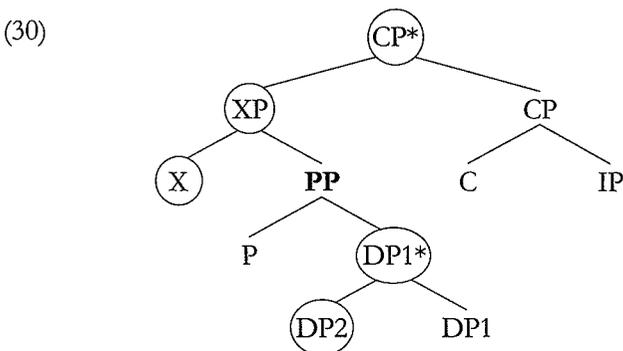


Here, there is no path of left branches from  $CP^*$  to each of the DPs. To go from  $PP$  to  $DP1^*$ , a right branch must be taken. To capture the fact that  $DP1^*$ ,  $DP2^*$  and  $DP3$  in (28) c-command out of  $PP$ , we have to say that the path of left branches  $\{DP1^*, DP2^*, DP3\}$  connects to the path of left branches  $\{CP^*, PP, P\}$ . This yields a definition of c-command as in (29):

(29) **C-command** (second version)

$X$  c-commands  $Y$  iff there is a (connected) path of left branches from  $Z$ , the minimal node that dominates  $X$  and  $Y$ , to  $X$

Now, we want to know under which circumstances two paths of left branches can be connected. As we have seen, if  $PP$  itself is embedded in a constituent, c-command out of  $PP$  is blocked. The relevant configuration is:



In (30), it is not possible to connect the path of left branches  $\{CP^*, XP, X\}$  with the path of left branches  $\{DP1^*, DP2\}$ : the  $PP$  in bold type is intervening between the two paths. No connection being possible, neither

DP1\* nor DP2 c-commands out of PP: there is no path of left-branches from CP\*, the minimal node dominating both the DPs and IP, to the DPs. The working definition of connected paths that I will use throughout this book is given in (31).

(31) **Connected path of left branches** (working definition)

Two paths of left branches A and B are a connected path of left branches  $A \cup B$  iff no node intervenes between the two paths<sup>4</sup>

<sup>4</sup> More formally, we can define the notion of path of left branches such that connected paths of left branches are a subcase of paths of left branches in general:

(i) **Path of left branches** (first version)

There is a **path of left branches** from Z to X

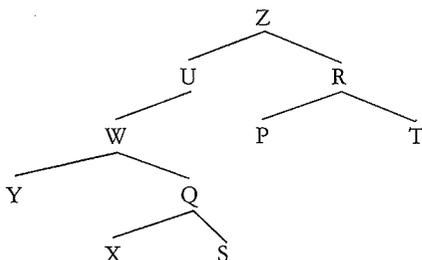
iff (i) there is a path of left branches from Z to W

AND (ii) there is a path of left branches from Q to X

AND (iii) W immediately dominates Q

The structure in (ii) illustrates the definition in (i). In (ii), there is a path of left branches from Z to X: there is a path of left branches from Z to W, and there is a path of left branches from Q to X, and W immediately dominates Q. This constitutes a connected path. There is also an ordinary path of left branches from Z to Y, since there is a path of left branches from Z to U and there is a path of left branches from W to Y, and U immediately dominates W. Thus, the definition in (i) makes the distinction between path of left branches and connected path of left branches superfluous.

(ii)



However, without further qualification, the definition in (i) requires that a path has minimally four nodes. This is not desirable: there is e.g. also a path of left branches from Z to U, including just two nodes. We therefore have to allow W, Q and X to be non-distinct. In (iii), the precise condition on distinctness is added to the definition.

(iii) A **Path of left branches** (final version)

There is a **path of left branches** from Z to X

iff (i) there is a path of left branches from Z to W

AND (ii) there is a path of left branches from Q to X

AND (iii) W immediately dominates Q

B Conditions on Z, W, Q and X:

(i) Z and W are distinct

(ii) W, Q and X need not be distinct

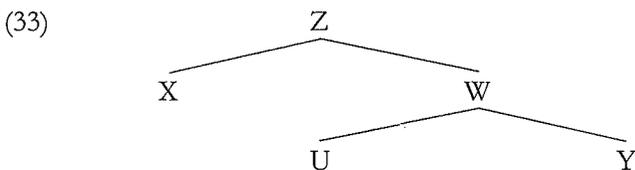
C Dominance is reflexive

The definition of c-command developed so far incorrectly defines c-command relations between the nodes on a path of left branches. For instance, in (30) XP c-commands X since there is a path of left branches from CP\* (the minimal node dominating XP and X) to XP. Similarly, X c-commands XP since there is a path of left branches from CP\* to X. To rule out these c-command relations, the definition of c-command in (29) must be slightly modified:

- (32) **C-command<sub>def</sub>** (final version)  
 X c-commands Y iff
- (i) X does not dominate Y and Y does not dominate X
  - and (ii) There is a (connected) path of left branches from Z, the minimal node that dominates X and Y, to X

### 2.1.5 C-command by segments and multiple adjunction

The definition of c-command in (32) captures the fact that DP c-commands out of PP unless PP is embedded in another constituent. As I will illustrate with the tree in (33), c-command relations are asymmetric as a result of this definition.

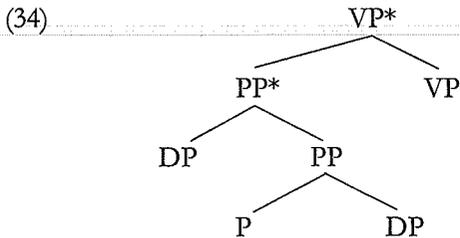


In (33), Z is the minimal node dominating X and W. X c-commands W, since there is a path of left branches from Z to X. On the other hand, W does not c-command X: there is no path of left branches from Z to W. The c-command relation between X and W is asymmetric. Similarly, the c-command relation between X and U, and between X and Y is asymmetric: there is a path of left branches from Z to X, such that X c-commands U and Y, but there is no path of left-branches from Z to U or to Y, hence U and Y do not c-command X. More generally, the definition of c-command

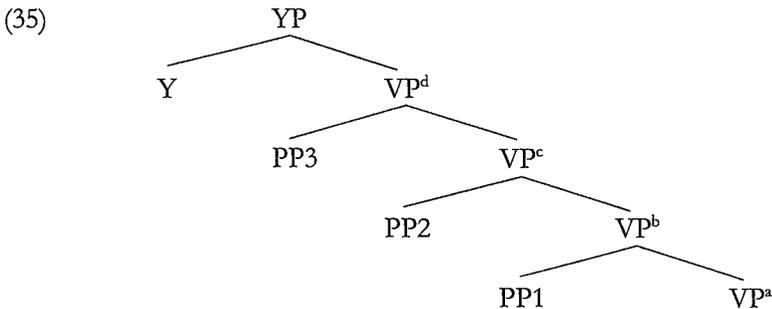
Since Q and X need not be distinct, we allow a path of left branches in the second clause of (iii-A) to contain just one node. Yet, the first clause of (iiiA) guarantees that a path of left branches consists of minimally two nodes connected by one left branch, since Z and W are distinct. Since W and Q need not be distinct, we have to allow immediate dominance to be reflexive to make it possible to satisfy the third clause of (iiiA) in such a case.

in (32) guarantees that there is only c-command 'from left to right'. This makes it possible to define a function that maps c-command relations to linear ordering, as in the LCA (Kayne 1994:6).

As desired, the definition in (32) also rules in c-command by segments, such that segments are visible for the PSI and hence contribute to the interpretation of a syntactic structure. For example, in (34), the segment PP c-commands the segment VP, since there is a connected path of left branches from VP\*, the minimal node dominating PP and VP, to PP: there is a path of left branches from VP\* to PP\*, and from PP\* to PP, and there is no node intervening between these two paths.



Finally, the definition in (32) makes multiple adjunction possible, e.g. as in (35):



In Kayne (1994:22), multiple adjunction is impossible because the adjuncts would symmetrically c-command each other. For example, according to Kayne's definition PP3 c-commands PP2 since YP is the only category that dominates PP3, and YP dominates PP2. At the same time, PP2 c-commands PP3, since the only category that dominates PP2 is YP, and YP dominates PP3. VP neither dominates PP2 nor PP3, because not every segment of VP dominates PP2 or PP3. The c-command relation between PP2 and PP3 being symmetric, the mapping from c-command to linear order will fail: the lexical material dominated by PP2 will both precede and follow the lexical material dominated by PP3. Since this is impossible, the

structure is ruled out.

Under the present definition of *c-command*, there is no symmetric *c-command* relation between adjuncts. For example, PP3 *c-commands* PP2 in (35) since there is a path of left branches from VP<sup>d</sup>, the minimal node dominating both PP3 and PP2, to PP3. On the other hand, PP2 does not *c-command* PP3, since there is no path of left branches from VP<sup>d</sup> to PP2.

We have now reached the three aims of this section: a modification of Kayne's definition of *c-command* such that (i) segments enter into *c-command* relations, (ii) *c-command* out of PP is captured, and (iii) multiple adjunction is available. I stipulate that natural language is uniformly right branching. In section 2.3.5, I show that the impossibility of right adjunction of qualifiers and of rightward movement follows from the present proposal.

Before this section is closed the notion of **immediate c-command**, that plays a crucial role in the PSI, must be defined. The definition is given in (36).

- (36) **Immediate c-command**<sub>def</sub>  
 X immediately *c-commands* Y iff  
 (i) X *c-commands* Y  
 and (ii) There is no **closer c-commander** W such that X *c-commands* W and W *c-commands* Y

## 2.2 Inventory of qualification configurations

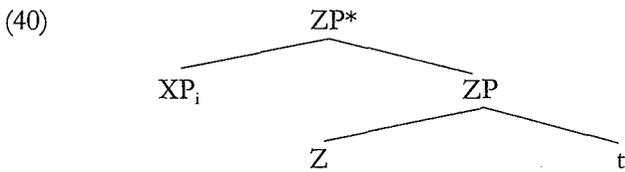
Now that the relevant theoretical notions are defined (they are repeated in 37-39), it is possible to make an inventory of syntactic configurations that yield a qualification relation. I give the properties of each configuration and an indication of the empirical domain in which the configuration is relevant.

- (37) Principle of Semantic Interpretation (PSI)  
 (i) A node Z establishes a **S(EMANTIC)-RELATION** between a node X and a node Y iff X immediately *c-commands* Z and Z immediately *c-commands* Y  
 (ii) A node Z is a **QUALIFIER** of a node X iff Z establishes a S(ematic)-relation between X and Y, and X and Y are coindexed

- (38) **C-command<sub>def</sub>** (final version)  
 X c-commands Y iff
- (i) X does not dominate Y and Y does not dominate X
- and (ii) There is a (connected) path of left branches from Z, the minimal node that dominates X and Y, to X
- (39) **Immediate c-command<sub>def</sub>**  
 X immediately c-commands Y iff
- (i) X c-commands Y
- and (ii) There is no **closer c-commander** W such that X c-commands W and W c-commands Y

### 2.2.1 A head as a qualifier of its complement

The simplest qualification configuration is the one in (40):

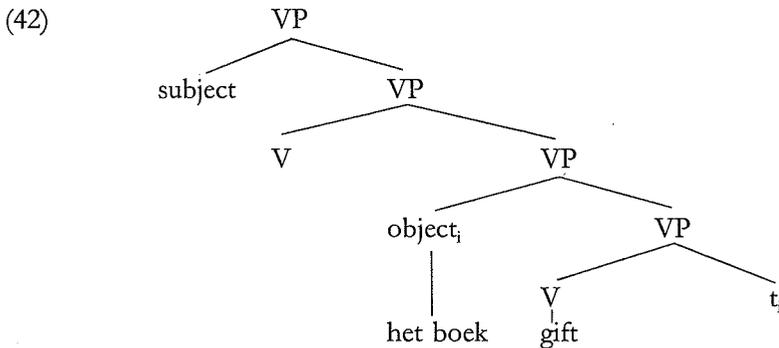


#### Qualification configuration 1: a head qualifies its complement

In this thesis, two empirical domains are discussed that are likely to involve a structure such as (40). In the chapters 3 and 5, it is argued that the root of transitive verbs ("root" in the sense of Hale and Keyser 1993), often is a qualifier or predicate of the internal argument of the verb:

- (41) a Jan doodt de vlieg  
 John kills the fly  
 Root: *dood* 'dead'; the fly gets the qualification dead as a result of John's action
- b Jan wit de muur  
 John whitens the wall  
 Root: *wit* 'white'; the wall gets the qualification white as a result of John's action
- c Jan geeft het boek  
 John gives the book  
 Root: *gift, gave* 'gift'; the book is qualified as a gift as a result of John's action

There being a qualification relation semantically between the internal argument and the root of a verb, this must be expressed in a configuration such as (40) if the PSI is correct. The representation in (42) is an example of this qualification configuration integrated in a Hale and Keyser-like representation of a verb:



According to the PSI, the lower node V is a qualifier of the object, since there is a triple  $V(\text{object}_i, t_i)$  such that the object immediately c-commands V and V immediately c-commands  $t_i$  and the object and  $t_i$  are coindexed.

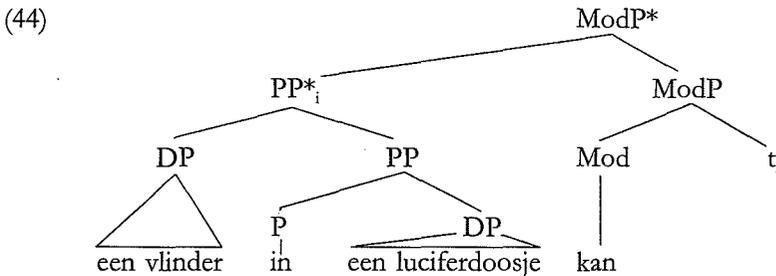
The structure in (42) is a first indication of how the PSI may substitute for theta-theory. A transitive verb does not assign a theta-role to its internal argument. Rather, the root of the verb is a qualifier of the internal argument and this qualification relation must be syntactically encoded in a structure such as (42). I will not elaborate this idea here and leave the issue for further research.<sup>5</sup>

<sup>5</sup> The difference between SVO (English) and SOV (Dutch) can now be made in two ways:

A second instance of the configuration in (40) is the qualification relation between a modal and its complement. As I argue in chapter 5, modals qualify their complement as being possible, necessary, desirable or permitted. Thus, the CP-complement of *zeg* 'say' in the example in (43a) is equivalent to the paraphrase in (43b):

- (43) a (Ik zeg) dat een vlinder in een luciferdoosje kan  
 I say that a butterfly in a matchbox can  
 'I say that a butterfly fits into a matchbox'  
 b Een vlinder in een luciferdoosje, dat kan  
 a butterfly in a matchbox that can  
 'A butterfly in a matchbox, that is possible'

The configuration proposed in chapter 5 is (44), an instance of (40). According to the PSI, the node Mod is a qualifier of  $PP_i$ , since there is a triple  $Mod(PP_i, t_i)$  such that  $PP_i$  immediately c-commands Mod and Mod immediately c-commands  $t_i$ , and  $PP_i$  and  $t_i$  are coindexed.

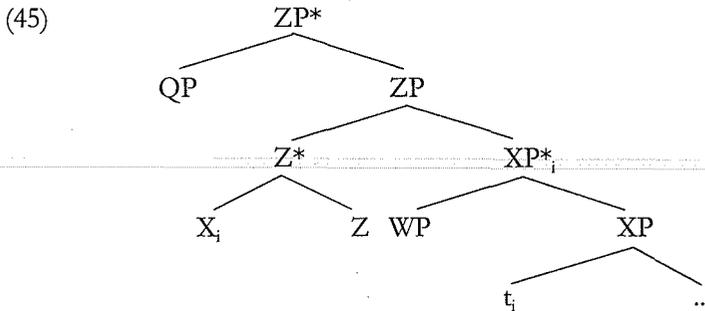


An advantage of a structure such as (44) is that the assumption that Dutch is SVO underlyingly (Kayne 1993, Zwart 1993) can be maintained. It is also explained why the complement of the modal moves to the left, i.e. into the specifier of the modal: this is necessary to make the modal interpretable as a qualifier of its complement. In contradistinction to Zwart (1993), we do not need to stipulate a Predicate Phrase to which the predicative complement of the modal has to move to be licensed syntactically. The structure further gives an initial explanation of the existence of verb raising clusters in Dutch: they are the result of moving the entire complement of a modal to the specifier of the modal projection (cf. Broekhuis 1995).

(i) the qualification relation between a verb and its object must be established overtly in Dutch and covertly in English, or (ii) this qualification relation must be established in overt syntax in both languages, but English has overt V-movement and Dutch has not (in embedded clauses).

### 2.2.2 A head qualifying another head

The second, more complex qualification configuration is given in (45). This is a common head movement configuration. My claim is that head movement (like any movement) is triggered by the need to establish a qualification configuration.



#### Qualification configuration 2: a head qualifies another head

The first task is to show that Z is a qualifier of  $X_i$  as a result of  $X_i$  moving to Z and adjoining to it. According to the PSI, for Z to be a qualifier of  $X_i$ ,  $X_i$  must immediately c-command Z and Z must immediately c-command a node coindexed with  $X_i$ . There are two nodes that are coindexed with  $X_i$ :  $XP*_i$ , since it is the maximal projection of  $X_i$ , and  $t_i$ .

Let us see if the required immediate c-command relations hold.  $X_i$  c-commands Z, since there is a path of left branches from  $Z^*$ , the minimal node dominating  $X_i$  and Z, to  $X_i$ .  $X_i$  immediately c-commands Z, since there is no closer c-commander W such that  $X_i$  c-commands W and W c-commands Z.

Z c-commands  $XP*_i$ , since there is a connected path of left branches from ZP, the minimal node dominating Z and  $XP*_i$ , to Z: first there is a path of left branches from ZP to  $Z^*$ , and this path directly connects to the single-membered path of left branches Z. Z immediately c-commands  $XP*_i$ , since there is no closer c-commander W such that Z c-commands W and W c-commands  $XP*_i$ . Although  $Z^*$  c-commands  $XP*_i$ , it is not a closer c-commander, since Z, being dominated by  $Z^*$ , does not c-command  $Z^*$ .

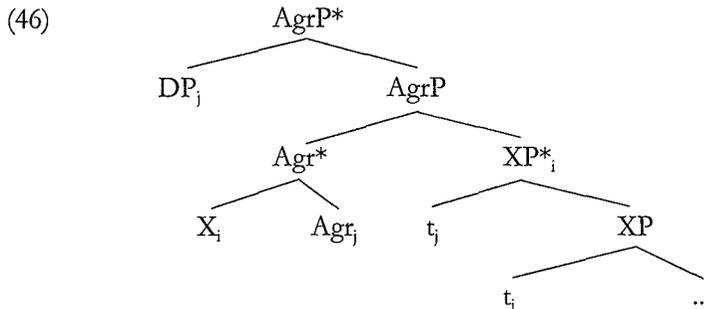
As for  $t_i$ , Z c-commands  $t_i$  but not immediately: WP is a closer c-commander, since Z c-commands WP and WP c-commands  $t_i$ . Therefore,  $t_i$  is too deeply embedded to enter into a qualification relation with Z. It is the triple  $Z(X_i, XP*_i)$ , where  $X_i$  immediately c-commands Z and Z immediately c-commands  $XP*_i$ , that defines Z as a qualifier of  $X_i$ .

The structure in (45) is a common head movement configuration. Suppose

that  $X_i = V$  and  $Z = \text{Tense} [\text{past}]$ . Then, by moving  $V$  to  $\text{Tense}$ ,  $\text{Tense}$  is interpreted as a qualifier of  $V$ . If  $V$  denotes a set of events, and  $\text{Tense}$  denotes  $[\text{past}]$ , then  $\text{Tense}$  qualifying  $V$  has as its interpretive result a set of past events. The set of events denoted by  $V$  is reduced to a proper subset of events that took place in the past. Hence, this analysis changes the perspective on the trigger of head movement: the trigger is not so much feature checking, but the need to establish a qualification configuration.

### 2.2.3 An Agreement head qualifying another head

I assume in this thesis that Agreement projections do exist.<sup>6</sup> The immediate question that arises is which semantic contribution Agreement makes. I will not give a full answer to this question, but limit myself to a brief indication of the direction into which an answer may go. The relevant configuration is (46):



#### Qualification configuration 3: an Agr-head qualifies a head

By definition, an Agr-head has the same  $\phi$ -features as the constituent that ends up in its specifier. If having the same  $\phi$ -features means having the same index,  $X$  is defined as a qualifier of  $DP_j$  by the configuration in (46):  $DP_j$  immediately c-commands  $X_i$  and  $X_i$  immediately c-commands  $Agr_j$ . If  $X_i$  in (46) is (the root of) a verb and  $DP_j$  is the object, the interpretive result cannot be distinguished from the object moving from the complement to the specifier of VP in (42): the root of the verb is interpreted as a qualifier of the object. If this were the only semantic contribution of  $AgrP$ , it would be superfluous.

However, by the triple  $Agr_j(X_i, XP*_i)$  in which  $X_i$  immediately c-commands

<sup>6</sup> Cf. Chomsky (1995), section 10 for a different view.

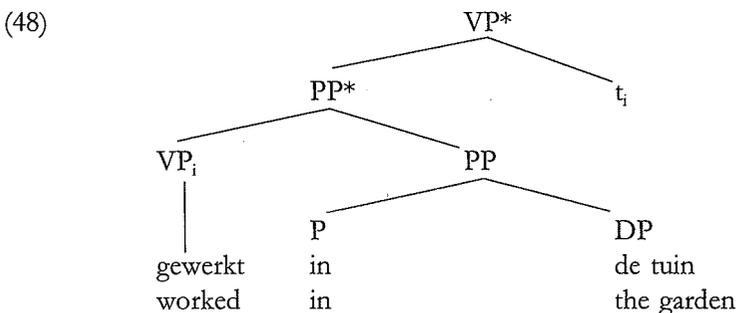
$\text{Agr}_j$  and  $\text{Agr}_i$  immediately c-commands  $\text{XP}^*$ ,  $\text{Agr}_j$  is interpreted as a qualifier of  $X_i$ . Suppose again that  $X_i$  is a verb and that  $\text{Agr}_j$  is object agreement, having the index of the object. What would it mean to say that the object is interpreted as a qualifier of the (root of the) verb? Recall that in a sentence such as (47), the root of the verb qualifying the object is interpreted as the book being a gift. Here we have the reverse, the  $\text{AgrO}$  (= the object) qualifying the root of the verb: the gift is a book.

- (47) Jan geeft een boek  
 John gives a book  
 I. The  $V_{\text{root}}$  *gift* qualifying 'a book': 'A book is the gift'  
 II.  $\text{AgrO}$  (= the object) qualifying the  $V_{\text{root}}$ : 'the gift is a book'

Put differently, the role of  $\text{AgrO}$  may be to qualify the gift as a book. Why both qualifications given in (47) are necessary for the full interpretation of the sentence is a question for further research.

## 2.2.4 An adjunct qualifying a maximal projection

The configuration in (48) is an example of the final qualification configuration that I discuss here. I give a concrete example because the kind of movement involved, movement to the specifier of an adjunct, is not commonly assumed to exist and plays a crucial role in the analysis of focus particles in chapter 3 and the analysis of PP Extraposition in chapter 4.



### Qualification configuration 4: qualification by an adjunct

The movement of  $\text{VP}_i$  to the specifier of the adjunct-PP in (48) is unusual, but it is allowed under Kayne's definition of c-command and under the modified version of it adopted here. For it can be shown that  $\text{VP}_i$  in (48) c-commands its trace: the minimal node dominating  $\text{VP}_i$  and  $t_i$  is  $\text{VP}^*$ , and

there is a path of left branches from  $VP^*$  to  $VP_i$ . It can further be shown that there is a triple  $PP(VP_i, t_i)$  in (48) by which  $PP$  is interpreted as a qualifier of  $VP_i$ .

First,  $VP_i$  c-commands  $PP$ , since there is a path of left branches from  $PP^*$ , the minimal node dominating  $VP_i$  and  $PP$ , to  $VP_i$ .  $VP_i$  immediately c-commands  $PP$  since there is no node  $W$  such that  $VP_i$  c-commands  $W$  and  $W$  c-commands  $PP$ . Secondly,  $PP$  c-commands  $t_i$ . The minimal node dominating  $PP$  and  $t_i$  is  $VP^*$ . There is a connected path of left branches from  $VP^*$  to  $PP$ : (i) there is a path of left branches from  $VP^*$  to  $PP^*$ ; (ii) there is a path of left branches from  $PP$  to  $P$ ; (iii) there is no node intervening between the path  $\{VP, PP^*\}$  and the path  $\{PP, P\}$ .  $PP$  immediately c-commands  $t_i$ , since there is no node  $W$  such that  $PP$  c-commands  $W$  and  $W$  c-commands  $t_i$ . Although  $PP^*$  is a c-commander of  $t_i$ , it is not a closer c-commander than  $PP$ . For  $PP^*$  to be a closer c-commander of  $t_i$  than  $PP$ ,  $PP$  must c-command  $PP^*$  and  $PP^*$  must c-command  $t_i$ . However,  $PP$  does not c-command  $PP^*$ , since  $PP^*$  dominates  $PP$ .

The interpretive result of moving  $VP_i$  into  $[spec, PP]$  is that  $PP$  qualifies the  $VP$ , in the case at hand the  $PP$  qualifies the event denoted by *gewerkt* 'worked' as being in the garden. This is basically the way in which  $PP$  Extraposition is analyzed in chapter 4. If  $VP_i$  moves into  $[spec, PP]$  in covert syntax, the non-extraposed order in (49a) is derived. If  $VP_i$  moves overtly into  $[spec, PP]$ , the extraposed order in (49b) is derived.

- (49) a Jan heeft  $[_{PP}$  in de tuin]  $[_{VP}$  gewerkt]  
       John has in the garden worked  
       b Jan heeft  $[_{PP}$   $[_{VP}$  gewerkt] $_i$   $[_{PP}$  in de tuin]]  $t_i$   
       John has worked in the garden

It is important to note that to allow this kind of movement does not amount to allowing just any constituent to move into the specifier of an adjunct: because of the immediate c-command requirement in the PSI, the movement is always local. The next section discusses this issue in more detail.

## 2.3 Consequences for the theory of movement

### 2.3.1 An apparent problem

Before I go into a number of desirable consequences of the PSI for the theory of movement, I want to discuss what may seem to be a potential problem for the theory proposed here: the fact that we have to allow

extraction out of the specifier of an adjunct, e.g. extraction out of the VP in [spec,PP] in (49). As is well known, adjuncts are islands for extraction, so it is likely that movement out of the specifier of an adjunct is impossible as well. The movement that has to be allowed is, e.g., head movement of a finite verb to T and higher up if the VP in [spec,PP] contains a finite verb, or movement of the object to [spec,AgrOP] if VP in [spec,PP] contains an object.

This problem is solved if we adopt a movement theory of the kind suggested in Chomsky (1993), in which the shortest move condition is crucial. Notice that VP-movement to [spec,PP] in (49) does not alter any of the configurational properties (apart from the configurational relation between PP and VP itself). In particular, the result of this movement is not that certain heads or specifiers that did not intervene before VP-movement come to intervene between elements within VP and the future landing site of those elements.<sup>7</sup>

### 2.3.2 Qualification is the trigger of all movement

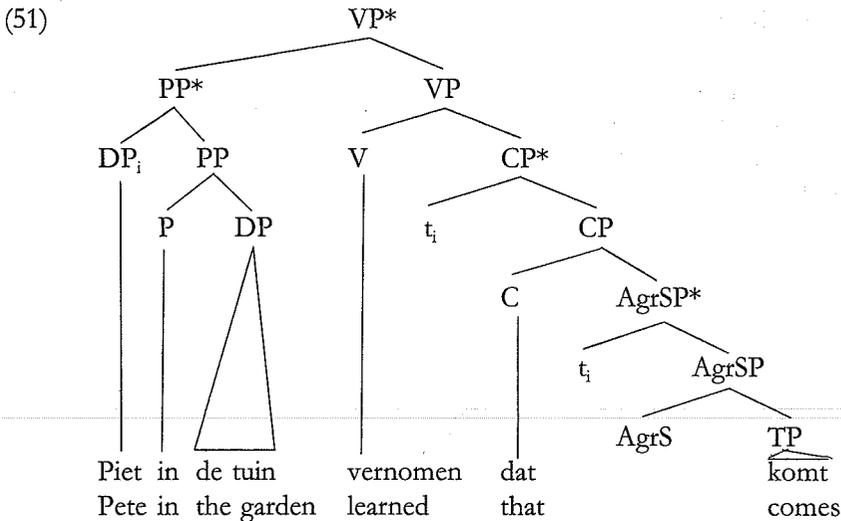
I claim that all movement is triggered by the need to establish a qualification relation and that if a movement operation does not yield a qualification relation, it does not take place. Since this claim plays an important role in this thesis, it is explicitly formulated in (50). Importantly, (50) is not a stipulation. As I will show, it follows from the PSI in combination with the Principle of Full Interpretation.

#### (50) **The interpretive nature of movement**

All movement is triggered by the need to establish a qualification configuration. If a movement operation does not yield a qualification configuration, it does not take place.

Consider the configuration in (51):

<sup>7</sup> A copy theory of movement will ensure that extraction always succeeds, since there is a full VP copy in the base position of VP from which extraction is straightforwardly allowed. I thank Marcel den Dikken for pointing this out.



In (51), the subject of the embedded clause has moved via the embedded [spec,CP] into the specifier of the adjunct PP in the matrix clause. The structure in (51) corresponds to the ungrammatical sentence in (52):

(52) \*(Jan heeft) Piet<sub>i</sub> in de tuin vernomen dat t<sub>i</sub> komt  
 John has Pete in the garden learned that comes

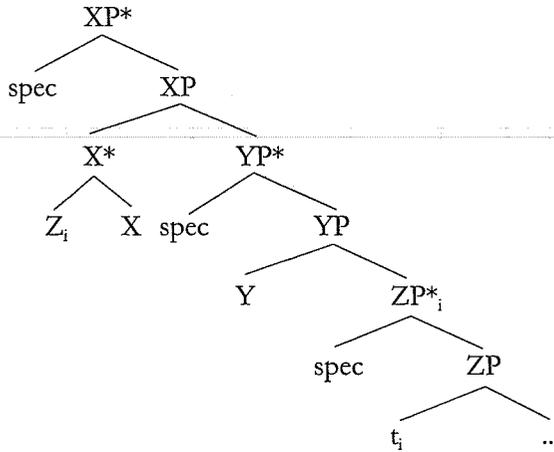
According to the PSI, DP<sub>i</sub> does not participate in a qualification relation in its landing site. DP<sub>i</sub> immediately c-commands PP, so PP is a potential qualifier of DP<sub>i</sub>. However, PP does not immediately c-command the trace of DP<sub>i</sub>. V is a closer c-commander for the trace of DP<sub>i</sub> in [spec,CP] (and thus also for the trace in [spec,AgrSP]), since PP c-commands V and V c-commands t<sub>i</sub>.

Hence, the movement of the embedded subject to [spec,PP] does not yield a qualification configuration. This being so, this movement is not innocuous. Because of the presence of DP<sub>i</sub> in [spec,PP], no other constituent can move into this position. As a result, PP is not interpretable as a qualifier at all and the structure does not determine what is going on in the garden. Thus, PP is not fully interpretable and the structure is ruled out. Ultimately, then, the impossibility of the movement operation depicted in (51) is caused by the principle of full interpretation.

### 2.3.3 Head Movement Constraint and Mirror Principle

Next, it can be shown that the Head Movement Constraint (HMC; Travis 1984) and the Mirror Principle (Baker 1985) directly follow from the PSI. According to the HMC, a head moving to a higher head cannot skip another head. The configuration corresponding to such a disallowed head movement is given in (53).

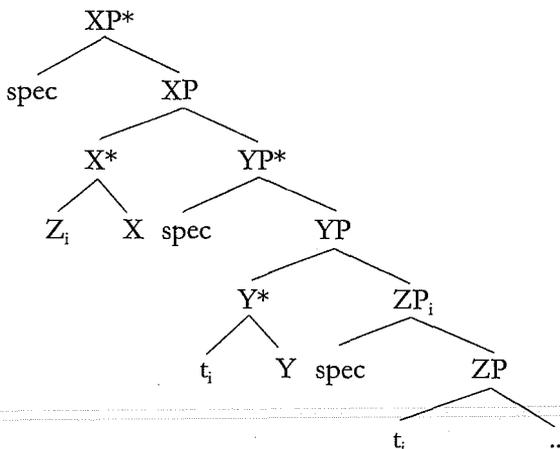
(53)



The movement of  $Z_i$  to  $X$ , skipping  $Y$ , does not yield a qualification relation. The only node that  $Z_i$  c-commands immediately is  $X$ , so the only potential qualifier of  $Z_i$  is  $X$ . However,  $X$  does not immediately c-command  $ZP^*_i$  or  $t_i$ . For example,  $Y$  is a closer c-commander, since  $X$  c-commands  $Y$  and  $Y$  c-commands  $ZP_i$  and  $t_i$ . Since the only trigger of movement is the need to establish a qualification relation, and since the movement of  $Z_i$  indicated in (53) does not yield a qualification relation, this movement does not take place. This explains why a head must move to the first node higher up, as in (45).

What happens when  $Z_i$  in (53) moves to  $Y$  first, adjoins to it, then excorporating and moving to  $X$ ? The relevant configuration is (54):

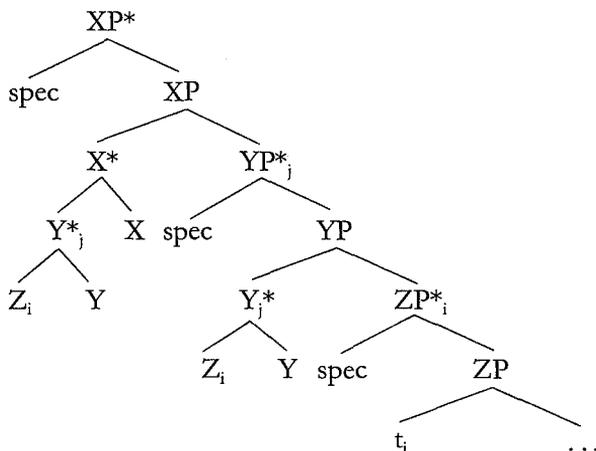
(54)



The excorporation step  $Z_i$  from  $Y^*$  to  $X$  is impossible if  $[spec, YP]$  is filled. This step would not create a configuration in which  $Z_i$  immediately c-commands  $X$  and  $X$  immediately c-commands  $t_i$ : the constituent in  $[spec, YP]$  would be a closer c-commander of  $t_i$  than  $X$ . Thus, if specifier positions are always filled, configurations such as (54) are systematically excluded. However, if specifier positions can be empty or absent, excorporation of the kind depicted in (54) will be available.

The possibility of an empty or absent specifier position is an empirical issue. Assuming for the moment that specifier positions cannot be empty or absent, the only way for  $Z_i$  to end up in  $X$  is by first moving  $Z_i$  to  $Y$ , and then  $Y^*$  to  $X$ . I have represented the trace of  $Y_j$  as a copy to make clear what happens.

(55)

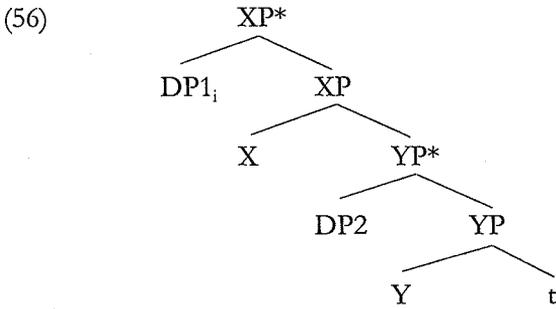


In (55),  $Y^*_j$  immediately c-commands  $X$  and  $X$  immediately c-commands

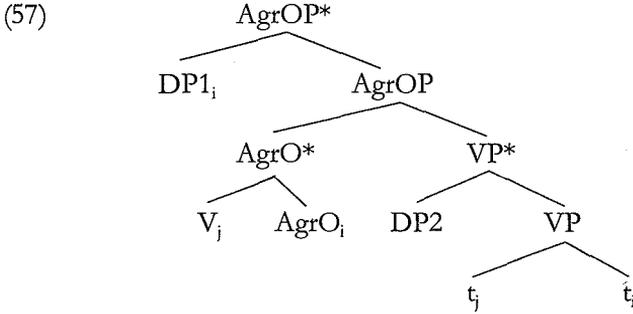
$YP_j^*$ , hence X is interpreted as a qualifier of  $Y_j^*$ . The trace of  $Z_i$  (i.e.  $Z_i$  in the copy of  $Y_j^*$  in (55)) immediately c-commands Y and Y immediately c-commands  $ZP_i$ , hence Y is a qualifier of  $Z_i$ . The requirement that every movement establishes a qualification configuration is satisfied. The linear order resulting from this movement is  $Z_i Y X$ , which is the mirror image of the basic order. Thus, the PSI in combination with the requirement that every movement must create a qualification configuration derives the mirror image effect of Baker (1985). In chapter 4, I discuss Koster's (1974) observation that multiple PP Extraposition exhibits a mirror image effect. This mirror image effect is argued to follow from the PSI as well. By the PSI, Baker's mirror image effect for heads and Koster's mirror image effect for maximal projections are reduced to one and the same phenomenon.

### 2.3.4 The role of Agr-projections in minimality violating movement

Agr-projections presumably are crucial to make minimality violating movement of maximal projections possible. If I am correct in assuming that all movement is triggered by the need to establish a qualification configuration, movement of the kind in (56) is excluded:

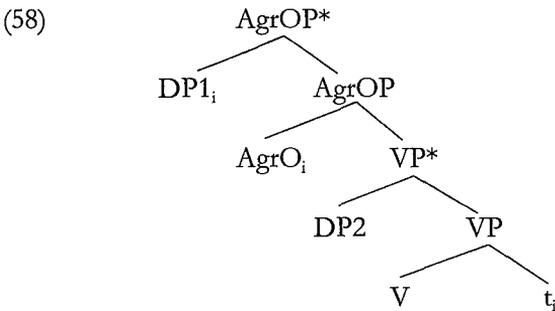


Since X in (56) does not immediately c-command  $t_i$ , no triple  $X(DP1_i, t_i)$  arises that makes X interpretable as a qualifier of  $DP1_i$ . Not creating a qualification configuration, the movement in (56) does not take place. However, if XP is an Agr-projection and Y (which I have taken to be V in (57)) moves to Agr, movement of  $DP1_i$  across [spec,VP] does yield a qualification configuration:



Since AgrO by definition has the same  $\phi$ -features as the object-DP, it is plausible that AgrO and DP have the same index. We then have a triple  $V(DP1_i, AgrO_i)$  in (57), in which  $DP1_i$  immediately c-commands  $V_j$  and  $V_j$  immediately c-commands  $AgrO_i$ . As before, this means that V is interpreted as a qualifier of  $DP1_i$ .

In Chomsky (1993), the DP-movement skipping [spec,VP] in (57) is possible because movement of  $V_j$  extends the domain such that [spec,AgrOP] and [spec,VP] become equidistant from the complement position of V. The availability of this non-local movement of DP now directly follows from the PSI, including the requirement that V must move to adjoin to AgrO at some level of derivation: if it does not, no triple of the kind mentioned above arises, hence no qualification relation:



In (58), there is no node Z such that  $DP1_i$  immediately c-commands Z and Z immediately c-commands  $AgrO_i$ . Hence, there is no trigger for the movement in (58) and it will not take place.

There is an important difference with Chomsky's equidistance analysis. In the present approach, skipping of a specifier position is only possible if the landing-site is a [spec,AgrP]. More precisely, a constituent can move to the specifier of a projection while skipping a number of intervening specifier positions, if it is coindexed with the head of the projection that it lands in. There is no requirement that all intermediate heads move up to create

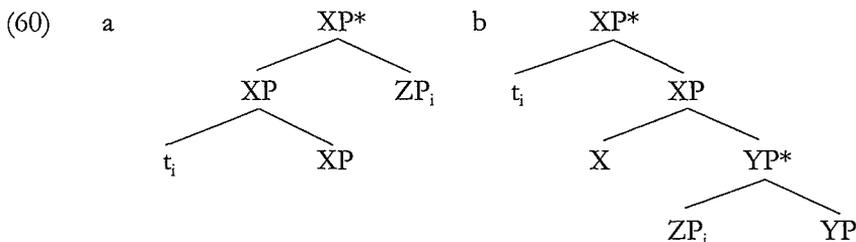
equidistance: it is sufficient if a configuration such as (57) results. That is, in principle it is sufficient if only the highest head moves to Agr.

### 2.3.5 Rightward movement and right adjunction

Just like Kayne's Antisymmetry, the theory proposed in this chapter excludes rightward movement. Under the assumption that language is uniformly right branching and that an antecedent must c-command its trace, the impossibility of rightward movement follows from the developed definition of c-command, repeated in (59):

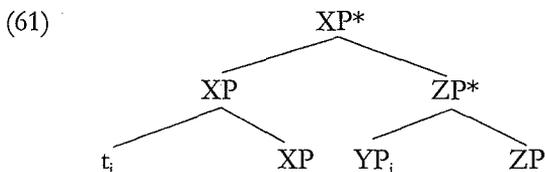
- (59) **C-command<sub>def</sub>** (final version)  
 X c-commands Y iff  
 (i) X does not dominate Y and Y does not dominate X  
 and (ii) There is a (connected) path of left branches from Z, the minimal node that dominates X and Y, to X

The configurations in (60) show why rightward movement is excluded:



Neither in (60a) nor in (60b) there is a (connected) path of left branches from XP\*, the minimal node dominating ZP<sub>i</sub> and t<sub>i</sub>, to ZP<sub>i</sub>. As a result, ZP<sub>i</sub> does not c-command its trace.

Because of the impossibility of rightward movement, right adjunction of a constituent ZP to a constituent XP can never yield a configuration in which ZP qualifies XP or any other constituent dominated by XP. The reason is that for ZP to be interpretable as a qualifier, a qualification relation must be established structurally by moving some constituent into [spec,ZP]. However, the moved constituent in [spec,ZP] does not c-command its trace, as (61) illustrates.



In (61), the minimal node dominating  $YP_i$  and  $t_i$  is  $XP^*$ . There is no (connected) path of left branches from  $XP^*$  to  $YP_i$ , therefore  $YP_i$  does not c-command its trace and the structure is ruled out. In this respect, the present theory raises the same question as Antisymmetry: how to account for syntactic constructions such as PP Extraposition if rightward movement and right adjunction of a qualifier are not available? Chapter 4 is an answer to this question.

## 2.4 Conclusion

In this chapter, the PSI was made technically precise. Kayne's (1994) definition of c-command was modified to make c-command by segments, c-command out of PP and multiple adjunction possible. A number of qualification configurations defined by the PSI were discussed. The perspective on movement was changed. Whereas in the minimalist program movement takes place to check morpho-syntactic features, in the present proposal movement takes place to establish a qualification relation. This approach is economical: if a movement operation does not yield a qualification relation, it does not take place. If it did take place, its host could not be interpreted as a qualifier, hence could not be fully interpreted. It was shown that from this many properties of movement follow, such as the Head Movement Constraint, the Mirror Principle and the possibility for movement to skip specifiers that are potential landing sites.<sup>8</sup>

<sup>8</sup> In the proposed theory, it is irrelevant at which syntactic level movement occurs. The required qualification relations must be there at LF, and this can be achieved both by overt and by covert movement. As is shown in chapter 3 and 4, PP Extraposition and focus particles allow both options. In the case of Dutch modals (chapter 5), however, movement of the complement of the modal must occur in overt syntax. The present theory does not offer an explanation for this difference. In this respect, it does not perform worse than minimalism. In minimalism, strength of features determines the locus of movement, but it is still poorly understood what it means for a feature to be weak or strong.



# 3 The syntax and semantics of focus particles

## 3.0 Introduction

This chapter primarily explores the semantic and syntactic properties of focus particles. Taking the Dutch scalar focus particle *pas* 'just' as a representative of the entire category, it is argued that the semantic ambiguity of a focus particle is the result of the interaction between its simple lexical meaning and its position in the syntactic configuration. The Principle of Semantic Interpretation correctly explains this: when the particle qualifies a constituent denoting a temporal object, the particle receives a temporal interpretation, when the particle qualifies a numeral-containing noun phrase or PP, it receives a numeral-associated interpretation. The analysis is extended to other than the scalar ones.

Descriptively, focus particles immediately c-command (the trace of) their semantic argument. Therefore, they can be used as a diagnostic for movement. In the last section of this chapter, this test is applied to investigate the structure of the middle field in Dutch and to successive cyclic movement. As for the first domain, the test supports the minimalist structure (Chomsky 1993) in which the subject moves to [spec,AgrSP] and the object to [spec,AgrOP]. As for the second domain, the test supports Chomsky's (1986) analysis in which long A'-movement involves adjunction to the matrix VP. Application of the PSI to such a configuration reveals that the semantic counterpart of adjunction to the matrix VP is that the moved constituent becomes an argument of the matrix V, in a sense that is made precise. This is argued to explain some of the properties of factive islands.

### 3.1 The semantics of focus particles

The first aim of this section is to demonstrate that the ambiguity of scalar focus particles is reducible to one basic lexical meaning. In this way, the foundation is laid for an analysis that ascribes the semantic ambiguity to the syntactic position of the particle. The second aim is to show that scalar focus particles are not quantifiers: they qualify a part of a linearly ordered set, but do not partition that set themselves. In section 3.1.1 the difference between scalar and non-scalar focus particles is discussed. Section 3.1.2 describes the ambiguity of the Dutch scalar focus particle *pas*, showing that its ambiguity can be reduced to one basic lexical meaning. Section 3.1.3 provides additional evidence for the claim that *pas* qualifies a part of a linear ordering. The evidence is based on Szabolcsi and Zwarts' (1992) analysis of weak island effects. Section 3.1.4 extends this analysis to other scalar focus particles. In section 3.1.5 it is briefly demonstrated that non-scalar or arithmetical focus particles behave differently. The analysis is compared with Rooth's influential analysis of arithmetical particles such as *only* and *even* (Rooth 1985, 1992). A tentative analysis is sketched in which arithmetical focus particles are treated as qualifiers, not as quantifiers.

#### 3.1.1 Scalar and arithmetical focus particles

Scalar focus particles such as Dutch *pas* 'just', *al* 'already', *nog* 'still' and *maar* 'only', 'just' differ from arithmetical focus particles such as *even* and *only* in that they require a semantic argument that is interpretable as a linearly ordered set.<sup>1</sup> Typically, their semantic argument is a numeral-containing noun phrase or a temporal constituent, such as a finite verb, a participle or a time adverbial (the semantic argument of the scalar focus particle is between brackets):<sup>2</sup>

<sup>1</sup> The term *arithmetical particles* is a translation from Foolen (1993). Foolen uses this term to indicate that these particles perform an arithmetical operation: a particle such as *even* or *also* adds a set to a set, whereas a particle such as *only* restricts a set to a subset. The distinction between scalar and non-scalar particles goes back at least to Altmann (1976) and König (1981). Cf. Bayer (1990) and Foolen (1993) for discussion.

<sup>2</sup> The semantic argument of a focus particle need not be identical to the constituent that is associated with the focus particle by focus accent:

- (i) John has only claimed that TWO visitors will come
  - I. John did not claim that three (four,...) visitors will come
  - II. #John claimed that only two visitors will come

In (i), the constituent *TWO visitors* is associated with *only* by focus accent. However, as the unavailability of the second interpretation shows, *TWO visitors* cannot be the semantic

- (1)
- a *Maar* [TWEE studenten] hebben gebeld  
only two students have called
  - b *Al* [in de vorige eeuw] was dit bekend  
already in the previous century was this known
  - c *Pas* [geplukt] zijn aardbeien het lekkerst  
freshly picked are strawberries the most delicious
  - d Jan [sliep] *nog*  
John slept still

When a scalar focus particle is forced to take a semantic argument that cannot denote a linearly ordered set, as in (2c,d), a deviant sentence is the result. In this respect, scalar focus particles differ systematically from arithmetical focus particles (2a,b):

- (2)
- a *Zelfs/alleen* [Jan] zit in de tuin  
even/only John sits in the garden
  - b *Zelfs/alleen* [de jongen] zit in de tuin  
even/only the boy sits in the garden
  - c \**Pas/al* [Jan] zit in de tuin  
just/already John sits in the garden
  - d \**Pas/al* [de jongen] zit in de tuin  
just/already the boys sit in the garden
  - e *Pas/al* [TWEE jongens] zitten er in de tuin  
just/already two boys sit there in the garden

The requirement that the semantic argument of the focus particle be able to denote a linearly ordered set is a semantic condition and does not seem to have anything to do with the syntactic make-up of the semantic argument, e.g. with the syntactic presence versus absence of a definite determiner in (2d,e). It is not hard to find a construction in which a scalar focus particle has as its semantic argument a noun phrase that contains a definite determiner:

- (3)
- a *Pas* de derde jongen stelde een vraag  
just the third boy asked a question  
'Not until the third boy was a question asked'
  - b *Al* de eerste vraag gaf problemen  
already the first question gave problems

Scalar focus particles are systematically ambiguous between temporal and numeral-associated interpretations. In the next section, the ambiguity of the representative particle *pas* 'just' is discussed. It is demonstrated that this ambiguity can be reduced to one basic lexical meaning.

### 3.1.2 *Pas*

The scalar focus particle *pas* 'just' can have at least four different interpretations:<sup>3</sup>

- (4) a **temporal 1:** 'not until'  
 Jan werkt pas morgen in Amsterdam  
 John works just tomorrow in Amsterdam  
 'John does not work in Amsterdam until tomorrow'
- b **temporal 2:** 'recently'  
 Jan heeft pas in Amsterdam gewerkt  
 John has just in Amsterdam worked  
 'John has been working in Amsterdam recently'
- c **temporal 3:** 'not long'  
 Jan werkt pas in Amsterdam  
 John works just in Amsterdam  
 'John has just started to work in Amsterdam'
- d **numeral-associated:** 'no more than'  
 Jan heeft pas DRIE boeken  
 John has just three books  
 'John has no more than three books'

My claim is that in all of these interpretations *pas* qualifies the part of a linear ordering for which the proposition is false as being long, or it qualifies the part of a linear ordering for which the proposition is true as being not long.<sup>4</sup> To show this, I first have to introduce an informal way of representing the partitioning that a sentence imposes on an axis. An

<sup>3</sup> Cf. Paardekooper (not dated) for description.

<sup>4</sup> Etymologically, the adverb *pas* derives from the noun *pas* 'step'. Just as English 'step' (cf. *It's just a step from my house to his*), the noun *pas* expresses a distance that is not long: *hij is een pas verwijderd van de oplossing* 'he is a step away from the solution', 'he is not far from the solution'. Johan Rooryck informs me that the negative word *pas* in French derives from Latin *passus* 'step'. This suggests that there is a relation between this focus particle and negation.



to be true. Thus, (4c) has the same representation as (6a), with some unspecified starting point before the speech time. Notice that this starting point is introduced in the representation independently of the presence of *pas*: when confronted with the sentence *Jan werkt in Amsterdam* 'John is working in Amsterdam', we automatically assume that this event has started to be true at some point on the axis. Similarly,  $t_s$  is automatically introduced (cf. Reichenbach 1947, Hornstein 1990). All that *pas* does is qualifying a part of the partitioned axis provided by the sentence.

We find a similar situation when *pas* is interpretively associated with a numeral, as in (4d), repeated as (7a). The interpretation of (7b) is nearly equivalent to that of (7a).

- (7) a Jan heeft pas DRIE boeken  
 John has only three books  
 'John has no more than three books'
- b Jan heeft lang geen vijftig boeken  
 John has long no fifty books  
 'John has not anywhere near fifty books'

The only difference between (6) and (7) is that we get a partitioning of the numerical axis instead of the temporal axis.<sup>5</sup> (8a) corresponds with (7a), (8b) corresponds with (7b).

- (8) a + + + - - - - - - - - - - truth value  
 | | |  
 [1-2-3]-4-5-6 ————— ∞ numerical axis  
 [ -long ][ long ] qualification
- b + + + + + - - - - - - - - - - truth value  
 | | | | |  
 x-1—x-2—x[ ————— 50]— ∞ numerical axis  
 [ -long ][ long ] qualification

As for (7a) and (8a), if John has three books, then it is also true that he has two books and that he has one book. But it is not true that he has four, five or more books. The sentence *John has three books* divides the numerical axis into a part from 1 up to 3 for which the proposition is true and a part from 4 to infinity for which the proposition is false. The particle *pas*

<sup>5</sup> The fact that the numerical axis has discrete points, as opposed to the temporal axis, does not seem to have any consequences here.

qualifies the latter part as being long. In this case, that is equivalent to qualifying the part of the numerical axis for which the proposition is true as being not long.

Sentence (7b) means that John has a small number of books,  $x$  in (8b). If John has  $x$  books, he also has  $x-1$  book,  $x-2$  books and so on. The sentence in (7b) selects the part between  $x$  and 50 and says that it is false for these values. The adverb *lang* 'long' then says that the span between  $x$  and 50 is long. If  $x$  in (8b) is 3, then the interpretation of (7b) is almost equivalent to that of (7a).

We can conclude that *pas* is not lexically ambiguous between a temporal interpretation 'not long' (6) and a numerical interpretation 'no more than' (7). It subjectively qualifies the part of the axis for which the proposition is false as long in both cases. The apparent ambiguity is the result of *pas* qualifying different kinds of linear orderings.

It can be shown that the tense of the verb entirely determines the different temporal interpretations of *pas* illustrated in (9).

- (9)
- |   |                                                                         |                                       |
|---|-------------------------------------------------------------------------|---------------------------------------|
| a | Jan heeft pas in Amsterdam gewerkt<br>John has just in Amsterdam worked | <b>perfect:</b> 'recently'            |
|   | I. 'John has been working in Amsterdam recently'                        |                                       |
|   | II. #'Jan has only just been working in Amsterdam'                      |                                       |
| b | Jan werkt pas in Amsterdam<br>John works just in Amsterdam              | <b>present:</b> 'not long'            |
|   | I. #'John is working in Amsterdam recently'                             |                                       |
|   | II. 'John has only just been working in Amsterdam'                      |                                       |
| c | Jan werkte pas in Amsterdam<br>John worked just in Amsterdam            | <b>past:</b> 'recently'<br>'not long' |
|   | I. 'Recently, John was working in Amsterdam'                            |                                       |
|   | II. 'John had only just been working in Amsterdam'                      |                                       |

As substitution by a synonym shows, *pas* means 'short' or 'not long' in all of these cases:



up to the event time  $t_e$ . Equivalently, it qualifies as short the time span during which John does have the property of having worked in Amsterdam that day. As a result, in this interpretation *pas* is not saying anything about the length of the event itself.

- (11) a Jan heeft *pas* in Amsterdam gewerkt  
 John has just in Amsterdam worked  
 'John has worked in Amsterdam recently'
- b  $\neg \neg \neg \neg + + +$  truth value of 'John has worked'  
 | |  
 —————  $t_c$  —————  $t_s$  temporal axis  
 [ long ] [  $\neg$ long ] qualification

In (11), the plus signs do not indicate that *John works in Amsterdam* is true during this time span, but they indicate that *John has worked in Amsterdam* is true during this time span. On the other hand, in the representation of the present tense in (12), the plus signs do indicate that the event is true from the start of the event  $t_0$  until the speech time. As a result, the time span between  $t_0$  and  $t_s$  also indicates the length of the event. The particle *pas* qualifies this length as being not long, or equivalently, it qualifies the time span for which the event is false as being long.

- (12) a Jan werkt *pas* in Amsterdam  
 John works just in Amsterdam  
 'John is only just working in Amsterdam'
- b  $\neg \neg \neg \neg + + +$  truth value of 'John works'  
 | |  
 —————  $t_0$  —————  $t_s$  temporal axis  
 [ long ] [  $\neg$ long ] qualification

Put differently, perfect and present tense have different truth conditions. A perfective sentence *John has V-ed* is true at  $t_y$  if *John V-s* is true at some moment before  $t_y$ . A present tense sentence *John V-s* is true at  $t_y$  if *John V-s* at  $t_y$ . Given these different truth conditions, the partitioning of the temporal axis in the perfect tense has a different interpretation than the partitioning of the temporal axis in the present tense. This is the source of the apparent ambiguity of *pas*.

As (9c) shows, *pas* combined with past tense has both possibilities: it can either mean that the length of the event is short or it can mean that the

event is not long ago. Again, this is a property of past tense, not of *pas*. As in the perfect tense, if *Jan werkte die dag in Amsterdam* 'John worked in Amsterdam that day' is true at  $t_y$ , then it will be true forever. The partitioning imposed by the past tense is identical to that of the perfect tense in (10). The past tense has an additional option, namely to shift the reference time  $t_r$  from speech time to some point in the past, as in (13a).

- (13) a Jan werkte in Amsterdam in die dagen  
 John worked in Amsterdam in those days  
 'John worked in Amsterdam in those days'
- b  $\neg \neg \neg \neg + + +$  truth value  
 | | |  
 —————  $t_0$  —————  $t_r$  —————  $t_s$  temporal axis

The particle *pas* then qualifies the part before  $t_0$  as long or the part between  $t_0$  and  $t_r$  as short.<sup>7</sup>

The only interpretation of *pas* for which we did not show yet that it is reducible to 'long not' is the one illustrated in (4a) and repeated in (14a), in which *pas* seems to mean 'not until'. As (14b) illustrates, it is obvious that *pas* qualifies the part of the axis for which *John is working in Amsterdam* is false as being long. Compare also the nearly equivalent sentence in (14c).

- (14) a Jan werkt pas volgende week in Amsterdam  
 John works just next week in Amsterdam  
 'John is not working in Amsterdam until next week'
- b  $\neg \neg \neg \neg +$  truth value  
 | | |  
 $t_s$  —————  $t_{\text{next week}}$  temporal axis  
 [ long ] qualification
- c Jan werkt nog lang niet in Amsterdam  
 John works still long not in Amsterdam  
 'John will not work in Amsterdam before long'

In this case, it is neither accurate to say that *pas* qualifies the time span for

<sup>7</sup> The possibility to shift the reference time is not unique to the past tense. It is also possible with the present tense, giving rise to the so called historical present, in which the present tense becomes a kind of past. It can be shown that combined with a historical present *pas* has the two interpretations that it has when combined with a real past tense. This confirms the idea that it is the partitioning imposed by the tense of the verb that determines the interpretation of *pas*.

which *John is working* is true as being ‘not long’, nor that the time span for which *John has worked* is true is ‘not long’. Apparently, the future interpretation just makes a negative part of the axis available for *pas* to qualify. Thus, to be able to maintain the claim that *pas* always has the same interpretation, we have to say that *pas* always qualifies as long the part of a linear ordering for which a proposition is false. In some, but not all cases, this is equivalent to qualifying the part of the axis for which the proposition is true as being not long.<sup>8</sup>

### 3.1.3 Additional evidence for the qualifier status of *pas*

We may summarize the findings of the preceding subsection as follows:

- (15) (i) The superficial ambiguity of *pas* ‘recently’, ‘not until’, ‘not long’, ‘no more than’ is reducible to one basic meaning: ‘long not’  
 (ii) *pas* is not a quantifier; it qualifies a part of a linearly ordered set as being long  
 (iii) *pas* does not partition a linearly ordered set: a numeral or a verbal tense takes care of the partitioning

It is important to note that the second claim in (15) does not imply that *pas* cannot be part of a quantifier. On the contrary, when *pas* is part of a noun

<sup>8</sup> The claim that *pas* is about the part of the axis for which the proposition is false is corroborated by the well-known fact that *pas* is often able to license the negative polarity item *hoeven* (cf. Paardekooper, not dated; Zwarts 1986). As Hans Bennis (p.c.) points out, *pas* is not able to license *hoeven* in cases such as (i-d,e). I have no explanation for this contrast.

- (i) a Jan heeft het boek pas gisteren hoeven inleveren  
 John has the book just yesterday need hand in  
 ‘John did not need to hand in the book until yesterday’  
 b Jan heeft pas TWEE dingen hoeven verkopen  
 John has just two things need sell  
 ‘John did not need to sell more than two things’  
 c Jan hoeft pas morgen te komen  
 John need just tomorrow to come  
 ‘John does not need to come until tomorrow’  
 d \*Jan heeft het boek pas hoeven inleveren  
 John has the book recently need hand in  
 e \*Jan hoefde pas in Amsterdam te werken  
 John needed only just in Amsterdam to work

phrase, this noun phrase is a quantifier. The important thing is that *pas* is not responsible for the quantificational properties in such a case. As the sentences in (16a,b) show, a numeral-containing noun phrase without *pas* has the same scopal properties as one that contains *pas*.

- (16) a Iedereen heeft twee boeken gelezen  
 everyone has two books read  
 I. 'There are two books such that everyone has read those two books'  
 II. 'Everyone has read two books, possibly two different books for each reader'
- b Iedereen heeft pas twee boeken gelezen  
 everyone has just two books read  
 I. 'Only two books are such that everyone has read those two books'  
 II. 'Everyone has read only two books, possibly two different books for each reader'

More evidence for the claim in (15-iii) that it is not *pas* that does the partitioning comes from weak island contexts. The relevant observation is that a numeral-containing noun phrase without *pas* causes weak island effects in the same way as a noun phrase that includes *pas* (17c,d) (sentences with a Weak Island effect are marked by WI).

- (17) a Hoe<sub>i</sub> denk je dat Piet t<sub>i</sub> naar huis is gegaan?  
 how think you that Pete to house is gone  
 'How do you think that Pete went home?'
- b WI Hoe<sub>i</sub> denk je NIET dat Piet t<sub>i</sub> naar huis is gegaan?  
 how think you not that Pete to house is gone  
 'How don't you think that Pete went home?'
- c WI Hoe<sub>i</sub> denken TWEE jongens dat Piet t<sub>i</sub> naar huis is  
 how think two boys that Pete to house is  
 gegaan  
 gone  
 'How do two boys think that Pete went home?'
- d WI Hoe<sub>i</sub> denken pas TWEE jongens dat Piet t<sub>i</sub> naar huis is  
 how think just two boys that Pete to house is  
 gegaan  
 gone  
 'How do just two boys think that Pete went home?'

The facts in (17) follow immediately from the analysis of weak islands

developed in Szabolcsi and Zwarts (1993; S&Z). I first give an informal version of such an explanation. The contrast between (17a) and (17b) can be described as follows. It is possible to ask the question in (17a) out of the blue, and a felicitous answer would be e.g. "by bike". It would not make sense to answer "in no way". However, if the question in (17a) is asked when a fixed set of ways to go home is contextually given, it does make sense to answer "in none of these ways", as in (18):

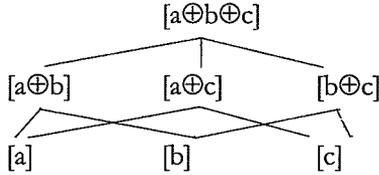
- (18) "I can imagine three ways for Pete to go home: by bus, by taxi or by bike; how do you think that Pete went home?"  
 "In none of these ways, he went on foot!"

The question in (17b), on the other hand, can only be asked in a context such as (18); it does not make sense to ask (17b) out of the blue. Thus, the presence of negation in (17b) forces an interpretation in which a fixed set is given of ways in which Pete may have gone home.

A similar weak island effect shows up in (17c,d): these questions presuppose a set of ways in which Pete may have gone home. The only difference between (17a) and (17c) is that the matrix clause has a numeral-containing subject. The fact that a numeral-containing subject causes a weak island effect just like negation suggests that a numeral within a noun phrase performs the same operation as negation. Negation takes the complement of a set: when we have a set  $U$  containing a set  $Z$  of boys and a set  $Z'$  of girls, the negation of  $Z$  ( $\neg Z$ ) gives us the complement of  $Z$ :  $Z'$ , the girls. According to the analysis in the preceding section, a numeral does exactly the same thing: it divides a linearly ordered set into a part for which a proposition is true and a part for which it is false. The data in (17) confirm our analysis that it is not *pas* but the numeral that is responsible for the partitioning of the numerical axis: if *pas* were responsible, (17d) but not (17c) should exhibit a weak island effect, contrary to fact.

A more technical version of the explanation of the data in (17) would run as follows. The questions in (17) are how-questions, asking for a manner. Most naturally, manners have a free join semilattice as their denotation domain, a particular kind of partially ordered set, schematically represented in (19) (from S&Z 1993:263).

(19)



A property of a free join semilattice is that it does not have a bottom element, one that is smaller than any other element in the structure. Therefore, a free join semilattice is not closed under complements: e.g. the negation of the top element  $[a\oplus b\oplus c]$  should be  $\emptyset$ , the empty set. This explains why (17a) cannot have the answer "in no way": such an answer amounts to trying to take the complement of a free join semilattice, which is impossible. However, the answer "in none of these ways" is fine when the context provides a (less natural) unordered, i.e. individualized set of ways to go home: such a set is closed under complements. In (17b) the negation *niet* occurs in the scope of *hoe*. Since *hoe* asks for manners, which have a free join semilattice as their denotation domain, the operation of taking a complement must occur within a domain that is not defined for such an operation. Therefore, (17b) is bad under the most natural interpretation of manners as denoting a free join semilattice. When context provides a fixed unordered set of ways to go home, the sentence is good and a negative answer is possible. In (17c,d), the numeral within the noun phrase also takes the complement of a set: it divides the numerical axis into a part for which the proposition is true and a part for which the proposition is false. Hence (17c,d) exhibit weak island effects as well, and they show that it is the numeral, and not the focus particle *pas* that is responsible for the partitioning of the set: if it were *pas*, we would expect only (17d) to yield a weak island effect.<sup>9</sup>

<sup>9</sup> In the domain of temporal partitioning, it is only the perfective that causes a weak island effect:

- (i) a Hoe denkt Jan dat Piet naar huis is gegaan?  
 how thinks John that Pete home is gone  
 b Hoe dacht Jan dat Piet naar huis is gegaan?  
 how thought John that Pete home is gone  
 c WI Hoe heeft Jan gedacht dat Piet naar huis is gegaan?  
 how has John thought that Pete to house is gone

This suggests that the situation is more complex than the description given in this subsection.

## 3.1.4 Other scalar focus particles

The particle *al* 'already' is the reverse of *pas*, as (21) shows. It qualifies the part of the axis for which the proposition is true as being long, which in general is equivalent to qualifying the part of the axis for which the proposition is false as not being long.<sup>10</sup>

- (20) a Jan heeft pas TWEE boeken  
John has just two books  
b Jan heeft al TWEE boeken  
John has already two books

|      |                                                                                                                           |                                                           |
|------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| (21) | $\begin{array}{cccc} + & + & \neg & \neg & \neg & \neg \\   &   & & & & \\ 1-2 & \text{-----} & \infty & & & \end{array}$ | Truth value                                               |
|      | $\begin{array}{cc} [-\text{long}] & [\text{long}] \\ [\text{long}] & [-\text{long}] \end{array}$                          | Qualification by <i>pas</i><br>Qualification by <i>al</i> |

The same holds for the temporal interpretation:

|      |                                                                                                                                                                                                                                                                                                                                                       |                                                                            |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| (22) | $\begin{array}{cccc} a & \text{Jan werkt pas/al sinds maandag} \\ & \text{John works only/already since monday} \\ b & \neg & \neg & \neg & + & + & + \\ & & &   & &   & \\ & \text{past} & \text{-----} & t_{\text{mon}} & \text{-----} & t_s & \\ & [\text{long}] & & [-\text{long}] & & & \\ & [-\text{long}] & & [\text{long}] & & & \end{array}$ | Truth value                                                                |
|      | $\begin{array}{cc} [\text{long}] & [-\text{long}] \\ [-\text{long}] & [\text{long}] \end{array}$                                                                                                                                                                                                                                                      | Temporal axis<br>Qualification by <i>pas</i><br>Qualification by <i>al</i> |

The ambiguity of *nog*, as illustrated in (23), can be handled in the same way. I take the particle *nog* to qualify the length of the part of the axis for which the proposition is true, saying that this is the 'current' length or the length 'now'.<sup>11</sup>

<sup>10</sup> The particle *al* is related to the Middle Dutch preposition *al*, which means *langs* 'along' (cf. Verdam 1911).

<sup>11</sup> Diachronically, *nog* derives from *nu* 'now' (cf. Franck 1936). Compare also:

- (i) a tot nog toe  
until still to  
'until now'  
b tot nu toe  
until now to  
'until now'

- (23) a Nog TWEE mannen werken in de tuin  
still two men work in the garden  
'Only two men are still working in the garden'
- b NOG twee mannen werken in de tuin  
still two men work in the garden  
'Two more men are working in the garden'
- c Jan werkt nog in de tuin  
John works still in the garden  
'John is still working in the garden (but he will soon finish up)'
- d Jan werkt NOG in de tuin  
John works still in the garden  
'John is still working in the garden (we expected him to stop earlier)'

The difference between (23a,b) is presuppositional and correlates with the position of focus accent in a way that I do not fully understand. In (23a), the presupposition is that at some point in the past, more than two people, say five, were working in the garden. At that time, the length of the part of the numerical axis for which the proposition was true was five, as indicated in (24a). The particle *nog* in (23a) says that two is the current length of the part of the numerical axis for which the proposition is true, which implies that the number has decreased. In (23b), if the presupposed length of the axis was five, *nog* says that the current length is seven.

- (24) a + + + + + ¬ ¬ truth value  
| |  
1 ————— 5 ————— ∞ numerical axis  
[presupposed]
- b + + ¬ ¬ truth value  
| |  
1 — 2 ————— ∞ numerical axis  
[now] qualification
- c + + + + + + + ¬ truth value  
| |  
1 ————— 7 — ∞ numerical axis  
[now] qualification

Similar representations can be given for the temporal interpretations of *nog* in (23c,d). The length of the event is presupposed, and *nog* says in (23c) that only a part of the presupposed length is left. In (23d), *nog* says that the current length is longer than the presupposed length.

- (25) a    + + + + +    ¬ ¬            truth value  
           |                    |  
           1 ————— 5 —————        temporal axis  
           [presupposed]
- b                    + +    ¬ ¬            truth value  
                           | |  
                           ————— 4-5 —————        temporal axis  
                           [ now]
- c    + + + + +    ¬            truth value  
           |                    | |  
           1 ————— 5-6 —————        temporal axis  
                           [now]                    qualification

For the focus particle *maar* 'only' I just give the ambiguity. The representations will be very much like the ones discussed before.<sup>12</sup>

- (26) a    Maar TWEE mannen werken er in de tuin  
           only two men work there in the garden  
           'Only two men are working in the garden'
- b    Jan zeurt maar over dat voorval  
           John nags only about that incident  
           'John keeps nagging about that incident'

I will make a brief remark on two scalar particles, *slechts* 'only' and *wel* 'as many as', 'once in a while', whose use is illustrated in (27).

- (27) a    Slechts VIJFTIG toeschouwers kwamen er naar de wedstrijd  
           only fifty spectators came there to the game  
           'Only fifty spectators came to the game'
- b    Wel VIJFTIG toeschouwers kwamen er naar de wedstrijd  
           as many as fifty spectators came there to the game  
           'As many as fifty spectators came to the game'
- c    Jan werkt slechts voor het rijk  
           John works just for the government  
           'John only works for the civil service'
- d    Jan werkt wel voor het rijk  
           John works once in a while for the government  
           'Once in a while, John works for the civil service'

<sup>12</sup> Cf. Foolen (1993) for an extensive discussion of *maar*.

The meaning of these two particles is more transparent than the meaning of the particles discussed up to now: historically, *slechts* is the adverbial (i.e. genitival) counterpart of the adjective *slecht* 'bad', and *wel* the adverbial counterpart of *goed* 'good'. In the numeral-associated interpretation, it is particularly clear that these particles are not quantifiers: they subjectively qualify a part of the numerical axis as good or bad. That the idea of scalar focus particles qualifying a part of a linear ordering is not far-fetched is also shown by sentences such as (28), in which ordinary adjectives act like such qualifiers:

- (28) a Het doosje bevat *ruim* vijftig lucifers  
 the box contains wide fifty matches  
 'The box contains over fifty matches'  
 b Het doosje bevat *kerap* vijftig lucifers  
 the box contains narrow fifty matches  
 'The box contains at most fifty matches'

### 3.1.5 Arithmetical focus particles

The question to be answered in this section is whether or not the proposed analysis can be extended to non-scalar or arithmetical focus particles such as *alleen* 'only' and *ook* 'even'. We start from the perspective of Rooth's influential analysis of *only* and *even* (Rooth 1985, 1992). Consider the example in (29).

- (29) a Mary only introduced BILL to Sue (Rooth 1985, 1992)  
 b Mary even introduced BILL to Sue

The sentence in (29a) means that from a pragmatically given set of persons, only Bill was introduced to Sue by Mary. Informally, the semantic interpretation of a sentence such as (29a) runs as follows (cf. also Karttunen & Karttunen 1977). By focus on BILL, a set of properties of the form {introducing x to Sue} is made available, i.e. a set of alternatives for {introducing Bill to Sue}, e.g. {introducing Mary to Sue}, {introducing John to Sue}. The particle *only* is interpreted as a universal quantifier of the set of properties {introducing x to Sue}: for all properties of the form {introducing x to Sue}, if Mary has such a property, it is the property {introducing Bill to Sue}. Thus, the constituent [introduced BILL to Sue] has two semantic values in the interpretation of (29a): the ordinary semantic value [introduce Bill to Sue] and the focus semantic value [introduce x to Sue].

A conceivable reformulation of this analysis is to say that focus on *Bill* partitions the set {introduce *x* to Sue} into a subset {introduce *Bill* to Sue} for which the proposition in (29a) is true and a subset {introduce *y* to Sue}, where *y* is not *Bill*, for which the proposition in (29a) is false. The arithmetical focus particle would then qualify one of these subsets and we would have the same analysis as for scalar focus particles. However, it cannot be maintained that focus is responsible for the partitioning. For whereas focus does not cause weak island effects (cf. (30a)), a focused constituent including an arithmetical particle does cause a weak island effect (30b,c). This shows that in these cases the arithmetical particles themselves are responsible for the partitioning of the set.

- (30) a Hoe<sub>i</sub> denkt JAN dat Piet t<sub>i</sub> naar huis is gegaan?  
 how thinks John that Pete to house is gone  
 'How does JOHN think that Pete went home?'  
 b WI Hoe denkt alleen JAN dat Piet t<sub>i</sub> naar huis is gegaan  
 how thinks only John that Pete to house is gone  
 'How does only JOHN think that Pete went home?'  
 c WI Hoe denkt ook JAN dat Piet t<sub>i</sub> naar huis is gegaan  
 how thinks even JOHN that Pete to house is gone  
 'How does even JOHN think that Pete went home?'

That the arithmetical particles themselves are responsible for the partitioning makes sense in view of common intuitions about the semantics of *alleen* 'only' and *ook* 'even'. As Foolen (1993) notices, they are very much like arithmetical operators: *alleen* subtracts from a set and *ook* adds to a set. Furthermore, it is particularly clear that in the case of *ook* 'even', there is no subset for which the proposition is false: rather, there is a subset for which the proposition is true and an additional subset for which the proposition is also true.

The conclusion is that arithmetical focus particles cannot simply be analyzed in the same way as scalar focus particles. Yet, it would be a desirable result if arithmetical focus particles were analyzable as qualifiers, not as quantifiers, since they behave syntactically identically to scalar focus particles, as will be shown in section 3.2.4. In particular, the semantic argument of the particle, which does not necessarily coincide with the focused constituent (cf. section 3.2.4), undergoes movement to the specifier position of the focus particle, a movement operation that creates a qualification configuration according to the PSI.

- (31) a [Alleen JAN] weet het antwoord  
           only John knows the answer  
       b [JAN<sub>i</sub> alleen t<sub>j</sub>] weet het antwoord  
           John only knows the answer  
       c [Maar TWEE jongens] weten het antwoord  
           only two boys know the answer  
       d [TWEE jongens<sub>i</sub> maar t<sub>j</sub>] weten het antwoord  
           two boys only know the answer

Let us therefore give the following tentative analysis. The quantificational properties of a constituent that contains an arithmetical particle, e.g. the possibility to undergo QR, derive from the focus accent on such a constituent, not from the presence of the focus particle.<sup>13</sup> By focus a subset is taken from a larger set, e.g. in the case of (29a) focus draws the singleton {Mary introduced Bill to Sue} from the set {Mary introduced x to Sue}. Although focus takes a subset, it does not divide the original set into a subset of values for which the proposition is true and a subset of values for which the proposition is false: focus just highlights a subset of a set but does not take the complement of the set. The particle *alleen* ‘only’ then qualifies the subset selected by focus as a unique subset. The result of this qualification is that the complement of the original subset is taken: if a subset is unique in having some property, then the rest of the set does not have that property. This explains why *alleen* ‘only’ causes a weak island effect. As for *ook* ‘even’, we may assume that it qualifies the subset selected by focus in terms of addition. This, however, does not explain why *ook* causes weak island effects as well. I leave this for future research.<sup>14</sup>

<sup>13</sup> Chomsky (1976) observes that a focused constituent behaves like WH and quantifiers in so-called crossover contexts, which is a reason to assume that focused constituents move at LF. The claim is here that a focused constituent containing an arithmetical focus particle behaves identically to one without such a particle. This is borne out by the data in (i):

- (i) a JOHN was betrayed by the woman he loved  
       b The woman he loved betrayed JOHN (LF: [JOHN<sub>i</sub> he<sub>j</sub> t<sub>j</sub>])  
       c Only JOHN was betrayed by the woman he loved  
       d The woman he loved betrayed only JOHN (LF: [only JOHN<sub>i</sub> he<sub>j</sub> t<sub>j</sub>])

Whereas (ia,c) allow a bound variable interpretation, (ib,d) yield a crossover configuration and do not allow a bound variable interpretation.

<sup>14</sup> The analysis of *alleen* ‘only’ as a qualifier is plausible in view of the possibility for *alleen* to occur in predicative position:

- (i) Jan is alleen  
       John is alone

Here the property *alleen* is attributed to *Jan*. It is not unlikely that *alleen* makes the same semantic contribution when it occurs as a focus particle.

### 3.1.6 Conclusion

Focus particles are qualifiers of sets, not quantifiers. Scalar focus particles qualify a part of a linearly ordered set that is partitioned by tense or a numeral, arithmetical focus particles qualify a subset that is selected by focus. The ambiguity of scalar focus particles can be reduced to one basic lexical meaning. We are now in a position to show that the Principle of Semantic Interpretation developed in chapter 1 correctly captures the syntactic distribution and the interpretation of focus particles. In particular, we can now show why scalar focus particles are ambiguous in certain syntactic configurations and disambiguated in others.

## 3.2 The syntax of focus particles

The main goal of this section is to demonstrate that the distribution and interpretation of focus particles follows from the Principle of Semantic Interpretation. As in the semantic section, I start with scalar focus particles and extend the analysis to arithmetical focus particles later on. First, section 3.2.1 shows that scalar focus particles are syntactically unselective, i.e. they take an argument of any syntactic category, as long as it denotes a linear ordering. Section 3.2.2 is an investigation of the locality conditions on the relation between a scalar focus particle and its semantic argument. The generalization is that a scalar focus particle immediately c-commands (the trace of) its semantic argument. Section 3.2.3 provides a syntactic analysis of scalar focus particles along the lines of the Principle of Semantic Interpretation. The syntactic configuration determines which constituent is qualified by the focus particle. If the qualified constituent denotes a temporal object, the particle receives a temporal interpretation; if it denotes a number of entities, the qualifier receives a numeral-associated interpretation. Section 3.2.4 extends the analysis to arithmetical focus particles, taking into account Rooth's theory.

### 3.2.1 The syntactic unselectivity of scalar focus particles

Scalar focus particles in general can take an argument of any syntactic category, as long as it denotes a linearly ordered set. To prove this, a configuration must be used in which the focus particle can take only one constituent as its semantic argument. A topicalization construction is such a configuration: as (32) shows, topicalization of the focus particle together with another constituent forces this constituent to be interpreted as the semantic argument of the focus particle, with disambiguation of the particle as the result.<sup>15</sup>

- (32) a Jan heeft pas twee boeken gelezen  
 John has just two books read  
 I. 'John has read just two books'  
 II. 'John has read two books recently'
- b [Pas twee boeken] heeft Jan gelezen  
 only two books has John read  
 I. 'Only two books has John read'  
 II. #'Recently, John has read two books'

The data in (33) illustrate the syntactic unselectivity of *pas*. I assume that the noun phrases in (33a-c) have the categorial status indicated in the examples. In (33i), the topicalization test has not been used since a finite verb cannot be topicalized. Yet it is clear that *pas* takes the finite verb, i.e. finite tense as its semantic argument. Infinitival TPs cannot be tested by topicalization because they tend to resist topicalization. It is plausible that in (33j) *pas* takes the infinitival TP as its argument.

<sup>15</sup> Topicalization is a well-known constituency test for Dutch: only one constituent can precede the finite verb in main clauses.

- (33)
- a [Pas [<sub>DP</sub> het derde meisje]] heeft een vraag gesteld  
just the third girl has a question posed
  - b [Pas [<sub>NumP</sub> EEN jongen]] heeft een vraag gesteld  
just one boy has a question posed
  - c [Pas [<sub>NP</sub> diamant]] wekte Jans interesse  
just diamond aroused John's interest
  - d [Pas [<sub>AP</sub> raar]] is dat Jan niet komt  
just strange is that John not comes
  - e [Pas [<sub>PP</sub> in Amsterdam]] ontdekten we dat Jan ziek was  
just in Amsterdam discovered we that John ill was
  - f [Pas [<sub>AdvP</sub> gisteren]] kregen we de brief  
just yesterday got we the letter
  - g [Pas [[<sub>VP</sub> hersteld] van een griep]] liep Jan de marathon  
just recovered from a flue ran John the marathon
  - h [Pas [<sub>VP</sub> bij een bedrijf werken]] is altijd vervelend  
just for a company working is always annoying
  - i We weten dat Jan pas [<sub>TP<sub>fin</sub></sub> schaatst]  
we know that John just skates
  - j Jan zegt het verhaal [pas [<sub>TP<sub>inf</sub></sub> te hebben gehoord]]  
John says the story just to have heard

These data can be repeated for *al* 'already' and *nog* 'still'.<sup>16</sup>

### 3.2.2 The locality of qualification

In this section evidence is provided for the generalization in (34):

- (34) A focus particle immediately c-commands (the trace of) its semantic argument

It is easier to demonstrate the correctness of (34) for scalar focus particles than for arithmetical ones: while the interpretation of scalar focus particles varies with the constituent that it qualifies, the interpretation of an

<sup>16</sup> The particle *maar* 'only' has a more idiosyncratic behaviour, e.g. it cannot occur on its own in topic position, unlike *pas*:

- (i)
- a Pas hebben twee mannen de bank beroofd  
just have two men the bank robbed
  - b \*Maar hebben twee mannen de bank beroofd  
only have two man the bank robbed

I leave such idiosyncrasies for future research.

arithmetical focus particle does not. We therefore concentrate on scalar focus particles here, taking *pas* as the representative case; all of these data can be repeated with other scalar focus particles. In section 3.2.4, arithmetical particles are argued to obey the same locality requirement.<sup>17</sup>

The test used in the examples in (35) below is the availability of a numeral-associated interpretation. As (35a) shows, a numeral-associated interpretation is possible when the focus particle is adjacent to the numeral-containing noun phrase. In the other sentences in (35), one or more constituents intervene between the numeral-containing noun phrase and *pas*. In none of these cases is there a numeral-associated interpretation. The fact that *pas* can have a temporal interpretation shows that *pas* is allowed in the positions involved.

- (35) a Jan heeft *pas* *TWEE* *boeken* gelezen  
 John has just two books read  
 I. 'John has read just two books'  
 II. 'John read two books recently'
- b Jan heeft *pas* [in de tuin] *TWEE* *boeken* gelezen  
 John has just in the garden two books read  
 I. #'John has read just two books in the garden'  
 II. 'John read two books in the garden recently'
- c *Pas* heeft Jan in de tuin *TWEE* *boeken* gelezen  
 just has John in the garden two books read  
 I. #'John has read just two books in the garden'  
 II. 'Recently, John read two books in the garden'
- d Jan heeft *pas* boos *TWEE* *politici* opgebeld  
 John has just angry two politicians phoned  
 I. #'John has phoned just two politicians angry'  
 II. 'John phoned two politicians angry recently'
- e Jan heeft *pas* (aan) dat meisje *TWEE* *boeken* gegeven  
 John has just (to) that girl two books given  
 I. #'John has given that girl just two books'  
 II. 'John gave that girl two books recently'

<sup>17</sup> The literature on the English focus particles *only* and *even* (e.g. Rooth 1985) centers around the example in (i):

(i) Mary only introduced BILL to Sue

This sentence can mean 'Mary introduced only Bill to Sue', where [Bill] is the semantic argument of [only], which seems to suggest that *only* need not be adjacent to, or immediately c-command its semantic argument. I show in section 3.2.4 that these cases are not an exception to the condition in (34).

- f Er heeft *pas* een jongen *TWEE* boeken gelezen  
 there has just a boy two books read  
 I. #‘A boy has read just two books’  
 II. ‘A boy read two books recently’
- g Jan vertelde *pas* dat *TWEE* jongens het examen gehaald hebben  
 John told just that two boys the exam passed have  
 I. #‘John said that just two boys have passed the exam’  
 II. ‘John said recently that two boys have passed the exam’
- h Jan vertelde *pas* dat Marie *TWEE* papegaaien heeft  
 John told recently that Mary two parrots has  
 I. #‘John said that Mary has just two parrots’  
 II. ‘John said recently that Mary has two parrots’

The facts in (35) eliminate three potential causes of the non-associability of the particle and the numeral. First, it is irrelevant whether the constituent intervening between the particle and the numeral-containing noun phrase is an argument (35e,f) or an adjunct (35b,d). Secondly, clause-boundedness is not the relevant factor. Although it is true that a focus particle in a matrix clause cannot be associated with a constituent in an embedded clause, i.e. across a CP-boundary (cf. (35g,h)), this is not a specific property of CPs: as the other sentences in (35) show, any intervening constituent blocks semantic association. Finally, the length of the intervening constituent is irrelevant, since even the short word *boos* in (35d) blocks association.

In view of the facts in (35), the generalization seems to be that *pas* must be left-adjacent to the numeral-containing noun phrase to get a numeral-associated interpretation. This generalization is a bit too strong, however: when the numeral-containing noun phrase is within a PP, *pas* can have a numeral-associated interpretation provided that it is left-adjacent to the preposition. An example is given in (36a). The sentences in (36b,c) show that a numeral-containing PP obeys the same locality requirement as a numeral-containing noun phrase (only the availability of a numeral-associated interpretation is indicated; the sentences are fine under a temporal interpretation of *pas*):

- (36) a Jan heeft *pas* in *TWEE* boeken gelezen  
 John has just in two books read  
 'John has read in just two books'  
 b Jan heeft *pas* in de tuin in *TWEE* boeken gelezen  
 John has just in the garden in two books read  
 #'John has read in just two books in the garden'  
 c *Pas* heb ik in *EEN* tuin een kat gezien  
 just have I in one garden a cat seen  
 #'I have seen a cat in just one garden'

In a sentence such as (36a), the PP *in twee boeken* 'in two books' is the semantic argument of the particle. The provisional generalization is, then, that *pas* must immediately precede the numeral-containing noun phrase or PP to receive a numeral-associated interpretation.

However, this generalization is not tenable in view of the data in (37) (again, only the availability of a numeral-associated interpretation has been indicated).

- (37) a *TWEE* boeken<sub>i</sub> denk ik dat Jan *pas* t<sub>i</sub> heeft gekocht  
 two books think I that John just has bought  
 'I think that John has bought just two books'  
 b Ik heb *TWEE* jongens verteld dat Jan *pas* een boek heeft  
 I have two boys told that John just a book has bought  
 gekocht  
 bought  
 #'I have told just two boys that John has bought a book'  
 c *TWEE* jongens hebben verteld dat Jan *pas* een boek heeft  
 two boys have told that John just a book has  
 gekocht  
 bought  
 #'Just two boys have told that John has bought a book'

The sentences in (37) are similar in that the numeral-containing noun phrase is in the matrix clause and the particle is in the embedded clause. Only in (37a) is association with the numeral possible. The relevant difference is that in (37a) *pas* immediately precedes the trace of *twee boeken*, whereas in (37b,c) there is no trace of *twee jongens* in the embedded clause, since *twee jongens* is an argument of the matrix verb *verteld*. Apparently, the particle either immediately precedes the **surface** position or the **base position** of the numeral-containing noun phrase. In the latter case, the stranded focus particle marks the base position of the associated constituent in a way very similar to floating quantifiers (cf. Sportiche 1988). This is confirmed by the

data in (38):

- (38) a Jan heeft [dat meisje] [twee boeken] gegeven  
 John has [that girl] [two books] given
- b \*Jan heeft [twee boeken] [dat meisje] gegeven  
 John has two books that girl given
- c [TWEË boeken] heeft Jan dat meisje *pas* gegeven  
 two books has John that girl just given  
 I. 'John has given that girl just two books'  
 II. 'John has given that girl two books recently'
- d [TWEË boeken] heeft Jan *pas* dat meisje gegeven  
 two books has John just that girl given  
 I. #'John has given that girl just two books'  
 II. 'John has given that girl two books recently'

The contrast between (38a) and (38b) shows that the direct object must follow the indirect object. The contrast between (38c) and (38d) shows that for *pas* to be associated with the topicalized object, *pas* must follow the indirect object.

The generalization that a focus particle must be left-adjacent to (the trace of) its semantic argument also captures the data in (39) if we assume that the numeral-containing noun phrase or PP has moved from a position immediately to the right of the particle to a position immediately to the left of the particle:

- (39) a [[TWEË boeken]<sub>i</sub> pas t<sub>i</sub>] heeft Jan gelezen  
 two books just has John read
- b [[Op EEN vraag]<sub>i</sub> pas t<sub>i</sub>] heeft Jan niet geantwoord  
 on one question just has John not answered

It has now been shown that the particle must be left-adjacent to (the trace of) the numeral-containing noun phrase or PP. It is hard to prove that the condition is immediate c-command, not left-adjacency. These alternative options can only be tested in a configuration such as (40):

- (40) [<sub>YP</sub> [<sub>XP</sub> ...[*pas*]]] [<sub>ZP</sub> TWEË boeken]

The relevant properties of this configuration are: (i) *pas* is embedded in XP, hence it does not c-command ZP, and (ii) *pas* is left-adjacent to *twee boeken*. If left-adjacency is the relevant condition, association of *pas* with *twee boeken* should be possible in (40). If immediate c-command is the relevant condition, association of *pas* with *twee boeken* should be impossible. The

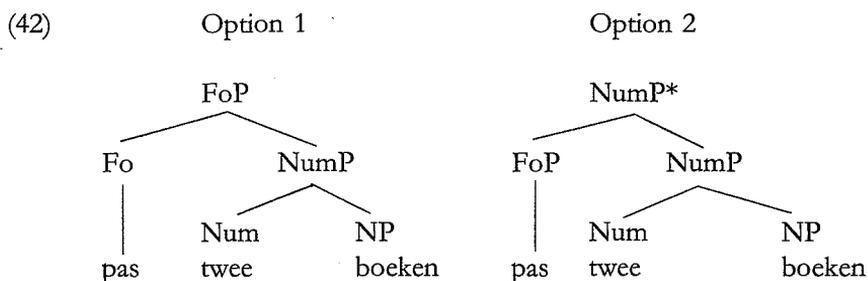
problem with this test is that the bracketing is not given a priori and therefore *pas* can always be taken to be part of ZP (marked by round brackets in (41a,c)) instead of XP (marked by square brackets in (41a,c)). It is plausible that this causes the ambiguity in (41a,c).

- (41) a Zij hebben [EEN meisje (*pas*) TWEE boeken] gegeven  
 they have one girl just two books given  
 I. 'They have given just one girl two books' (square brackets)  
 II. 'They have given one girl just two books' (round brackets)
- b [EEN meisje *pas*]<sub>i</sub> hebben zij t<sub>i</sub> TWEE boeken gegeven  
 one girl just have they two books given  
 I. 'They have given just one girl two books'  
 II. #'They have given one girl just two books'
- c Ik heb [het meisje dat opbelde (*pas*) TWEE boeken] gegeven  
 I have the girl that phoned just two books given  
 I. 'I have given two books to the girl that phoned recently  
 (square brackets)  
 II. 'I have given just two books to the girl that phoned'  
 (round brackets)
- d [Het meisje dat opbelde *pas*]<sub>i</sub> heb ik t<sub>i</sub> TWEE boeken gegeven  
 the girl that phoned just have I two books given  
 I. I have given two books to the girl that phoned recently'  
 II. #I have given just two books to the girl that phoned'

Nonetheless, the data in (41) are an indication that the relevant condition is immediate c-command. If *pas* is taken to be part of the constituent that precedes it in (41a,c), these sentences can be the input of a topicalization operation yielding the results in (41b,d). After topicalization, *pas* cannot take *two books* as its semantic argument, despite the fact that it is left-adjacent in the configuration from which (41b,d) are derived. This suggests that immediate c-command is the relevant factor.

### 3.2.3 Syntactic analysis

We have argued that a scalar focus particle immediately c-commands (the trace of) its semantic argument. It was also shown that such a particle can take a semantic argument of any syntactic category. Furthermore, the particle can form one syntactic constituent with its semantic argument, witness the data in (33). Therefore, we have two options for the syntactic position of the particle within the syntactic constituent that it forms with its semantic argument. The particle may be a head taking the semantic argument as its complement, or it may be an adjunct to its semantic argument. The two options are represented in (42), where FoP indicates the projection of the focus particle and the semantic argument is a NumP:



Option 1 would be in line with Sportiche's (1994) proposal that adjuncts do not exist, option 2 is the structure assumed in Bayer (1990). In fact, there is evidence against option 1 and in favour of option 2.<sup>18</sup> As (43) shows, a maximal projection (a PP) may function exactly like a focus particle:

- (43)
- a Jan heeft [<sub>PP</sub> op zijn minst] TIEN boeken gekocht  
John has at its least ten books bought  
'John has bought minimally ten books'
  - b [TIEN boeken [<sub>PP</sub> op zijn minst]] heeft Jan gekocht  
ten books at its least has John bought
  - c [TIEN boeken]<sub>i</sub> heeft Jan [<sub>PP</sub> op zijn minst] t<sub>i</sub> gekocht  
ten books has John at its least bought

It will be clear that there is no way to represent *tien boeken* as the syntactic complement of such a PP. I therefore take focus particles to be adjuncts.<sup>19</sup>

Recall that at surface structure, a focus particle may immediately precede or immediately follow its semantic argument, and that it may form one

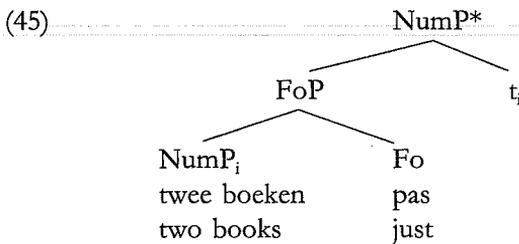
<sup>18</sup> I thank Wim Klooster for drawing my attention to this fact.

<sup>19</sup> Büring and Hartmann (1995) draw the same conclusion for focus particles in German.

constituent with the semantic argument in both orders:

- (44) a [Pas TWEE boeken] heeft Jan  
           just two books has John  
       b [TWEED boeken pas] heeft Jan  
           two books just has John

Recall also that antisymmetry or the adapted version used in this thesis does not allow right adjunction. The structure for (44b) must then be as in (45):<sup>20</sup>



In chapter 2, it was argued that in a configuration such as (45), NumP<sub>i</sub> immediately c-commands Fo, and Fo immediately c-commands t<sub>i</sub>. According to the main hypothesis of this dissertation, the PSI repeated in (46), this configuration determines a qualification relation between Fo and NumP<sub>i</sub>.<sup>21</sup>

<sup>20</sup> Cf. chapter 4 for more evidence for this structure.

<sup>21</sup> The relevant definitions are repeated below. For discussion and empirical evidence, see chapter 2.

- (a) **X c-commands Y** iff  
       (i) X does not dominate Y and Y does not dominate X  
       and (ii) There is a (connected) path of left branches from Z, the minimal node that dominates X and Y, to X
- (b) **X immediately c-commands Y** iff  
       X c-commands Y and there is no **closer c-commander** W such that X c-commands W and W c-commands Y
- (c) **Connected path of left-branches**  
       Two paths of left branches are a connected path of left branches A ∪ B iff no node intervenes between the two paths.

I briefly show the relevant c-command relations in (45). NumP<sub>i</sub> c-commands Fo since there is a path of left branches from FoP, the minimal node that dominates NumP<sub>i</sub> and Fo, to NumP<sub>i</sub>. NumP<sub>i</sub> immediately c-commands Fo, since there is no closer c-commander W such that NumP<sub>i</sub> c-commands W and W c-commands Fo. NumP<sub>i</sub> c-commands t<sub>i</sub>, since there is a path of left branches from NumP\*, the minimal node that dominates NumP<sub>i</sub> and t<sub>i</sub>, to NumP<sub>i</sub>. NumP<sub>i</sub> does not c-command t<sub>i</sub> immediately, since Fo is a closer c-commander for t<sub>i</sub>: Fo is c-commanded by NumP<sub>i</sub>, and Fo c-commands t<sub>i</sub>, since there is a connected path

(46) **Principle of Semantic Interpretation**

- I. A node Z establishes a **S(EMANTIC)-RELATION** between a node X and a node Y iff X immediately c-commands Z and Z immediately c-commands Y
- II. A node Z is a **QUALIFIER** of a node X iff Z establishes a Semantic relation between X and Y and X and Y are coindexed

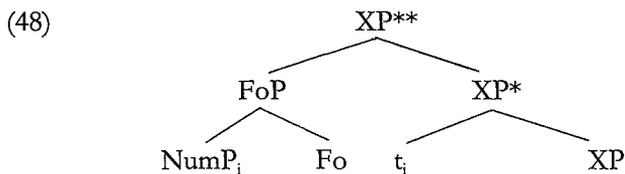
Thus, by occurring in the configuration in (45) *pas* 'just' is interpreted as a qualifier of *twee boeken* 'two books', which gives rise to the interpretation discussed in section 3.1: the part of the linearly ordered set that *twee boeken* selects is not long. If this analysis is correct, we have an answer to the question as to what triggers the movement of NumP<sub>i</sub> to [spec,FoP]: this movement is necessary to make *pas* interpretable as a qualifier. In view of the fact that in (44a) *pas* qualifies *twee boeken* as well, it must be assumed that the movement operation may also take place in covert syntax. Thus, the configuration required by the PSI must be reached ultimately at LF. Finally, the fact that it is possible to strand the focus particle, e.g. under topicalization of its semantic argument as in (37a), must mean that the semantic argument can move further from [spec,FoP] to a higher position. The analysis so far is summarized in (47):

- (47) (i) A focus particle immediately c-commands (the trace of) its semantic argument.
- (ii) The semantic argument moves to the specifier of the projection of the focus particle in overt or covert syntax. The trigger of this movement is to make the particle interpretable as a qualifier of the semantic argument.
- (iii) The semantic argument of a focus particle may move further from [spec,FoP] to a higher position.

As it is formulated in (47i), the locality requirement does not force the focus particle to adjoin to its semantic argument, it may also adjoin to a projection that contains the semantic argument, as long as it immediately c-commands (the trace of) its semantic argument from that position. An example of such a configuration is given in (48). After movement, NumP<sub>i</sub> immediately c-

of left branches from NumP\*, the minimal node dominating Fo and NumP, to Fo. Fo immediately c-commands t<sub>i</sub>, since there is no closer c-commander W such that Fo c-commands W and c-commands t<sub>i</sub>. Thus, in the triple Fo(NumP<sub>i</sub>,t<sub>i</sub>), NumP<sub>i</sub> immediately c-commands Fo and Fo immediately c-commands t<sub>i</sub>. As a result, Fo is interpreted as a qualifier of NumP<sub>i</sub>.

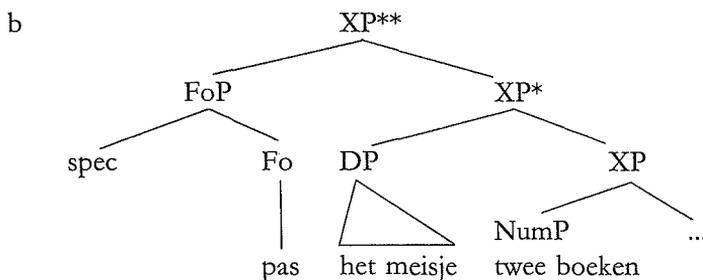
commands Fo and Fo immediately c-commands  $t_i$ ; the PSI is thus satisfied.<sup>22</sup>



Put differently, the PSI does not distinguish between a structure in which a focus particle is adjoined to its semantic argument, as in (45), and a structure in which the focus particle is adjoined to a projection that contains the semantic argument, as in (48): in both structures the NumP can be the semantic argument of the focus particle. There is plain evidence that a focus particle can adjoin to any constituent (cf. (33)), but there is no evidence for or against (48). I assume that (48) is possible and use this configuration to argue that the locality condition in (47i) need not be stipulated, but follows from the PSI.

Consider the sentence in (49a), in which *twee boeken* cannot be the semantic argument of *pas*, and its base configuration in (49):

- (49) a dat Jan pas het meisje TWEE boeken heeft gegeven  
 that John just the girl two books has given  
 #‘that John has given the girl just two books’



It is impossible to derive from (49b) a configuration in which *twee boeken* immediately c-commands *pas* and *pas* immediately c-commands the trace of *twee boeken*.

<sup>22</sup> Configurations such as (48) play an important role in the analysis of extraposition and scrambling in chapter 4.



- (52) a Jan meent [<sub>Fo</sub> pas] [<sub>TP</sub> te hebben gebeld]]  
 John thinks just to have called  
 'John thinks that he called recently'
- b Jan meent [<sub>TP</sub> [<sub>FoP</sub> [<sub>TP</sub> te hebben gebeld]<sub>i</sub>] [<sub>Fo</sub> pas] t<sub>i</sub> ]  
 John thinks to have called just  
 'John thinks that he called recently'

In (52a,b) *pas* is an adjunct to the embedded TP. A segment of this TP moves into the specifier of the projection of the focus particle. This yields a configuration in which TP immediately c-commands Fo and Fo immediately c-commands the trace of TP. This movement takes place in overt or covert syntax. As a result, the focus particle is interpreted as a qualifier of TP. The temporal and perfective nature of TP gives the focus particle a temporal interpretation, 'recently'.

Dutch linguists tend to disagree on the judgement of (52b). An often heard objection is that comma intonation between *pas* and the rest of the sentence is required, and comma intonation is then (tacitly) taken to tell us that the following constituent is not a part of the syntactic structure of that sentence. In view of the contrasts in (53), I conclude that comma intonation is not necessary in (52b), and that the tacit assumption just mentioned is not valid:

- (53) a Jan heeft daar gewerkt (,) gisteren/pas  
 John has there worked yesterday/just
- b Die studenten hebben daar gewerkt \*(,) studenten uit Leiden  
 those students have there worked students from Leiden
- c \*Die studenten hebben daar gewerkt (,) hard  
 those students have there worked hard

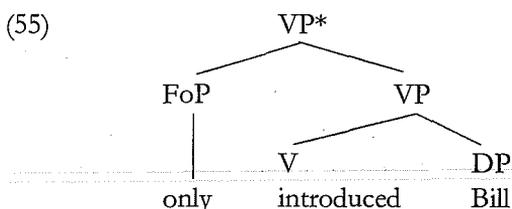
There is a clear contrast between (53a,b) when comma intonation is absent. In addition, as the contrast between (53a,c) shows, there is apparently also a syntactic restriction on the possibility for a constituent to be set off from the rest of the clause by comma intonation: whereas temporal adverbials can, manner adverbials cannot. This suggests that the constituent following the comma does belong to the syntactic structure of the sentence.

### 3.2.5 Arithmetical focus particles

Arithmetical focus particles in English do not seem to obey the generalization that focus particles immediately c-command (the trace of) their semantic argument. Consider the example in (54) (from Rooth 1985):

- (54) Mary only introduced BILL to Sue  
 'Mary introduced only BILL to Sue'

This sentence can have the indicated interpretation, in which *Bill* is the semantic argument of *only*. Assuming the structure in (55), *only* does not immediately c-command *Bill*, since the verb is a closer c-commander for *Bill*:



We can take this to mean either (i) that arithmetical focus particles are different from scalar focus particles, or (ii) that English focus particles are different from Dutch focus particles. As for the first option, it is clear that there is a locality restriction on the relation between *only* and its semantic argument (cf. von Stechow 1991: 814):

- (56) a He only claims that SUE likes him  
 b He claims that only SUE likes him

The sentence in (56a) exclusively means that the only claim that he made was the claim that SUE likes him, i.e. he did not claim that anyone else likes him. The sentence in (56b) on the other hand means that he claimed that only Sue likes him, i.e. he claimed that no one else likes him. Thus, the semantic argument of *only* in (56a) is *claims that ...*, whereas the semantic argument of *only* in (56b) is *Sue*.

As for the second option, the idea that English is different is not tenable in view of the behavior of scalar focus particles:

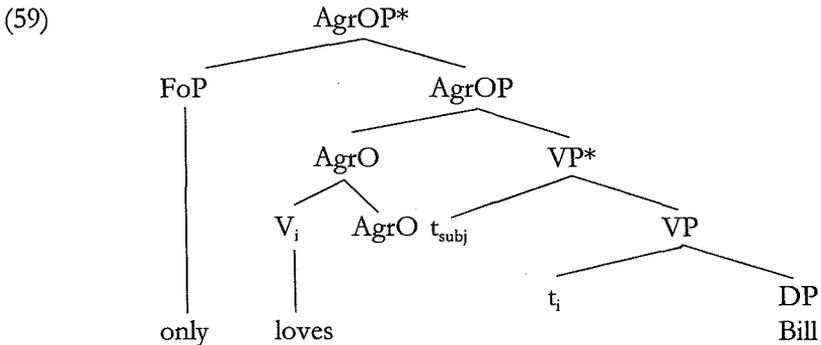
- (57) a John has bought just two books  
 b John *just* claimed that he had bought *TWO books*  
 #'John has claimed that he had bought just two books'  
 c John *just* claimed that *TWO guests* would leave  
 #'John claimed that just two guests would leave'  
 d John *just* has introduced *TWO guests*  
 #'John has introduced just two guests'  
 e John *just* sometimes introduces *TWO guests*  
 #'John sometimes introduces just *TWO guests*'

It seems that English focus particles behave identically to Dutch ones, and that (54) is the only exception. There are two conceivable explanations for this exceptionality. First, it can be demonstrated that the sentences in (58) are logically equivalent:

- (58) a Mary only loves BILL  
b Mary loves only BILL

The sentences in (58) imply each other. If Mary's only love is Bill, then only Bill is Mary's love. If only Bill is Mary's love, then Mary's only love is Bill. A way to save the generalization that a focus particle immediately c-commands (the trace of) its semantic argument would then be to say that in a sentence such as (58a) the semantic argument of *only* is *loves Bill* and that this is logically equivalent to *only* taking *Bill* as its argument. This would be in accordance with Rooth's semantic analysis of focus particles (cf. section 3.1.5 for a brief discussion).

A second way to save the generalization would be to say that in (58a) *only* takes an AgrOP as its semantic argument:



In this configuration, *only* can be made interpretable as a qualifier of AgrOP by moving this segment (overtly or covertly) to [spec,FoP]. Since, by definition, AgrO has the same  $\phi$ -features as the object, it is reasonable to say that it has the same index as the object. *Only* qualifying AgrOP then yields the same interpretation as *only* qualifying the object.<sup>23</sup>

It is likely that (59) is the syntactic way to express the logical equivalence of the sentences in (58): the two explanations coincide. This would immediately explain why the sentences in (60) are not logically equivalent:

<sup>23</sup> In contradistinction to Chomsky (1995), I assume that the  $\phi$ -features of AgrO are relevant for interpretation at LF.

- (60) a He only [<sub>AGROP</sub> claims that Sue likes him]  
 b He claims that only [<sub>DP</sub> Sue] likes him

It is clear that the bracketed constituents in (60a,b) do not have the same index. We thus can maintain the generalization that a focus particle immediately c-commands (the trace of) its semantic argument.<sup>24</sup>

A brief word on Rooth's (1985, 1992) analysis of English focus particles is necessary to further clarify the theoretical position of the present proposal. Rooth (1985) discusses and rejects an alternative explanation for (61): movement of *Bill* to a position right-adjacent of the focus particle:

- (61) Mary [only [Bill]<sub>i</sub>] introduces <sub>t<sub>i</sub></sub> to Sue

Rooth provides two convincing arguments against such an analysis, using observations by Anderson (1972): (i) it is possible to associate more than one focused constituent with one focus particle, as in (62a), and (ii) association with a focused constituent is possible even when the focused constituent is within a complex-NP island, that disallows extraction (62b).

- (62) a John claims that he can sell refrigerators to the Eskimos, but  
 in fact he couldn't even sell WHISKEY to the INDIANS  
 b John even has [<sub>CNP</sub> the idea that HE is tall for a Watusi]

We can now add to this a third argument, namely that the focused constituent associated with the focus particle must be distinguished from the semantic argument (a distinction that goes back to Karttunen & Karttunen 1977). A sentence such as (56a) (*He only claims that SUE likes him*), not allowing an interpretation in which *Sue* is the semantic argument of *only*, shows that the focused constituent need not be the semantic argument of *only*. Just in case *only* immediately c-commands the (trace of the) focused constituent, this constituent coincides with the semantic argument, as in *Only TWO boys would call*.<sup>25</sup>

<sup>24</sup> As Marcel den Dikken (p.c.) points out, the fact that in a sentence such as (i), *only* preceding the matrix verb can take the object of the embedded verb as its semantic argument can be explained if the object *Sue* raises to the matrix [<sub>spec, AgrOP</sub>].

(i) He *only* expects/wants to love *Sue*

See Den Dikken (1995b) for independent evidence for this view.

<sup>25</sup> The problem that association with focus exhibits crossover effects, an argument in favor of an analysis that moves the focused constituent, has been convincingly solved by Rooth (1985). The relevant data are given in (i):

### 3.3 Focus particles as a diagnostic test for movement

Section 3.2 showed that a focus particle can be stranded in a position where it immediately c-commands the base-position of its semantic argument. Therefore, focus particles can be used as a diagnostic for movement in a way very similar to floating quantifiers (cf. Sportiche 1988).<sup>26</sup> The focus particle *maar* 'only', 'just' provides the most reliable test: whereas it can qualify a dynamic verb and then receives a durative interpretation (63a), it cannot qualify stative verbs such as *kennen* 'know', *weten* 'know', *hebben* 'have', *bezitten* 'possess' and *zien* 'see'. When *maar* is used in combination with such a stative verb, the sentence is ungrammatical (63b), unless there is a numeral-containing constituent that can be the semantic argument of *maar* (63c):

- (63) a Jan praat maar over emigreren  
 John talks only about emigrate  
 'John talks about nothing but emigrating'  
 b \*Jan weet maar het antwoord  
 John knows only the answer  
 c Jan weet maar EEN antwoord  
 John knows only one answer

Put differently, in the context of stative verbs *maar* is forced to take a numeral-containing argument and if there is none, the sentence is ungrammatical. This yields the clearest judgements, and I therefore mainly use *maar*

- (i) a We only wonder [<sub>CP</sub> whether HE<sub>i</sub> was betrayed by the woman he<sub>i</sub> loves]  
 b We only wonder [<sub>CP</sub> whether he<sub>i</sub> was betrayed by the woman HE<sub>i</sub> loves]

The sentence in (i-a) has a bound variable interpretation, the one in (i-b) does not. Rooth's solution to this problem is that independently of the presence of *only*, the focused constituent undergoes QR at LF, adjoining to the embedded IP. This gives rise to a crossover effect in (i-b) but not in (i-a). Cf. Bayer (1990), Kratzer (1991) and von Stechow (1991) for discussion.

<sup>26</sup> Unfortunately, the test cannot decide the current debate on the SVO - SOV character of Dutch. The marginal sentence in (i-a) can be derived both by movement of the object from the complement position, as in (i-b), and by movement of an AgrOP-segment to [spec,FoP], as in (i-c).

- (i) a ?Jan heeft EEN koning gekend *maar*  
 John has one king known only  
 'John has known just one king'  
 b [<sub>XP</sub> [<sub>DP</sub> EEN koning]<sub>i</sub>] [<sub>X</sub> [<sub>VP</sub> [<sub>V</sub> gekend [*maar* t<sub>i</sub>]]]]  
 c [<sub>AGROP</sub> [<sub>FoP</sub> [<sub>AGROP</sub> EEN koning gekend]<sub>i</sub>] [<sub>Fo</sub> *maar* [<sub>AGROP</sub> t<sub>i</sub>]]]]

as the diagnostic particle in this section. In the two subsections that follow, the test is applied to investigate the structure of the middle field in Dutch and the nature of successive cyclic movement.

### 3.3.1 The middle field in Dutch

Application of the test to the position of subject and object in the middle field in Dutch confirms the structure proposed in MPLT (Chomsky 1993). The relevant data are given in (64):

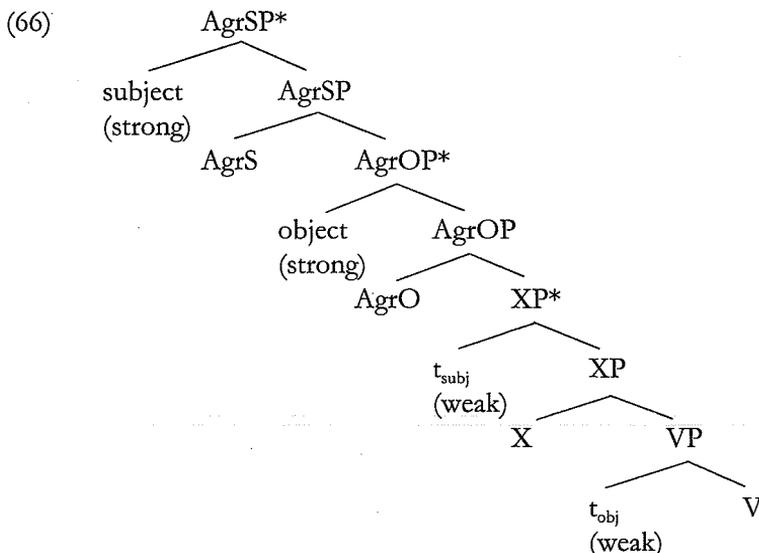
- (64) a \*Dus heeft *EEN jongen* 'n koning *maar* gekend  
 thus has one boy a king only known  
 b Dus heeft *EEN jongen maar* 'n koning gekend  
 thus has one boy only a king known  
 c Dus heeft *EEN jongen de koning maar* gekend  
 thus has one boy the king only known  
 d Dus heeft *EEN jongen maar de koning* gekend  
 thus has one boy only the king known

The crucial observation is the contrast between (64a) and (64c): a stranded focus particle associated with the subject can follow the object when the object is definite, but not when the object is indefinite. This effect is well-known and has been taken to correlate with scrambling (cf. Diesing 1992, De Hoop 1992): scrambling of indefinites is usually bad. This is especially clear when *wat* is scrambled (Postma 1995):

- (65) a Jan heeft gisteren het boek gekocht  
 John has yesterday the book bought  
 b Jan heeft het boek gisteren gekocht  
 John has the book yesterday bought  
 c Jan heeft gisteren wat gekocht  
 John has yesterday what bought  
 'John has bought something yesterday'  
 d \*Jan heeft wat gisteren gekocht  
 John has what yesterday bought

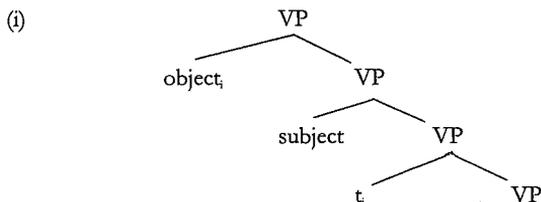
The facts in (64) suggest the structure in (66), a structure proposed in Chomsky (1993) (TP and CP have been left out):<sup>27 28</sup>

<sup>27</sup> The focus particle evidence obviously does not distinguish between the structure in (66)



The structure in (66) is fully compatible with the minimalist program if the latter is combined with a VP-decomposition analysis such as Hale and Keyser (1993). In such an analysis, XP\* can be taken to be the higher VP-shell, the specifier of which is the base position of the subject and the head of which is an abstract verb. The head of the lower VP-shell is a non-verbal root.

and one in which there are no functional projections and the moved constituents adjoin to higher VP-segments. However, if the PSI is correct, the latter analysis seems to be excluded since the resulting structure would define the subject as a qualifier (or predicate) of the object and the object as a qualifier (or predicate) of the subject, as in (i). In (i), the moved object immediately c-commands the subject and the subject immediately c-commands the object's trace, hence the subject should qualify the object.



Nothing in the semantics seems to justify the existence of such relations between the subject and the object.

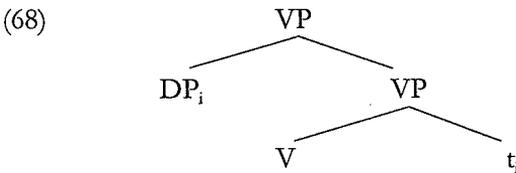
<sup>28</sup> Unfortunately, it is not possible to test the base position of the object and the subject at the same time. I have no explanation for this fact.

- (i) \*Dus hebben [TWEË jongens]<sub>i</sub> [DUIZEND boeken]<sub>j</sub> maar t<sub>i</sub> al t<sub>j</sub> verzameld  
thus have two boys thousand books just already collected

antisymmetry in which all languages are underlyingly SVO within VP (Kayne 1993, Zwart 1993): the base position of the object is to the left of the verb. To make it compatible, we could assume that the object in fact originates as the right-sister of the verb, and that it moves to [spec,VP]. Although there is no empirical evidence for or against making this assumption (cf. footnote 26), there is a theory internal reason. For many transitive verbs, it seems to be correct that the root of the verb is a qualifier of the object. To give some examples:

- (67) a Jan doodt de vlieg (root: *dood* 'dead')  
 John kills the fly  
 b Jan wit de muur (root: *wit* 'white')  
 John whitens the wall  
 c Jan geeft het boek (root: *gift* 'gift')  
 John gives the book

The fly will be dead, the wall will be white and the book will be a gift as a result of John's action. According to the PSI, a node X is a qualifier of a node Y if Y immediately c-commands X and X immediately c-commands the trace of Y. This is exactly the configuration that arises when the object moves from complement to specifier position within VP in (68): V, the root of the verb, is defined as a qualifier of the object.



### 3.3.2 Successive cyclic movement

In the common analysis of successive cyclic A'-movement, long WH-extraction or topicalization proceeds via intermediate [spec,CP] positions: if these positions were skipped, the movement would cross more than one bounding node or barrier at the same time, yielding a subjacency violation (cf. Chomsky 1986 and references cited there). Application of the stranded focus particle test leads to the following expectations: (i) we expect to find a stranded focus particle in a position immediately c-commanding the base position of the extracted constituent; (ii) we might find stranded focus particles in the intermediate [spec,CP] positions. The second expectation is reasonable in view of the explanation that we provided for the requirement

that a focus particle immediately c-commands (the trace of) its semantic argument: only then is a configuration possible in which the semantic argument immediately c-commands the particle and the particle immediately c-commands the trace of the semantic argument. There is no obvious reason why this local movement could not take place when the semantic argument including the focus particle is in an intermediate [spec,CP].

We have seen several cases that confirm the first expectation. In fact, these are the very basis of the test:

- (69) TWEE vogels<sub>i</sub> zei Jan dat ie dacht dat ie *maar* t<sub>i</sub> gezien had  
 two birds said John that he thought that he only seen had  
 'John said that he thought that he had seen only two birds'

As for the second expectation: we do indeed find stranded focus particles in intermediate positions, as in (70b). The contrast between (70a) and (70b) shows that the possibility to interpret *twee vogels* 'two birds' as the argument of *maar* really is dependent on movement of *twee vogels* to the matrix topic position:<sup>29</sup>

- (70) a Jan zei *maar* [CP dat hij TWEE vogels gezien had]  
 John said just that he two birds seen had  
 I. #'John said that he had seen just two birds'  
 II. 'John just said that he had seen two birds'  
 b [TWEE vogels]<sub>i</sub> zei Jan *maar* [CP dat ie t<sub>i</sub> gezien had]  
 two birds said John just that he seen had  
 I. 'John said that he had seen just two birds'  
 II. 'John just said that he had seen two birds'

Surprisingly, the stranded focus particle cannot be in the embedded [spec,CP] but must be in the matrix clause.<sup>30</sup>

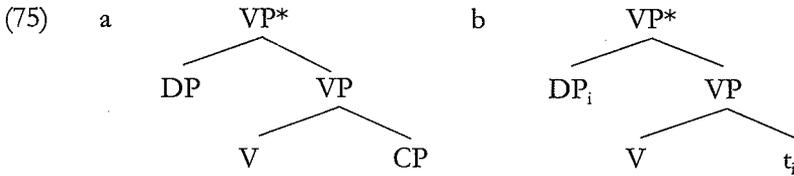
<sup>29</sup> The intended movement is island sensitive:

- (i) a TWEE vogels vertelde Jan maar dat ie gezien had  
 two birds told John just that he seen had  
 b \*TWEE vogels vertelde Jan (maar) het verhaal (maar) dat hij gezien had  
 two birds told John just the story just that he seen had

<sup>30</sup> I thank Hans Bennis for bringing this to my attention.







In (75b), DP movement makes the root of the verb interpretable as a qualifier of the internal argument. In (75a), this is impossible: CP cannot move to [spec,VP] because the object-DP is there. As a result, neither DP, nor CP can be interpreted as an internal argument of V, and V cannot be interpreted as a qualifier. Such a structure is ruled out by the Principle of Full Interpretation.

The PSI makes the further prediction that a structure such as (75a) is possible just in case DP and CP are coindexed: coindexation and the fact that DP immediately c-commands V and V immediately c-commands the CP coindexed with DP yields the canonical qualification configuration. In such a case, V is a qualifier of both the DP and the CP. Cases like (75a) do exist:

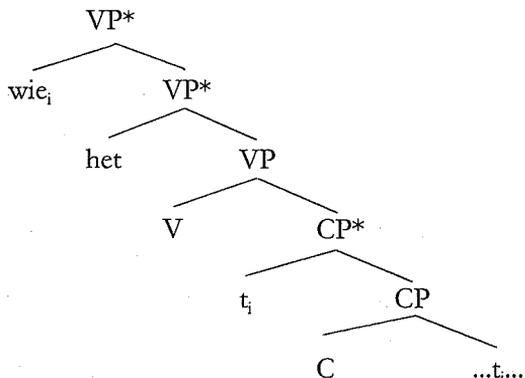
- (76) Jan zal (het)<sub>i</sub> betreuren [dat Piet Marie heeft ontmoet]<sub>i</sub>  
 John will it regret that Pete Mary has met

Finally, the PSI explains the well-known observation in (77) that verbs such as *betreuren* in (77), invoke factive islands (cf. Cinque 1990 and references cited there):

- (77) a \*Wie zal Jan het betreuren dat Piet t<sub>i</sub> heeft ontmoet  
 who will John it regret that Pete has met  
 b ?Wie zal Jan betreuren dat Piet t<sub>i</sub> heeft ontmoet  
 who will John regret that Pete has met

The relevant part of the structure is given in (78):

(78)



Movement of *wie* from [spec,CP], adjoining it to VP, does not yield a qualification relation between V and *wie*, since in (78) *wie* does not immediately c-command V: *het* is a closer c-commander for V. In this respect, the PSI performs better than the barriers analysis: there is no obvious reason why *wie* would not be able to adjoin to VP in (78). In addition, the contrast in (77), namely that the absence of *het* makes the sentence almost grammatical, directly follows from the PSI. In that case, *het* is not present in the structure in (78). As a result, there is a qualification relation between *wie* and V.

### 3.4 Conclusion

The results of this chapter can be stated as follows:

- (i) The semantic ambiguity of focus particles can be reduced to one basic meaning. The syntactic configuration determines which interpretation a particular focus particle has. Both the semantic interpretation and the syntactic distribution of focus particles follow immediately from the PSI.
- (ii) Stranded focus particles can be used as a diagnostic for movement
- (iii) The diagnostic of stranded focus particles applied to Dutch clause structure supports the minimalist structure in which there are two positions each for the subject and the object, and in which the subject crosses the object when moving to its higher position.
- (iv) The diagnostic test confirms the barriers-analysis of long A'-movement in which the moved constituent adjoins to the matrix VP. Certain factive island properties follow from the proposed analysis.

# 4 The syntax and semantics of PP Extraposition

## 4.0 Introduction<sup>1</sup>

PP Extraposition (henceforth PP-X) comes in two varieties, extraposition of an independent PP, as in (1b), and extraposition of a dependent PP, as in (1d):

- (1) a Jan heeft [<sub>PP</sub> in de tuin] [<sub>VP</sub> gewerkt]  
John has in the garden worked  
b Jan heeft [<sub>VP</sub> gewerkt] [<sub>PP</sub> in de tuin]  
John has worked in the garden  
c Jan heeft [<sub>DP</sub> een boek [<sub>PP</sub> over schaatsen]] [<sub>VP</sub> gekocht]  
John has a book on skating bought  
d Jan heeft [<sub>DP</sub> een boek] [<sub>VP</sub> gekocht] [<sub>PP</sub> over schaatsen]  
John has a book bought on skating

PP-X poses a number of theoretical problems. Since in the antisymmetry framework (Kayne 1994) and in the theory proposed in this thesis rightward movement and right-adjunction are not available, analyses that derive (1b,d) from (1a,c) by rightward movement of PP are excluded, and so is an analysis that base-generates the PP in (1b,d) in a right-adjoined position. In MPLT (Chomsky 1993), movement is always obligatory and triggered by the need to check a morpho-syntactic feature. In this respect, PP-X is problematic because it seems to be optional and there is no obvious feature that triggers it.

I propose to analyze extraposition of an independent PP (as in (1b)) as

<sup>1</sup> Parts of this chapter were presented at the 10th Comparative Germanic Syntax Workshop at the Catholic University of Brussels, January 17-19, 1995, and at the 18th GLOW Colloquium at the University of Tromsø, May 31 - June 2, 1995.

leftward-movement of VP to the specifier of a PP adjoined to it.<sup>2</sup> This movement has an interpretive trigger: it is necessary to establish a qualification relation between PP and VP, as defined by the Principle of Semantic Interpretation. The movement being necessary for interpretation, it is not optional, although it may take place either in overt or in covert syntax. Evidence in favor of this analysis, and against the other logically possible analyses, comes from the distribution and interpretation of focus particles in sentences such as (1). This evidence is provided in section 4.1. Section 4.2 is a detailed discussion of the proposed analysis. It is shown that it captures the distribution and interpretation of focus particles in this syntactic environment.

In section 4.3, it is shown that the mirror image effect observed by Koster (1974), i.e. roughly the fact that a rigid underlying order PP3 PP2 PP1 VP yields as the only possible extraposed order VP PP1 PP2 PP3, straightforwardly follows from the proposed analysis. Special attention is paid to the question as to why there are restrictions on the order of preverbal PPs. In section 4.4, the impossibility of extraposing a small clause predicate PP is shown to follow as well. Further evidence comes from restrictions on VP-topicalization including one or more PPs. In section 4.5, the analysis is extended to extraposition of dependent PPs, as in (1d): on the assumption that a dependent PP and the associated DP can be base-generated discontinuously (cf. Bach & Horn 1976; Klein & van den Toorn 1978, 1979, Rochemont & Culicover 1990), an extended projection of VP, namely AgrOP or AgrSP, moves to [spec,PP]. This captures the interpretive nesting requirement observed in Rochemont & Culicover (1990) in a way similar to the mirror image effect. In section 4.6, it is briefly argued that the analysis cannot be extended to relative clause extraposition. This is a desirable result, because there are a number of significant differences between PP-X and Relative Clause Extraposition. Section 4.7 provides independent evidence for the most unusual ingredient of the proposal: movement to the specifier of an adjunct. It is argued that Dutch has an previously unnoticed type of scrambling that involves movement to the specifier of an adverbial. Section 4.8 summarizes the results of this chapter.

<sup>2</sup> This analysis is inspired by Sportiche's (1994) proposal that VP can be base-generated in the specifier of an adjunct. One difference with Sportiche's proposal is that VP moves to [spec,PP] in the present analysis. Another difference is that I assume the existence of adjuncts. Some evidence for the latter assumption is provided in section 4.7.



- c [PP In EEN stadion]<sub>i</sub> heeft Jan *maar* t<sub>i</sub> gespeeld  
 in one stadium has John just played  
 'John has played just in one stadium'
- d Jan heeft [PP op EEN feestje] verteld dat hij *maar* gewerkt heeft  
 John has at one party told that he just worked has  
 #'John has told just at one party that he has worked'

Application of this diagnostic to PP-X yields the following results:<sup>5</sup>

- (6) a Jan heeft [PP *pas* in EEN stad] gewerkt  
 John has just in one city worked  
 'John has worked in just one city'
- b Jan heeft [F<sub>OP</sub> *pas*] [V<sub>P</sub> gewerkt] [PP in EEN stad]  
 John has just worked in one city  
 'John has worked in just one city'
- c Jan heeft [PP in EEN stad] [V<sub>P</sub> gewerkt] [F<sub>OP</sub> *pas*]  
 John has in one city worked just  
 #'John has worked in just one city'
- d \*Jan heeft [V<sub>P</sub> gewerkt] [PP *pas* in EEN stad]  
 John has worked just in one city
- e [PP *Pas* in EEN stad] heeft Jan gewerkt  
 just in one stad has John worked  
 'John has worked just in one city'
- f Jan heeft [V<sub>P</sub> gewerkt] [PP in *pas* EEN stad]  
 John has worked in just one city  
 'John has worked in just one stadium'
- g Jan heeft [PP in pas EEN stad] gewerkt  
 John has in just one city worked  
 'John has worked in just one city'

The facts in (6) are evidence against an analysis of PP-X involving rightward or leftward movement of PP and against a base-generation analysis. In particular, the facts in (6d,e) are problematic for such analyses: whereas a particle-initial PP can be topicalized as a whole (6e), it cannot be extraposed

<sup>5</sup> The observation that constituents with a constituent-initial focus particle cannot be extraposed goes back to Jacobs (1983) for extraposed CPs in German. For Dutch, Hoeksema (1989) has observed that a PP with a PP-initial focus particle cannot be extraposed either, regardless of whether the PP is an argument or an adjunct. Bayer (1990) claims that there is an adjunct-argument asymmetry: the restriction on PP-initial focus particles would only hold for argument-PPs. However, I have not been able to find a native speaker for whom (6d), a case of extraposition of an adjunct-PP, is acceptable.

(6d). An analysis that takes PP VP as the basic order and moves PP to the right would have to stipulate a construction-specific rule to exclude (6d). An analysis that takes VP PP as the basic order and moves PP to the left would not be able to derive (6a) from (6d), since (6d) is ungrammatical to begin with. Similarly, an analysis that allows base-generation of PP at both sides of the VP would have to stipulate a construction-specific restriction to exclude (6d). Such restrictions would really be construction-specific stipulations: other constructions in Dutch in which a PP (or DP) containing a focus particle moves or occurs in two different positions do not exhibit such a restriction. This is shown for PP-scrambling in (7a,b). The sentence in (7c) shows that this type of scrambling involves movement: the focus particle is stranded. The sentence in (7d) shows the other difference with extraposition: no constituent can intervene between the particle and the numeral-containing PP.<sup>6</sup>

- (7)
- a Jan heeft vandaag [<sub>PP</sub> maar voor EEN klant] opgebeld  
John has today just for one client called
  - b Jan heeft [<sub>PP</sub> maar voor EEN klant] vandaag opgebeld  
John has just for one client today called
  - c Jan heeft [<sub>PP</sub> voor EEN klant] vandaag *maar* t<sub>i</sub> opgebeld  
John has for one client today just called  
'John has phoned today for just one client'
  - d Jan heeft *maar* vandaag [<sub>PP</sub> voor EEN klant] opgebeld  
John has just today for one client called  
#'John has phoned today for just one client'

The construction-specific constraint that would have to be stipulated would be even more construction-specific in view of the grammaticality of (6f), with a PP-medial instead of a PP-initial focus particle. The grammaticality of (6f) eliminates three potential reasons for the ungrammaticality of (6d): (i) it cannot be a prosodic factor, e.g. that the postverbal position is a non-focus position; (ii) it cannot be a semantic factor: there is no interpretive difference between a PP with a PP-initial focus particle and a PP with a PP-medial focus particle; (iii) it cannot be a syntactic factor of the type: a PP containing a focus particle must be licensed preverbally in overt syntax. Thus, given the facts in (6d-f), the most likely analysis of PP-X is VP-movement, either to the right or to the left. Assuming a framework such as the present one in which rightward-movement is not available theoretically, the remaining option is leftward-movement of VP.

<sup>6</sup> More on this type of scrambling in section 4.7.

In such a framework, (6b) is an apparent exception to the generalization in (4): VP is intervening between the focus particle and PP. It is not an exception if VP is in [spec,PP], as in (8).

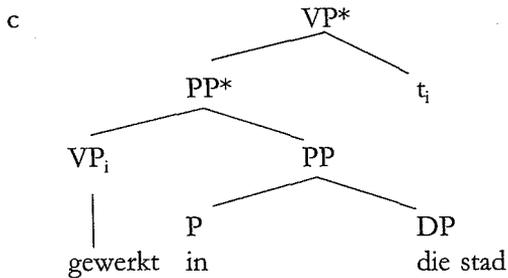
(8) *maar* [PP [VP gewerkt]<sub>i</sub> [PP in EEN stad]]

In the next section, an analysis is developed that yields the structure in (8).

## 4.2 A VP-movement analysis of PP Extraposition

The proposed derivation of PP-X is given in (9c):

- (9) a Jan heeft [PP in die stad] [VP gewerkt]  
 John has in that city worked  
 b Jan heeft [VP gewerkt] [PP in die stad]  
 John has worked in that city



In (9c),  $VP_i$  immediately c-commands PP, and PP immediately c-commands  $t_i$ .<sup>7</sup> According to the PSI, repeated in (9), this configuration defines PP as

<sup>7</sup> The relevant definitions of c-command and immediate c-command are repeated below. See chapter 2 for empirical evidence and discussion.

(a) **C-command**

X c-commands Y iff

- (i) X does not dominate Y and Y does not dominate X
- (ii) There is a (connected) path of left branches from Z, the minimal node that dominates X and Y, to X

(b) **Immediate c-command**

X immediately c-commands Y iff X c-commands Y and there is no *closer c-commander* W such that X c-commands W and W c-commands Y

(c) **Connected path of left branches**

Two paths of left branches A and B are a connected path of left branches  $A \cup B$  iff there is no node that intervenes between the two paths

a qualifier of VP; PP attributes a location to the work event denoted by the VP.

(10) **Principle of Semantic Interpretation**

- I. A node Z establishes a **S(EMANTIC)-RELATION** between a node X and a node Y iff X immediately c-commands Z and Z immediately c-commands Y
- II. Z is a **QUALIFIER** of X iff Z establishes a S(ematic)-relation between X and Y, and X and Y are coindexed

Thus, the trigger of VP-movement to [spec,PP] is interpretive: if VP does not move to [spec,PP], PP is not interpretable as a qualifier of VP. If nothing else moves locally to [spec,PP], PP is not interpretable as a qualifier at all, and the structure is ruled out by the principle of full interpretation. Put informally, in that case the structure does not determine what is going on in the garden.

The trigger of movement being interpretive, namely to create a configuration such as (9c) in which PP is interpreted as a qualifier of VP, it is plausible that the movement operation may take place at any level of derivation provided that the required configuration is there at LF. This explains the difference between (9a) and (9b). In (9a), VP-movement takes place in covert syntax. In (9b), VP-movement takes place in overt syntax. In this respect, VP-movement in PP-X is similar to many focus constructions that have an overt and a covert variant. To give one example:

- (11) a Jan kan WERKEn!  
 John can WORK  
 'John can work very hard'
- b WERKEn dat Jan kan!  
 WORK that John can  
 'John can work very hard'

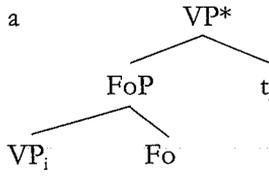
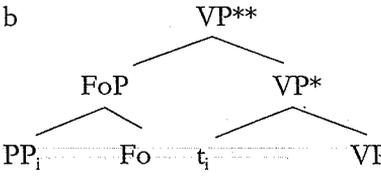
In (9c),  $VP_i$  c-commands its trace, since there is a path of left branches from  $VP^*$ , the minimal node that dominates  $VP_i$  and  $t_i$ , to  $VP_i$ . Furthermore,  $VP_i$  immediately c-commands PP, since there is a path of left branches from  $PP^*$ , the first node that dominates  $VP_i$  and PP, to  $VP_i$ , and there is no closer c-commander W such that  $VP_i$  c-commands W and W c-commands PP. PP immediately c-commands  $t_i$ , since there is a connected path of left branches  $\{VP^*, PP^*, PP\}$  from  $VP^*$ , the minimal node that dominates PP and  $t_i$ , to PP, and there is no closer c-commander W such that PP c-commands W and W c-commands  $t_i$ . Although  $PP^*$  c-commands  $t_i$ , it is not a closer c-commander than PP: PP does not c-command  $PP^*$  since  $PP^*$  dominates PP. The triple  $PP(VP_i, t_i)$  satisfies clause II of the PSI, and PP is therefore interpreted as a qualifier of VP.

There is evidence that (11a) involves covert movement of a projection of the focused verb at LF: just like (11b), (11a) is sensitive to negative islands:

- (12) a \*Jan kan niet WERKEn!  
       John can not WORK  
       b \*WERKEn dat Jan niet kan!  
       WORK that John not can

If the ungrammaticality of (12b) is the result of the focused VP moving across negation overtly, then the ungrammaticality of (12a) is the result of the focused VP moving across negation covertly.<sup>8</sup> As is well-known, PP-X comes with focus effects itself (cf. Rochemont & Culicover 1990 for discussion and references), such that the parallel between PP-X and other focus constructions is not implausible.

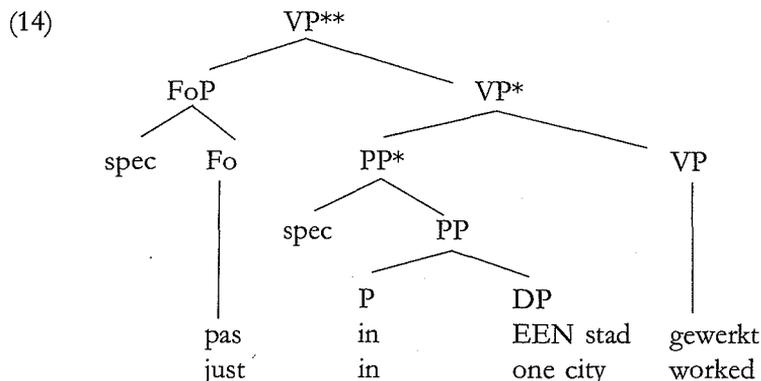
We are now almost in a position to explain why the order [VP-particle-PP] is ungrammatical and why in the order [particle-VP-PP] the particle can be associated with a numeral within PP, despite the fact that VP intervenes between particle and PP. First, I briefly repeat the analysis of focus particles provided in chapter 3. The semantic argument of the focus particle must locally move into [spec,FoP] to make the focus particle interpretable as a qualifier. If a constituent that denotes a temporal object, e.g. a VP, moves into [spec,FoP], then the particle gets a temporal interpretation. If a numeral-containing noun phrase or PP moves into [spec,FoP], then the particle gets a numeral-associated interpretation.

- (13) a
- 
- b
- 
- temporal interpretation                      numeral associated interpretation

Thus, PPs and FoPs are similar in that the constituent that they qualify

<sup>8</sup> Assuming Szabolcsi and Zwarts's (1992) analysis of negative islands, the ungrammaticality of (11b) is explained by the fact that a focused verb in exclamatives denotes an unbounded partially ordered set (a scale of different degrees of working) and has scope over negation: an unbounded partially ordered set is not defined for the Boolean operation of complementation performed by the negation. To explain the ungrammaticality of (12a) in the same way, we must assume that a projection of the verb moves covertly across the negation, taking scope over it. Cf. section 3.1.3 for more discussion.

moves into their specifier. In both cases, this movement may take place in overt or in covert syntax. If the two adjuncts are combined in one structure, we get (14):



The first step in a derivation that has (14) as its base structure is movement of VP into [spec,PP]. As a result, VP immediately c-commands PP and PP immediately c-commands the trace of VP, such that PP is interpreted as a qualifier of VP. As for the second step, there are three options:

- (i) PP\* moves into [spec,FoP]. As a result, PP\* immediately c-commands Fo and Fo immediately c-commands the trace of PP\*. Therefore, the focus particle is interpreted as a qualifier of PP\* and receives a numeral-associated interpretation.
- (ii) VP\* moves into [spec,FoP]. As a result, VP\* immediately c-commands Fo and Fo immediately c-commands the trace of VP\*: Fo is interpreted as a qualifier of VP\*. Since VP\* denotes a temporal object, the focus particle gets a temporal interpretation.
- (iii) VP moves (into [spec,PP] and then) into [spec,FoP]. As a result, VP immediately c-commands Fo and Fo immediately c-commands the trace of VP in [spec,PP]. Fo is interpreted as a qualifier of VP, and receives a temporal interpretation.

In case of the order [particle-VP-PP] *maar gewerkt in EEN stad* 'just worked in one city', with the numeral-associated interpretation of the particle, VP moves overtly into [spec,PP]. PP moves covertly into [spec,FoP], and this yields a numeral-associated interpretation.

Under the assumption that all movement taking place in this domain is movement to the specifier of an adjunct, the only way to derive the ungrammatical order [VP-particle-PP] *\*gewerkt maar in EEN stad* 'worked just in one city' is to apply option 3 in overt syntax: movement of VP into

[spec,PP] and subsequently into [spec,FoP]. Even if we assume that this movement is available, it does not yield a numeral-associated interpretation: since it is VP that moves into [spec,FoP], the focus particle will receive a temporal interpretation. Indeed, a temporal interpretation is marginally possible for a focus particle in this position, especially for *pas* 'just', whereas a numeral-associated interpretation is ungrammatical.<sup>9</sup>

- (15) a ?Jan heeft geWERKT pas in die stad  
 John has worked just in that city  
 'John has worked in that city recently'  
 b ?Jan heeft geWERKT gisteren in die stad  
 John has worked yesterday in that city  
 'John has worked in that city yesterday'  
 c \*Jan heeft gewerkt pas in EEN stad  
 John has worked just in one city  
 'John has worked in just one city'

Put differently, the explanation of the ungrammaticality of (15c) is that to get the order [VP-particle-PP], VP must move into [spec,FoP], whereas a numeral-associated interpretation requires movement of PP into [spec,FoP]. These are conflicting requirements.<sup>10</sup>

The proposed analysis correctly derives the other possible orders and their interpretation. The full paradigm is given in (16):

<sup>9</sup> To filter out the numeral-associated interpretation, in (15a) a PP without a numeral has been used. My own judgement is that (15a) is about as good or as bad as (15b), but certainly much better than (15c). However, many informants find (15a-c) equally ungrammatical. But whereas focus on *gewerkt* and comma intonation between *gewerkt* and *pas*, and between *pas* and the PP help to improve (15a,b), these interventions do not help in the case of (15c). Interestingly, a comma intonation effect also shows up in the context of extraposition of more than one PP when the order of the extraposed PPs is not the mirror image of the preverbal order of the PPs. As is shown in section 4.3, the way to derive this is movement of the lowest VP through the respective PPs, which is similar to the way in which (15a) is derived.

<sup>10</sup> The analysis of focus particles developed in chapter 3 also allows adjunction of FoP to the PP that it qualifies:

(i) [VP [PP [FoP maar] [P in [DP een stad]]] [VP gewerkt]]

In such a structure, the lower VP can only move to [spec,FoP], but this movement will not take place since it does not give rise to a qualification relation: there are closer c-commanders than Fo for the trace of VP.

- (16)
- |   |           |                              |                              |                              |          |
|---|-----------|------------------------------|------------------------------|------------------------------|----------|
| a | Jan heeft | [ <sub>FoP</sub> pas]        | [ <sub>PP</sub> in EEN stad] | [ <sub>VP</sub> gewerkt]     | temp/num |
| b | Jan heeft | [ <sub>PP</sub> in EEN stad] | [ <sub>VP</sub> gewerkt]     | [ <sub>FoP</sub> pas]        | temp     |
| c | Jan heeft | [ <sub>FoP</sub> pas]        | [ <sub>VP</sub> gewerkt]     | [ <sub>PP</sub> in EEN stad] | temp/num |
| d | Jan heeft | [ <sub>VP</sub> gewerkt]     | [ <sub>PP</sub> in EEN stad] | [ <sub>FoP</sub> pas]        | temp/num |
| e | Jan heeft | [ <sub>VP</sub> gewerkt]     | [ <sub>FoP</sub> pas]        | [ <sub>PP</sub> in EEN stad] | ?temp    |
| f | Jan heeft | [ <sub>PP</sub> in EEN stad] | [ <sub>FoP</sub> pas]        | [ <sub>VP</sub> gewerkt]     | temp/num |

The table in (17) gives an overview of the respective derivations.

(17)

| Underlying order  | Operations                           | Overt            | Surface order | Inter-pretation        |
|-------------------|--------------------------------------|------------------|---------------|------------------------|
| FoP [VP* PP [VP]] | VP to [spec,PP]<br>VP* to [spec,FoP] | $\neg$<br>$\neg$ | FoP PP VP     | tem-<br>poral<br>(16a) |
| FoP [VP* PP [VP]] | VP to [spec,PP]<br>VP* to [spec,FoP] | $\neg$<br>+      | PP VP FoP     | tem-<br>poral<br>(16b) |
| FoP [VP* PP [VP]] | VP to [spec,PP]<br>VP* to [spec,FoP] | +<br>$\neg$      | FoP VP PP     | tem-<br>poral<br>(16c) |
| FoP [VP* PP [VP]] | VP to [spec,PP]<br>VP* to [spec,FoP] | +<br>+           | VP PP FoP     | tem-<br>poral<br>(16d) |
| FoP [VP* PP [VP]] | VP to [spec,PP]<br>PP to [spec,FoP]  | $\neg$<br>$\neg$ | FoP PP VP     | numeral<br>(16a)       |
| FoP [VP* PP [VP]] | VP to [spec,PP]<br>PP to [spec,FoP]  | $\neg$<br>+      | PP FocP VP    | numeral<br>(16f)       |
| FoP [VP* PP [VP]] | VP to [spec,PP]<br>PP to [spec,FoP]  | +<br>$\neg$      | FoP VP PP     | numeral<br>(16c)       |
| FoP [VP* PP [VP]] | VP to [spec,PP]<br>PP to [spec,FoP]  | +<br>+           | VP PP FoP     | numeral<br>(16d)       |
| FoP [VP* PP [VP]] | VP to [spec,PP]<br>VP to [spec,FoP]  | +<br>+           | VP FoP PP     | tem-<br>poral<br>(16e) |
| PP [VP FoP [VP]]  | VP to [spec,FoP]<br>VP' to [spec,PP] | $\neg$<br>$\neg$ | PP FoP VP     | tem-<br>poral<br>(16f) |

Thus, the proposed analysis captures the possible permutations and their interpretations.<sup>11</sup>

<sup>11</sup> I have added the underlying structure for each case, because (16f) in the temporal interpretation requires a different underlying structure, in which the PP is adjoined higher

In the examples used up to this point, the PP is an adjunct-PP. As is well-known, so called argument-PPs can extrapose as well. The analysis is extendable to argument-PPs on the assumption that argument-PPs are qualifiers (or predicates) of the root of the verb.<sup>12</sup> Though this is an unusual assumption, there is some evidence that this predicative view on "argument-PPs" is correct.<sup>13</sup>

- (18)
- a Jan wacht op Marie  
John waits for Mary
  - b Het wachten is op Marie  
the waiting is for Mary
  - c Opa verhaalde over de oorlog  
Grandpa told about the war
  - d Het verhaal ging over de oorlog  
the story went about the war
  - e Oma betoogde tegen de kruisraketten  
Grandma demonstrated against the cruise missiles
  - f De betoging was tegen de kruisraketten  
the demonstration was against the cruise missiles

The PPs in (18b,d,f) are arguably small clause predicates. For instance, they cannot be extraposed (cf. Hoekstra 1984).<sup>14</sup> The subject of these small clause predicates denotes an event. Semantically speaking, in (18a,c,e) the semantic relation between the event denoted by the verb and the PP is identical to the semantic relation between the subject and the small clause predicate in (18b,d,f). The tentative proposal for "argument-PPs" is that they are base-generated as adjoined to the lowest VP-shell, the head of which is the root in the sense of Hale and Keyser (1993). Thus, after movement of  $VP_{root}$  into [spec,PP], the "argument-PP" is a qualifier (or predicate) of  $VP_{root}$  the event. (FP in (19) is a shorthand notation for the functional

than FoP, an option that is freely available. In such a configuration, the PP will never end up in [spec,FoP], and therefore, only temporal interpretations can be derived from this structure. As (16) shows, a temporal interpretation is always possible. I have not given the other covert/overt combinations for this underlying structure, since they will not yield any new order/interpretation combinations (apart from 16f). Similarly, I did not provide the other covert/overt combinations for the case in which VP moves twice: no new order/interpretation combinations result from this variant.

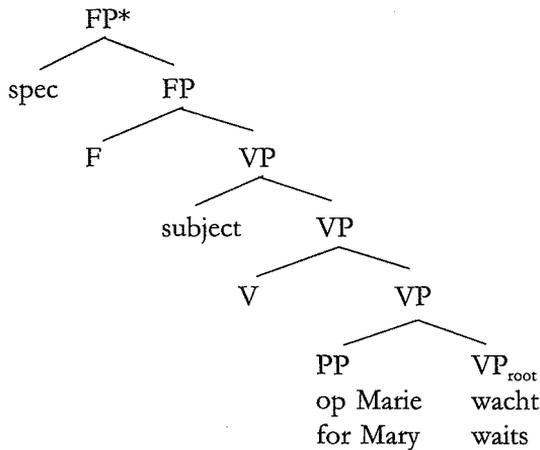
<sup>12</sup> Cf. 2.2.1 for a brief discussion of an analysis that decomposes VP into a verbal part and a non-verbal root, following ideas of Hale and Keyser (1993).

<sup>13</sup> I thank Hans Broekhuis for drawing my attention to these facts.

<sup>14</sup> See section 4.4.2 for discussion.

projections dominating DP.)

(19)



### 4.3 The mirror effect

#### 4.3.1 Introduction

In the preceding section I have shown that a VP-movement analysis of extraposition of an independent PP yields the correct distribution and interpretation of focus particles. In the present section, it is demonstrated that the proposed analysis straightforwardly explains the mirror effect observed in Koster (1974). The sentences in (20)-(22) illustrate the mirror effect. Given are three PPs and a VP. Preverbally, the order is rigidly PP3 PP2 PP1 VP, as in (20a). The sentences in (21) show that other preverbal orders are excluded. PP Extraposition yields seven grammatical orders in addition to (20a): the ones in (20b-f). Thus, out of 24 (4!) logically possible permutations, only 8 are grammatical. The phenomenon is called mirror effect because the order of postverbal PPs is the mirror image of the order of preverbal PPs. The sentence in (20d) shows this for full extraposition (compare (20a)). In the other grammatical sentences in (20), less than three PPs are extraposed; they all obey the mirror image effect. In the eleven ungrammatical orders in (22), either the extraposed PPs do not obey the mirror effect, or the rigid preverbal order is not observed, or both.

- (20) a Hij is [<sub>PP3</sub> door 'n stuurfout] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand]  
 he is [<sub>PP3</sub> by a steering-error] [<sub>PP2</sub> with a bang] [<sub>PP1</sub> on the fence] [<sub>VP</sub> stranded]  
 'He got stranded on the fence with a bang by a steering-error'
- b Hij is [<sub>PP3</sub> door 'n stuurfout] [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek]  
 c Hij is [<sub>PP3</sub> door 'n stuurfout] [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal]  
 d Hij is [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout]  
 e Hij is [<sub>PP3</sub> door 'n stuurfout] [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand] [<sub>PP2</sub> met een knal]  
 f Hij is [<sub>PP2</sub> op het hek] [<sup>VP2</sup> gestrand] [<sub>PP1</sub> met een knal] [<sub>PP3</sub> door een stuurfout]  
 g Hij is [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand] [<sub>PP3</sub> door een stuurfout]  
 h Hij is [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door een stuurfout]
- (21) a \*Hij is [<sub>PP3</sub> door een stuurfout] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand]  
 b \*Hij is [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout] [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand]  
 c \*Hij is [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door een stuurfout] [<sub>VP</sub> gestrand]  
 d \*Hij is [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door een stuurfout] [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand]  
 e \*Hij is [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout] [<sub>VP</sub> gestrand]
- (22) a \*Hij is [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door 'n stuurfout] [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek]  
 b \*Hij is [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand] [<sub>PP3</sub> door 'n stuurfout]  
 c \*Hij is [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door 'n stuurfout] [<sub>VP</sub> gestrand] [<sub>PP2</sub> met een knal]  
 d \*Hij is [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand] [<sub>PP3</sub> door 'n stuurfout] [<sub>PP2</sub> met een knal]  
 e \*Hij is [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand] [<sub>PP3</sub> door 'n stuurfout] [<sub>PP1</sub> op het hek]  
 f \*Hij is [<sub>PP3</sub> door 'n stuurfout] [<sub>VP</sub> gestrand] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek]  
 g \*Hij is [<sub>VP</sub> gestrand] [<sub>PP3</sub> door 'n stuurfout] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek]  
 h \*Hij is [<sub>VP</sub> gestrand] [<sub>PP3</sub> door 'n stuurfout] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal]  
 i \*Hij is [<sub>VP</sub> gestrand] [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door 'n stuurfout] [<sub>PP1</sub> op het hek]  
 j \*Hij is [<sub>VP</sub> gestrand] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door 'n stuurfout]  
 k \*Hij is [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door 'n stuurfout] [<sub>PP2</sub> met een knal]

Koster's explanation of these data, within a transformational generative framework, runs as follows. Dutch is SOV underlyingly. The PPs are base-generated to the left of VP. Dutch has an optional transformation that moves a preverbal PP to postverbal position. In the case of multiple PPs, the rule may apply more than once per cycle and application must start with the leftmost PP. Such an analysis exactly derives the eight grammatical orders and rules out the ungrammatical ones.

However, as was argued in the preceding sections, this analysis faces problems in view of current generative theory which does not allow rightward movement and requires a trigger for each movement. In addition, this analysis cannot capture the distribution of focus particles. The VP-movement analysis was shown to solve these theoretical and empirical problems. Before I show that it also captures the mirror effect, I first want to answer the question as to why the preverbal order of PPs is rigidly PP3 PP2 PP1. The answer to this question will help us to gain a deeper insight into the mirror effect.

### 4.3.2 Semantic interpretation and the order of adjunct-PPs

If the behavior of adjunct-PPs other than the ones in (20)-(22) is taken into account, rigid preverbal linear order appears to be the exception rather than the rule. Usually, variation in the preverbal linear order of PP-adjuncts is possible and corresponds to variation in interpretation. In (23), this is exemplified for a frequency PP, a temporal PP and a locative PP.

- (23) a Jan heeft [<sub>PP3</sub> om de haverklap] [<sub>PP2</sub> in de zomer]  
 John has [<sub>PP3</sub> frequently] [<sub>PP2</sub> in the summer]  
 [<sub>PP1</sub> op Hawaii] [<sub>VP</sub> vakantie gehouden]  
 [<sub>PP1</sub> on Hawaii] [<sub>VP</sub> holidays had]  
 'Frequently, John has had holidays on Hawaii in the summer'
- b Jan heeft [<sub>PP3</sub> om de haverklap] [<sub>PP1</sub> op Hawaii] [<sub>PP2</sub> in de zomer]  
 [<sub>VP</sub> vakantie gehouden]
- c Jan heeft [<sub>PP2</sub> in de zomer] [<sub>PP3</sub> om de haverklap] [<sub>PP1</sub> op Hawaii]  
 [<sub>VP</sub> vakantie gehouden]
- d Jan heeft [<sub>PP2</sub> in de zomer] [<sub>PP1</sub> op Hawaii] [<sub>PP3</sub> om de haverklap]  
 [<sub>VP</sub> vakantie gehouden]
- e Jan heeft [<sub>PP1</sub> op Hawaii] [<sub>PP3</sub> om de haverklap] [<sub>PP2</sub> in de zomer]  
 [<sub>VP</sub> vakantie gehouden]
- f Jan heeft [<sub>PP1</sub> op Hawaii] [<sub>PP2</sub> in de zomer] [<sub>PP3</sub> om de haverklap]  
 [<sub>VP</sub> vakantie gehouden]

The differences between the interpretations of the examples in (23) will become clear when we compare the interpretation of (24a) with that of (24b), or the interpretation of (25a) with that of (25b).

- (24) a Jan heeft [<sub>PP2</sub> in de zomer] [<sub>PP1</sub> op Hawaii] vakantie gehouden  
 'In the summer, John has had holidays on Hawaii'
- b Jan heeft [<sub>PP1</sub> op Hawaii] [<sub>PP2</sub> in de zomer] vakantie gehouden  
 'On Hawaii, John has had holidays in the summer'

The sentence in (24a) says that whenever it was summer, John had his holiday on Hawaii, whereas (24b) says that whenever he was on Hawaii, John had his holidays in the summer. Something similar occurs with the frequency PP and the temporal PP in (25):

- (25) a Jan heeft [<sub>PP3</sub> om de haverklap] [<sub>PP1</sub> in de zomer] vakantie  
gehouden  
'Frequently, John had holidays in the summer'
- b Jan heeft [<sub>PP1</sub> in de zomer] [<sub>PP3</sub> om de haverklap] vakantie  
gehouden  
'In the summer, John had holidays frequently'

The different meanings of the sentences in (23) can now be computed from the semantic effects of the different PP-orderings in (24)-(25).

The behavior of the PPs in (23) is exemplary for adjunct-PPs. This suggests that adjunct-PPs may be base-generated freely in preverbal position. If so, why is it that the PPs in (20a) require a rigid PP3 PP2 PP1 order preverbally? The reason appears to be that the qualification relations provided by the syntax, in combination with the lexical meaning of the PPs involved, may cause difficulties in interpretation, as e.g. (26b) shows:

- (26) a Jan heeft om het uur gedurende een minuut gezwommen  
John has about the hour during one minute swum  
'Every other hour John has swum for a minute'
- b Jan heeft gedurende een minuut om het uur gezwommen  
John has during one minute about the hour swum  
#'For a minute John has swum every other hour'

In (26a) *gedurende een minuut gezwommen* 'swum for a minute' denotes a set of one-minute-swim events and the higher qualifier *om het uur* 'every hour' takes the subset of this set for which it is true that there is a time span of one hour between every one-minute-swim event. The interpretive instruction that (26b) gives is to take first the set of moments for which *Jan heeft om het uur gezwommen* 'John has swum every other hour' is true and then take a subset of this set, i.e. an interval of one minute for which it is true that John has swum every other hour. This subset is empty: for 'John has swum every other hour' to be true, an interval longer than one hour is needed, a one minute interval is too short.

More abstractly, a VP denotes a set A of events, the lowest PP-adjunct that qualifies VP takes a subset B of A, the next PP-adjunct takes a subset C of B and so on. If we end up with an empty set, as in (26b), the interpretation does not make sense. This makes the sentence neither ungrammatical nor uninterpretable. For (26b), we can think of a pragmatic context that makes it interpretable. Suppose John has a discussion in which he claims that he has swum every other hour, and he believes in his own claim. His discussion partners successfully refute this claim within one minute, such that John himself does not believe it anymore. The sentence

in (26b) can then be used to evaluate the discussion, in which case it means: for one minute, it has been true in John's world of beliefs that he has swum every other hour. Thus, what a hearer does to make a sentence such as (26b) interpretable is to look for an alternative world in which 'swimming every other hour' can be true for one minute.

By the inclusion relations that qualifying PPs impose, we can better understand why (20a) seemingly is the only well-formed preverbal order: the most natural way to take subsets from sets in (20) is to take the set of stranding-events A, select the subset B of A that are stranding against the fence-events, then select the subset C of B that are stranding against the fence events that occurred with a bang and then select the subset D of C of stranding with a bang against the fence events that were caused by John making a steering-error.

However, this is only the most **natural** way, i.e. the other ways are not entirely impossible. Thus, if a context is provided with a set A of stranding-with-a-bang events, a subset B may be taken of stranding-with-a-bang-events against the fence. Exactly in such a context the preverbal linear order of PP1 and PP2 may be reversed: *Jan is tegen het HEK met een knal gestrand, (en Marie tegen de MUUR)* 'John has stranded on the FENCE with a bang (and Mary on the WALL)'.<sup>7</sup>

A similar story holds for adjectival modification in DPs. Inclusion makes (27a) the unmarked and (27b) the marked order:

- (27) a de geblesseerde getackelde spelers  
the injured tackled players  
b de getackelde geblesseerde spelers  
the tackled injured players

In (27a), the interpretive instruction is to take a set of tackled players A and select from this set the subset B of players that are injured. Put differently, for an x to be a member of the set of injured tackled players, x must be a tackled player. The implication here is: if x is an injured player, then he has been tackled. Such an implication is easily interpreted as a causal relation, where the consequent is the cause of the antecedent. Compare the implication "if someone had disease y, he had been eating onions". If such an implication is found in medical research, the hypothesis will be that eating onions causes disease y. Not surprisingly, (27a) has as its most salient interpretation one where the state of being injured is caused by being tackled.

In (27b), on the other hand, the instruction is to take a set of injured players and select the subset of injured players that have been tackled. In other words, for x to be a member of the set of tackled players, x must be injured. Since in a healthy view of the world, being injured is not a natural

cause of being tackled, no causative interpretation of the implication is available, and we tend to interpret (27b) as contrastive, i.e. as taking the subset of injured players that has been tackled, implying that there is another subset of players that are injured but have not been tackled. Another inclusion effect is found in (28):

- (28) a de mooie rode auto's  
       the beautiful red cars  
       b de rode mooie auto's  
       the red beautiful cars

The interpretation of (28a) is: take the set A of cars, of that set take the subset B of red cars and then take the subset C of B, the beautiful red cars. In this interpretation, for a car to be beautiful it must be red, which captures the intuition that in order to call something beautiful one must first know certain properties of it that are relevant for beauty. Examples of the type (28b) have often been judged ungrammatical (cf. Sproat & Shih 1988) for other languages. My intuition is that they are not ungrammatical: their markedness has to do with our preference to first reduce the set of cars by adding properties relevant for beauty and then add the predicate *mooi* 'beautiful'. (28b) is fine with contrastive stress on *rode* 'red' under the following interpretation: given in the discourse context is a set of beautiful cars, and of those beautiful cars, we select the subset of cars that are red.<sup>15</sup> This interpretation of (28b) implies that here a red color is irrelevant for the beauty of the car, since in the set of beautiful cars selected first, cars with all kinds of colors should be present. This is what makes (28b) marked.

Given these considerations, the generalization appears to be that adjunct-PPs may be freely base-generated preverbally. Different linear orders of PPs reflect different qualification relations and therefore different interpretations. Does this mean that the orderings in (20b-f), i.e. the grammatical orders resulting from PP-X, are not transformationally related to the ordering in (20a), but also base-generated? The answer is no. The difference between (20) on the one hand and (21) and (22) on the other is that in (20) all alternative orderings have the same interpretation, that of (20a), whereas in (21) and (22) a different ordering corresponds to a different interpretation.

<sup>15</sup> Notice that there are languages in which adjectives in DPs show a mirror effect very similar to the one found with adjunct PPs at the sentence level. Thus, in a language like Modern Greek, that allows prenominal and postnominal adjectives, ordering restrictions prenominally are the mirror image of ordering restrictions postnominally (cf. Androutsopoulou 1994). It is likely that these phenomena can be analyzed in the way proposed here for PP-adjunctions.

That this is so is shown in (29), where preverbal permutation of PPs is compared with PP-X. Whereas (29b) loses the interpretation of (29a), and (29e) loses the interpretation of (29d), the extraposition sentences (29c,f) retain the interpretation of (29a) and (29b), respectively.

- (29)
- a Jan heeft in de zomer op Hawaii vakantie gehouden  
John has in the summer on Hawaii holidays held  
'In the summer, John has had his holidays on Hawaii'
  - b Jan heeft op Hawaii in de zomer vakantie gehouden  
John has on Hawaii in the summer holidays held  
'On Hawaii, John has had his holidays in the summer'
  - c Jan heeft in de zomer vakantie gehouden op Hawaii  
John has in the summer holidays held on Hawaii  
'In the summer, John has had his holidays on Hawaii'  
'On Hawaii, John has had his holidays in the summer'
  - d Jan heeft om het uur gedurende een minuut gezwommen  
John has about the hour during a minute swum  
'Every other hour, John has swum for a minute'
  - e Jan heeft gedurende een minuut om het uur gezwommen  
John has during a minute about the hour swum  
'For one minute, John has swum every other hour'
  - f Jan heeft gedurende een minuut gezwommen om het uur  
John has during one minute swum about the hour  
'Every other hour, John has swum for a minute'  
'For one minute, John has swum every other hour'

The sentence in (29c) is ambiguous between the interpretation of (29a) and (29b), as expected, since linear order does not show any difference between (29c) being derived syntactically from (29a) or from (29b). Disambiguation is possible with a stranded focus particle: in (30b,d) only the interpretation of (29a) (modulo the focus particle) is available, where the PP [in the summer] is the highest predicate. The focus particle indicating the base-position of the extraposed PP is responsible for the disambiguation.

- (30) a Jan heeft in de zomer maar op EEN eiland vakantie gehouden  
 John has in the summer only on one island holidays held  
 'In the summer, John has had his holidays on only one island'
- b Jan heeft in de zomer maar vakantie gehouden op EEN eiland  
 John has in the summer only holidays held on one island  
 'In the summer, John has had his holidays on only one island'
- c Jan heeft maar in EEN zomer op Hawaii vakantie gehouden  
 John has only in one summer on Hawaii holidays held  
 'Only in one summer, John has had his holidays on Hawaii'
- d Jan heeft maar op Hawaii vakantie gehouden in EEN zomer  
 John has only on Hawaii holidays held in one summer  
 'Only in one summer, John has had his holidays on Hawaii'

Thus, the permutations resulting from PP-X all have the same interpretation, whereas permutations not resulting from extraposition do not. If the PSI is correct, syntactic structure should establish identical qualification relations for the permutations that result from PP-X.

#### 4.3.3 A VP-movement analysis of the mirror effect

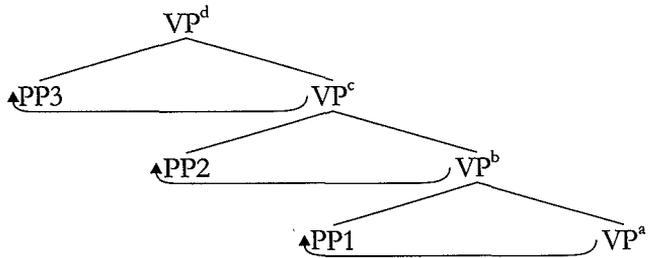
Under a VP-movement analysis, the qualification relations established in extraposition contexts are indeed identical. Let me first show how the orderings of (20b-f), repeated below, can be derived from (20a) in the VP-movement analysis.

- (20) a Hij is [<sub>PP3</sub> door 'n stuurfout] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand]  
 he is [<sub>PP3</sub> by a steering-error] [<sub>PP2</sub> with a bang] [<sub>PP1</sub> on the fence] [<sub>VP</sub> stranded]  
 'He got stranded on the fence with a bang by a steering-error'
- b Hij is [<sub>PP3</sub> door 'n stuurfout] [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek]
- c Hij is [<sub>PP3</sub> door 'n stuurfout] [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal]
- d Hij is [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout]
- e Hij is [<sub>PP3</sub> door 'n stuurfout] [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand] [<sub>PP2</sub> met een knal]
- f Hij is [<sub>PP2</sub> op het hek] [<sub>VP2</sub> gestrand] [<sub>PP1</sub> met een knal] [<sub>PP3</sub> door een stuurfout]
- g Hij is [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>VP</sub> gestrand] [<sub>PP3</sub> door een stuurfout]
- h Hij is [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand] [<sub>PP1</sub> op het hek] [<sub>PP3</sub> door een stuurfout]

Assume that the relevant part of the base-structure of (20a) is as in (31):<sup>16</sup>

<sup>16</sup> Notice that I assume multiple adjunction to be possible, in contradistinction to Kayne (1994); cf. chapter 2 for discussion and relevant definitions.

(31)

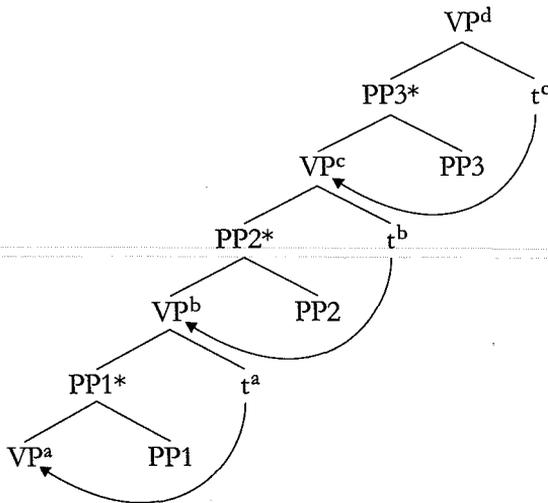


PP3 is a qualifier of  $VP^c$ :  $[PP2[PP1[VP^a]]]$ . PP2 is a qualifier of  $VP^b$ :  $[PP1[VP^a]]$ . PP1 is a qualifier of  $VP^a$ . At the level of interpretation LF, the configuration should determine a qualification relation between  $VP^a$  and PP1, between  $VP^b$  and PP2 and between  $VP^c$  and PP3. These qualification relations come into existence by movement of each VP-segment into the specifier of the PP that is adjoined to it. So the qualification relations to be established require the movement operations in (32):

- (32) (i) PP1 is a qualifier of  $VP^a$ :  $VP^a$  moves into [spec,PP1]  
 (ii) PP2 is a qualifier of  $VP^b$ :  $VP^b$  moves into [spec,PP2]  
 (iii) PP3 is a qualifier of  $VP^c$ :  $VP^c$  moves into [spec,PP3]

The structure resulting from the operations in (32) is as in (33):

(33)



(linear order: VP PP1 PP2 PP3)

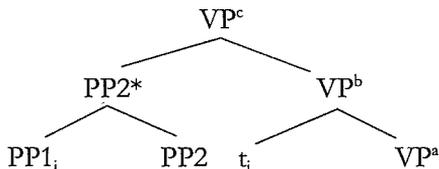
This is the structure that must be available at LF. If each step of (32) occurs overtly, the linear order in (20d) is derived. If one or more of the steps in (32) occur covertly, the other orders of (20) are derived. The table in (34) gives an overview.

## (34) Interpretation preserving permutations of PP3 PP2 PP1 VP

| Linear order   | Operations                                                                                            | Overt       |
|----------------|-------------------------------------------------------------------------------------------------------|-------------|
| PP3 PP2 PP1 VP | VP <sup>a</sup> into [spec,PP1]<br>VP <sup>b</sup> into [spec,PP2]<br>VP <sup>c</sup> into [spec,PP3] | ¬<br>¬<br>¬ |
| PP3 PP2 VP PP1 | VP <sup>a</sup> into [spec,PP1]<br>VP <sup>b</sup> into [spec,PP2]<br>VP <sup>c</sup> into [spec,PP3] | +<br>¬<br>¬ |
| PP3 VP PP1 PP2 | VP <sup>a</sup> into [spec,PP1]<br>VP <sup>b</sup> into [spec,PP2]<br>VP <sup>c</sup> into [spec,PP3] | +<br>+<br>¬ |
| VP PP1 PP2 PP3 | VP <sup>a</sup> into [spec,PP1]<br>VP <sup>b</sup> into [spec,PP2]<br>VP <sup>c</sup> into [spec,PP3] | +<br>+<br>+ |
| PP1 VP PP2 PP3 | VP <sup>a</sup> into [spec,PP1]<br>VP <sup>b</sup> into [spec,PP2]<br>VP <sup>c</sup> into [spec,PP3] | ¬<br>+<br>+ |
| PP2 PP1 VP PP3 | VP <sup>a</sup> into [spec,PP1]<br>VP <sup>b</sup> into [spec,PP2]<br>VP <sup>c</sup> into [spec,PP3] | ¬<br>¬<br>+ |
| PP2 VP PP1 PP3 | VP <sup>a</sup> into [spec,PP1]<br>VP <sup>b</sup> into [spec,PP2]<br>VP <sup>c</sup> into [spec,PP3] | +<br>¬<br>+ |
| PP3 PP1 VP PP2 | VP <sup>a</sup> into [spec,PP1]<br>VP <sup>b</sup> into [spec,PP2]<br>VP <sup>c</sup> into [spec,PP3] | ¬<br>+<br>¬ |

All other conceivable movement operations within this domain either (i) change the qualification relations existing in (20a), or (ii) do not establish a qualification relation. As an example of the first case, suppose PP1 moves to [spec,PP2] in overt syntax, yielding the ungrammatical linear order in (35a) and the partial structure in (35b):

- (35) a \*PP3 PP1 PP2 VP (=21a)  
 b \*Hij is [<sub>PP3</sub> door een stuurfout] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>VP</sub> gestrand]  
 c

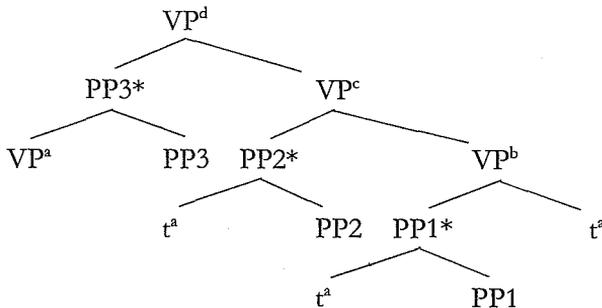


In (35c), PP1 immediately c-commands PP2, and PP2 immediately c-commands  $t_i$ . This configuration defines PP2 as a qualifier of PP1. As a result, PP2 cannot be made interpretable as a qualifier of  $VP^b$  anymore: to achieve this,  $VP^b$  would have to move into [spec,PP2], which is already occupied. Thus, the movement operation in (35b) does not establish the qualification relations of (20a). In addition, it defines PP2 *met een knal* as a qualifier of PP3 *op het hek*. There does not seem to be a sensible interpretation of the qualification relation between these two PPs.

As for the second case, if a movement operation does not establish a qualification relation at all, it does not occur, since there is no other trigger for movement within this domain. An example would be to move  $VP^a$  to [spec,PP3] in one fell swoop, deriving the ungrammatical linear order (22g),  $VP^a$  PP3 PP2 PP1. This movement does not yield a qualification relation: there is no triple  $\{VP^a, PP3, t^a\}$  such that  $VP^a$  immediately c-commands PP3 and PP3 immediately c-commands  $t^a$ . Whereas the former immediate c-command relation is there after movement, the trace of  $VP^a$  is too low. In this way, all other movements that skip a potential landing-site are excluded.

Finally, what about successive cyclic movement of  $VP^a$  via the respective [spec,PP]s? If that is possible, we would still be able to derive the order  $VP^a$  PP3 PP2 PP1. We did not find anything yet that excludes such a successive cyclic movement. Assuming that it is allowed, we can show that although every step of successive cyclic movement yields a qualification relation, these qualification relations are not identical to the one in (20a):

(36)



In (36), the trace in [spec,PP1] immediately c-commands PP1, and PP1 immediately c-commands  $t^a$ . Thus PP1 qualifies  $VP^a$ . The trace in [spec,PP2] immediately c-commands PP2, and PP2 immediately c-commands the trace in [spec,PP1]. Thus, PP2 qualifies  $VP^a$ . Similarly, PP3 qualifies  $VP^a$ . So the difference between (20a) and (36) is that whereas in (20a) each PP qualifies the entire segment that it is a sister of, in (36) each PP qualifies just the smallest segment  $VP^a$ . It could be that this configuration corresponds to a sentence such as (37), with comma intonation preceding each PP:

- (37) Jan is gestrand, door een stuurfout, met een knal, tegen het hek  
 John is stranded, by a steering-error, with a bang, against the fence

With comma intonation, the order of PPs is irrelevant and it really seems to be the case that each PP qualifies just the VP. Recall that we found a similar case with *pas* in section 4.2, *Jan heeft gewerkt, pas, in die stad* 'John has worked, recently, in that city'.

In sum, the PSI correctly defines the movement operations and linear orders given in (34) as preserving the qualification relations of (20a), it defines other movement operations as yielding qualification relations different from the ones in (20a), and it rules out movement operations that do not yield qualification relations. No construction specific stipulations are necessary to derive the mirror effect, and the antisymmetric assumptions that all movement and adjunction is leftward can be maintained.

#### 4.4 More evidence for the VP-movement analysis

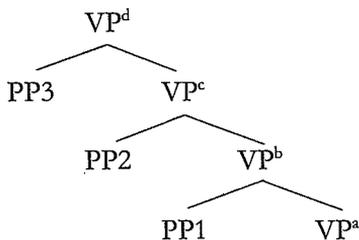
##### 4.4.1 VP Topicalization

In this section it is shown that topicalization of a VP that includes one or more PPs can occur only if it preserves the possibility to establish the required qualification relations. The VP-movement analysis of PP-X makes

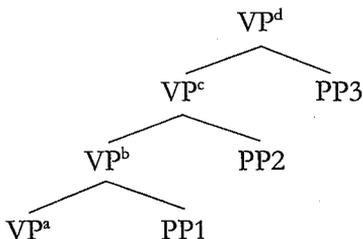
the correct predictions, whereas the facts are unexpected under a base-generation or rightward movement analysis.

Assuming as before that the basic structure is as in (38), the structure of full extraposition is as in (39) both in the base generation analysis and in the rightward movement analysis. In the VP-movement analysis, full extraposition corresponds to the structure in (40).

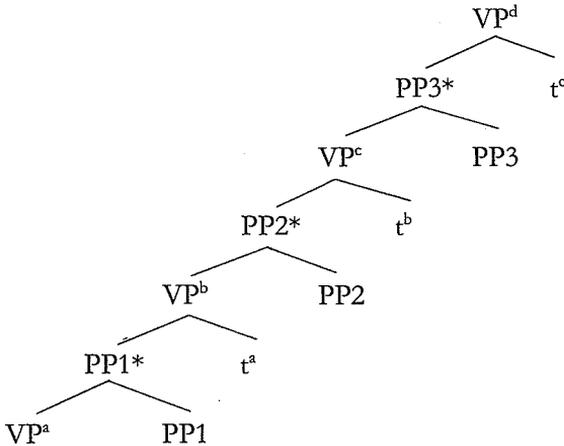
(38) Structure of non-extrapolated order



(39) Structure of extrapolated order in rightward movement/base generation analyses



## (40) Structure of extraposed order in VP-movement analysis



The rightward movement and base-generation analyses assume that extraposition is optional. The prediction then is that from (38),  $VP^a$ ,  $VP^b$ ,  $VP^c$  and  $VP^d$  may all be topicalized, given that VP or VP including an adjunct-PP may normally be topicalized:

- (41) a  $[_{VP} \text{Stranden}]_i$  zal Jan niet op het hek  $t_i$   
 strand will John not on the fence
- b  $[_{VP} [_{PP} \text{Op het hek}] [_{VP} \text{stranden}]]_i$  zal Jan niet  $t_i$   
 on the fence strand will John not

For the VP-movement analysis, (38) is only the basic structure. At LF, the structure must be as in (40) in order to get the required qualification relations. Thus, if the linear order is PP3 PP2 PP1 VP, (40) is derived by covert movement. Under this analysis, the prediction is that topicalization of a constituent from (38) is only possible if after topicalization the qualification relations in (40) are still derivable. In other words, we expect topicalization to be possible only in those cases in which either all relevant qualification relations are realized before topicalization (as in (40)), or the qualification relations that are lacking in overt syntax can still be realized in covert syntax.

For instance,  $VP^a$  topicalization from (38) should not be possible: such a topicalization must either proceed via the specifier positions of the successive PPs or in one fell swoop. As was already demonstrated, in the first case,  $VP^a$  or its trace would be the immediate c-commander of each PP, such that each PP would be a qualifier of  $VP^a$ . No qualification relation between PP2 and  $VP^b$ , and between PP3 and  $VP^c$  would be created. This

does not yield the same semantic interpretation as (40). In the second case, VP<sup>a</sup>-topicalization in one fell swoop, PP1 would not be interpretable as a qualifier of VP<sup>a</sup>.<sup>17</sup>

For similar reasons, the VP-movement analysis predicts that topicalization of [<sub>VPb</sub> [PP1 VP<sup>a</sup>]] from (38) is impossible. Topicalization of [<sub>VPc</sub> [PP2 VP<sup>b</sup> [PP1 VP<sup>a</sup>]]], on the other hand, should be possible if this proceeds via [spec,PP3]: this step would turn PP3 into a qualifier of VP<sup>c</sup>, as required (cf. (40)), and the other qualification relations can still be established covertly after topicalization: VP<sup>a</sup> moves to [spec,PP1] covertly, VP<sup>b</sup> moves to [spec,PP2] covertly). Also, topicalization of the entire VP<sup>d</sup> should be possible, since all qualification relations may be established covertly.

Only the VP-movement analysis makes the correct predictions:

- (42) a \* [<sub>VPa</sub> Stranden] zal Jan niet [<sub>PP3</sub> door een stuurfout] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek]<sup>18</sup>  
 b \* [<sub>VPb</sub> [<sub>PP1</sub> op het hek] [<sub>VPa</sub> stranden]] zal Jan niet [<sub>PP3</sub> door een stuurfout] [<sub>PP2</sub> met een knal]  
 c [<sub>VPc</sub> [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>VPa</sub> stranden]] zal Jan niet [<sub>PP3</sub> door een stuurfout]  
 d [<sub>VPd</sub> [<sub>PP3</sub> door een stuurfout] [<sub>PP2</sub> met een knal] [<sub>PP1</sub> op het hek] [<sub>VPa</sub> stranden]] zal Jan niet

As for topicalization from the extraposed order VP<sup>a</sup> PP1 PP2 PP3, the base-generation and rightward movement analyses predict that topicalization of VP<sup>a</sup>, VP<sup>b</sup>, VP<sup>c</sup> and VP<sup>d</sup> from (39) is possible. The VP-movement analysis predicts the same, since in (40) the required qualification relations are already established, i.e. before topicalization. As (43) shows, all of these topicalizations are possible indeed:

- (43) a [<sub>VPa</sub> Stranden] zal Jan niet [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout]  
 b [<sub>VPb</sub> [<sub>VPa</sub> Stranden] [<sub>PP1</sub> op het hek]] zal Jan niet [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout]  
 c [<sub>VPc</sub> [<sub>VPa</sub> Stranden] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal]] zal Jan niet [<sub>PP3</sub> door een stuurfout]  
 d [<sub>VPd</sub> [<sub>VPa</sub> Stranden] [<sub>PP1</sub> op het hek] [<sub>PP2</sub> met een knal] [<sub>PP3</sub> door een stuurfout]] zal Jan niet

<sup>17</sup> Unless the theory allows covert movement of the copy of the topicalized VP<sup>a</sup> to [spec,PP1].

<sup>18</sup> If comma intonation is imposed between the different PPs, the sentence is grammatical according to my judgement, and the PPs are interpreted independently, exactly as predicted.

Thus, the contrast between (42a) and (43a), and the contrast between (42b) and (43b), are explained by the VP-movement analysis, and completely mysterious under the other analyses. In (42) and (43), only topicalization from non-extraposed or fully extraposed orders is tested. Other contrasts show up when topicalization takes place from partial extraposition structures. I will not demonstrate this here, but in this case as well, the VP-movement analysis explains these contrasts, whereas the other analyses do not. An important conclusion of this subsection is that the topicalization data show that VP-movement is obligatory: if it were optional, there would be no explanation for the contrasts just mentioned.

#### 4.4.2 Why small clause predicates do not extrapose

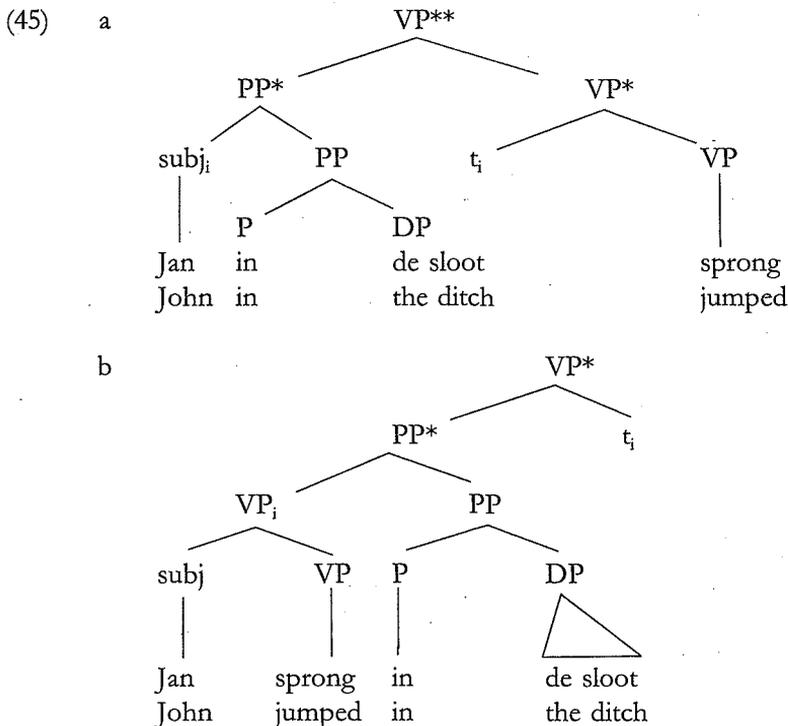
The VP-movement analysis provides a straightforward explanation for the observation (cf. Hoekstra 1984) that PPs that are small clause predicates cannot extrapose. An example of this observation is given in (44) (loc. PP = locative PP; SC = small clause PP).

- (44) a Hij weet dat Jan [<sub>PP</sub> in de sloot] sprong  
 He knows that John in the ditch jumped  
 I. 'He knows that John was jumping in the ditch' Loc. PP  
 II. 'He knows that John jumped into the ditch' SC PP
- b Hij weet dat Jan sprong [<sub>PP</sub> in de sloot]  
 He knows that John jumped in the ditch  
 I. 'He knows that John was jumping in the ditch' Loc. PP  
 II. #'He knows that John jumped into the ditch' SC PP
- c Hij weet dat Jan de kopjes [<sub>PP</sub> op tafel] zette  
 He knows that John the cups on table put
- d \*Hij weet dat Jan de kopjes zette [<sub>PP</sub> op tafel]  
 He knows that John the cups put on table

In (44a), in the small clause interpretation (II), the PP *in de sloot* is a qualifier (or predicate) of the DP *Jan*: John is in the ditch as a result of the jumping event. In the other interpretation, the PP is a qualifier of the VP: the entire event of John's jumping takes place in the ditch. In (44b), only the interpretation in which PP is a qualifier of the jumping event is possible. In (44c), the PP can only be a small clause predicate because the verb *zetten* requires a small clause complement. As (44d) shows, extraposition of such a small clause PP makes the sentence ungrammatical.

This state of affairs is precisely what the VP-movement analysis predicts. For the PP to qualify the VP, i.e. the event, VP must move into [spec,PP].

For the PP to be a qualifier (or predicate) of the subject, the subject must be in the specifier of PP at some level. The relevant structures are given in (45):<sup>19</sup>



In (45a), VP\* cannot move into [spec,PP], since the subject occupies that position. This explains why (44d) is ungrammatical. In (45b), VP<sub>i</sub> has moved into [spec,PP] overtly, hence PP cannot be a small clause predicate. This explains why overt PP-X, as in (44b) disambiguates the PP. Finally, (44a) is ambiguous because it does not give any indication as to which constituent is in [spec,PP]. The subject may have been in this position before moving up to the specifier of a functional projection. Alternatively, the VP may move into [spec,PP] in covert syntax.

<sup>19</sup> There may be another way to establish the predicative relation between the small clause PP and the subject: the subject may be base-generated in [spec,PP] and move to an AGRP-projection. This is irrelevant for the point to be made here: if the subject must be in [spec,PP] at some level, the VP cannot move into it.

#### 4.5 Extraposition of a dependent PP

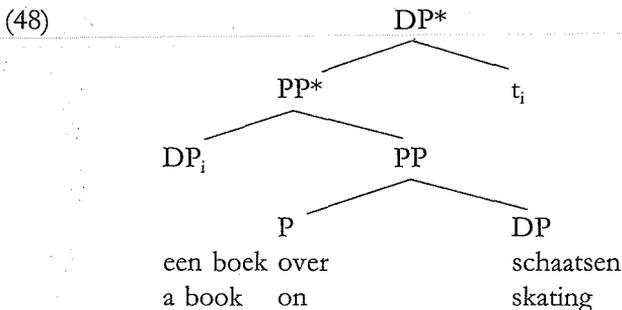
In this section, the VP-movement analysis of PP-X is extended to extraposition of a dependent PP, i.e. a PP that does not qualify VP but a DP. The sentence in (47b) is an example of extraposition of a dependent PP.

- (47) a Jan heeft [[<sub>DP</sub> een boek] [<sub>PP</sub> over schaatsen]] gekocht  
 John has a book on skating bought  
 'John has bought a book on skating'  
 b Jan heeft [<sub>DP</sub> een boek] gekocht [<sub>PP</sub> over schaatsen]  
 John has a book bought on skating

In (47), PP qualifies the DP *een boek*: the book is on skating.

##### 4.5.1 PP as a qualifier of DP

If the PSI is correct, a qualification relation between a DP and a PP must be configurationally defined. At LF, DP must immediately c-command PP and PP must immediately c-command the trace of DP. There are potentially two underlying structures from which such a configuration can be derived: the PP is base generated as an adjunct to DP, or the PP is base generated as an adjunct to some XP that contains DP. After movement of DP into [spec,PP], DP immediately c-commands PP and PP immediately c-commands the trace of DP. The relevant LF-configurations are given in (48) and (49):<sup>20</sup>



<sup>20</sup> The idea that a DP and an interpretively associated PP are base-generated discontinuously is not new: it has been proposed by Bach and Horn (1976) and by Rochement and Culicover (1990).



- (51) a Jan zou *maar* [<sub>DP</sub> een stukje] [<sub>PP</sub> van EEN taart] willen  
 John would just a piece of one cake want  
 'John would want a piece of just one cake'  
 b \*Jan zou [<sub>DP</sub> een stukje] *maar* [<sub>PP</sub> van EEN taart] willen  
 John would a piece just of one cake want

The explanation is the same as in the case of independent PP-X. When a FoP is added to (49), we get (52) as the structure of (51a). DP has moved into [spec,DP], such that PP is interpretable as a qualifier of DP. At LF, the entire PP moves into [spec,FoP], such that Fo is interpretable as a qualifier of PP.

- (52) [<sub>XP</sub> [<sub>FoP</sub> *maar*] [<sub>XP</sub> [<sub>PP</sub> [<sub>DP</sub> een stukje]<sub>i</sub> [<sub>PP</sub> van EEN taart]] [<sub>XP</sub> ...<sub>t<sub>i</sub></sub>...]]]

The sentence in (51b) is the result of moving DP overtly into [spec,FoP] in (52) (instead of PP covertly):

- (53) \*[[<sub>XP</sub> [<sub>FoP</sub> [<sub>DP</sub> een stukje]<sub>i</sub> [<sub>Fo</sub> *maar*]] [<sub>XP</sub> [<sub>PP</sub> <sub>t<sub>i</sub></sub> [<sub>PP</sub> van EEN taart]] [<sub>XP</sub>...<sub>t<sub>i</sub></sub>...]]]

It can be shown that in this structure, DP in [spec,FoP] immediately c-commands Fo, and Fo immediately c-commands the trace of DP in [spec,PP]. Thus, the structure defines *maar* as a qualifier of the DP instead of the PP. The reason why (51b) is out is that *maar* requires a semantic argument that denotes a linear ordering: the DP *een stukje* does not denote a linear ordering.<sup>22</sup> The immediate prediction is that if DP does denote a linear ordering, the structure in (53) should be good. This prediction is correct:

- (54) Jan zou EEN stukje maar van die taart willen  
 John would one piece just of that cake want  
 'John would want just one piece of that cake'

The facts in (51),(54) are clear evidence that a DP must move into the specifier of a PP that qualifies it. At first sight, this analysis is incompatible with a VP-movement analysis of extraposition of a dependent PP: if DP

<sup>22</sup> The parallel with VP moving into [spec,FoP] is that the focus particle receives a temporal interpretation (cf. section 4.2):

- (i) Jan heeft gewerkt pas in die stad  
 John has worked just in that city  
 'John has recently worked in that city'

must move into the specifier of a qualifying PP, then VP cannot move into the same specifier. In the next subsection, it is argued that it is not VP but AgrP that moves into [spec,PP] in case of extraposition of a dependent PP.

Before closing this section, I want to come back to a contrast discussed in section 2.1.3:

- (55) a [PP Aan niemand] heeft Jan ook maar EEN keer steun gehad  
to nobody has John even only one time help had  
'Nobody has been a help to John a single time'
- b \*[DP steun [PP aan niemand]] heeft Jan ook maar EEN keer  
help to nobody has John even only one time  
gehad  
had  
'Nobody has been a help to John a single time'

Whereas *niemand* within the PP licenses the polarity item *ook maar EEN keer* in (55a), it does not license this polarity item in (55b). For ease of exposition (cf. footnote 1 of chapter 2) the traditional analysis of the constituent [DP steun aan niemand] was adopted in section 2.3.1, in which the PP *aan niemand* 'to nobody' is a complement of the noun *steun* 'help'. The embedding of the PP in DP was held responsible for the fact that the DP *niemand* cannot c-command out of PP in (55b).

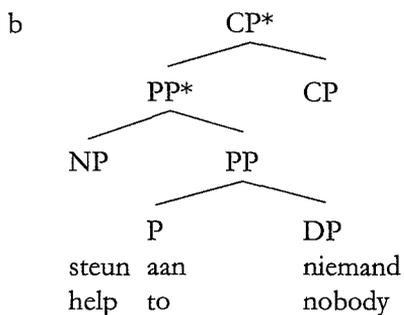
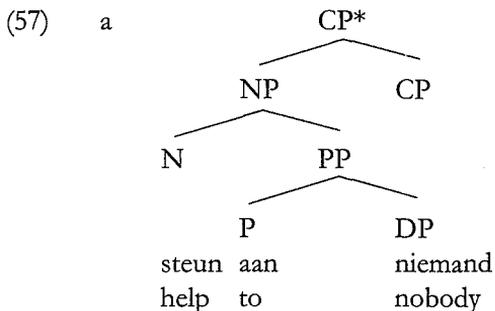
In view of the discussion above of PPs interpretively associated with a DP, in which DP moves into the specifier of an immediately c-commanding PP, the analysis of PP being a complement of the noun *steun* in (55b) cannot be maintained. Focus particles show the same behavior in N + PP contexts. A focus particle can take a postnominal numeral-containing PP as its semantic argument (56a), but the focus particle cannot occur between the noun and the PP (56b).

- (56) a Jan heeft *maar* [N steun] [PP aan EEN meisjē] gehad  
John has only help to one girl had  
'Only one girl has been a help to John'
- b \*Jan heeft [N steun] *maar* [PP aan EEN meisjē] gehad  
John has help only to one girl had

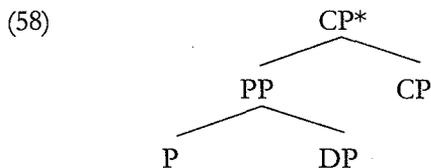
We find similar effects in Adjective+PP context such as *trots op Marie* 'proud of Mary'. This suggests that these cases must receive an analysis like (52) as well: NP or AP moves into [spec,PP].

Changing the analysis of these cases has no consequences for the definition of c-command developed in chapter 2. It can be shown that this definition of c-command correctly predicts the contrast in (55). The relevant

structure of the analysis in chapter 2 is given in (57a), the new structure is given in (57b).

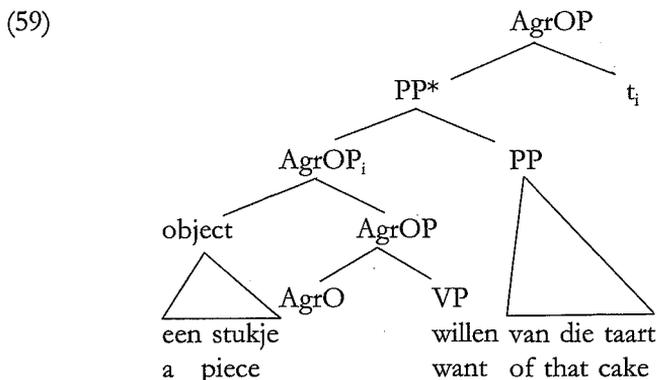


For the DP *niemand* to c-command CP or a constituent dominated by CP, there must be a connected path of left branches from CP\* to DP. However, there is no such connected path of left branches. In (57a), DP cannot connect to the path {CP\*,NP,N}, since the node PP is intervening. In (57b), DP cannot connect to the path {CP\*,PP\*,NP} since PP is intervening. On the other hand, when there is just a PP in [spec,CP], c-command out of PP is possible, since in that case there is no node intervening between the path of left branches {CP\*,PP,P} and DP.



### 4.5.2 An AgrP-movement analysis of dependent PP Extraposition

Suppose that XP in the structure in (49) is AgrOP and that a segment of AgrOP moves into [spec,PP]:



In (59), AgrOP<sub>i</sub> immediately c-commands PP and PP immediately c-commands t<sub>i</sub>. Thus, PP must be interpreted as a qualifier of AgrOP. AgrO has the same  $\phi$ -features as the object. Assuming that these  $\phi$ -features are relevant for interpretation and therefore are not deleted by checking operations, we can say that AgrOP has the same index as the object. Hence, by moving AgrOP into [spec,PP], the PP comes to qualify the object. Since movement operations of the type under discussion may also occur in covert syntax, we find sentences such as (60) in which the qualifying PP precedes the DP that is its semantic argument. Here, AgrOP moves into [spec,PP] in covert syntax.<sup>23</sup>

- (60) Jan zou [<sub>PP</sub> van EEN taart] [<sub>AgrOP</sub> [<sub>DP</sub> een stukje] willen]  
 John would of one cake a piece want  
 'John would like to have a piece of one cake'

The difference between PP being a qualifier of the AgrOP instead of just the object-DP should not remain without semantic consequences. In the

<sup>23</sup> According to the diagnostic of stranded focus particles, the order PP DP is not derived by movement of PP from a position following DP, as (ib) shows.

- (i) a Jan zou [<sub>PP</sub> van EEN taart] [<sub>DP</sub> een stukje] willen  
 John would of one cake a piece want  
 b \*Jan zou [<sub>PP</sub> van EEN taart] [<sub>DP</sub> een stukje] *maar* willen  
 John would of one cake a piece just want

first case, VP is part of AgrOP such that PP in principle is also qualifying VP. More precisely, in (59) the PP is qualifying *een stukje* 'a piece' in its state of being wanted. It is to be expected that PP imposes restrictions on the kinds of verbs that may occur in this construction. In particular, if a PP can not possibly be interpreted as a qualifier of VP, the sentence should be bad.

- (61) a \*Jan heeft een afspraak geschonden met Marie  
 John has an agreement violated with Mary  
 'John has violated an agreement with Mary'  
 b \*Jan heeft een brief verscheurd aan de koning  
 John has a letter teared to the king  
 'John has teared up a letter to the king'

It has often been observed that the verbal predicate has its influence on the possibility of PP-X. It has been claimed that PP-X from subject DP varies with the kind of verbal predicate (Guéron 1980). It has been argued (Coopmans and Roovers 1986) that only unaccusative predicates allow for extraposition from subject, but Rochemont & Culicover (1990) convincingly argue that this is not the correct generalization. It has also been argued that only predicates of appearance may occur in this construction (Guéron 1980, Rochemont 1978). Rochemont and Culicover (1990) argue that this predicate of appearance restriction is contextually defined, not syntactically. It has furthermore been suggested that only a PP that is an adjunct to DP may be extraposed, but not a PP that is the complement of N (De Hoop et al. 1989). I claim that the possibility of extraposition from object is just as dependent on the kind of verbal predicate as extraposition from subject, that there is no complement-adjunct asymmetry and that the verbal predicate is able to influence the extraposition possibility because of the qualification relation between PP and AgrOP. Only if the PP is a suitable qualifier of the whole AgrOP, extraposition is possible. PP is a suitable qualifier of the whole AgrOP if the meaning of the verb is not very specialized. Consider the minimal contrasts between (61a,b) and (62a,b):

- (62) a Jan moet een afspraak hebben met Marie  
 John must an agreement have with Mary  
 b Jan moet een brief hebben aan de koning  
 John must a letter have to the king

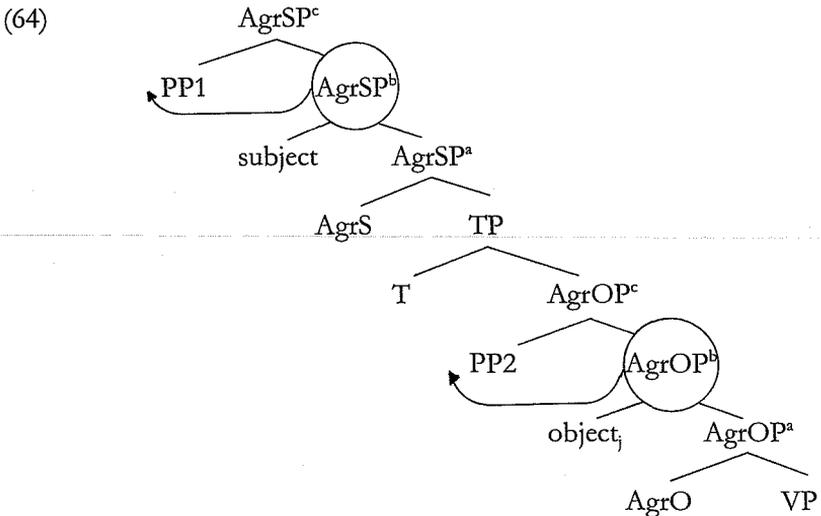
Since the notion of "suitable predicate" is vague, it is not surprising that there is not a clear-cut class of verbs that allows for extraposition from DP, and it is also explained why judgements in this area tend to diverge.

### 4.5.3 More evidence for the AGRP-movement analysis

When an extraposed PP qualifies a subject-DP, movement of AgrSP into the specifier of a PP that is adjoined to it must take place. We are now able to explain the observation in Rochemont and Culicover (1990) that an extraposed PP qualifying a subject must follow an extraposed PP qualifying an object. To give a Dutch example:

- (63)
- a EEN kist op dat schip zou boeken over taalkunde bevatten  
one box on that ship would books on linguistics contain
  - b EEN kist zou boeken bevatten over taalkunde op dat schip  
one box would books contain on linguistics on that ship
  - c \*EEN kist zou boeken bevatten op dat schip over taalkunde  
one box would books contain on that ship on linguistics

Rochemont & Culicover (1990) capture this fact by assuming an interpretive nesting requirement of the kind that is found in A-bar movement. In the present theory, no such assumption is necessary: the interpretive nesting requirement can be explained in the same way as Koster's mirror effect. We illustrate this with the structure in (64), where irrelevant structure has been omitted.



The indicated movement of AgrOP<sup>b</sup> to [spec,PP2] yields the linear order [object VP PP2]. Next, the indicated movement of AgrSP<sup>b</sup> yields the linear order [subject object VP PP2 PP1].

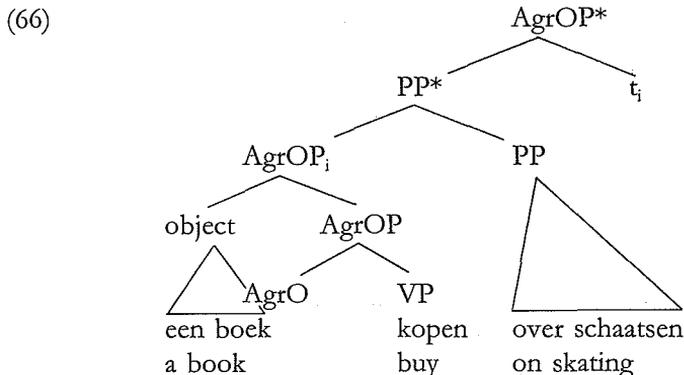
Movement of an AgrOP-segment to [spec,PP1] is filtered out at LF: since

PP1 does not immediately c-command any of the AgrOP-segments, such a movement will never yield a qualification relation between AgrOP and PP1, i.e. a triple  $PP1(AgrOP_i, t_i)$  in which AgrOP<sub>i</sub> immediately c-commands PP1 and PP1 immediately c-commands  $t_i$ . If a movement operation does not yield a qualification relation, it does not take place. PP2 cannot be interpreted as a qualifier of the subject either: none of the AgrSP-segments could ever reach [spec,PP2], since each segment dominates PP2. The subject could only reach [spec,PP2] by lowering, which is generally believed to be impossible.

For similar reasons, it is impossible to move VP instead of an AgrOP-segment to e.g. [spec,PP2], since this would not yield a qualification relation between VP, PP2 and VP-trace: VP would immediately c-command PP2, but PP2 would not immediately c-command VP-trace. This correctly rules out the possibility of "extraposing" the object (in AgrOP) across VP-internal material.

The presented analysis also straightforwardly explains the well-known observation that VP-topicalization (or topicalization of an extended projection of VP) cannot include a PP extraposed from object while stranding the object (cf. Guéron 1980, Reinhart 1980, Baltin 1981, Rochemont & Culicover 1990). The observation is illustrated in (65).

- (65) a Jan zal een boek kopen over schaatsen  
 John will a book buy on skating  
 'John will buy a book on skating'  
 b [<sub>AgrOP</sub> Een boek kopen over schaatsen] zal Jan niet  
 a book buy on skating will John not  
 c \*[Kopen over schaatsen] zal Jan een boek niet  
 buy on skating will John a book not  
 d [<sub>VP</sub> Kopen] zal Jan een boek niet over schaatsen  
 buy will John a book not on skating



As the structure in (66) shows, the VP and the extraposed PP cannot be one constituent without the object. This is why (65c) is ungrammatical. The structure correctly allows topicalization of AgrOP\*: this yields (65b). Furthermore, the structure allows topicalization of just the VP, yielding the sentence in (65d).

Bach and Horn's (1976) strong right roof constraint also follows from the proposed analysis. The relevant contrast is given in (67):

- (67) a [Dat hij een boek [<sub>PP</sub> over taalkunde] leest] is verrassend  
 that he a book on linguistics reads is surprising  
 b [Dat hij een boek leest] [<sub>PP</sub> over taalkunde] is verrassend  
 that he a book reads on linguistics is surprising  
 c \*[Dat hij een boek leest] is verrassend [<sub>PP</sub> over taalkunde]  
 that he a book reads is surprising on linguistics

The contrast shows that the PP cannot be extraposed from the embedded clause "into" the matrix clause. In the present analysis, the underlying structure of (67a) would be as in (68):

- (68) [<sub>CP1</sub> [<sub>CP2</sub> dat hij [<sub>AgrOP</sub> [<sub>PP</sub> over taalkunde] [<sub>AgrOP</sub> een boek leest <sub>CP2</sub>]]]  
 [<sub>CP1</sub> is [<sub>AgrSP</sub> ....verrassend....]]]

To derive the order in (67b), the AgrOP-segment moves into [spec,PP]. The order in (67c) cannot be derived: first, AgrOP would have to move into a position preceding the PP, then the CP1 segment would have to lower into the embedded clause to some unknown position.

#### 4.6 Relative clause extraposition is different

In this subsection, I briefly consider the question as to whether or not the proposal can be extended to relative clause extraposition. The answer is no: relative clauses are arguably different from PPs in a number of respects. The differences are illustrated in (70)-(74), taking the sentences in (69) as a basis.

- (69) a Jan heeft EEN boek [<sub>PP</sub> over schaatsen] gekocht  
 John has one book on skating bought  
 'John has bought a book on skating'  
 b Jan heeft EEN boek [<sub>CP</sub> dat over schaatsen gaat] gekocht  
 John has one book that on skating goes bought  
 'John has bought a book that is on skating'

The first difference is that a PP can be stranded in the middle field under topicalization, but a relative clause cannot:

- (70) a EEN boek heeft Jan [<sub>PP</sub> over schaatsen] gekocht  
 one book has John on skating bought  
 b \*EEN boek heeft Jan [<sub>CP</sub> dat over schaatsen gaat] gekocht  
 one book has John that on skating goes bought

Secondly, a PP can precede the DP that it qualifies in the middle field, but a relative clause cannot:

- (71) a Jan heeft [<sub>PP</sub> over schaatsen] een boek gekocht  
 John has on skating a book bought  
 b \*Jan heeft [<sub>CP</sub> dat over schaatsen gaat] een boek gekocht  
 John has that on skating goes a book bought

The behavior of PP in (70) and (71) is entirely as expected: we already discussed (71a) in which PP is adjoined to AgrOP, the segment of AgrOP moving into [spec,PP] in covert syntax. In (70a), the PP is not extraposed. This means that the object-DP itself, instead of AgrOP, must have moved into [spec,PP], as in (49). From this position, the object-DP can be topicalized.

The behavior of the relative clause in (70) and (71) is captured by the analysis proposed by Koster (1995). Briefly, in that analysis extraposition is treated as *asyndetic* coordination, having the structure in (72), where the colon takes the place of *and* in *syndetic* coordination:

- (72) a Hij heeft [[<sub>DP</sub> de vrouw] [ : [ die alles wist]]] gezien  
 he has the woman that all knew seen  
 b Hij heeft [[<sub>DP</sub> Jan] [ en [ Marie]]] gezien  
 he has John and Mary seen  
 c \*Jan heeft hij en Marie gezien  
 John has he and Mary seen

The impossibility to move the DP while stranding the relative clause, as in (70b), now has the same status as the impossibility to move a conjunct out of a coordinate structure, as in (72c). Both cases fall under the Coordinate Structure Constraint (Ross 1967). It will be clear that this analysis does not yield the correct results for PPs: as (70a) shows, extraction of DP is possible under stranding of the PP.

A third difference is that whereas extraposition of a relative clause obviates principle C violations (cf. Rochemont and Culicover 1990),

extraposition of PP does not:

- (73) a \*Ik heb hem<sub>i</sub> een boek dat Jan<sub>i</sub> niet leuk vindt gegeven  
 I have him a book that John not funny finds given  
 b Ik heb hem<sub>i</sub> een boek gegeven dat Jan<sub>i</sub> niet leuk vindt  
 I have him a book given that John not funny finds  
 c \*Ik heb hem<sub>i</sub> een boek over Jan<sub>i</sub> gegeven  
 I have him a book about John given  
 d \*Ik heb hem<sub>i</sub> een boek gegeven over Jan<sub>i</sub>  
 I have him a book given about John

The difference between (73b) and (73d) suggests that *hem* c-commands the extraposed PP but not the extraposed relative clause.

In view of these differences, it seems reasonable to conclude that it is unlikely that PP Extraposition and Relative Clause Extraposition are one and the same phenomenon.

## 4.7 Another case of scrambling in Dutch<sup>24</sup>

### 4.7.1 Introduction

Perhaps the most unusual and controversial ingredient of the analysis of PP Extraposition presented in this chapter is movement of a constituent to the specifier of an adjunct. In this section, independent evidence for the existence of such movement is provided. It is argued that Dutch has a previously unattested type of scrambling that involves precisely this movement operation. Consider the minimal pair in (74):

- (74) a [De krant gisteren] meldde het voorval niet  
 the paper yesterday reported the incident not  
 b [De krant van gisteren] meldde het voorval niet  
 the paper of yesterday reported the incident not  
 'Yesterday's newspaper did not report the incident'

According to Geerts et al. (1984:711), the bracketed constituent *de krant gisteren* in (74a) (henceforth 'pseudo-DP') occurs in spoken language, whereas the seemingly equivalent *de krant van gisteren* (henceforth 'adverbially modified

<sup>24</sup> An extended version of this section was presented at the TIN-dag 1995 and has appeared in Barbiere (1995).

DP') in (74b) would be preferred in written language. Closer examination of this minimal pair reveals that the difference is not stylistic but that the members of the pair have distinct syntactic properties: they have a different syntactic distribution, the presence of *gisteren* makes the occurrence of a contradictory time adverbial impossible in (74a) but not in (74b), and *gisteren* directly influences the temporal interpretation of the finite verb in (74a) but not in (74b). These observations suggest that in (74b) *gisteren* is truly embedded in the DP *de krant van gisteren*, but that in (74a) the adverb *gisteren* is a matrix adverbial. Adverbials of other syntactic and semantic classes behave identical to *gisteren*.

My claim is that a pseudo-DP such as *de krant gisteren* in (74a) is derived by movement of the DP *de krant* into the specifier of the projection of the adverbial *gisteren*, turning the adverbial into a predicate of DP. The stranded focus particle test developed in chapter 3 confirms that movement is involved. Apart from providing evidence in favor of movement into the specifier of an adjunct, the data presented in this section have two other important theoretical consequences. First, they are evidence against Sportiche's (1994) idea that adjunction does not exist. Secondly, Neeleman's (1994) inventory of scrambling types available in Dutch (base-generated scrambling and focus scrambling) should be extended with movement to the specifier of an adjunct.

#### 4.7.2 The matrix scope of an adverbial in a pseudo-DP

If a time adverbial is truly embedded in a DP, it modifies some constituent within DP or the DP as a whole, but it cannot modify something outside the DP (cf. Neeleman 1994:75). For example, if a DP embeds *gisteren* 'yesterday', the clause containing this DP may contain a matrix time adverb *vandaag* 'today' and there is no contradiction (75a,b). However, as (75c) shows, in the case of a pseudo-DP the presence of *vandaag* in the matrix clause does result in a contradiction, just like when *gisteren* is in the matrix clause (75d). This is the first reason to doubt the idea that the adverbial is embedded in DP in pseudo-DPs.<sup>25</sup>

<sup>25</sup> Notice that an analysis of *gisteren* in *de krant gisteren* as a reduced relative clause would neither explain the incompatibility of *gisteren* with a contradictory time adverbial, nor the influence of *gisteren* on the matrix tense, since a relative clause that includes *gisteren* need not have these properties:

- (i) Die man die jgisteren ontmoet hebt werkt vandaag alweer  
 that man who you yesterday met have works today already  
 'That man that you met yesterday is working again today'

- (75) a Die gisteren nog zieke man werkte vandaag alweer  
that yesterday still sick man worked today again  
b Die man van gisteren vertelde vandaag de waarheid  
that man of yesterday told today the truth  
c Die man gisteren vertelde (\*vandaag) de waarheid  
that man yesterday told today the truth  
d \*Die man vertelde gisteren vandaag de waarheid  
that man told yesterday today the truth

Secondly, when *gisteren* is embedded in a DP, a verb in the present tense can be interpreted as referring to the speech time (76a,b), whereas in the case of *gisteren* in a pseudo-DP, a verb in the present tense cannot be so interpreted (76c,d). In this respect, *gisteren* in a pseudo-DP behaves like a matrix adverbial (76e,f).

- (76) a Die gisteren nog zieke man staat in de tuin  
that yesterday still sick man stands in the garden  
b Die man van gisteren staat weer in de tuin  
that man of yesterday stands again in the garden  
c \*Die man gisteren staat weer in de tuin  
that man yesterday stands again in the garden  
d \*De krant gisteren ligt in de gang  
the newspaper yesterday lies in the hallway  
e \*Die man staat gisteren in de tuin  
that man stands yesterday in the garden  
f \*De krant ligt gisteren in de gang  
the newspaper lies yesterday in the hallway

Most other time adverbials behave like *gisteren* in this respect; examples are *zondag* '(on) sunday', *vorige week* 'last week', *dit jaar* 'this year'.

With certain locative adjuncts we find a similar situation. A pseudo-DP containing a locative adverbial cannot cooccur with a contradictory locative adverbial (77a,b), just as in the case of two matrix locative adverbials (77c,d). The preposition *van* 'of' may be inserted between the noun and the locative adverbial, and then the clause may contain a second locative adverbial of the same class (77e,f).<sup>26</sup>

<sup>26</sup> It may be that *van* 'of' is not a preposition here, but a nominal copula. Den Dikken (1995) analyses *van* in *een man van weinig woorden* 'a man of few words' and *of* in *a hell of a problem* as the nominal counterpart of BE.

- (77)
- a Die man in de tuin staat (\*binnen) te praten  
that man in the garden stands inside to talk
  - b De fans thuis zitten comfortabel (\*in de concertzaal)  
the fans at home sit comfortable in the concert hall
  - c \*Die man staat in de tuin binnen te praten  
that man stands in the garden inside to talk
  - d \*De fans zitten thuis in de concertzaal  
the fans sit home in the concert hall
  - e Die man van in de tuin staat binnen te praten  
that man of in the garden stands inside to talk
  - f De fans van thuis zitten in de concertzaal  
the fans of home sit in the concert hall

Frequency and modal adverbials are marginally possible in a pseudo-DP. Insertion of *van* is impossible with these classes.

- (78)
- a ?Oude mannen vaak bewaken (\*soms) die parkeergarage  
old men often guard (sometimes) that parking lot
  - b \*Oude mannen bewaken vaak soms de parkeergarage  
old men guard often sometimes the parking lot
  - c ?Die zieke man waarschijnlijk heeft haar (\*beslist) gebeld  
that sick man probably has her definitely called
  - d Die waarschijnlijk zieke man heeft haar beslist gebeld  
that probably sick man has her definitely called

Compared to the above mentioned adverbial classes, manner adverbials are strongly ungrammatical contained in a pseudo-DP:

- (79)
- a Dat meisje heeft het gedicht perfect voorgedragen  
that girl has the poem perfectly recited
  - b \*Het gedicht perfect heeft het meisje voorgedragen  
that poem perfectly has the girl recited

I give an explanation of the difference between manner adverbials and the other adverbial classes in section 4.7.5. What is crucial here is that adverbials in a pseudo-DP have matrix scope, but adverbials in an adverbially modified DP do not.

### 4.7.3 The syntactic distribution of pseudo-DPs

The observations in section 4.7.2 suggest that the adverbial in a pseudo-DP is not embedded in DP. Yet, a pseudo-DP must be one constituent if the well-known generalization is correct that material preceding the finite verb in Dutch main clauses forms one constituent. Giving this up would cause more problems than it solves. Two arguments cannot occur in that position, and reversing the order DP-adverbial yields strongly ungrammatical sentences (80a,b):

- (80) a \*Gisteren de krant meldde dit voorval niet  
 yesterday the paper reported this incident not  
 b \*In de tuin die jongen staat te praten  
 in the garden that boy stands to talk

The question now arises as to what the syntactic structure of a pseudo-DP is. I propose that the DP is in the specifier of the adverbial phrase:<sup>27</sup>

- (81) [<sub>AdvP</sub> [<sub>DP</sub> de krant] [<sub>AdvP</sub> [<sub>Adv</sub> gisteren]]]

The pseudo-DP is not a DP but a projection of the adverbial. This predicts that a pseudo-DP does not have the syntactic distribution of a true argument DP. In the examples given so far, the pseudo-DP is in topic position (say [<sub>spec,CP</sub>]). This position is accessible to both arguments and adjuncts. If a pseudo-DP is in argument position, the sentence is ungrammatical (82a,b). The sentences in (82c,d) show that an adverbially modified DP can occur in an argument position.

- (82) a Jan heeft snel de krant (\*gisteren) gelezen  
 John has quickly the newspaper yesterday read  
 b Dus heeft op tafel de krant (\*gisteren) gelezen  
 thus has on table the newspaper yesterday lain  
 c Jan heeft snel de krant van gisteren gelezen  
 John has quickly the paper of yesterday read  
 d Dus heeft op tafel de krant van gisteren gelegen  
 thus has on table the paper of yesterday lain

<sup>27</sup> The syntactic category of the adverbial is irrelevant here. The adverbial projection may also be a PP. When the adverbial projection is more complex (e.g. a Degree Phrase), the DP is in the highest specifier ([<sub>spec, DegP</sub>]), such that the entire complex constituent is a qualifier of DP.

The test in (82) rests on the fact that a time adverbial cannot follow a manner adverbial (cf. (83a,b)): if the pseudo-DP *de krant gisteren* were an ordinary DP containing a time adverbial, we would expect (82a) to be grammatical, just like (82c). If on the other hand the pseudo-DP is a projection of the adverbial *gisteren*, we expect it to be out if embedded under a manner adverbial, for the same reason that a bare time adverbial is barred in this position, whatever that reason may be. A similar story holds for frequency and modal adverbials. Locative adverbials, however, cannot be conclusively tested in this way, since they have a less restricted distribution (cf. (83c,d)).

- (83)
- a Jan heeft gisteren snel de krant gelezen  
John has yesterday quickly the newspaper read
  - b \*Jan heeft snel gisteren de krant gelezen  
John has quickly yesterday the newspaper read
  - c Jan heeft in de tuin snel de krant gelezen  
John has in the garden quickly the paper read
  - d Jan heeft snel in de tuin de krant gelezen  
John has quickly in the garden the paper read

If DP is in derived position, like the object in (84), it may occur as a pseudo-DP:

- (84) Jan heeft [de krant gisteren] snel gelezen  
John has the newspaper yesterday quickly read

Another correct prediction is that a pseudo-DP cannot be the predicate of a small clause in cases in which the bare adverbial cannot be a such a predicate:<sup>28</sup>

<sup>28</sup> In cases in which the bare adverbial can be a small clause predicate, a pseudo-DP can be a small clause predicate as well, as predicted:

- (i)
- a dat die show gisteren was  
that that show yesterday was
  - b dat die show de publiekstrekker gisteren was  
that that show the crowd puller yesterday was

I thank Marcel den Dikken for bringing this to my attention.

- (85) a \*Ik weet dat die prop de krant gisteren is  
I know that that ball the paper yesterday is  
b \*Ik weet dat die prop gisteren is  
I know that that ball yesterday is  
c Ik weet dat die prop de krant van gisteren is  
I know that that ball the paper of yesterday is

#### 4.7.4 The derivation of a pseudo-DP

The contrast between (82a) and (84) shows that a pseudo-DP is possible only if the DP is scrambled. This already suggests that a pseudo-DP with the structure in (81) is not base-generated but derived by movement of the DP into the specifier of the adverbial projection. The distribution of stranded scalar focus particles provides independent evidence supporting this movement analysis.

- (86) a Ik heb [[EEN bezoeker]<sub>i</sub> gisteren] *maar* <sub>t<sub>i</sub></sub> gesproken  
I have one visitor yesterday just spoken  
'I have spoken to just one visitor yesterday'  
b [EEN bezoeker gisteren] heb ik *maar* gesproken  
one visitor yesterday have I just spoken  
'I have spoken to just one visitor yesterday'
- (87) a Jan kan [[EEN ding]<sub>i</sub> thuis] *maar* <sub>t<sub>i</sub></sub> leuk vinden  
John can one thing home just nice find  
'John can like just one thing at home'  
b [EEN ding thuis] kan Jan *maar* leuk vinden  
one thing home can John just nice find  
'John can like just one thing at home'
- (88) a Jan hoeft [[EEN kamer]<sub>i</sub> doorgaans] *maar* <sub>t<sub>i</sub></sub> schoon te houden  
John needs one room usually just clean to keep  
'Usually, John needs to keep just one room clean'  
b ?[EEN kamer doorgaans] hoeft Jan *maar* schoon te houden  
one room usually needs John just clean to keep  
'Usually, John needs to keep just one room clean'

- (89) a Jan zou [[EEN ding]<sub>i</sub> waarschijnlijk] *maar* t<sub>i</sub> leuk vinden  
 John would one thing probably just nice find  
 'John probably would like just one thing'
- b ?[EEN ding waarschijnlijk] zou Jan *maar* leuk vinden  
 one thing probably would John just nice find  
 'John probably would like just one thing'

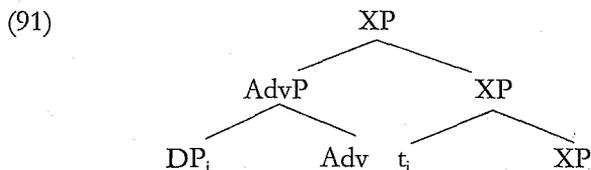
The facts in (86)-(89) have two important consequences. First, the a-examples show that the order DP-Adverbial can be derived from the order Adverbial-DP by moving the DP into the specifier of the adverbial projection. Consequently, movement to the specifier of an adjunct should be added to Neeleman's (1994) inventory of scrambling types available in Dutch. Secondly, these facts are evidence against Sportiche's (1994) proposal that adjuncts do not exist. As the b-examples in (86)-(89) show, the pseudo-DP resulting from movement of DP to the specifier of the adverbial projection may be topicalized. This would be impossible if the adverbials involved were heads: movement of such an adverbial would force pied-piping of everything in the complement of the adverbial (say the material to the right of the adverbial in the a-examples in (86)-(89)).

A remark on manner adverbials to conclude this section. Recall that manner adverbials cannot occur in a pseudo-DP. Interestingly, although an object may follow or precede a manner adverbial (90a), the focus particle test indicates that this order variation does not involve movement (90b). This confirms Neeleman's (1994) conclusion that Dutch has base-generated scrambling.

- (90) a Jan heeft (EEN boek) langzaam (EEN boek) gelezen  
 John has one book slowly one book read
- b \*Jan heeft EEN boek langzaam nog gelezen  
 John has one book slowly yet read

#### 4.7.5 The nature of movement to the spec of an adverbial projection

The derivation of a pseudo-DP yields the configuration in (91):



In this configuration,  $DP_i$  immediately c-commands Adv and Adv immediately c-commands  $t_i$ . According to the PSI, this configuration defines Adv as a qualifier of DP, which is the correct result semantically. This explains the observation in 4.7.2, the sentences in (79), that a DP cannot move into the specifier of a manner adverbial: by its very meaning, a manner adverbial must qualify a VP, not a DP.<sup>29</sup> Given the immediate c-command condition in the PSI, it is predicted that an adverbial cannot be interpreted as a qualifier of DP if it does not immediately c-command the base-position of that DP. Thus, the PSI correctly rules out pseudo-DPs derived by non-local movement:<sup>30</sup>

<sup>29</sup> I did not make the observation explicit yet that an adverbial in a pseudo-DP behaves like a matrix adverbial. In view of the theory advocated in this thesis, this influence should be determined configurationally. How the matrix behavior of an adverbial is determined configurationally can be illustrated with the structure in (91). Suppose that XP is TP, and Adv is a time adverbial. Then according to the first clause of the PSI, Adv, the time adverbial, establishes a Semantic relation between  $DP_i$  and TP. I hold this Semantic relation responsible for the matrix behavior of the adverb in a pseudo-DP.

<sup>30</sup> If *two* objects move, the problematic configuration [ $IO_i DO_j Adv t_i t_j$ ] arises, in which Adv does not immediately c-command  $t_i$ , by the presence of  $t_j$ . This problem is solved if Den Dikken & Mulder's (1991) analysis is adopted: the derivation would then be [ $IO_i DO_j Adv t_i t_j$ ].

- (92)
- a Ik heb [<sub>Adv</sub> gisteren] [<sub>DP</sub> die man] [<sub>DP</sub> de krant] gegeven  
I have yesterday that man the newspaper given
  - b Ik heb [<sub>DP</sub> die man]<sub>i</sub> [<sub>Adv</sub> gisteren] t<sub>i</sub> de krant gegeven  
I have that man yesterday the newspaper given
  - c \*Ik heb [<sub>DP</sub> de krant]<sub>i</sub> [<sub>Adv</sub> gisteren] die man t<sub>i</sub> gegeven  
I have the newspaper yesterday that man given
  - d Heeft [<sub>Adv</sub> gisteren] [<sub>DP</sub> die man] [<sub>DP</sub> de vrouwen] de krant  
has yesterday that man the women the paper  
gegeven?  
given
  - e Heeft [<sub>DP</sub> die man]<sub>i</sub> [<sub>Adv</sub> gisteren] t<sub>i</sub> de vrouwen de krant  
has that man yesterday the women the paper  
gegeven?  
given
  - f \*Heeft [<sub>DP</sub> de vrouwen]<sub>i</sub> [<sub>Adv</sub> gisteren] die man t<sub>i</sub> de krant  
has the women yesterday that man the paper  
gegeven?  
given
  - g \*Heeft [<sub>DP</sub> de krant]<sub>i</sub> [<sub>Adv</sub> gisteren] die man de vrouwen t<sub>i</sub>  
has the paper yesterday that man the women  
gegeven?  
given

Thus, the problem for A'-movement analyses of scrambling that scrambling is more local than regular A'-movement (cf. Vanden Wyngaerd 1989) is not a problem for the type of scrambling under discussion.

Some of the problems for A-movement analyses discussed in Neeleman (1994) are unproblematic here as well. Trivially, more than one constituent in a single clause may scramble if there is more than one adverbial. Furthermore, the fact that PPs may scramble, which is a serious problem for analyses that assume that scrambling is Case-driven, is expected since there is no principled ban on a PP coming into a qualification relation with an adverbial. The analysis makes an interesting prediction for PP-scrambling. As was already noted, in a pseudo-DP the only possible order is DP-Adverbial, since the adverbial can be a qualifier of the DP but not the other way around (cf. (93a,b)). That is, DP can move into the specifier of the adverbial projection, but the adverbial cannot move into the specifier of the DP. In the case of two qualificatory constituents, such as the adverbials *vanmorgen* and *in het café* in (93c,d), the expectation is that they can occur in either order in topic position if they can occur in either order in the middle field. This is so because either adverbial may move into the specifier of the other. As (93e,f) show, this expectation is correct.

- (93) a [[<sub>DP</sub> Dat broodje] [<sub>Adv</sub> vanmorgen]] heeft Jan niet opgegeten  
that sandwich this morning has John not eaten
- b \*[[<sub>Adv</sub> Vanmorgen] [<sub>DP</sub> dat broodje]] heeft Jan niet opgegeten  
this morning that sandwich has John not eaten
- c Ik heb [<sub>Adv</sub> vanmorgen] (dus) [<sub>PP</sub> in het café] koffie gedronken  
I have this morning thus in the café coffee drunk
- d Ik heb [<sub>PP</sub>in het café] (dus) [<sub>Adv</sub>vanmorgen] koffie gedronken  
I have in the café thus this morning coffee drunk
- e [[<sub>Adv</sub> Vanmorgen] [<sub>PP</sub> in het café]] heb ik koffie gedronken  
this morning in the café have I coffee drunk
- f [[<sub>PP</sub> In het café] [<sub>Adv</sub> vanmorgen]] heb ik koffie gedronken  
in the café this morning have I coffee drunk

#### 4.8 Conclusion

The results of this chapter may be summarized as follows:

- (i) An analysis of PP-X in which VP or AgrP moves to the specifier of the extraposed PP correctly explains the properties of PP-X mentioned in the literature, such as Koster's mirror effect, Rochemont & Culicover's interpretive nesting requirement, restrictions on VP-topicalization, the impossibility of extraposing a small clause predicate PP, the distribution and interpretation of focus particles in PP-X environments.
- (ii) Since most of the properties mentioned in (i) are also properties of PP-X in English, it is quite likely that the analysis carries over to English.
- (iii) The VP/AgrP-movement analysis neither uses rightward movement nor right-adjunction, and is therefore compatible with the antisymmetry framework.
- (iv) According to the analysis, the trigger of PP-X is interpretive. Movement of VP/AgrP into [spec,PP] is necessary to establish a qualification relation between VP/AgrP and PP. If no movement into [spec,PP] takes place, the PP will not be interpretable as a qualifier at all. Such a structure is filtered out by the Principle of Full Interpretation.
- (v) Relative clause extraposition is fundamentally different (cf. Koster 1995).
- (vi) Dutch has a type of scrambling that involves movement to the specifier of an adjunct.
- (v) Adjuncts exist.

## 5.0 Introduction

This case study is an investigation of the semantic and syntactic properties of modal verbs in Dutch. The study starts in section 5.1 with a brief description of the semantic ambiguity of sentences containing a modal. Based on this description, it is argued that the traditional semantic distinction between an epistemic and a deontic (or root) interpretation must be refined. Two semantic properties classify modal interpretations: (i) the subject-orientation of the modal, and (ii) the involvement of a polarity transition or switch of truth value in the modal interpretation.

Before developing a syntactic analysis that reflects these semantic criteria, a closer look is taken at the properties of the complement of modals. In section 5.2 a number of arguments are provided against the traditional view that the complement of a modal in Dutch is always verbal. Modal verbs take nominal complements and small clause complements of various categories. In 5.3, it is shown that the selectional restrictions imposed by modals are captured by one simple statement: the complement of a modal must denote a value on a bounded lattice. A modal is a qualifier of this value. In most cases, the bounded lattice is a linear ordering with 0 as its lower and 1 as its upper bound.

In section 5.4, a syntactic analysis is developed for modals with a verbal complement, along the lines of the Principle of Semantic Interpretation. After a discussion in section 5.4.1 of the structure of VP and the syntactic position of the subject, section 5.4.2 is dedicated to the syntactic representation of subject-orientation and polarity transition. Subject-orientation is hypothesized to be determined by a number of syntactic relations between D (an abstract determiner), the modal and the subject. The presence or absence of a polarity transition in the interpretation of the modal is hypothesized to depend on the type of syntactic complement of the modal. If it is a definite DP containing a modal, then it is a polarity transition.

the modal receives a probability interpretation. If it is an indefinite Ind(ividual)P, the modal does not get a probability interpretation. The analysis builds on Kayne's (1993) analysis of possessive sentences and auxiliary selection. In section 5.4.3, evidence is provided for these hypotheses. Section 5.4.4 contains a brief discussion of alternative analyses.

Section 5.5 provides a syntactic analysis of modals with a non-verbal complement. Modals with non-verbal complements are analyzed on a par with modals taking a verbal IndP complement. Section 5.6 contains a summary of the results of this chapter.

## 5.1 The semantic ambiguity of modal sentences

Dutch modals allow at least the four different kinds of interpretations indicated in (1).<sup>1</sup>

- (1)
- |      |                                            |                             |
|------|--------------------------------------------|-----------------------------|
|      | Jan moet schaatsen                         |                             |
|      | John must skate                            |                             |
| I.   | 'John definitely wants to skate'           | <b>dispositional</b>        |
| II.  | 'John has the obligation to skate'         | <b>directed deontic</b>     |
| III. | 'It is required that John skates'          | <b>non-directed deontic</b> |
| IV.  | 'It must be the case that John is skating' | <b>probability</b>          |

### 5.1.1 The dispositional interpretation

In the dispositional interpretation some force, tendency or capacity internal to a subject is described. For *moeten* 'must', *zullen* 'will' and *willen* 'want', this internal force is a (strong) will or desire. For *hoeven* 'need' it is a need felt by the subject. For *mogen* 'may' it is sympathy or attraction experienced by the subject. For *kunnen* 'can', it is ability, capacity. Examples of this interpretation are given in (2):

- (2) a
- |                                  |
|----------------------------------|
| Jan moet en zal schaatsen        |
| John must and shall skate        |
| 'John definitely wants to skate' |

<sup>1</sup> For extensive discussion of the semantic ambiguity of modals, cf. Lyons (1977) and Palmer (1986). The reason for not using the traditional epistemic-deontic or epistemic-root distinction will become clear below. The term "dispositional" is from Klooster (1986).

- b Jan hoeft niet zo nodig beroemd te worden  
John need not so necessarily famous to become  
'John does not feel a strong need to become famous'
- c Jan mag graag hard werken  
John may gladly hard work  
'John likes to work hard'
- d Jan kan goed voetballen  
John can well play soccer  
'John can play soccer very well'
- e Jan zal voor zijn tiende beroemd zijn  
John will before his tenth famous be  
'John definitely wants to be famous before he is ten years old'
- f Jan wil dat boek hebben  
John wants that book have  
'John wants to have that book'

### 5.1.2 The directed deontic interpretation

In the directed deontic interpretation, a subject has an obligation (*moeten* 'must', *hoeven* 'need', *zullen* 'will'), permission (*mogen* 'may', *kunnen* 'can'). This permission or obligation has an external source.<sup>2</sup>

- (3) a Jan moet vanmiddag schaatsen van zijn vader  
John must this afternoon skate of his father  
'His father obliges John to skate this afternoon'
- b Jan hoeft het werk niet af te maken van de leraar  
John needs the work not off to make of the teacher  
'The teacher does not require John to finish the work'
- c Jan mag gaan schaatsen  
John may go skating  
'John has permission to go skating'
- d Jan kan gaan schaatsen  
John can go skating  
'John has permission to go skating'
- e Je zult voor vijf uur dat werk af hebben  
you shall before five hour that work off have  
'You are obliged to finish that work before five o'clock'

<sup>2</sup> The modal *willen* 'want' has no directed deontic interpretation. The reason may be that it is impossible to provide someone with a desire. Obviously, one can impose one's desire on a person, but in that case the person has an obligation, not a desire.

### 5.1.3 The non-directed deontic interpretation

In the non-directed deontic interpretation, the respective modals have a permission, obligation or requirement interpretation as well.<sup>3</sup> The difference with the directed deontic interpretation is that the permission, obligation or requirement is not directed to the subject of the sentence. As Klooster (1986:124) points out, even though the interpretation of the modal is deontic in these cases, the modal does not establish a binary relation between the subject and the rest of the sentence. Rather, it is a unary predicate of the entire proposition, saying that the situation expressed by this proposition is admitted or required (cf. also Feldman 1986, and Brennan 1993 for discussion). Examples of this interpretation are given in (4).

- (4)
- a De arts moet eens per jaar geraadpleegd worden<sup>4</sup>  
the doctor must once a year consulted be  
'It is required to consult the doctor once a year'
  - b Zulke ongelukken hoeven niet meer te gebeuren  
such accidents need not anymore to happen  
'It is not necessary that such accidents still happen'
  - c De nieuwe machine mag geen problemen geven  
the new machine may no problems give  
'It is not acceptable if the new machine causes problems'
  - d Deze boeken kunnen wel weg  
these books can well away  
'These books can be thrown away'

<sup>3</sup> The non-directed deontic interpretation of *willen* does not fit into one of these categories. This interpretation of *willen* is close to *can*, as the English translation indicates.

<sup>4</sup> The argument structure of the embedded verb is in principle irrelevant for the availability of certain interpretations. More specifically, passives and unaccusatives embedded under a modal can have the dispositional and directed deontic interpretation (cf. (i)-(ii)), even though passives and unaccusatives are often thought of as denoting processes that are not under the control of the surface subject.

- (i) Jan moet (en zal) tot president worden gekozen  
John must and shall to president be elected  
'John definitely wants to be elected president'
- (ii) Jan mag pas sterven als de dokter het zegt  
John may only die when the doctor it says  
'John is not allowed to die until the doctor gives permission'

- e Het werk zal op tijd klaar zijn  
the work shall on time ready be  
'The work must be ready in time'
- f Dat apparaat wil maar niet in de doos  
that machine wants only not in the box  
'I cannot get that machine in the box'

#### 5.1.4 The probability interpretation

The probability interpretation involves a qualification of the truth value of the proposition expressed by the sentence, i.e. an estimation of the degree of probability of a proposition. Since we are dealing with a probability scale, the values expressed can range from 0 (not true) to 1 (true). Different modals take different positions on the scale: *kunnen* 'can' is relatively low on the scale, *moeten* 'must' and *zullen* 'will' are relatively high, and *mogen* 'may' and *willen* 'want' take a truth value of 1. As the examples of this interpretation show, the position on the probability scale can be made more precise by adding adverbial material. A characteristic of this class of interpretations is that there is no element of will, need, permission, ability here, and that the modality is not ascribed to the subject.

- (6) a Het moet haast wel dat Jan aan het schaatsen is  
it must almost well that John to the skating is  
'It is almost certainly the case that John is skating'
- b Jan hoeft die moord niet gepleegd te hebben  
John need that murder not committed to have  
'It is not necessarily true that John has committed that murder'
- c Jan mag dan vaak zeuren, hij is niet onvriendelijk  
John may then often nag he is not unfriendly  
'It may be true that John often nags, but he is not unfriendly'
- d Het kan haast niet dat Jan dat voorval gezien heeft  
it can almost not that John that incident seen has  
'It is almost impossible that John has seen that incident'
- e Jan zal wel vaak eten laten brengen  
John will well often food let bring  
'Probably, John often has food delivered'
- f Er wil hier nog wel eens een ongeluk gebeuren  
there wants here yet well once an accident happen  
'Every once in a while an accident occurs here'

### 5.1.5 Two semantic parameters

The distinctions just described are semantically based. These are the four most salient interpretations, which are also the ones that all modals have in common (but see fn. 2). Zwicky and Sadock's (1975) test (cf. McDowell 1987 for discussion) shows that it is a real ambiguity, not merely vagueness:

- (7) a Jan mag graag sigaren roken, maar hij mag geen sigaren roken  
 John may gladly cigars smoke but he may no cigars smoke  
 'John likes to smoke cigars but he is not allowed to'
- b Jan mag dan sigaren roken, hij mag geen sigaren roken  
 John may then cigars smoke he may no cigars smoke  
 'John may smoke, he is not allowed to'
- c Jan mag dan geen sigaren roken, hij mag graag sigaren roken  
 John may then no cigars smoke he may gladly cigars smoke  
 'It may be true that John is not smoking cigars, but he likes to smoke cigars'
- d Jan mag sigaren roken maar 't mag niet dat hij sigaren rookt  
 John may cigars smoke but it may not that he cigars smokes  
 'John has permission to smoke cigars but it should not be that he is smoking cigars'

If the differences between the dispositional and the directed deontic interpretation in (7a), between the probability and the directed deontic interpretation (7b), between the probability and the dispositional interpretation (7c) and between the directed and non-directed deontic interpretation (7d) were a matter of vagueness, coordinating them while one is affirmative and the other is negative should yield a contradiction. This is clearly not the case in (7).<sup>5</sup>

In view of this informal semantic description, there are two semantic classes of modal interpretation: (i) a subject-oriented class, subsuming the dispositional and the directed deontic interpretation, in which the modality is ascribed to the subject, and (ii) a class that is not subject-oriented, subsuming the non-directed deontic and the probability interpretation. If this was all there is, we could maintain the traditional two-way distinction between epistemic and deontic (= root) modality. However, subject-orientation is only one of the relevant factors for the classification of modal interpretations.

<sup>5</sup> I will not exhaust the possible combinations of interpretations, but it can be shown that no combination leads to a contradiction.

The second factor for this classification is whether or not the interpretation involves a polarity transition. The term polarity transition is due to Ter Meulen (1990), who argues that the interpretation of aspectual verbs such as *stop* or *begin* involves a polarity transition: a negative and a positive stage of the event embedded under the aspectual verb. A sentence such as *John began to talk* presupposes that there is a stage in which *John is talking* is false: *begin* says that the truth value of *John is talking* switches from negative to positive. The reverse holds for *stop*. My claim is that the dispositional, directed and non-directed interpretations (henceforth **polarity interpretations**) involve a polarity transition, whereas the probability interpretation does not. The role that polarity transition plays in the interpretation of modals differs from the role it plays in the interpretation of aspectual verbs: whereas in the case of aspectual verbs an actual polarity transition takes place, the polarity transition is required, possible, desirable or permitted in the case of modals.

I will briefly digress on the interaction between modal interpretation and the semantic nature of the modal's complement to substantiate the claim that except for the probability interpretation, modal interpretations involve a polarity transition.<sup>6</sup> The aspectual class (in the sense of Vendler 1967) of the infinitive embedded under the modal is irrelevant for modal interpretation: activities, accomplishments, achievements and states all allow for the full range of modal interpretations. But an interesting effect is found when a stative verb is embedded under a modal (cf. Steedman 1977, McDowell 1987):

- (8) Jan moet tien dollar hebben  
 John must ten dollar have
- |      |                                               |                         |
|------|-----------------------------------------------|-------------------------|
| I.   | 'John definitely wants to have ten dollars'   | <b>dispositional</b>    |
| II.  | 'John has the obligation to have ten dollars' | <b>dir. deontic</b>     |
| III. | 'It is required that John has ten dollars'    | <b>non-dir. deontic</b> |
| IV.  | 'It must be true that John has ten dollars'   | <b>probability</b>      |

Interpretations I-III presuppose that the present stage is one in which John does not have ten dollars. Put differently, the interpretations I-III involve a switch of truth value, a polarity transition: the embedded proposition *John has ten dollars* is false at the speech time and required to be true at some point in the future. No such polarity transition is involved in the probability interpretation: here the speaker expresses his belief that John has ten dollars

<sup>6</sup> As is discussed below, there is another modal interpretation that does not involve a polarity transition, namely when a modal takes a proper name or a definite DP as its complement.

at the speech time. That this difference between the probability interpretation and the polarity interpretations really exists is confirmed by a test from Zwicky and Sadock (1975). If (8) is coordinated with the negation of the proposition expressed by the modal's complement, i.e. with *Jan heeft geen tien dollar*, we get a contradiction in the probability interpretation (9-I) but not in the other interpretations (9-II):

- (9) Jan moet tien dollar hebben maar hij heeft ze nog niet  
 John must ten dollar have but he has them yet not
- I. #‘It must be true that John has ten dollars but he does not have them yet’
  - II. ‘John is obliged/wants to have ten dollars but he does not have them yet’

If the polarity interpretations involve a switch of truth value, we expect individual-level predicates to disambiguate modal sentences. Since an individual-level predicate expresses a permanent property of an entity, it disallows a switch of truth value: there are no stages in which the entity does not have the property. The expectation is correct: the sentence in (10) only has a probability interpretation.

- (10) Jan moet een native speaker van het Vlaams zijn  
 John must a native speaker of the Flemish be
- I. #‘John definitely wants to be a native speaker of Flemish’
  - II. #‘John is obliged to be a native speaker of Flemish’
  - III. #‘It is required that John is a native speaker of Flemish’
  - IV. ‘It must be true that John is a native speaker of Flemish’

The relevance of a polarity transition can also be demonstrated with a perfective complement. When the perfective complement is interpreted as denoting a past event, the probability interpretation is forced, whereas the polarity interpretations arise under a future interpretation of the perfective complement:

- (11) a Jan moet gisteren zijn kamer hebben opgeruimd  
 John must yesterday his room have cleaned  
 'John must have cleaned his room yesterday'
- b Jan moet voor morgen zijn kamer hebben opgeruimd  
 John must before tomorrow his room have cleaned
- I. 'John has the strong will to have cleaned his room  
 before tomorrow'
- II. 'John has the obligation to have cleaned his room  
 before tomorrow'
- III. 'It is required that John has cleaned his room before  
 tomorrow'

When the perfective complement denotes a past event, it partitions the temporal axis in a way that I have called the once-and-for-all effect in section 3.1.2: if it is true that John has cleaned his room at the event time  $t_e$ , it will be true forever that John has cleaned his room at  $t_e$ . In this sense, from  $t_e$  on "having cleaned his room" is an individual-level property of John. Hence the probability interpretation is forced. When the perfective complement denotes a future event, John does not have the property "having cleaned his room" at the speech time and it is claimed that he will have this property at some point in the future. Here a polarity transition is possible and we get the polarity interpretations.

The resulting classification is given in (12):

(12)

| Classification of modal interpretations | [+ subject-oriented]                      | [¬ subject-oriented] |
|-----------------------------------------|-------------------------------------------|----------------------|
| [+ polarity transition]                 | dispositional<br>directed deontic         | non-directed deontic |
| [¬ polarity transition]                 | negative/positive<br>relation (cf. 5.3.3) | probability          |

Whether or not a modal sentence is interpreted as involving a polarity transition is semantically and syntactically determined by the complement of the modal, as is argued in sections 5.3 and 5.4. Much insight in the properties of the complement of modals is to be gained by examining modals with a non-verbal complement. This is what we will do first.

## 5.2 Non-verbal complements of modal verbs

The main claim of this section is that Dutch modals, as opposed to their English counterparts, can take a syntactic complement of virtually every major syntactic category, as long as such a complement obeys the semantic selectional restriction that the modal imposes. This claim is controversial. Both in traditional grammar (Geerts et al. 1984: 558) and in generative grammar (Vanden Wyngaerd 1994: 65-68; henceforth VdW) it is commonly assumed that in apparent cases of non-verbal complements, a silent infinitive is present. VdW proposes that the GO-less variant in sentences such as (13a,b), and the HAVE-less variant in (13c) are the result of PF-deletion of GO and HAVE: at all syntactic levels GO is taken to be present.

- (13) a Jan wil weg (gaan)  
       John wants away go  
       'John wants to go away'
- b Jan wil dood (gaan)  
       John want dead go  
       'John wants to die'
- c Jan wil een pizza (hebben)  
       John wants a pizza have  
       'John wants to have a pizza'

This analysis has some advantages. First, it allows us to make the cross-linguistic generalization that modals take a verbal complement. Secondly, it can be maintained that modals do not assign accusative case.

Plausible though this analysis may look for the cases in (13), problems arise once the empirical domain is broadened. Two kinds of non-verbal complements of modals can be distinguished: small clause complements and nominal arguments. I first discuss a number of arguments against a verb deletion analysis of small clause complements.

### 5.2.1 Small clause complements

First, it is not sufficient to assume that a verb GO, HAVE or another basic verb is deleted. Other, more complex verbal expressions must be assumed to be deletable as well.

- (14) a Deze lampen moeten uit (#gaan/#zijn)  
 these lights must out go/be  
 'These lights must be switched off'  
 b Die boeken mogen weg (#gaan/#zijn)  
 those books may away go/be  
 'Those books can be thrown away'

Whereas in (13) GO seemingly can be present or absent at the phonological level under identity of interpretation (but see below), in (14) the presence of overt GO leads to an entirely different interpretation: it forces the interpretations that the lights go out by themselves or the interpretation that the books go away by themselves. No such interpretations are available for the sentences in (14) without GO. Other simple verbs such as BE change the interpretation of (14) considerably as well. As the English translations indicate, the interpretation of the sentences in (14) is more like passive. To get as close as possible to the interpretation of (14a,b), a passive should be added:

- (15) a Deze lampen moeten uit **worden gedaan**  
 these lights must out be done  
 'These light must be switched off'  
 b Die boeken mogen weg **worden gedaan**  
 those books may away be done  
 'Those books can be thrown away'

Obviously, nothing in the theory excludes that *worden gedaan* in (15) is deleted at PF. However, serious problems for such an analysis are that the sentences in (14) cannot contain a *by*-phrase or an agent-oriented adverb, whereas the sentences in (15) can:

- (16) a \*Deze lampen moeten door jou uit  
these lights must by you out  
'These lights must be switched off by you'
- b Deze lampen moeten door jou uit worden gedaan  
these lights must by you off be done  
'These lights must be switched off by you'
- c De lamp moet door Piet uit en door Jan aan worden gedaan  
the light must by Pete off and by John on be done  
'The light must be switched off by Pete and on by John'
- d \*Deze boeken mogen door niemand weg  
these books may by nobody away
- e Deze boeken mogen door niemand weg worden gedaan  
these books may by nobody away be done  
'These books should not be thrown away by anybody'
- f \*Deze lampen moeten zorgvuldig uit  
these lights must carefully off
- g Deze lampen moeten zorgvuldig uit worden gedaan  
these lights must carefully off be done  
'These lights must be switched off carefully'

The contrasts between (16a) and (16b), and between (16d) and (16e) are unexpected under a PF-deletion analysis of (16a,d): if *worden gedaan* is present at every syntactic level including LF, a *by*-phrase should be able to occur in (16a,d). It is not the case that deletion of *worden gedaan* automatically requires deletion of a *by*-phrase, as the right node raising construction in (16c) shows.<sup>7</sup> The contrast between (16f) and (16g) also suggests that in (16f) *worden gedaan* is absent from the syntactic representation of these sentences.

As a second argument against PF-deletion of the infinitive, cases can be brought up where no suitable verb can be found:

- (17) Jan kan zijn werk niet aan  
John can his work not on  
'John cannot cope with his work'

Thirdly, there are cases in which the verb GO cannot be deleted:

<sup>7</sup> I test this in a right node raising construction, since deletion of a passive under a modal is bad independently of the presence of the *by*-phrase, for reasons that I do not understand:

(i) \*De krant moet worden gelezen en het boek mag  
the newspaper must be read and the book may

- (18) a Deze maatregel moet vandaag in \*(gaan)  
 this measure must today in go  
 'This measure must be effective as from today'
- b Jan wil de vervuiling tegen \*(gaan)  
 John wants the pollution against go  
 'John wants to fight pollution'

A fourth argument against PF-deletion is the following. Suppose PF-deletion would exist. The prediction is then that GO-deletion in e.g. the sentence in (19) preserves the interpretation possibilities: the variants with overt and silent GO are identical at LF. This prediction is not confirmed: the sentence with GO can have a probability interpretation, but the sentence without GO cannot. This can be made more salient by adding some material. Adding *dan* 'then' and a clause such as the one between brackets in (19) strongly favors the probability interpretation. The probability interpretation can be paraphrased as: "Although I (the speaker) admit that it is true that John is leaving, I assure you that he will return one day". Such an interpretation is clearly not available when GO is absent, as in (19b).

- (19) a Jan mag (dan) weggaan (, hij zal ooit terugkeren)  
 John may then away-go he will ever return  
 I. 'John has permission to leave'  
 II. 'It is allowed that John leaves'  
 III. 'It may be true that John is leaving, but some day he will return'
- b Jan mag (dan) weg (, hij zal ooit terugkeren)  
 I. 'John has permission to leave'  
 II. 'It is allowed that John leaves'  
 III. #'It may be true that John is leaving, but some day he will return'

The absence of a probability interpretation is a general property of modal sentences in which the modal has a non-verbal complement. None of the infinitiveless sentences in (13), (14), (17) has a probability interpretation.

In the preceding examples, the complements of the modals are small clauses. As is well-known, PP small clauses cannot be extraposed in Dutch (Hoekstra 1984), and this holds for PP-complements of modals as well, as the sentences in (20) show. These sentences are clearly cases that cannot be analyzed as involving an empty verbal constituent:

- (20)
- a dat Jan wel twee keer in die jas kan  
that John well two times in that coat can  
'that John fits twice into that coat'
  - b \*dat Jan wel twee keer kan in die jas  
that John well two times can in that coat
  - c dat Jan niet tegen katten kan  
that John not against cats can  
'that John is allergic to cats'
  - d \*dat Jan niet kan tegen katten  
that John not can against cats

Notice that the sentences in (20) do not have a probability interpretation either. The sentences in (20) typically refer to the properties of the subject: the size of John compared to that coat, John's property that he is allergic to cats. As was discussed in section 5.1, in the probability interpretation there is no semantic relation between the modal and the subject: the modality applies to the proposition as a whole, expressing a value on the probability scale.

### 5.2.2 Nominal complements

We now turn to nominal complements. Here, the probability interpretation is not available either. Some examples are given in (21) and (22).

- (21) DP-complements (names)
- a Jan mag Marie (wel)  
John may Mary (affirmative)  
'John likes Mary'
  - b Jan moet Marie \*(niet)  
John must Mary not  
'John does not like Mary'
  - c \*Jan kan Marie  
John can Mary
  - d \*Jan zal Marie  
John will Mary

- e Jan hoeft Marie \*(niet)<sup>8</sup>  
 John needs Mary not  
 'John does not want Mary'
- f Jan wil Marie  
 John wants Mary  
 'John wants Mary'

## (22) DP-complements (other than names)

- a Jan mag een koekje/\*een ingewikkelde truc/?? een plas  
 John may a cookie/an intricate trick/a pee  
 'John may have a cookie'
- b Jan moet een koekje/\*een ingewikkelde truc/een plas  
 John must a cookie/an intricate trick/a pee  
 'John definitely wants a cookie'  
 'John has to go for a pee'
- c Jan kan \*een koekje/een ingewikkelde truc/\*een plas  
 John can a cookie/an intricate trick/a pee  
 'John is able to do an intricate trick'
- d Jan zal \*een koekje/\*een ingewikkelde truc/\*een plas  
 John will a cookie/an intricate trick/a pee
- e Jan hoeft geen koekje/\*geen ingewikkelde truc/geen plas  
 John needs no cookie/no intricate trick/no pee  
 'John does not need a cookie'  
 'John does not need to go for a pee'
- f Jan wil een koekje/\*een ingewikkelde truc/\*een plas  
 John wants a cookie/an intricate trick/a pee  
 'John wants a cookie'

It might be suggested that the examples in (21) and (22) involve the presence of a phonologically empty verb DO or HAVE.<sup>9</sup> However, this

<sup>8</sup> The modal *hoeven* is a polarity item that must be licensed by negation. The modal *moeten* only requires a negation if it takes a [+definite] DP-complement.

<sup>9</sup> If the PF-deletion analysis were correct, we would expect deletion to be allowed specially in those cases where the meaning of the deleted verb is recoverable from the presence of other words that form a fixed expression with the deleted verb. For Dutch, *de was doen* 'do the wash' would be such a fixed expression. Importantly, deletion of DO is impossible in this case, even with modals that allow for the absence of DO in some cases:

- (i) a Jan kan de was \*(doen)  
 John can the wash do  
 'John can do the wash'
- b Jan kan dat trucje (doen)  
 John can that trick

would not give the exact meaning in all of the cases. In particular, the meaning of (21a,b) would be changed by adding HAVE, and it is not obvious that any other verb could give the required meaning.

One could also consider the option to save the generalization that modal auxiliaries always have a verbal complement by assuming that the modals in (21) are not modal auxiliaries but main verbs. Put differently, one could assume that there are two lexical entries for each modal. At least for *mogen* this is highly unattractive given sentences like (23):

- (23) a Jan mag graag een uur per dag hardlopen  
 John may gladly an hour a day run  
 'John likes it to run one hour a day'  
 b Jan mag Marie graag  
 John may Mary gladly  
 'John likes Mary'

The interpretation of the "modal auxiliary" *mogen* in (23a) is identical to the interpretation of the modal "main verb" *mogen* in (23b), namely 'like'. This suggests that we are dealing with the same lexical item *mogen* in both cases.

Under a verb deletion analysis, the idiosyncratic behavior of the modals in (22) is entirely unexpected, given that in all of the examples of (22) HAVE or DO can be added:

- (24) a Jan mag een koekje hebben/een ingewikkelde truc doen/een  
 plas doen  
 b Jan moet een koekje hebben/een ingewikkelde truc doen/een  
 plas doen  
 c Jan kan een koekje hebben/een ingewikkelde truc doen/een  
 plas doen  
 d Jan zal een koekje hebben/een ingewikkelde truc doen/een  
 plas doen  
 e Jan hoeft geen koekje te hebben/geen ingewikkelde truc te  
 doen/geen plas te doen  
 f Jan wil een koekje hebben/een ingewikkelde truc doen/een  
 plas doen

In such an analysis, we would have to say that four factors determine the

- c Jan moet de was \*(doen)  
 John must the wash do  
 d Jan moet een plas (doen)  
 John must a pee do

deletability of the embedded verb: (i) the modal, (ii) the embedded verb, (iii) certain combinations of a modal and a verb, and (iv) the complement of the embedded verb (cf. the contrast between *Jan moet een plas (doen)* and *Jan moet een ingewikkelde truc \*(doen)*). A much simpler explanation for the facts in (21)-(24) is that the lexical semantics of the modal verb directly imposes selectional restrictions on the DP-complement. This explains for instance the difference between *moeten* 'must' and *kunnen* 'can': whereas *moeten* (in its dispositional interpretation) is about a subject's physical needs, *kunnen* is about a subject's abilities.

Another argument against PF-deletion of the verb, already discussed in the context of small clause complements of modals, can be repeated here: the deletion of the verb does not preserve the probability interpretation, i.e. whereas none of the examples in (21)-(22) has a probability interpretation, each example in (24) does have one.

Most of the examples in (21)-(22) are ungrammatical when passivized. Do we have to conclude from this that the modals are not transitive verbs in (21)-(22) and that they do not take a nominal internal argument? The answer is no: modal verbs behave identically to other stative transitive verbs with respect to standard transitivity tests, as will be briefly shown. As has long been known (cf. Lees 1960, Chomsky 1965, Rooryck 1994), transitivity is not a sufficient condition for felicitous passivization of a verb. The verb must have a dynamic aspect. The minimal pairs in (25)-(26) show that stativity is the relevant factor in passivization and prenominal modification. The verb *geven* 'give' has a dynamic and a stative variant with an identical argument structure (cf. (25a),(26a)). The dynamic variant behaves as in (25); the stative variant as in (26).

- |      |   |                                                                               |                         |
|------|---|-------------------------------------------------------------------------------|-------------------------|
| (25) | a | Jan geeft het paard voer<br>John gives the horse feed                         |                         |
|      | b | Jan is het paard voer (aan het) geven<br>John is the horse feed (on the) give | <b>progressive</b>      |
|      | c | het (door Jan) gegeven voer<br>the by John given feed                         | <b>prenom. modifier</b> |
|      | d | Voer werd het paard niet gegeven<br>Feed was the horse not given              | <b>passive</b>          |

- (26) a Het kind geeft de oppas problemen  
the child gives the baby sit problems
- b \*Het kind is de oppas problemen (aan het) geven **progressive**.  
the child is the baby sit problems on the give
- c \*de (door het kind) gegeven problemen **prenom. modifier**  
the (by the child given) problems
- d \*Problemen werden de oppas niet gegeven **passive**  
problems were the baby sit not given

Modals behave like the stative variant of *geven*. This is shown for *mogen* in (27):

- (27) a \*Niemand is Jan (aan het) mogen **progressive**  
nobody is John on the may
- b \*de (door niemand) gemogen jongen **prenom. modifier**  
the by nobody may (part) boy
- c \*Jan wordt door bijna niemand gemogen **passive**  
John is by almost nobody may (part)

Since both modals and transitive statives select the auxiliary HAVE in the perfect, as (28) shows, there does not appear to be any reason to assign the modals in (21)-(22) a syntactic status different from stative transitive verbs:

- (28) a Het kind heeft/\*is de oppas vaker problemen gegeven  
the child has/is the baby sit more often problems given
- b Jan heeft/\*is Marie nooit gemogen  
John has/is Mary never may (part)

To a certain extent, modals occur in the transitivity alternation [NP1 V NP2]-[NP2 V] exhibited by BREAK-type verbs.<sup>10</sup> The best results are

<sup>10</sup> Modals differ from the *break* class in that they do not alternate between transitive and unaccusative, at least according to the diagnostic of auxiliary selection. In this respect, modals are similar to verbs such as *koken* 'boil' and *drogen* 'dry'. The latter class of verbs takes HAVE in the NP V alternant. They also allow BE, but only in the perfective passive. Since modals cannot be passivized, they do not allow BE.

- (i) a Jan heeft/\*is het glas gebroken  
John has/is the glass broken
- b Het glas is/\*heeft gebroken  
the glass is/has broken
- d Jan heeft/\*is veel gekund  
John has/is much can (participle)

obtained when the modal's complement is a bare plural or a quantified noun phrase.

- (29) a Jan kan alles  
John can all  
'John is capable for everything'
- b Alles kan  
all can  
'Everything is possible/allowed'
- c Jan kan veel/weinig/niets/wat/iets  
John can much/little/nothing/what/something  
'John has many/little/no/some capacities'
- d Er kan veel/weinig/niets/wat/iets  
there can much/little/nothing/what/something  
'Much/little/nothing/something is possible/allowed'

- e Alles had/\*is gekund  
all had/is can (participle)
- f Jan heeft/\*is soep gekookt  
John has/is soup cooked
- g De soep heeft/is een uur gekookt  
the soup has/is an hour cooked

The fact that modals do not take HAVE in the [NP V] alternant does not necessarily imply that modals are not unaccusative in that case. It has been claimed in the literature that auxiliary selection is determined by aspect and that some unaccusatives select HAVE (cf. Mulder & Wehrmann 1989).

- (30) a Jan mag van zijn vader geen stiletto  
John may of his father no switchblade  
'John's father does not allow him to have a switchblade'
- b Stiletto's mogen/\*mag tegenwoordig niet meer  
Switchblades may (plur)/may (sing) nowadays not more  
'Switchblades aren't allowed anymore nowadays'
- c Stiletto's hebben mag/\*mogen tegenwoordig niet meer  
switchblades have may(sing)/may(plur) nowadays not anymore  
'Having switchblades is not allowed anymore nowadays'
- d Jan kan zijn broeken weer aan  
John can his trousers again on  
'John's trousers fit again'
- e Zijn broeken kunnen weer aan  
His trousers can again on  
'His trousers fit again'

There are cases where only the intransitive variant NP V exists:

- (31) a \*Jan kan geen lange haren  
John can no long hair
- b Lange haren kunnen echt niet meer (voor mannen)  
long hairs can really not more for men  
'Long hair has become old fashioned (for men)'

The sentences in (30b)-(31b) are particularly convincing examples of non-verbal complements to modals. If *stiletto's* in (30b) were an internal argument of a deleted embedded verb, this deleted verb should be *hebben* 'have' or *bezitten* 'possess', given the interpretation of (30a,b). Since *stiletto's* in (30b) agrees with the modal in number, it is the surface subject. This implies that it must have raised. For this to be possible, the deleted verb must be unaccusative or passive. However, the verbs *hebben* 'have' and *bezitten* 'possess' neither occur as unaccusatives nor in the passive:

- (32) a Jan heeft/bezit een stiletto  
John has/possesses a switchblade
- b \*Een stiletto wordt door Jan gehad/bezeten  
a switchblade is by John had/possessed
- c \*Een stiletto heeft/bezit  
a switchblade has/possesses

It is also impossible to derive (30b) from (30c) by deleting *hebben* at PF. If *hebben* is there, the modal agrees with it: it occurs in the singular, as in (30c).

If *hebben* is absent, as in (30b), the modal occurs in the plural, in agreement with *stiletto's*.

As for (31b), assuming *gedragen worden* ('be worn') as the deleted verbal constituent yields a sloppy approximation of its meaning and is awkward, and it is even completely impossible when *voor mannen* is present:

- (33) a ??Lange haren kunnen niet meer gedragen worden  
 long hairs can not anymore worn be  
 b \*Lange haren kunnen niet meer gedragen worden voor  
 long hairs can not anymore worn be for  
 mannen  
 men

### 5.2.3 Conclusion—on raising and control

From the evidence provided in this section it can be safely concluded that Dutch modals allow a non-verbal complement. With this said, we can make a strong argument against the classical analysis of the epistemic/root distinction in terms of control versus raising (cf. Hofmann 1966, Ross 1969, Perlmutter 1970; for Dutch, cf. Klooster 1986).<sup>11</sup> The classical analysis can be briefly summarized as follows. In the root interpretations (i.e. the subject-oriented interpretations), the modal assigns a theta-role to its subject. This subject is the controller of PRO, which is the subject of the embedded verb. In the epistemic (= probability) interpretation, the subject does not assign a theta-role to the subject. The subject of the embedded verb raises to the specifier of the modal projection. This is meant to capture the observation that in the root interpretation the modal expresses a semantic relation between the subject and the embedded verb, whereas in the epistemic interpretation the modal is semantically a predicate of the entire proposition.

Now note that a modal with a non-verbal complement, e.g. the PP in (34), has the three polarity interpretations (I-III), but not the probability interpretation (IV):

<sup>11</sup> See Picallo (1990) for convincing arguments against a control versus raising analysis of Catalan modals.

- (34) Jan moet [<sub>PP</sub> in de regering]  
 John must in the government
- I. 'John definitely wants to be a member of the government'
  - II. 'John is obliged to become a member of the government'
  - III. 'John in the government, that's necessary'
  - IV. #'John in the government, that's necessarily true'

The semantic relation between the DP *Jan* and the PP *in de regering* can be expressed in two ways: either by base-generating the DP in [<sub>spec,PP</sub>] and moving it up to [<sub>spec,IP</sub>] for case or checking reasons, or by base-generating PRO in [<sub>spec,PP</sub>] and *Jan* in [<sub>spec,IP</sub>], where the DP *Jan* controls PRO. However, since the PP is a small clause complement, its subject cannot be PRO (Stowell 1981).<sup>12</sup> Thus, despite the fact that (34) must be the result of raising the subject from [<sub>spec,PP</sub>] to [<sub>spec,IP</sub>], the sentence has the root interpretations, i.e. the dispositional and the directed deontic interpretation, and it does not have the epistemic, i.e. the probability interpretation. This is exactly the opposite of what the control-raising analysis predicts.

This section may be summarized as follows:

- (35) (i) Modal verbs in Dutch select both verbal and non-verbal complements.
- (ii) The non-verbal complement of a modal can be a small clause or a nominal argument.
- (iii) Non-verbal complements block the probability interpretation.
- (iv) The difference between probability and polarity interpretations does not correspond to the syntactic difference between raising and control structures.

Now that we have established that Dutch modals can take a non-verbal complement, the stage is set for an examination of the intracategorical restrictions that modal verbs impose on their complement. It is shown in the next section that the seemingly complex selectional restrictions that modals impose on their complement can be captured in one simple statement. The fact that such a simple statement is possible is in itself of course another strong argument against a verb deletion analysis of modal verbs with a non-verbal complement.

<sup>12</sup> Notice that this conclusion holds regardless of the analysis of small clause constituents.

### 5.3 Semantic description of the complement of modals

#### 5.3.1 Adjectival complements

The first syntactic category to be examined are the adjectives. In the preceding section, it was shown that non-verbal complements block the probability interpretation of the modal: they only allow the three polarity interpretations. From section 5.1, we know that the polarity interpretations require a switch of truth value: a stage  $t_1$  in which the proposition embedded under the modal is false and a stage  $t_2$  in which that proposition is required, permitted or desired to be true. The immediate expectation is that individual-level adjectives cannot occur as the complement of a modal, since the characteristic property of an individual-level predicate is that if it holds of an entity at stage  $t_1$ , then it holds of this entity at any stage  $t_2$ . This expectation is correct, as (36) illustrates. However, this does not automatically imply that every stage-level adjective can be the complement of a modal: only a subclass of the stage-level adjectives can be such a complement, e.g. the ones in (37); some other members of this class are *dood* 'dead', *kapot* 'broken', *dicht* 'closed', *vol* 'full', *vast* 'fixed'. Some of the classical stage-level predicates, such as *beschikbaar* 'available', *ziek* 'ill' are completely impossible under a modal, as (38) shows.

- (36) a \*Het verhaal kan leuk  
the story can funny  
b \*Het programma kan lang  
the program can long  
c \*De programmamakers mogen intelligent  
the producers may intelligent
- 
- (37) a De trossen mogen los  
the hawsers may loose  
'You can cast off'  
b De fles moet leeg  
the bottle must empty  
'That bottle must be emptied'  
c Het raam kan open  
the window can open  
'It is allowed/possible to open that window'

- (38) a \*Jan kan ziek  
       John can ill  
       b \*Die fiets mag beschikbaar  
           that bicycle may available

Apparently, a distinction more refined than individual-level versus stage-level predicate must be made. I claim that a modal's complement must obey the selectional restriction in (39):

(39) **Selectional restriction on the complement of a modal**

The complement of a modal must denote a value on a bounded lattice. In modal contexts, this usually is a linear ordering with 0 as the lower and 1 as the upper bound

The selectional restriction in (39) will be demonstrated first for the example in (37b).

The adjective *leeg* 'empty' in (37b) introduces a volume scale and a value on that scale for which [*die fles leeg*] is false at the matrix *t*. The scale goes from not empty via intermediate values such as half empty and almost empty and ends at completely empty. The other adjectives in (37) introduce identical scales. Schematically:

|      |                       |                       |                       |
|------|-----------------------|-----------------------|-----------------------|
| (40) | 0-----1/2-----1       |                       |                       |
|      | <i>t</i> <sub>1</sub> | <i>t</i> <sub>2</sub> | <i>t</i> <sub>3</sub> |
|      | <i>vol</i>            | <i>half leeg</i>      | <i>leeg</i>           |
|      | ‘full’                | ‘halfway empty’       | ‘empty’               |
|      | <i>vast</i>           | <i>half los</i>       | <i>los</i>            |
|      | ‘fixed’               | ‘halfway loose’       | ‘loose’               |
|      | <i>dicht</i>          | <i>half open</i>      | <i>open</i>           |
|      | ‘closed’              | ‘halfway open’        | ‘open’                |

For (37b) to be felicitous at matrix time,  $\alpha$  in *the bottle is  $\alpha$  empty* must have one of the values from 0 to 1 on the scale in (40), but not 1 itself. The volume scale is directly mapped onto a temporal scale, for obvious reasons: one and the same bottle cannot have the value 1 and some other value on the volume scale at one particular time *t*. For an object to go from the value 1/2 to the value 1 on the emptiness scale, two distinct *t*'s are required.

The computation of the interpretation of *De fles moet leeg* runs as in (41). The different steps in (41) can be viewed as cognitive operations on the information that the sentence provides.

- (41) Interpretation of *De fles moet leeg*  
 Step 1:  $\neg$  [the bottle is 1 empty at  $t_{\text{matrix}}$ ]  
 Step 2: [the bottle is  $\alpha$  empty at  $t_{\text{matrix}}$ , AND  $0 \leq \alpha < 1$ ]  
 Step 3: The value of the bottle on the emptiness scale must raise from  $\alpha$  to 1

Thus, from the utterance *De fles moet leeg*, the hearer concludes that (i) the bottle is not empty now. By this denial of 'the bottle is empty now', (ii) the hearer gets all the values that the bottle can now have on the emptiness-scale, namely the ones from 0 up to 1, but not 1 itself. If the hearer concludes that the bottle is  $\alpha$  empty, then (iii) he knows that the value that the bottle has on the emptiness scale must be raised from  $\alpha$  to 1, since *leeg* 'empty' introduces a linear ordering, having the properties of transitivity and antisymmetry. Put differently, the fact that *leeg* denotes a value on a bounded linear ordering enables the hearer to unambiguously deduce the **direction** of the required **change** on the linear ordering: (37b) says that the value of the bottle on the volume scale must raise to 1.

It may be tempting to think that an unambiguous deduction of the direction of the change on a the linear ordering from an example such as (37b) is possible only because in (37b) the required value on the scale is identical to the end point of the scale itself. After all, since the possible values that the bottle can have can only be on one side of *leeg*, there is only one possible direction. The question is now what happens when the end point of the direction does not coincide with the upper or lower bound of the scale, as in (42).

- (42) a De fles moet half leeg  
 the bottle must halfway empty  
 b De fles is half leeg  
 the bottle is halfway empty  
 c 0----- $\frac{1}{2}$ -----1  
 full                      halfway empty                      empty

If the negation of 'half empty' implied "any other value on the scale but not  $\frac{1}{2}$ ", then it would no longer be possible to deduce the direction of the change: the present value could be between 0 and  $\frac{1}{2}$  or between  $\frac{1}{2}$  and 1. In the first case, the bottle would be required to get emptier, in the second case, the bottle would be required to get fuller. However, the negation of half empty does not select all values except  $\frac{1}{2}$ . This becomes clear when we look at (42b). The emptiness scale has a cumulative nature: stating that the bottle is half empty implies that it is also true that a quarter, one eighth

(and so on) of the bottle is empty. Thus, a sentence like (42b) selects all of the values between 0 and  $\frac{1}{2}$  in (42c). When (42b) is denied, all of the values between  $\frac{1}{2}$  and 1 are selected: when it is claimed that the bottle is not halfway empty, then it is also not the case that three quarters of the bottle or the whole bottle is empty. Thus, when it is claimed that the bottle is not halfway empty, it must have a value between 0 and  $\frac{1}{2}$ , e.g. a quarter of the bottle may be empty.<sup>13</sup>

Recall now that the first step in interpreting a sentence containing a modal was to deny the proposition expressed by the modal's complement, [*de fles half leeg*] in the case of (42a). This makes the values between 0 and  $\frac{1}{2}$  available as possible values, i.e. at the matrix time, the bottle is full or somewhere in between full and halfway empty. Given that each value between 0 and  $\frac{1}{2}$  is ordered with respect to the other and with respect to  $\frac{1}{2}$ , an unambiguous direction on the linear ordering is deducible.

If it is true that the complement of a modal must denote a value on a bounded lattice, it is to be expected to find two types of adjectival predicates that cannot occur in the complement of a modal: (i) predicates that lack the lower or upper bound or both, and (ii) predicates that do not introduce a linear ordering at all. The individual-level predicates *leuk* 'funny', *intelligent* and *lang* 'tall' are instances of the first type of predicate. Although they can be said to introduce a scale, or at least to be scalable, none of them has an upper bound. As opposed to *leeg*-type of predicates, these predicates cannot be modified by elements that need an upper bound to get an interpretation: it does not make sense to say *John is halfway funny/intelligent/tall* since it is not clear what it means to be completely funny/intelligent/tall. Negation of such predicates has an effect entirely different from negation of *leeg*-type of predicates: whereas negation of a predicate of the latter type exactly gives the complement set of values on the linear ordering, negation of predicates of the former type does not: *John is not funny/intelligent/tall* does not split the scales introduced by *funny/intelligent/tall* into a set of values for  $\alpha$  for which *John is  $\alpha$  funny/intelligent/tall* is true and a set of values of  $\alpha$  for which this proposition is false. Not doing this, these predicates do not enable a hearer to establish the direction of the change of the value unambiguously. Stating the same in

<sup>13</sup> This is the unmarked result of negating *de fles is half leeg*. With marked intonation, e.g. focus on *half*, it is possible to overrule the properties of the emptiness scale described in the main text:

- (i) De fles is niet HALF leeg, hij is helemaal leeg  
 the bottle is not half empty, he is totally empty  
 'The bottle is not halfway empty, it is totally empty'

I thank Wim Klooster for pointing this out.

a more technical way, individual-level predicates like *funny/intelligent/tall* have semilattices as their denotation domain and semilattices are not closed under complements (cf. Szabolcsi & Zwarts 1993 for discussion). Since the interpretation of a sentence containing a modal is claimed here to crucially involve taking a complement set of a linear ordering, such predicates cannot occur as the head of the small clause complement of a modal.

An example of the second type of predicates that is predicted not to occur as the complement of a modal, is the stage-level predicate *beschikbaar* 'available'. Such predicates do not introduce a linear ordering at all. Whereas the individual-level predicates just discussed can be modified by elements like *erg* 'very' and *een beetje* 'a little' (*erg intelligent* 'very intelligent', *een beetje leuk* 'a little bit funny'), a predicate like *beschikbaar* cannot (*\*erg beschikbaar* 'very available', *\*een beetje beschikbaar* 'a little bit available'). This predicate cannot occur in the comparative either *\*Jan is beschikbaarder dan Marie* 'John is more available than Mary'. Not introducing a linear ordering, the predicate is not interpretable as a value on a linear ordering, hence it cannot be the head of a small clause complement of a modal.

We now have an explanation of the facts in (36)-(38): the modal's complement must denote a value on a bounded lattice because only then is it possible for a hearer to unambiguously deduce the direction of a change on a linear ordering. Given this explanation, the contrasts in (43)-(44) do not come as a surprise:

- (43) a \*Het verhaal kan leuk  
the story can funny  
b \*Het programma moet lang  
that program moet long  
c \*De programmamakers mogen intelligent  
the producers may intelligent
- (44) a Het verhaal kan veel leuker  
that story can much funnier  
b Het programma moet een uur langer  
that program must an hour longer  
c De programmamakers mogen wel wat intelligenter  
the producers may well what intelligenter

The idea that a comparative denotes a value on a bounded lattice can be illustrated most easily with the example in (44b). The relevant axis is given in (45):

(45)                   -----0-----1----- time (in hours)  
                                          one hour

Here, we are talking about relative length: a "longer"-scale. The lower bound of this scale is 0 longer: i.e. the absolute length  $x$  of the program at speech time. The upper bound of the scale is 1 longer:  $x + 1$  hour. The choice of the value 1 is again irrelevant: any other upper bound can be reduced to 1. A difference between the comparative in (44b) and the ones in (44a,c) is that the latter do not exactly specify how much funnier the story or how much more intelligent the producers should be. In these cases, some value  $y$  on the scale must be taken. This value  $y$  then functions as the upper bound and is reducible to 1.

### 5.3.2 Prepositional complements

The prediction for PP-complements of modals is that only PPs that can receive a directional interpretation may be the complement of a modal. Three situations must be distinguished: (i) PPs that can only have a directional interpretation can be the complement of a modal (46); (ii) PPs that are ambiguous between a directional and a locative interpretation (depending on the verb that they are a complement of) are disambiguated under a modal (47); (iii) PPs that can only have a locative interpretation are ungrammatical under a modal (48):

- |      |   |                                                                        |                    |
|------|---|------------------------------------------------------------------------|--------------------|
| (46) | a | Jan gaat naar Marie toe<br>John goes to Mary to                        | <b>directional</b> |
|      | b | Jan is naar Marie toe<br>John is to Mary to                            | <b>directional</b> |
|      | c | Jan mag naar Marie toe<br>John may to Mary to<br>'John can go to Mary' |                    |

- (47) a Die papieren gaan in de prullenmand **directional**  
 those papers go into the waste basket
- b Die papieren liggen in de prullenmand **locative**  
 those papers lay in the waste basket
- c Die papieren moeten in de prullenmand  
 those papers must in the waste basket  
 I. 'Those papers must be thrown into the waste basket' **dir.**  
 II. #'Those papers must be in the waste basket' **loc.**
- (48) a \*Jan gaat thuis/in Amsterdam **directional**  
 John goes at home/in Amsterdam
- b Jan is thuis/in Amsterdam **locative**  
 John is at home/in Amsterdam
- c \*Jan kan thuis/in Amsterdam  
 John can at home/in Amsterdam

So called ergative prepositions and particles (cf. Guéron 1990, Den Dikken 1995), can also be embedded under a modal, as long as they denote a bounded lattice:

- (49) a De wijn moet op  
 the wine must up  
 'The wine is to be finished'
- b De rolgordijnen mogen neer  
 the blinds may down  
 'The blinds can be lowered'
- c Die kleren kunnen uit  
 those clothes can off  
 'Those clothes can be taken off'

### 5.3.3 Nominal complements

Nominal predicates are expected to be impossible as a complement of a modal, since they do not introduce a bounded lattice.

- (50) a \*Jan moet voorzitter  
 John must chair
- b \*Jan kan dokter  
 John can doctor

The cases discussed in section 5.1.1 in which the modal appears to be a

transitive verb can be shown to fall under the generalization in (39). Consider first (51).

- (51) a Jan moet Marie \*(niet)  
 John must Mary not  
 'John does not like Mary'  
 b Jan mag Marie ?(wel)  
 John may Mary well  
 'John likes Mary'

The crucial observation for these cases is that in a sentence like *Jan moet Marie \*(niet)* 'John does not like Mary', the modal *moeten* 'must' requires the presence of a negation. If we assume that in *Jan mag Marie (wel)* 'John likes Mary' the counterpart of negation, *wel* 'affirmative', 'positive', must always be present (overtly or covertly), we have the required bounded lattice: the scale from *niet* to *wel* has the same properties as the bounded linear orderings we have discussed up to this point (importantly, *wel-niet* introduces a scale, not a binary distinction, witness the fact that we can address intermediate points on the scale: *haast wel* 'almost true', *bijna niet* 'almost not'). Apparently, then, when the complement does not introduce a bounded lattice itself, it is sufficient to add the *niet-wel* scale to save the structure.<sup>14</sup> The resulting interpretation is that the modal indicates the degree in which there is a negative or positive relation between the subject and the object.

For nominal complements with more syntactic structure than names, as in (52), the situation is slightly more complex.

- (52) a Jan moet een hond  
 John must a dog  
 'John definitely wants to have a dog'  
 b ??Jan moet de hond  
 John must the dog  
 c Jan kan twee dingen: werken en slapen  
 John can two things to work and to sleep

The grammaticality of (52a,c) is not surprising in view of the linear ordering requirement: the set of integers is of course a linear ordering. In the example the upper bound is 1. Taking the embedded proposition to be *John has  $\alpha$  dog*, the relevant change on the linear ordering is that  $\alpha$  is 0 at speech

<sup>14</sup> Though not in cases like (50). I have no explanation for this contrast.

time and should become 1.<sup>15</sup> In (52c) the upper bound is 2 instead of 1; obviously, every other integer as an upper bound is equivalent to 1 as an upper bound. As (52b) shows, definite DPs make bad complements of a modal. The explanation is the same as for names: a definite DP does not introduce a bounded lattice. We expect (52b) to improve when negation is added, and this is borne out:

- (53) . Jan moet de hond niet  
       John must the dog not  
       'John does not like the dog'

There are other ways to make definite DP-complements better. One is to focus the noun, an other is to use a focused demonstrative:

- (54) a Jan moet de HOND  
       John must the dog  
       'John definitely wants the dog'  
       b Jan moet DIE hond  
       John must that dog  
       'John definitely wants that dog'

In (54a), from a presupposed set of individuals including exactly one dog, John wants to have the dog. In (54b), it is the particular dog pointed at that John wants, and not the other dogs in a presupposed set. Apparently, the subset-superset relation created by focus is sufficient here. This set-theoretic inclusion yields a bounded lattice: since focus operates on a presupposed finite set, the upper bound is given. Set-theoretic inclusion is not equivalent to linear ordering. Since a linear ordering from 0 up to and including 1 is a special case of a bounded lattice, the term bounded lattice exactly covers the selectional restriction imposed by a modal.

As for the definite DP in (52b), a subset-superset relation is hard to get: the definite determiner presupposes that there is only one particular dog in the discourse domain. From this singleton, no proper subset can be taken that contains an individual. Obviously, focus on the determiner or the noun cannot be used to save modals with a name as their complement. Names do not come with determiners in Dutch, but more importantly, the effect of focus would have to be that a subset-superset relation is called into existence, but this is of course impossible in the case of names.

<sup>15</sup> In section 5.4, it will be argued that the possessive relation between *John* and *a dog* is determined syntactically and that there is no empty verb HAVE involved.

### 5.3.4 Verbal complements

We have seen that non-verbal complements of modals can denote different kinds of scales: e.g. volume, space and comparative. Since modals with a verbal complement also allow polarity interpretations, the question now arises what kind of scale verbal complements introduce in that case. A sentence such as *Jan moet werken* 'John must work' means: there is a requirement that the state of affairs *there is no event "John is working"* switches to *there is an event "John is working"*. That is, the cardinality of the event is required to switch from 0 to 1, just as in the case of a indefinite nominal complement (*Jan moet een hond* 'John wants a dog'). As with non-verbal complements, the different stages *t* come in as a side-effect: since it is logically impossible for there to be no event *John is working* and an event *John is working* at one and the same time *t*, two distinct *t*'s are needed. Hence, in the polarity interpretation the verbal complement does not introduce the temporal but the numerical axis. In section 5.4 syntactic evidence supporting this claim will be provided; in particular it will be shown that the complement of a modal is not a TP or CP.

Semantic evidence for this claim can be given as well. As was said earlier, there are modifiers that can only apply to constituents denoting an upper bound. We can say that a bottle is halfway empty because we know the upper bound of emptiness, but we cannot say that John is halfway intelligent or tall since intelligence and tallness have no upper bound. A modifier such as *halfway* (*half*) can be used to modify an infinitive under a modal, and its presence strongly favors the polarity interpretations (55a). Compare also the parallel between (55b,c). Here, the modifier *meer dan* 'more than' has exactly the same effect on a noun phrase with a numeral as on the infinitive.

- (55) a *Jan moest half huilen*  
       John must(past) half cry  
       'John was torn between laughter and tears'
- b *Jan heeft meer dan één verplichting*  
       John has more than one obligation  
       'John has more than one obligation'
- c *Jan moet meer dan werken*  
       John must more than work  
       'John has more obligations than just working'

The modifier *half* in (55a) modifies the value 1 on the numerical axis, not a value on the temporal axis: it says that there was a half cry event, but it does not say that John was halfway of reaching the moment at which he

would start to cry.

The difference between indefinite noun phrases and infinitives then seems to be the denotation of the lexical element: an entity in the case of an indefinite DP and an event in the case of an infinitival verb. The idea to treat infinitival complements as indefinites is not new. Higginbotham (1983) treats infinitival complements of perception verbs as existentially quantified constituents. Below, I provide more evidence for the similarity of infinitives in the polarity interpretation and indefinites.

So much for the polarity interpretations. What about the verbal complement when the modal gets a probability interpretation? Semantically, it is quite clear that the modal does not qualify a value between 0 and 1 on the numerical scale in this case: it is a qualifier of a value on the probability or yes-no scale, which of course has the same set-theoretic properties as the numerical scale between 0 and 1. The test of modifying the upper bound shows that the upper bound of the relevant scale is "positive" or "affirmative" in (56a) and "negative" in (56b).

- (56) a Jan moet bijna wel werken nu  
 John must almost AFF work now  
 'It is almost certainly the case that John is working now'
- b Jan kan haast niet werken nu  
 John can almost not work now  
 'It is almost impossible that John is working now'

The defining difference between the probability interpretation and the polarity interpretations is that the latter involve a polarity transition but the former does not. There being no polarity transition in the probability interpretation, there are not necessarily two distinct moments *t* either. I attribute this difference to the kind of scale involved: the negative-positive scale for the probability interpretation, the numerical 0-1 scale for the polarity interpretation. Recall that definite nominal complements, as in *Jan moet Marie niet* 'John does not like Mary', do not involve two distinct moments *t* either: here the modal is about the degree in which the relation between *John* and *Mary* is positive or negative. In these respects, definite nominal complements and verbal complements in the probability interpretation are similar. The parallel between nominal and verbal complements are summarized in (57):

(57)

|                    | [+ polarity transition]                            | [ $\neg$ polarity transition]                                                                       |
|--------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| nominal complement | cardinality scale (0-1)<br>(indefinite complement) | negative - positive scale<br>(applying to a relation between two entities)<br>(definite complement) |
| verbal complement  | cardinality scale (0-1)                            | negative - positive scale<br>(probability)                                                          |

In the case of nominal complements, the cardinality scale is chosen if the complement is an indefinite, whereas the negative-positive scale is chosen if the complement is definite.<sup>16</sup> The semantic parallels between nominal and verbal complements suggest that in the polarity interpretations, the verbal complement is indefinite, whereas in the probability interpretation the verbal complement is definite. In section 5.4, a number of arguments are provided that confirm this.

### 5.3.5 Conclusion

The statement in (39) not only captures the selectional restrictions imposed on a modal's complement, it also makes the semantic contribution of the complement explicit: a value on a bounded lattice. Given this, modal verbs can be simply analyzed as qualifiers, since their semantic contribution is as stated in (58):

(58) **The interpretation of modal verbs**

A modal verb qualifies a value on a bounded lattice. It says that this value is possible, required, permitted or desirable.

<sup>16</sup> Except when the determiner or the noun of a definite noun phrase is focused. A modal with such a complement does not express a negative or positive relation but has a polarity interpretation (cf. (54)), just like a modal with an indefinite nominal complement. The syntactic analysis to be developed below crucially hinges on the syntactic difference between definite and indefinite complements. Since definite noun phrases with focus are like indefinite noun phrases semantically, it must be assumed that they do not have the same syntactic structure as ordinary definite noun phrases. I leave the syntactic structure of definite noun phrases with focus for further research.

Thus, there are two crucial building blocks in the interpretation of a modal sentence: (i) the modal's complement denoting a value on a bounded lattice; (ii) the modal qualifying that value. This is about everything a hearer needs and gets for a full interpretation of a modal sentence: he deduces the rest from (i) and (ii).

For instance, the first step in (41) is a matter of combining the sentence *de fles moet leeg* 'the bottle must empty' with pragmatic knowledge. Assuming that the speaker is sincere and informative (i.e. assuming Grice's cooperation principle (Grice 1975)), the hearer concludes from *de fles moet leeg* that the bottle is not empty at the speech time. There is no reason to think that the denial of the embedded proposition is represented syntactically or semantically by a negation. Nor is there any reason to think that the syntactic or semantic representation contains two different moments  $t_1$  and  $t_2$ : the involvement of two different moments  $t$  in the polarity interpretations of modal sentences is just a side effect of the presence of a predicate denoting a value on a bounded lattice. Simply put, since one and the same bottle cannot be completely empty and halfway empty at one particular  $t$ , there must be two distinct  $t$ 's. This conclusion is logically implied by the sentence *de fles moet leeg*.

The polarity transition that was argued in section 5.1 to be characteristic of the polarity interpretation directly applies to the value denoted by the modal's complement: the subject does not have that value on the introduced scale at  $t_1$  and is required to have that value at some  $t_2$ . In other words, the truth of the embedded proposition is evaluated relative to a value on a bounded lattice. In intensional logic, the truth of modal sentences is evaluated relative to an index, where this index can indicate a world, a different time, or whatever index is needed (cf. Partee et al. 1990 for discussion and references). What non-verbal modal complementation in Dutch shows is that such an index must be introduced by a syntactic constituent.<sup>17</sup>

<sup>17</sup> The selectional restriction that modals impose on their complement is a restriction specific for modals, not a general selectional restriction on small clause complements. As the examples in (i) show, resultative small clause complements may contain predicates that can never occur as the complement of a modal, such as an individual-level predicate (i-a), a nominal predicate (i-b) and a non-scalar stage-level predicate (i-c).

- (i) a Die bril maakt Jan intelligent  
 those glasses make John intelligent  
 b De vergadering maakte Jan voorzitter  
 the meeting made John chair  
 c De regering maakt meer geld voor onderzoek beschikbaar  
 the government makes more money for research available

## 5.4 The syntax of modal verbs

In this section I investigate how syntactic structure determines the interpretation of modal sentences. Recall from section 5.1 that semantically two factors determine modal interpretation: (i) the subject-orientation of the modal, i.e. whether or not the modality is ascribed to the subject, and (ii) the involvement of a polarity transition. Subject-oriented interpretations will be shown to be available only if certain syntactic relations between the modal and the subject are determined, along the lines of the Principle of Semantic Interpretation. A polarity transition is involved only if the modal qualifies a complement that denotes a value on a bounded lattice. Evidence is provided that in Dutch, the complement of a modal must move overtly to the specifier of the projection of the modal to make the modal interpretable as a qualifier of its complement. A theory of the syntactic and semantic relations between a modal and a subject presupposes a theory of the syntactic position of subjects, and more generally, a theory of the syntactic structure of VP. I provide such a theory first, extending Kayne's (1993) analysis of possessive structures to all verbs by integrating ideas of Hale and Keyser (1993).

### 5.4.1 The syntactic position of the subject and the structure of VP

A simple and intuitive semantic test for qualification is that Y is a qualifier of X if X is Y (*old* is a qualifier of *John* if John is old). According to this test, an unergative verb cannot be a direct qualifier of its subject. For example, there is no way in which *John works* could pass this test. The same conclusion is reached in Hale and Keyser (1993: sections 2.3-4), on different grounds. They explain the existence of lexical gaps, i.e. the systematic absence of lexical syntactic causative constructions built on unergative verbs (e.g. \**We'll sing Loretta this evening*) by assuming that the subject of unergative verbs is not present in the Lexical Relational Structure (the argument structure) of an unergative verb. Instead, they propose to base generate the subject in [spec,IP].<sup>18</sup> I would like to argue that it is an abstract D or P, instead of I, that establishes the crucial semantic relation between the subject and the event.

There is empirical evidence that the semantic relation between a subject and an event can be established by a preposition.<sup>19</sup> The construction in

<sup>18</sup> Cf. Williams (1980), Chomsky (1981), Rothstein (1983) for other VP-external subject proposals.

<sup>19</sup> Cf. Mahajan (1994) and Hoekstra (1994) for proposals in which the relation between a

(60) is not completely productive, although there are many more examples. The construction in (61), a progressive, is productive: any verb can occur in it as long as it is not stative.

- (60) a Jan is op reis = Jan reist  
       John is on travel 'John is travelling'  
       b Jan is aan het werk = Jan werkt  
       John is on the work 'John is working'  
       c Jan is in het bezit van een auto = Jan bezit een auto  
       John is in the possession of a car John owns a car<sup>20</sup>
- (61) a Jan is aan het roddelen  
       John is on the gossip  
       'John is gossiping'  
       b Jan is aan het eten  
       John is on the eat  
       'John is eating'

The PPs in (60)-(61) cannot be extraposed, which tells us that they are small clause predicates. Semantically, the surface subject is the subject of these PPs. Since BE is a raising predicate, the analysis of (60)-(61) should be:

- (62)  $DP_i$  BE [<sub>PP</sub>  $t_i$  [<sub>PP</sub> [P [DP]]]]

In these cases, the preposition P establishes the semantic relation between the event denoted by the DP-complement of P and the DP-subject of P.

Does this imply that the relation between a subject and an event is always established by a preposition? Not necessarily. English and Dutch have an alternative way to establish a semantic relation between two DPs: by genitive case. Genitive case appears to be a general enough semantic relation to subsume all kinds of more specific semantic relations between two DPs. For instance, in *John's portrait*, *John* can be interpreted as the artist, the possessor, the origin (the one who brought the portrait), and the one

verb and a subject is established via a preposition.

<sup>20</sup> Strangely enough, the two sentences in (i) mean the same:

- (i) a Jan is in het bezit van de grootste auto  
       John is in the possession of the biggest car  
       'John possesses the biggest car'  
       b De grootste auto is in het bezit van Jan  
       the biggest car is in the possession of John  
       'John possesses the biggest car'

portrayed. Similarly, the semantic relation between the event nouns and their subject in (60) can be established by genitive case:

- (63) Jans reis/werk/bezit  
John's travel/work/possession

The genitive relation allows for at least the following interpretations of the subject: starting point, source, origin, possessor, agent, cause, theme. DPs such as the one in (63) are usually analyzed as in (64) (cf. Szabolcsi 1983, Abney 1987):

- (64)
- ```

      DP*
     /  \
    DP   DP
   /  \  /  \
  Jan  s D   NP
  John s   werk
         s   work
  
```

If it is genitive case, or rather D, that is responsible for the semantic relation between the subject and the event, then something like (64) can be taken as the basis of all unergative verbs by extending and slightly modifying Kayne's (1993) analysis of possessive verbs. The structure that Kayne assumes for possessive sentences is given in (65).²¹

- (65)
- ```

 beP
 / \
 be DP*
 / \
 spec DP
 / \
 D AgrP*
 / \
 DPpossessor AgrP
 | / \
 John Agr NPpossessee
 | |
 | a sister

```

<sup>21</sup> In Kayne (1993), the head D is D/P, indicating that this head has D- and P-like properties.

According to Kayne, the sentence *John has a sister* is derived by moving D to the copula BE. Incorporation of D into BE is spelled out as HAVE (cf. Freeze 1992). The possessor is moved to [spec,DP] and then higher up to a position in which nominative case is licensed. One of the advantages of this structure is that it relates possessive sentences with the copula BE and a dative possessor to possessive sentences with HAVE. For instance, a Dutch sentence such as (66b) could be derived from (66a) (cf. Den Dikken 1995).

- (66) a (Aan) jou is de keus  
to you is the choice  
b Jij hebt de keus  
you have the choice

I now extend this analysis to all unergative verbs.<sup>22</sup> The hypothesis is that unergative verbs are derived from copula constructions containing a genitive. Thus, (67b) is derived from (67a), (67d) from (67c), and (67f) from (67e):<sup>23</sup>

<sup>22</sup> I use 'unergative' as a cover term for all verbs that select an external argument.

<sup>23</sup> It is plausible that sentences with possessive HAVE must be analyzed along these lines as well:

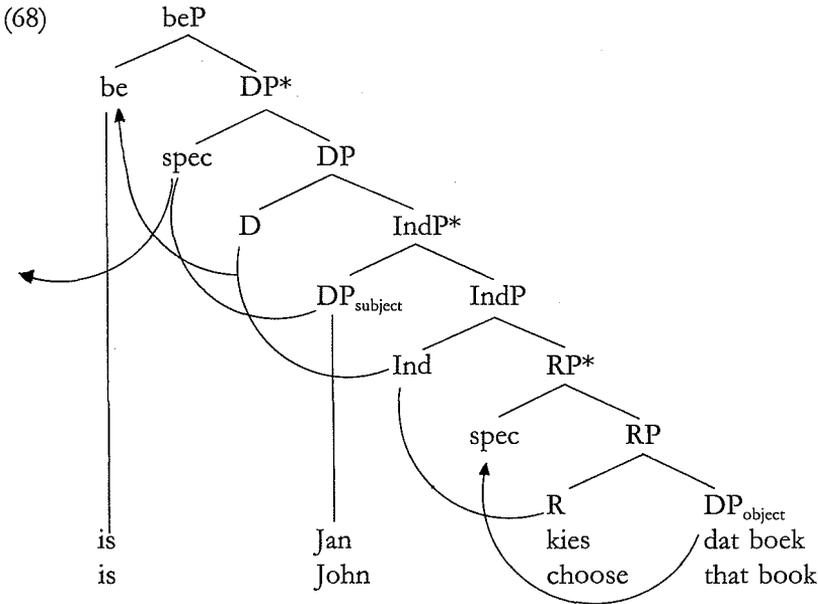
- (i) a Jan heeft een papegaai  
John has a parrot  
b Een papegaai is Jans have  
a parrot is John's property

Taking *have* 'property' or *heb* 'have' to be the root incorporating into higher heads, (i-a) is derived from (i-b). The advantage of such an analysis is that the somewhat strange rule that spells out BE + D as HAVE becomes superfluous. If this suggestion is correct and the analysis can be extended to auxiliary HAVE, the interaction between modals and auxiliary HAVE discussed in section 5.4.3 no longer counts as evidence for the structure proposed in (74).

- (67)
- a Dat boek is Jans keus  
that book is John's choice
  - b Jan kiest dat boek  
John chooses that book
  - c Dat boek is Jans gift  
that book is John's gift
  - d Jan geeft dat boek  
John gives that book
  - e Dat boek is Jans bezit  
that book is John's possession
  - f Jan bezit dat boek  
John possesses that book

To extend Kayne's analysis of possessive sentences to unergative verbs such as the ones in (67), I first integrate Hale and Keyser's (1993) idea that each verb has a non-verbal root. The syntactic category of this root is irrelevant; we call it R(oot)P.<sup>24</sup> In addition, I assume that Kayne (1994) is right that objects are base-generated as a right-sister of the verb (now the root), and that the base-position of subjects of unergatives is the same as the base-position of possessors. Finally, I take the labeling of AgrP to be Ind(ividual)P, for reasons that become clear below. This changes Kayne's structure into (68).

<sup>24</sup> Perhaps the syntactic category is determined by the functional structure dominating it (cf. Hoekstra 1995): i.e., when the root incorporates into Tense, it becomes verbal, when it stays in its base position, it is nominal. Cf. Khalaily (1994) for the claim that all verbs have a nominal root.



The verbal structure is now derived by moving R via Ind, D and BE to higher functional projections such as Tense. As in Kayne (1993), the  $DP_{\text{subject}}$  moves to [spec,DP] and then higher up to the specifier of functional projections. In addition, the object moves to [spec,RP]. All of these steps can occur overtly or covertly, presumably parametrized cross-linguistically.

I now apply the Principle of Semantic Interpretation, repeated in (69), to this structure, to show that the structure determines the required semantic relations.<sup>25</sup>

<sup>25</sup> The relevant definitions are repeated below. See chapter 2 for discussion and empirical evidence.

(a) **C-command**

X c-commands Y iff

- (i) X does not dominate Y and Y does not dominate X
- and (ii) There is a (connected) path of left branches from Z, the minimal node that dominates X and Y, to X.

(b) **Immediate c-command**

X immediately c-commands Y iff X c-commands Y and there is no closer c-commander W such that X c-commands W and W c-commands Y

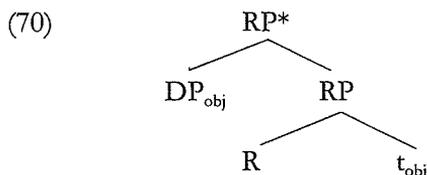
(c) **Connected path of left branches**

Two paths of left branches A and B are a connected path of left branches  $A \cup B$  iff there is no node that intervenes between the two paths.

(69) **Principle of Semantic Interpretation**

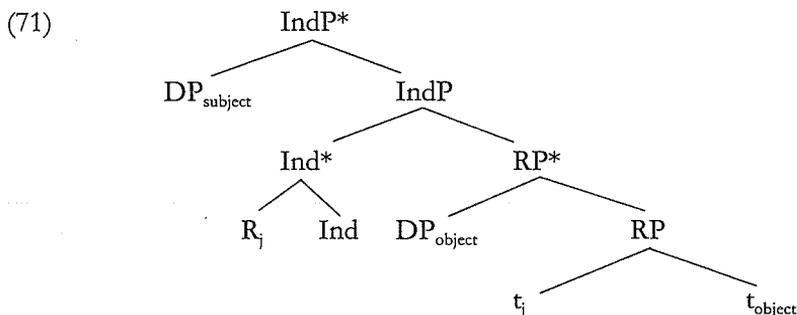
- (i) A node Z establishes a **S(EMANTIC)-RELATION** between a node X and a node Y iff X immediately c-commands Z and Z immediately c-commands Y
- (ii) A node Z is a **QUALIFIER** of a node X iff Z establishes a S(-emantic) relation between X and Y, and X and Y are coindexed.

Movement of the  $DP_{object}$  yields the substructure in (70) (cf. section 2.2.1):



The triple  $R(DP_{obj}, t_{obj})$  satisfies the second clause of the PSI, such that the root is interpreted as a qualifier of the object. As the sentences in (67) show, this is the required result. Thus, in *John gives the book*, the book is qualified as a gift.

Let us now look at the semantic contribution of the Individuator Phrase.<sup>26</sup> Movement of R up to Ind yields the structure in (71):

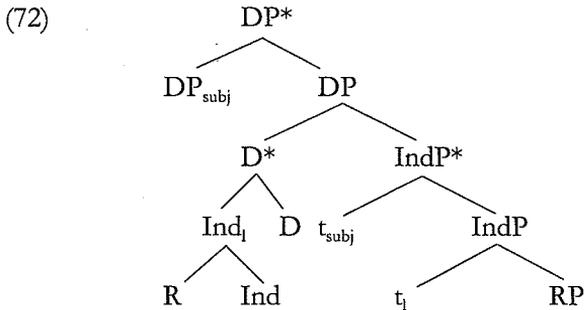


The triple  $Ind(R_j, RP^*)$  satisfies the second clause of the PSI: the immediate c-command relations hold and  $R_j$  and  $RP^*$  can be taken to be coindexed, since  $RP^*$  is a projection of R. Thus, Ind is a qualifier of R. I take Ind to be an indefinite determiner. It individuates the event denoted by R by attributing cardinality 1 to it. This semantic contribution will be crucial in

<sup>26</sup> The term individuator is due to Muromatsu (1995), who proposes an analysis of the numeral classifier in languages such as Japanese and Chinese as an individuator of the bare noun within a DP.

the analysis of modals with a verbal complement. In the polarity interpretation, the modal takes an IndP as its syntactic complement: recall that in the polarity interpretation the bounded lattice introduced by the verbal complement of the modal is the numerical 0-to-1 scale. The second semantic contribution that Ind makes is establishing an S-relation between the subject and RP\*: the triple  $\text{Ind}^*(\text{DP}_{\text{subject}}, \text{RP}^*)$ . This is interpreted as: there is an individuation relation between the subject and the event.

As was already noticed, the semantic contribution of D must be fairly abstract, since it subsumes notions such as origin, source, possessor, starting point, agent, cause of the event. In the absence of an adequate meta-language, any term used to express this is necessarily just an approximation of this contribution. I take the terms "determined" and "determiner" to be a reasonable approximation: the semantic contribution of D is (i) to make the individuated event determined and (ii) to make the subject the determiner of the event. The relevant part of the structure is given in (72):



The triple  $\text{D}^*(\text{DP}_{\text{subj}}, \text{IndP}^*)$  expresses that there is a determining relation between the subject and the individuated event. By virtue of the qualification relation  $\text{D}^*(\text{DP}_{\text{subj}}, t_i)$ ,  $\text{D}^*$  qualifies the subject as the determiner. Similarly, by the triple  $\text{D}(\text{Ind}_I, \text{IndP}^*)$ , D qualifies  $\text{Ind}_I$ , i.e. the individuated event, as determined. So the structure in (72) means: there is a determining relation between the subject and the individuated event, the subject is the determiner and the event is determined.

So far, we have been talking about unergative verbs. What about unaccusatives? In the standard analysis, the surface subject of an unaccusative is the deep internal argument. As a result, it is present in the lexical projection or representation of the root of the verb. According to standard syntactic analysis, the internal argument of an unaccusative moves up to get Case. Semantically, the internal argument both undergoes the event and is the starting point, source, cause or origin, i.e. the determiner of the event:

- (73) a Het glas breekt  
the glass breaks  
b Jan is in de sloot gesprongen  
John is in the ditch jumped  
c Jan is gevallen  
John is fallen

I conclude from this that unaccusative verbs have a DP-projection as well, and that the theme has to move up through [spec,DP] to be licensed.<sup>27</sup>

#### 5.4.2 The syntactic position of the modal

I propose that modals with a "verbal" complement can have two structural base positions:<sup>28</sup>

- (74) a Polarity interpretations  
... [<sub>DP</sub> [D [<sub>ModP</sub> [Mod [<sub>IndP</sub> [subject] [Ind [<sub>RP</sub> [R]]]]]]]]]]  
b Probability interpretation  
... [<sub>ModP</sub> [Mod [<sub>DP</sub> [D [<sub>IndP</sub> [subject] [Ind [<sub>RP</sub> [R]]]]]]]]]]

In the polarity interpretations, the modal takes IndP as its complement, whereas in the probability interpretation, the modal takes a DP complement. I will discuss the syntactic derivations and their semantic correlates step by step.

##### 5.4.2.1 Polarity

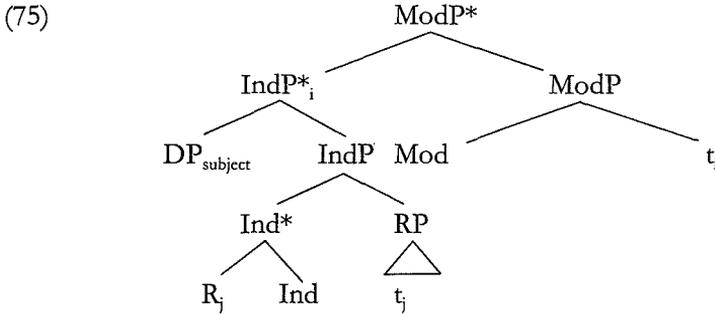
The first step in the derivation of the polarity interpretation is moving R to Ind. This step makes Ind interpretable as a qualifier of R: the cardinality 1 is assigned to the event denoted by R.<sup>29</sup> Thus, the event has a position on

<sup>27</sup> Given this conclusion, Dutch auxiliary selection cannot be explained in terms of the presence or absence of D, in contradistinction to Kayne (1993). This does not seem to be an unsolvable problem in view of languages such as English that have HAVE for both unaccusative and unergative verbs: for such languages, Kayne assumes D to be present in the structure of unaccusative verbs as well.

<sup>28</sup> The projection of the modal is labeled ModP for ease of reference. It should not be taken to indicate the existence of a functional projection ModP. As argued in the main text, modal verbs are analyzed as lexical qualifiers.

<sup>29</sup> All other operations on the cardinality of the event are operations on the value 1; e.g. in *Jan moest half huilen* "John must half cry", the half of 1 is taken.

the numerical scale, which is a minimal requirement for the polarity interpretations to be possible. The next step is moving  $\text{IndP}^*$  into  $[\text{spec}, \text{ModP}]$ . By this step the triple  $\text{Mod}(\text{IndP}^*, t_i)$  is derived, satisfying the second clause of the PSI. The interpretive result is that the value 1 is qualified as possible, required, permitted, desirable for the event.



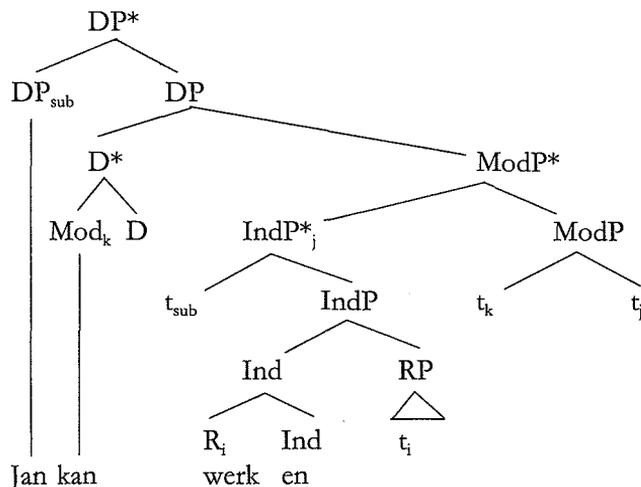
This part of the derivation is sufficient for the non-directed polarity interpretation to arise:

- (76) a Werken (dat) moet (\*haast wel)  
 work (that) must almost certainly  
 'Working is obligatory'
- b Slapen (dat) mag (\*graag)  
 sleep (that) may gladly  
 'Sleeping is allowed'

In (76), the modal is a qualifier of the preposed infinitive. The constructions in (76) do not have a probability interpretation, witness the ungrammaticality of (76a) with *haast wel*. Neither do they have a directed deontic or dispositional interpretation, witness the ungrammaticality of (76b) with *graag*, for obvious reasons: to get a directed deontic or dispositional interpretation, there must be a semantic relation between a subject and the modal. The sentences in (76) do not contain a subject other than the infinitive.

Subsequently, the modal moves to D and the subject moves to  $[\text{spec}, \text{DP}]$ ; this yields the structure in (77):

## (77) Polarity interpretation



By the triple  $D^*(DP_{sub}, ModP^*)$ , there is determining relation between the subject and the modality (cf. Hoekstra 1995 for an analysis in which the semantic relation between a modal and its subject is established via an abstract head). By the triple  $D^*(DP_{sub}, t_{sub})$ ,  $D^*$  is interpreted as a qualifier of the subject, i.e. the subject is the determiner of the modality. By the triple  $D(Mod_k, ModP^*)$ , the modality is interpreted as determined. As before, by the triple  $Mod(IndP^*_j, t_j)$ , the modal is a qualifier of cardinality 1.

The polarity interpretations thus arise compositionally: the modal *kunnen* 'can' being a qualifier of the individuated event yields the first semantic building block 'a work event is possible', or more precisely: the value 1 is possible for this work event. The relations established by  $D$  are the other building blocks: the possibility of the work event is determined and the subject is the determiner. Since the notion of determiner is taken to subsume notions such as source, possessor, origin and so on, the subject *Jan* in (77) can be interpreted as the source of the possibility, which yields the ability interpretation, or as the possessor of the possibility, which yields the permission reading. The ambiguity between a dispositional and a directed deontic interpretation is thus ascribed to the ambiguity of, or rather the abstractness of  $D$ , just as in the case of *John's portrait*, where the semantic relations between *John* and *portrait* established by  $D$  can be interpreted as possessor, artist, source and so on. The approach in terms of the PSI replaces theta-role assignment, which has often been assumed to express the semantic relation between the subject and the modal in the polarity interpretations (cf. section 5.2.1 for discussion). A summary of the relevant syntactic and semantic relations is given in (78):

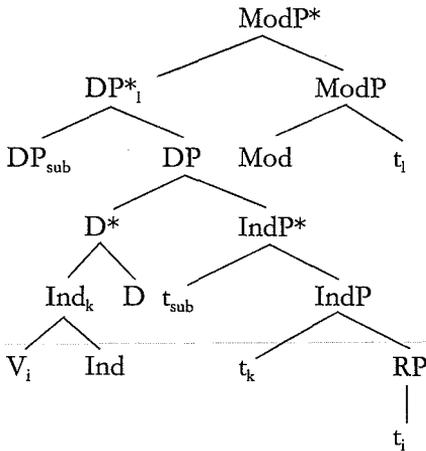
(78) **Polarity interpretations**<sup>30</sup>

- (i)  $\text{Mod}(\text{IndP}^*_{j,t_i})$  : the modal is a qualifier of  $\text{IndP}^*$
- (ii)  $\text{D}^*(\text{DP}_{\text{subj}}, \text{ModP}^*)$  : there is a determining relation between the subject and the modality
- (iii)  $\text{D}(\text{Mod}_k, \text{ModP}^*)$  : the modality is determined
- (iv)  $\text{D}^*(\text{DP}_{\text{sub}}, t_{\text{sub}})$  : the subject is the determiner of the modality

**5.4.2.2 Probability**

We next turn to the compositional semantics of the probability interpretation. In this interpretation, the modal is assumed to take the entire DP as its complement, instead of  $\text{IndP}$ . First, the subject moves to  $[\text{spec}, \text{DP}]$ , and the embedded verb moves to D via  $\text{Ind}$ . Next,  $\text{DP}^*$  is moved into  $[\text{spec}, \text{ModP}]$ :

(79) Probability interpretation



The following triples are especially relevant for the interpretation of (79). By

<sup>30</sup> Obviously, in the non-subject-oriented polarity interpretation, the subject does not determine the modality. Presumably, in such cases the subject remains in  $[\text{spec}, \text{IndP}]$ . Some evidence for this idea is given in the main text.

As the reader may ascertain, the structure of the polarity interpretation not only defines the subject as the determiner of the modality, but also of the event denoted by R. This is the correct result: in both the polarity and the probability interpretations, the subject must be interpretable as the subject of the event.

the triple  $\text{Mod}(\text{DP}^*_i, t_i)$ , the modal is a qualifier of  $\text{DP}^*$ . By the triple  $\text{D}^*(\text{DP}_{\text{sub}}, \text{IndP}^*)$ , there is a determining relation between the subject and the individuated event. By the triple  $\text{D}(\text{Ind}_k, \text{IndP}^*)$ , the individuated event is determined, and by the triple  $\text{D}^*(\text{DP}_{\text{sub}}, t_{\text{sub}})$ , the subject is interpreted as the determiner of the event. Again, the interpretation is compositional: an event determined by the subject is said to be possible. The relations that are relevant for the probability interpretation are summarized in (80):

(80) **Probability interpretation**

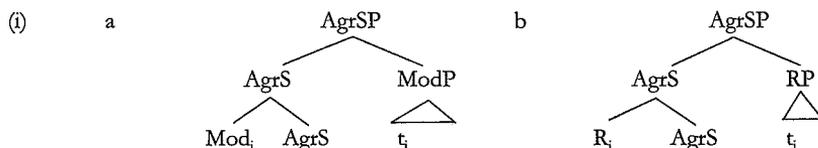
- (i)  $\text{Mod}(\text{DP}^*_i, t_i)$  : the modal is a qualifier of  $\text{DP}^*$  (where  $\text{DP}^*$  is the extended projection of  $\text{RP}$ )
- (ii)  $\text{D}^*(\text{DP}_{\text{sub}}, \text{IndP}^*)$  : there is a determining relation between the subject and the individuated event
- (iii)  $\text{D}(\text{Ind}_k, \text{IndP}^*)$  : the individuated event is determined
- (iv)  $\text{D}^*(\text{DP}_{\text{sub}}, t_{\text{sub}})$  : the subject is the determiner of the individuated event

Result e.g.: a work event determined by John is possible

The differences between (78) and (80) capture the insight that the polarity interpretations involve a polarity transition (by (78i), the modal qualifies an  $\text{IndP}$ -complement that denotes the value 1 on the cardinality scale), whereas the probability interpretation does not involve a polarity transition (by (80i), the modal qualifies a  $\text{DP}$ -complement, that does not denote a value on the cardinality scale). They also capture the insight that some of the polarity interpretations are subject-oriented, whereas the probability interpretation is not (78ii-iv versus 80ii-iv).<sup>31</sup>

It has been left implicit in these structures that in the probability interpretation the modal is a qualifier of a value on the negative-positive scale. Making this explicit would require a theory of the position of negation/affirmation in Dutch. Several theoretical options are possible:

<sup>31</sup> Pollock (1989, 1994) claims that in English and French  $\text{AgrS}$  is below  $T$ . If that holds for Dutch as well, it might be that  $D$  can be identified with  $\text{AgrS}$ . Part of the configurational consequence of this identification is given in (i):



In the configuration in (i-a),  $\text{AgrS}$  must be interpreted as a qualifier of  $\text{Mod}$ , i.e. the modality is in the set of properties that the subject has. In (i-b)  $\text{AgrS}$  must be interpreted as a qualifier of  $R$ : the event denoted by  $R$  is in the set of properties that the subject has.

negation/affirmation might be an adjunct, or a separate functional projection  $\Sigma P$  as e.g. in Laka (1990). Too many questions are open to develop such a theory here.

### 5.4.3 Empirical evidence

As a first piece of evidence for the analysis proposed in the previous section, I consider the behavior of infinitival complements in exclamative focus constructions. There is a difference between definite noun phrases and indefinite noun phrases with respect to the possibility to undergo focus movement in exclamative constructions:<sup>32</sup>

- (81) a Een huis dat Jan heeft!  
 a house that John has  
 'John has an extraordinary house!'  
 b Een huizen dat Jan heeft!  
 a houses that John has  
 'John has a whole lot of houses'  
 c \*Het huis dat Jan heeft!  
 the house that John has  
 d \*De huizen dat Jan heeft!  
 the houses that John has

If the assumption is correct that the infinitival complement of the modal is a DP, i.e. a definite constituent, in the probability interpretation but an IndP, i.e. an indefinite constituent, in the polarity interpretations, it is to be expected that focus movement of the infinitival complement blocks the probability interpretation: this would involve focus movement of the definite DP. The expectation is correct.

<sup>32</sup> The constituents *een huis* 'a house' and *een huizen* 'a houses' in (81) are clearly indefinite. E.g., they can occur as the subject of an existential sentence. As Bennis (1995) points out, the *een* in exclamative constructions is not the normal indefinite determiner: it lacks  $\phi$ -features, witness e.g. the fact that it may occur with a plural noun in exclamative constructions but not in a normal indefinite noun phrase. Bennis analyzes *een* in this construction as a  $\phi$ -featureless exclamative marker.

- (82) Werken dat Jan kan!  
 work that John can  
 I. 'John is able to work very hard'  
 II. 'John is allowed to work very hard'  
 III. #'It is permitted that John is working very hard'  
 II. #'It is possible that John is working very hard'

Of course, the additional assumption must be made that it is not possible to move the IndP from DP. This is not farfetched, since in Dutch it is always impossible to extract IndP from DP.<sup>33 34</sup>

Secondly, the quantifier *wat* may occur in constructions containing an indefinite noun phrase, but not with definite noun phrases:

- (83) a Wat heeft Jan een boeken!  
 What has John a books  
 'John has a whole lot of books'  
 b \*Wat heeft Jan de boeken  
 what has John the books

If infinitival complements may be IndPs yielding a polarity interpretation or a DP yielding a probability interpretation, the expectation is that the probability interpretation is impossible in constructions such as (83) with an infinitive. This expectation is correct:

- (84) Wat kan Jan schaatsen!  
 what can John skate  
 I. 'John is a very good skater'  
 II. #'It is (very well) possible that John is skating'

<sup>33</sup> It is e.g. impossible to extract the IndP [*ene auto*] from the DP [*die ene auto*] 'that one car':

- (i) a Jan heeft [<sub>DP</sub>die [<sub>IndP</sub>ene auto]] verkocht  
 John has that one car sold  
 b \*<sub>[IndP</sub>Ene auto]<sub>i</sub> heeft Jan [<sub>DP</sub>die t<sub>i</sub>] verkocht  
 one car has John that sold

<sup>34</sup> Topicalization constructions do not disambiguate modal verbs:

- (i) a Meedoen aan de marathon (dat) kan Jan haast niet probability  
 participate to the marathon that can John almost not  
 'It is almost impossible that John is competing in the marathon'  
 b Meedoen aan de marathon (dat) kan Jan polarity  
 participate to the marathon that can John  
 'John is able to compete in the marathon'

This is expected, since topicalization is not restricted to indefinite constituents.

The third piece of evidence is the behaviour of symmetric relations in the context of a modal, as observed by Brennan (1993).<sup>35</sup> Symmetric relations are relations that have the inference pattern in (85a). Examples are given in (85b,c).

- (85) a  $R(x,y) \iff R(y,x)$   
 b The governor shook hands with all the prisoners  
 c All the prisoners shook hands with the governor

The sentence in (85c) is a valid inference from (85b) and the same holds the other way around. That is what makes *shake hands with* a symmetric relation. Brennan observes that a modal destroys the symmetry in its subject-oriented polarity interpretations, but not in the probability interpretation:

- (86) a The governor may shake hands with all the prisoners  
 b All the prisoners may shake hands with the governor

In the probability interpretation, the sentence in (86a) means 'it is possible that the governor shakes hands with all the prisoners'. This obviously implies that it is also possible that all the prisoners shake hands with the governor. Again, the inference holds in the reverse direction as well; symmetry is preserved under the probability interpretation. In the subject-oriented polarity interpretations, however, symmetry is not preserved. In these interpretations, the sentence in (86a) means that the governor has the right to shake hands with all the prisoners. From this it does not follow that all the prisoners have the right to shake hands with the governor. The same observations can be made for Dutch.

The different behavior of symmetric relations under different modal

<sup>35</sup> In Brennan (1993), the behavior of symmetric predicates under modal predicates is brought up as evidence for the distinction between VP-scope modals (for the polarity interpretations) and S-scope modals (for the probability interpretation). Brennan's analysis is primarily semantic, i.e. she introduces semantic rules (in a GPSG-framework) to derive the scopal properties of modals from the surface structure. In this respect, the present approach crucially differs from Brennan's: the main assumption of the present analysis is that there is a direct mapping from syntactic structure to semantic structure, the syntactic structure entirely determining the semantic relations.

One of the important insights of Brennan's regarding symmetric predicates is that these behave differently under VP-modals than under S-modals. In the interpretation of the former, as opposed to the latter, accessibility (of worlds) is keyed to the subject (cf. Brennan 1993: section 2.2). The structures in the main text reflect this insight: the subject is structurally defined as the determiner of the modality in the case of VP-modals (polarity), but not in the case of S-modals (probability).

interpretations follows directly from the structures in (77) and (79). The crucial point is that in the subject-oriented polarity interpretations, the structure identifies the subject as the determiner of the modality, but not the PP *with all the prisoners*. The subject moves into [spec,DP] and participates in the syntactic and semantic relations described in (80), but the PP does not move into such a position. This explains the asymmetry between the subject and the PP. In the probability interpretation, the structure does not identify the subject as the determiner of the modality (cf. (79)). Hence, in the probability interpretation there is no asymmetry between the subject and the PP.

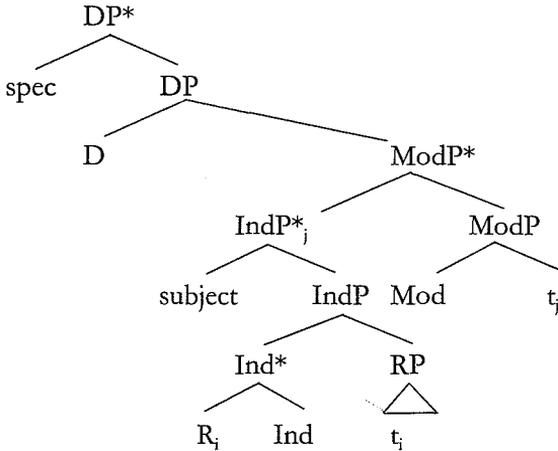
A fourth piece of evidence is the observation that in the subject-oriented polarity interpretations an indefinite subject must be interpreted specifically, whereas in the non-subject-oriented polarity interpretation and the probability interpretation there is no such requirement:

- (87) a \*Er mag 'n jongen graag schaatsen  
 there may a boy gladly skate  
 Intended interpretation: 'There is some boy that likes skating'
- b Er mag EEN jongen graag schaatsen  
 there may one boy gladly skate  
 'There is one boy (from a given set) that likes skating'
- c Er mag dan 'n/EEN jongen schaatsen,(...)  
 'It may be true that there is a/one boy skating'  
 'It is permitted that a boy is/goes skating'

This fact is explained if a non-specific subject remains (or is interpreted at LF) in IndP, whereas a specific subject must move to [spec,DP].<sup>36</sup> In the latter case, we derive the by now familiar structure in which the subject is interpreted as the determiner of the modality. The former case yields the structure in (88):

<sup>36</sup> The idea that the subject remains in IndP when it is interpreted non-specifically is inspired by the analysis of Diesing (1992). Diesing's domain of existential closure corresponds to IndP in the present proposal. This makes existential closure even more syntactic than in Diesing's analysis: the head of Ind is assumed to be the indefinite article, functioning as a qualifier that assigns the cardinality 1 to the event denoted by the root of the verb.

(88)



It is clear that in a structure such as (88) there is no definite relation established between the subject and the modality. As a result, the structure can only have a non-directed polarity interpretation. When the modal takes the entire DP as its argument, no contrast between a specific and a non-specific subject can be found: for the modal to be a qualifier of DP and receive a probability interpretation, it is irrelevant where the subject is: it may be in [spec,IndP] or in [spec,DP].<sup>37</sup>

A fifth piece of evidence is a restriction on the interpretation of double modals. As opposed to English, Dutch modals have infinitival forms. For ease of exposition, I consider modals to be two-ways ambiguous for the moment: a Subject-Oriented Polarity interpretation, henceforth SOP, and a probability interpretation (abbreviated as PR). If this ambiguity were entirely lexical, a sentence with two modals would logically allow four different interpretations. However, one of the four is systematically impossible:

<sup>37</sup> Brennan (1993:35) presents an observation that is presumably related to the present observation: the subject of a probability modal is referentially opaque whereas the subject of subject-oriented modals is referentially transparent. This can be captured in the present analysis if it is assumed that the modal being a qualifier of a constituent containing the subject makes the subject intensional, whereas the modal being a qualifier of the individuated root, but entertaining a determining relation with the subject, makes the subject extensional.

- (89) a Jan moet haast wel mogen werken  
 John must almost AFF may work  
 'John almost certainly has permission to work' **PR-SOP**
- b Jan moet van mij voor mei kunnen zwemmen  
 John must of me before may can swim  
 'I require John to be able to skate before May' **SOP-SOP**
- c Het moet hem nog wel 'ns willen tegenzitten  
 it must him once in a while want against-sit  
 'It is said that things go against him once in a while' **PR-PR**
- d Jan moet en zal nog wel 'ns willen winnen  
 John must and shall yet AFF once want win  
 #'John definitely wants that he wins now and then' **SOP-PR**

Although the combination SOP-PR in (89d) is semantically not implausible, it is not available. It is therefore likely that this unavailability must be ascribed to the syntax. The explanation is simple. The relevant base configurations for (89a-c) are given in (90):

- (90) a [<sub>ModP1</sub> spec [Mod1 [<sub>DP</sub> spec [D [<sub>ModP2</sub> spec [Mod2 [<sub>IndP...</sub>]]]]]]]]]  
 b [<sub>DP</sub> spec [D [<sub>ModP1</sub> spec [Mod1 [<sub>ModP2</sub> spec [Mod2 [<sub>IndP...</sub>]]]]]]]]]  
 c [<sub>ModP1</sub> spec [Mod1 [<sub>ModP2</sub> spec [Mod2 [<sub>DP</sub> [D [<sub>IndP...</sub>]]]]]]]]]

To get the combination PR-SOP, the highest modal must be a qualifier of DP and the lower modal must be a predicate of IndP, as in (90a). For the combination SOP-SOP, both modals must be a qualifier of IndP, hence they are both below D, as in (90b). As the reader can compute, the resulting derivation defines the subject as the determiner of each of the modals. For the combination PR-PR, both modals must be a qualifier of DP, hence higher than DP, as in (90c). A syntactic structure for the combination SOP-PR (89d) is logically impossible. For the higher modal to have a SOP-interpretation, it must be below D; for the lower modal to have a probability interpretation, it must be above D. Since the higher modal is higher than the lower one, it cannot be that the lower modal is above D and the higher modal below it.<sup>38 39</sup>

<sup>38</sup> This analysis presupposes that no syntactic reordering of the two modals is possible to get the desired surface string. A modal A that is structurally lower than a modal B can end up in a higher position than B either by skipping the position of B or by adjoining to B and subsequent excorporating from B. As was discussed in chapter 2, the impossibility of such HMC-violations follows from the theory proposed in this thesis. Cf. also Den Dikken & Hoekstra (1995).

<sup>39</sup> Notice that the facts in (89) would not be automatically explained by the traditional

A sixth piece of evidence is provided by unaccusative verbs such as *lijken* 'seem' and *opvallen* 'strike' when embedded under a modal. They give rise to an interesting contrast, shown for *lijken* in (91):

- (91) a Jan mag graag/dan aardig lijken  
 John may gladly/then kind look  
 I. 'John likes to look kind' (*graag*) **dispositional**  
 II. 'It may be true that John looks kind,...(*dan*)' **probability**
- b \*Jan mag de meisjes graag aardig lijken  
 John may the girls gladly kind look  
 Intended interpretation: 'John likes to look kind to the girls'
- c Jan mag de meisjes dan aardig lijken, hij is het niet  
 John may the girls then kind look he is it not  
 'John may look kind to the girls, but he is not'

As (91a) shows, a dispositional interpretation is available when the experiencer argument is absent, in addition to a probability interpretation. When the experiencer argument is present, as in (91b), the dispositional interpretation is blocked. To show this, I have added *graag*, which forces the dispositional interpretation. As a result the sentence in (91b) is ungrammatical since it is subject to contradictory requirements: the presence of the experiencer blocks the dispositional interpretation and the presence of *graag* requires it. Finally, (91c) shows that the probability interpretation is retained when the experiencer is present. The question is: why does the presence of

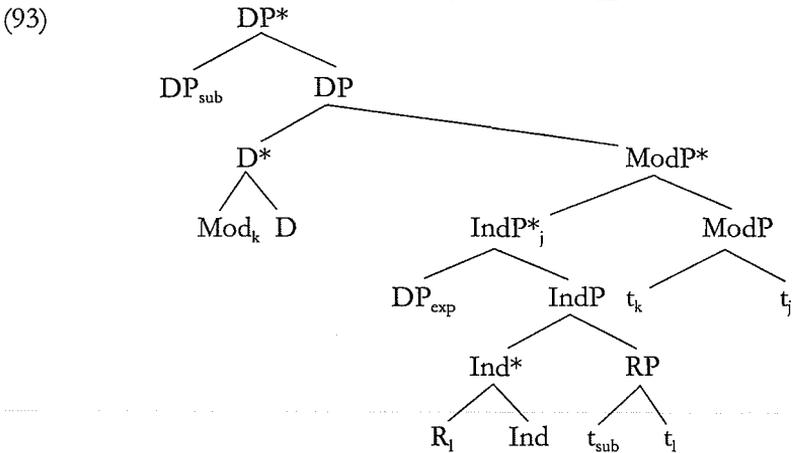
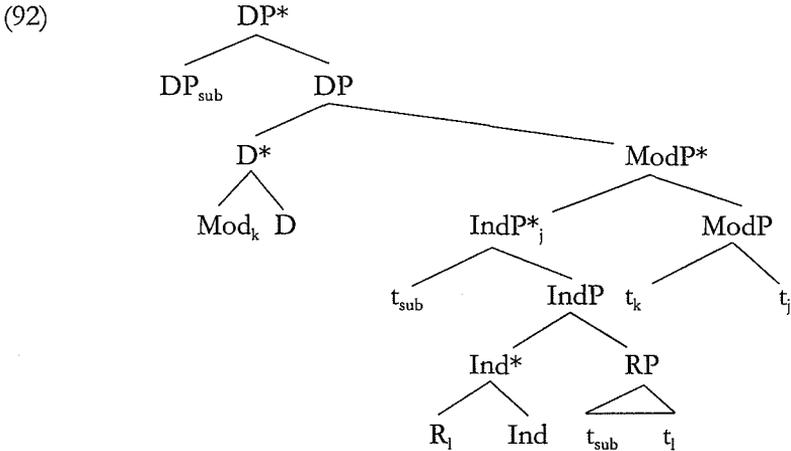
control versus raising analysis of root and epistemic modality. The combination root-epistemic being impossible, we expect that a raising verb cannot be embedded under a control verb, but there is no such restriction, as (ib) shows.

- (i) a Jan schijnt te proberen te winnen raising-control  
 John seems to try to win
- b Jan probeert aardig te lijken control-raising  
 John tries nice to look
- c Jan zegt te proberen te winnen control-control  
 John says to try to win
- d Jan schijnt aardig te zijn raising-raising  
 John seems nice to be

Neither can these facts be explained by an analysis as proposed in Picallo (1990) for modals in Catalan: in this analysis, epistemic modals are base-generated in the matrix T, and root modals are base-generated in VP. Under the assumption (made by Picallo) that a modal sentence contains only one T, the combinations epistemic-epistemic and the combination root-epistemic should be out. As the Dutch data show, the combination epistemic-epistemic is possible in Dutch. Since this combination is apparently impossible in Catalan, there must be independent differences between Dutch and Catalan.

the experiencer argument make the dispositional interpretation disappear?

I assume that the experiencerless alternant has the structure in (92). When the experiencer is present, the structure is as in (93):



As (93) indicates, the experiencer is taken to be external to the Lexical Relational Structure, namely base generated in [Spec,IndP], i.e. in the same position as the subject of transitive verbs.<sup>40</sup> The small clause subject of the adjective *aardig* 'kind' must undergo A-movement. When an experiencer is present, A-movement of the small clause subject crosses the position of the experiencer, giving rise to well-known inverse binding effects (cf. Belletti

<sup>40</sup> This is similar to the analysis proposed in Bennis (to appear), in which an experiencer is an underlying subject that does not become a surface subject.

and Rizzi 1988).

The explanation of the contrast in (91) now runs as follows. In (92), the small clause subject moves up via [spec,IndP] to [spec,DP]. This yields precisely the same semantic relations as with unergatives. The relevant relation is  $D^*(DP_{sub}, t_{sub})$ : the subject is interpreted as the determiner (of the modality). This gives the directed polarity interpretations, as before. In (93) the subject crosses the experiencer. As a result, the triple  $D^*(DP_{sub}, t_{sub})$  does not come into existence, since  $D^*$  does not immediately c-command the trace of the subject. Hence, the subject cannot be interpreted as the determiner of the modality. This is what causes the effect in (91b). As before, the probability interpretation arises for both (91a) and (91b) when the modal takes the DP as its complement. For this configuration and interpretation, the subject crossing the experiencer is irrelevant.

A seventh piece of evidence is the nature of auxiliary selection in modal environments. According to Kayne (1993), selection of HAVE involves incorporation of D into BE. Assuming that BE and D must be adjacent, i.e. DP must be the complement of BE, for incorporation to be possible, the modal can be in two positions, as indicated in (94).

- (94) a BE D Mod Ind R  
b Mod BE D Ind R

After incorporation of D into BE, we get:

- (94<sup>∧</sup>) a HAVE Mod Ind R **polarity**  
b Mod HAVE Ind R **probability** (but see fn. 41)

Since the modal takes IndP as its complement in (94a), we expect the order in (94a<sup>∧</sup>) to have polarity interpretations but not a probability interpretation. This expectation is correct, as the contrast between (95a) and (95b) shows. In (95a), the individual-level predicate *een geboren leider* 'a born leader' combined with *zijn* 'be' forces a probability interpretation, whereas the order HAVE MOD forces a polarity interpretation. Due to these conflicting requirements, (95a) is ungrammatical. In (95b) a stage-level predicate is used and the sentence is fine under a polarity interpretation. Similarly, in (95c), the unaccusative experiencer verb forces the probability interpretation, whereas the order HAVE MOD forces the polarity interpretation. The sentence in (95d) shows that the order MOD HAVE (94b<sup>∧</sup>) is compatible with a probability interpretation.<sup>41 42</sup>

<sup>41</sup> The correspondence between modal interpretation and the relative order of modal and

- (95) a \*Jan heeft een geboren leider moeten zijn  
John has a borne leader must be
- b Jan heeft de hele dag aardig moeten zijn  
John has the whole day kind must be  
'John was forced to be kind all day'
- c \*Jan heeft Marie moeten opvallen  
John has Mary must strike
- d Jan moet zijn kamer gisteren hebben opgeruimd  
John must his room yesterday have cleaned  
'John must have cleaned his room yesterday'

The eighth piece of evidence for the proposed analysis comes from the data in (96):<sup>43</sup>

- (96) a Het kan [<sub>CP</sub> dat Jan een boek leest]  
it can that John a book reads  
'It is possible that John is reading a book'  
#'John is able to read a book'
- b Het moet haast wel [<sub>CP</sub> dat Jan een boek leest]  
it must almost AFF that John a book reads  
'It is almost certain that John is reading a book'  
#'John has the obligation to read a book'

auxiliary is not perfect: the order MOD AUX can also have a polarity interpretation:

- (i) Jan moet morgen zijn kamer opgeruimd hebben  
John must tomorrow his room cleaned have  
'John has the obligation to have cleaned his room tomorrow'

The analysis of the order MOD Aux must therefore be more complex than [MOD BE D Ind R]. I leave this for further research.

<sup>42</sup> Remarkably, when the auxiliary occurs in the past tense, the individual-level predicate allows for a polarity interpretation. The interpretation as a whole is traditionally called an irrealis.

- (i) Jan had een geboren leider moeten zijn  
John had a born leader must be  
'John should have been a born leader'

Clearly, (i) is not about the probability of John being a born leader: it entails that he is not. (i) expresses an unfulfilled wish or necessity; e.g. John's parents might be disappointed about John because they had hoped that he would be a born leader. Whatever the analysis of this irrealis may be, it is not an exception to the generalization that HAVE MOD V forces a polarity interpretation.

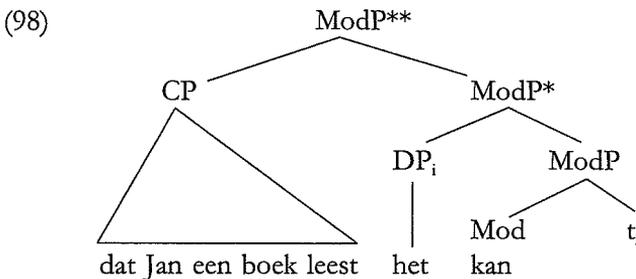
<sup>43</sup> Thanks to Pierre Pica for discussion of these data and related data in French. The proposed analysis is the result of that discussion.

The sentences in (96a,b) can only have a probability interpretation. They seem to be cases of a modal taking a finite CP-complement. However, as has been observed in Bennis (1986), these CPs do not behave as complements since they are islands for extraction:

- (97) a \*Wat<sub>i</sub> kan het [<sub>CP</sub> dat Jan t<sub>i</sub> leest]  
 what can it that John reads  
 b \*Wat moet het [<sub>CP</sub> dat Jan t<sub>i</sub> leest]  
 what must it that John reads

Bennis therefore proposes to analyze these CPs as adjuncts, the real argument of the modal being *het* 'it'. Via coindexing of the adjunct with *het*, the modal assigns its modality to the CP. Assuming this analysis to be basically correct, it confirms the idea that a modal receives a probability interpretation when it takes a DP-complement. Since *het* is a definite determiner and a pronoun in Dutch, it is likely that its category is D.

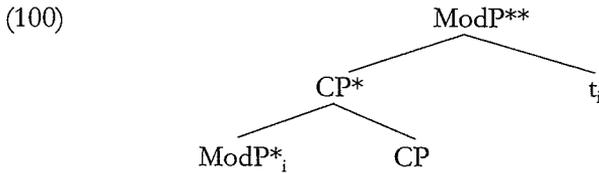
Ignoring irrelevant parts of the structure, the representation of sentences such as (96) after movement of the internal argument *het* must be as in (98):



As a matter of fact, with the demonstrative or relative pronoun *dat* 'that' instead of *het*, the linear order produced by (98) is fine:

- (99) [<sub>CP</sub> dat Jan een boek leest] dat kan  
 that John a book reads that can  
 'It is possible that John is reading a book'

The order in (96), in which the CP is extraposed, can now be derived in the same way as PP Extraposition is derived in chapter 4: by movement of the segment ModP\* to [spec,CP]:



Semantically, this yields the required qualification relations. (i) By movement of the DP *het* as in (98), we get the triple  $\text{Mod}(\text{DP}_i, t_i)$ : the modal qualifies *het* as possible or necessary. Since *het* is a DP, a probability interpretation is forced. (ii) By movement of the segment  $\text{ModP}^*$  into  $[\text{spec}, \text{CP}]$ , the segment CP is identified as a qualifier of  $\text{ModP}^*$ : the triple  $\text{CP}(\text{ModP}^*_i, t_i)$ . So the CP qualifies the possibility or necessity as ‘that John is reading a book’.

The empirical evidence provided in this section justifies most parts of the proposed derivation. One operation that has not been justified explicitly yet is movement of DP or  $\text{IndP}$  to  $[\text{spec}, \text{ModP}]$ . It is plausible that the existence of verb raising clusters such as (101) reflects the movement of  $\text{IndP}$  to  $[\text{spec}, \text{ModP}]$ .

- (101) a underlying structure:  
 dat Jan  $[\text{Mod kan } [\text{IndP vlug een boek lezen}]]$   
 b surface structure  
 dat Jan  $[\text{ModP } [\text{IndP vlug een boek lezen}]_i [\text{Mod kan}]] t_i$   
 that John quickly a book read can

It is simple to account for the fact that no constituent can intervene between *lezen* and *kan* by assuming that  $\text{IndP}$  has moved to  $[\text{spec}, \text{ModP}]$ . An analysis such as the one in Zwart (1993) faces more difficulties in this respect. Zwart assumes the same basic structure, i.e. (101a). The surface order in (101b) is derived by moving the object to  $[\text{spec}, \text{AgrOP}]$  and by head movement of *lezen* to *kan*. The problem is that the manner adverb cannot occur to the right of the verb cluster, while we know from much recent research (e.g. Cinque 1995) that cross-linguistically a manner adverb is adjacent to the base position of the verb that it modifies. Thus, the analysis forces the stipulation of an unusual obligatory leftward movement of manner adverbs. No such stipulation is necessary in the present proposal. It will be clear, however, that the present analysis does not immediately solve all the problems involved in verb raising clusters. For an interesting attempt, roughly along the lines sketched here, I refer the reader to Broekhuis (1995).

#### 5.4.4 Alternative analyses

In the present proposal, the complement of a probability modal is a larger constituent than the complement of a polarity modal: a DP containing the embedded subject in the probability interpretation, but an IndP not containing the embedded subject in the polarity interpretations. In a sense, the present proposal is similar to traditional analyses of the epistemic/root ambiguity in which modals take the entire proposition as an argument in the probability interpretation (cf. Hofmann 1966, Jackendoff 1972, Ross 1969, Perlmutter 1971), whereas they take a VP-complement in the polarity interpretations. In more recent analyses, probability modals are assumed to be higher in the structure than polarity modals, as a result of base generation or movement: McDowell (1987) assumes that probability modals move to COMP at LF in English; Picallo (1990) assumes that probability modals in Catalan are base-generated in INFL, whereas polarity modals are base generated within VP. Another possibility would be that the modal takes an embedded TP or CP. In this section, I briefly discuss the reasons why I did not adopt these alternatives.

If it were possible for the complement of a Dutch modal to be an infinitival CP, we would expect overt complementizers and WH-constituents to show up, but they never do. Furthermore, overt realization of T by *te* 'to' should be obligatory, but it is impossible, except in the case of the modal *hoeven* 'need'. These facts are well known. A strong argument against the TP-status of the complement of a modal is provided by the future modal *zullen* 'will'. It distinguishes between clauses that contain tense (both non-finite and finite), and clauses that do not, as (102) shows. It can never occur in the complement of a modal (103), not even in the complement of *hoeven*.

- (102)
- |   |                                                                                 |
|---|---------------------------------------------------------------------------------|
| a | Jan zal zeggen dat Piet het zal vragen<br>John will say that Pete it will ask   |
| b | Jan zegt/belooft/lijkt te zullen komen<br>John says/promises/seems to will come |
| c | Jan hoort dat Piet zal komen<br>John hears that Pete will come                  |
| d | *Jan hoort Piet zullen komen<br>John hears Pete will come                       |
| e | *Jan laat Piet zullen werken<br>John let Pete will work                         |
| f | *Jan blijft/gaat zullen werken<br>John keeps/goes will work                     |

- (103) a \*Jan moet/kan/mag/wil zullen werken  
 John must/can/may/wants will work  
 b \*Jan hoeft niet te zullen werken  
 John needs not to will work

A test from Cremers (1983) provides further evidence against the idea that the complement of a modal contains tense. When a clause contains tense, a time adverbial can be added. As a result, in a sentence such as (102b) both the matrix clause and the embedded clause may contain a time adverbial: (104a). Such is not possible with modals and perception verbs, as (104b,c) show.

- (104) a Jan belooft vandaag morgen te komen  
 John promises today tomorrow to come  
 b \*Jan hoort vandaag Piet morgen komen  
 John hears today Pete tomorrow come  
 c \*Jan kan vandaag morgen vertellen of Piet komt  
 John can today tomorrow tell whether Pete comes

From this, it is reasonable to conclude that the complement of a modal is not a CP or a TP.<sup>44</sup>

If the modal took the entire **matrix** clause as its (semantic) argument in the probability interpretation, as in McDowell (1987), we would expect everything else to be in its scope. This, however, is not the case. For instance, past tense can take scope over the modal (105a), and so can frequency adverbials (105b), time adverbials (105c) and matrix negation (105d).

- (105) a Er had een ongeluk kunnen gebeuren  
 there had an accident can happen  
 'An accident could have happened'  
*(past (possible (an accident happens)))*  
*#(possible (past (an accident happens)))*<sup>45</sup>  
 b De beklagde moet soms haast wel de dader zijn  
 the accused must sometimes almost AFF the offender be  
 'Sometimes, it almost certainly is true that the accused is the offender'

<sup>44</sup> Cf. Den Dikken (1995c) for a different view.

<sup>45</sup> This scopal order would correspond to *Er kon een ongeluk zijn gebeurd*. Thus, in Dutch surface order seems to determine scopal relations between tense and the modal. Cf. Den Dikken & Hoekstra 1995.

- c Er moet vandaag haast wel een ramp gebeuren  
 there must today almost AFF a disaster happen  
 'Today, almost certainly a disaster will happen'
- d Jan kan haast niet aanwezig zijn geweest  
 John can almost not present be been  
 (*almost not (possible (John has been present))*)

I conclude from these facts that for a modal to have a probability interpretation it need not take the entire matrix clause as its semantic/syntactic argument. It is base-generated below the matrix tense and does not standardly undergo LF-raising.<sup>46</sup>

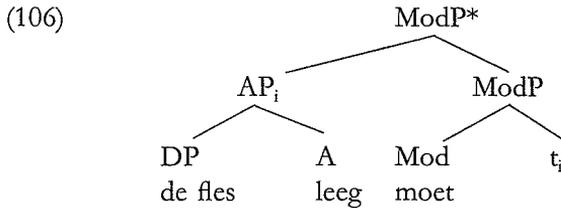
### 5.5 The syntax of non-verbal complements

Throughout this chapter, modals are taken to be qualifiers of a value on a bounded lattice denoted by the complement. In the case of polarity interpretations, the value is on the numeric scale 0-1. The syntactic structure mirrors this semantic analysis: the modal selects an IndP, and this IndP moves into [spec,ModP], making the modal interpretable as a qualifier of IndP.

Recall that non-verbal complements only allow polarity interpretations, and that they introduce their own type of linear ordering: spatial, volume, degree and so on. Thus, non-verbal complements should receive the same analysis as IndP, the only difference being the labeling of the head and its projection: PP, AP, DegP (cf. Abney 1986, Corver 1990). The relevant part of the derivation is given in (106), where the complement of the modal is an AP:

<sup>46</sup> McDowell (1987:235) claims that the probability interpretation is impossible in questions, both Y/N questions and WH-questions. If this were correct, it would support her analysis of probability modals moving to the matrix COMP at LF: under the assumption of the doubly filled COMP filter, a modal and e.g. a WH-constituent cannot be both in COMP. However, Brennan (1993:24) provides examples such as (i), which show that a modal can have a probability interpretation in questions. The Dutch translations of these examples clearly have a probability interpretation as well.

- (i) a Might your keys be at Jack's house?  
 Kunnen je sleutels bij Jack liggen?  
 b What may he have done?  
 Wat kan hij gedaan hebben?



This part is sufficient for the [ $\neg$  subject-oriented] polarity interpretation, as (107) shows:

- (107) De fles leeg, dat moet  
 the bottle empty that must  
 'The bottle empty, that's required'

To obtain the right surface order, it must be assumed that the small clause AP moves overtly to [spec,ModP]. If this holds in Dutch for small clause complements in general, we have a simple alternative for Zwart's (1993) analysis of small clause predicate movement to PredP: the small clause always moves to the specifier of the verb that is selecting it in order to establish the qualification relation between the verb and the small clause complement.<sup>47</sup>

As before, the subject-oriented polarity interpretations require the presence of a DP-projection. The presence of a DP-projection is independently forced by Kayne's (1993) analysis of auxiliary selection: HAVE is the result of incorporating D into BE, and modals with a non-verbal complement invariably select HAVE:

- (108) a De deur had/\*was open gemoeten  
 the door had open must (participle)  
 'The door should have been closed'
- b Dat ding had/\*was wel weg gemoeten  
 that thing had/was AFF away may (participle)  
 'It would have been allowed to throw away that thing'

<sup>47</sup> For this analysis to be compatible with the explanation in chapter 4 of the impossibility to extrapose a small clause PP, it must be assumed that the qualification relation between the small clause predicate and its subject is established via an AgrP, which is not an unusual assumption (cf. Den Dikken 1987, Chomsky 1993). Furthermore, it must be assumed that there is a difference between movement to the specifier of an adjunct and movement to the specifier of a non-adjunct, e.g. a verbal projection: whereas the former may occur in overt or in covert syntax, the latter must occur in overt syntax.

Again, there is no difference between the structure of a modal with a verbal complement in the polarity interpretations and a modal with a non-verbal complement.

Finally, we look at modals taking an internal nominal argument:

- (109) a Jan mag Marie wel  
 John may Mary AFF  
 'John likes Mary'  
 b Jan moet Marie niet  
 John must Mary not  
 'John does not like Mary'

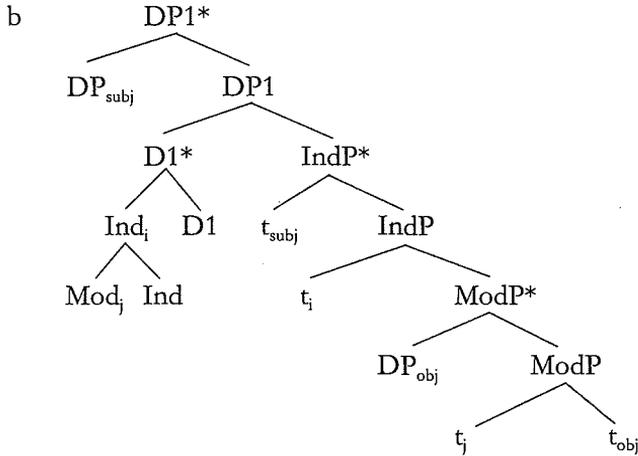
These constructions are argued in section 5.2 to involve transitive modals. Semantically, the modals are subject-oriented here and they do not involve a polarity transition. The interpretation is about negative or positive feelings that John has for Mary, and it is not about some value being false at  $t_1$  and being required to be true at some  $t_2$ . That is, we are dealing with the modal interpretation in the bottom left-hand cell in the table in (12), repeated here as (110). Not involving a polarity transition, this interpretation and the probability interpretation are of the same kind. This was one of the reasons to assume that the complement is a definite DP in the case of a modal with a verbal complement in the probability interpretation. It was argued that a definite DP as such does not provide a value on a bounded lattice. A modal with a DP-complement is then possible if negation or affirmation is added.

(110)

| Classification of modal interpretations | [+ subject-oriented]              | [¬ subject-oriented] |
|-----------------------------------------|-----------------------------------|----------------------|
| [+ polarity transition]                 | dispositional<br>directed deontic | non-directed deontic |
| [¬ polarity transition]                 | negative/positive<br>relation     | probability          |

The base-structure and the analysis of sentences such as the ones in (109) is given in (111); I leave the position of negation/affirmation for further research.

(111) a  $[_{DP1} \text{ spec D1 } [_{\text{IndP}} [_{DP_{\text{subj}}}]] \text{ Ind } [_{\text{ModP}} \text{ spec Mod } [_{DP_{\text{obj}}}]]]]$



This derivation of transitive modals is similar to the analysis of other transitive verbs given in section 5.3.1, the only difference being that the modal is in the position of the root. Thus, I take the pair (112a,b) to be parallel to the pair (112c,d):

- (112) a Jan mag Marie  
 John may Mary  
 'John likes Mary'
- b Marie is Jans meug  
 Mary is John's taste/desire
- c Jan kiest Marie  
 John chooses Mary
- d Marie is Jans keus  
 Mary is John's choice

The triple  $\text{Mod}(\text{DP}_i, t_i)$  makes the modal a qualifier of the object, capturing the idea that the semantics of e.g. (112a) is identical to that of (112b), where *meug* is the small clause predicate of *Marie*. The subject *John* is again identified as the possessor or experiencer (or whatever the appropriate term for the role of *John* in sentences such as (112a) may be) by the syntactic relations between the subject, D and the (individuated) modal.

To conclude this section, I give a tentative explanation for the fact that only verbal complements allow a probability interpretation. The crucial difference seems to be the eventive character of verbal complements (i.e. of the root of the verb) and the non-eventive character of non-verbal complements, in interaction with D. Recall that I take the abstract semantic

contribution of D (or genitive case) in this syntactic environment to be that it defines the subject as the determiner, starting point, source or origin of the event: the event springs from the subject. Without the subject, the event would not have come into existence. With AP-, DegP- and PP-predicates, the subject is not the source of the denoted property or direction. The property or direction exists independently of the subject and is attributed to the subject. Syntactically, this corresponds to a selectional restriction on the complement of D: it does not take an AP, DegP or PP. Thus, a structure such as (113), necessary for a probability interpretation, will not arise:

(113) [Mod [<sub>DP</sub> [D [<sub>PP/AP/DegP</sub> ....]]]]

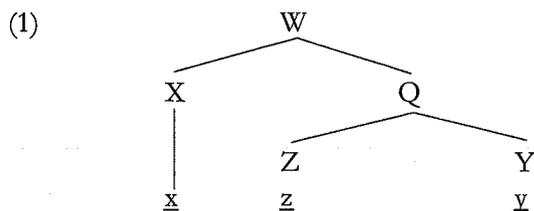
## 5.6 Conclusion

The main results of this chapter are the following:

- (i) Modal interpretations are classified by two semantic factors, the involvement of a polarity transition and the subject-orientation of the modal
- (ii) Both semantic factors are syntactically encoded, in a way correctly accounted for by the PSI.
- (iii) The involvement of a polarity transition is determined by the nature of the complement of the modal. In the case of a verbal complements, the relevant difference is between a definite event (DP dominating the root of a verb) and an indefinite event (IndividuatorP dominating the root of the verb). A definite event gives rise to the probability (i.e. epistemic) interpretation, whereas an indefinite event gives rise to polarity (i.e. non-epistemic) interpretations.
- (iv) Subject-orientation is encoded as a set of syntactic relations between an abstract D, the modal and the subject.
- (v) Modal verbs in Dutch differ from modal verbs in languages such as English and French in that they allow a non-verbal complement. It is unclear why there is such a cross-linguistic difference.
- (vi) The semantic restriction on the non-verbal complement of a modal is that it must denote a value on a bounded lattice.
- (vii) When a modal takes a nominal complement, the interpretive situation is parallel to a modal taking a verbal complement: a definite nominal complement does not yield a polarity transition, but an indefinite nominal does.



In chapter 1, I introduced a minimal theory of the correspondence between syntactic structure and semantic interpretation. The hypothesis was that X-bar structure is a set of syntactic relations between nodes that directly determines a set of semantic relations between nodes. Since a basic relation consists of the relation itself and the two objects of which the relation holds, the syntactic and semantic atom is ternary in that it consists of three nodes. The semantic content of the relation is determined by the terminals of the nodes. Therefore, each node must have its own terminals, and the syntactic and semantic atom has the abstract structure in (1), in which Z establishes a semantic relation  $\underline{z}$  between X and Y:



There are semantic relations that seem to be binary instead of ternary, such as the semantic relation between an adjective and the noun that it modifies, or between a PP and the VP that it modifies, or between a small clause predicate and its subject. These apparently binary relations are a special case of the ternary relation in (1): by making the two objects X and Y identical, the ternary relation is reduced to a binary relation. This theory of the correspondence between syntactic structure and semantic interpretation is minimal, since there is only one syntactic relation that corresponds to only one semantic relation. It is also minimal because the nodes themselves establish the semantic relations, not the inherent properties of lexical items, such as theta-roles. The theory is summarized in the hypothesis in (2):

(2) **Principle of Semantic Interpretation (PSI)**

- I. A node Z establishes a **S(EMANTIC)-RELATION** between a node X and a node Y iff X immediately c-commands Z and Z immediately c-commands Y.
- II. A node Z is a **QUALIFIER** of a node X iff Z establishes a S(emantic)-relation between X and Y and X and Y are coindexed

In chapter 2, I have made the hypothesis technically precise. Starting out from Kayne's (1994) Antisymmetry definition of c-command, I modified this definition such that c-command out of PP is accommodated, segments can enter into c-command relations and multiple adjunction is possible. An inventory was provided of configurations that establish qualification relations according to the PSI. A perspective on movement was offered that differs from the minimalist perspective. Whereas in the minimalist program the trigger of all movement is assumed to be morpho-syntactic feature checking, I have claimed that the sole trigger of movement is the need to establish a qualification relation.

The PSI raises a number of interesting questions in two large theoretical domains: theta-theory and the theory of functional projections. Since a full investigation of the consequences of the PSI for these domains is beyond the scope of this thesis, I have limited myself to an indication of the direction into which these theoretical domains may develop if the PSI is correct. As for theta-theory, it was suggested that there is a qualification relation between the root of a transitive verb (in the sense of Hale and Keyser 1993) and its internal argument, and that this qualification relation must be established by moving the internal argument from the complement position of V to [spec,VP]. In the syntactic analysis of modals in chapter 5, it was argued that the semantic relation between a verb and a subject is established by an abstract D, the D that is present in Kayne's (1993) representation of possessive HAVE and auxiliary constructions. Thus, a start has been made to abandon theta-theory, substituting it by an approach in terms of S-relations and qualifications.

As for functional projections, it was shown that the Head Movement Constraint (Travis 1984) and the Mirror Principle (Baker 1985) follow from the PSI. It is therefore likely that functional heads must be analyzed as qualifiers as well, qualifying the head that adjoins to them. It was argued that the PSI explains the occurrence of Agreement heads. Agreement heads are auxiliary heads that make it possible to establish a qualification relation. In particular, an Agreement head is necessary when a constituent must skip one or more specifier positions that are potential landing sites: such non-local movement will not lead to establishing a qualification relation, unless

Agr is there to make coindexing with the moved constituent possible.

In chapter 3, I concentrated on one of the qualification configurations predicted by the PSI, a configuration in which an adjunct is interpreted as a qualifier. A semantic and syntactic description of focus particles was provided. Taking the scalar focus particle *pas* 'just' as representative, I argued that the apparent ambiguity of *pas* is the result of the interaction between one simple lexical meaning and the syntactic position of the focus particle. When the syntax determines a qualification relation between *pas* and a constituent that denotes a temporal object, *pas* has a temporal interpretation. When syntax determines a qualification relation between *pas* and a numeral-containing constituent, *pas* has a numeral-associated interpretation. Similar observations were made for other scalar focus particles. I have shown that the locality restrictions on the relation between a scalar focus particle and its syntactic and semantic argument is directly explained by the PSI. Furthermore, the analysis was extended to other than scalar focus particles.

An interesting spin-off of the investigation of focus particles is that stranded focus particles can be used as a diagnostic for movement, very much like floating quantifiers (Sportiche 1988). Since focus particles must immediately c-command (the trace of) their semantic argument to be able to enter into a qualification relation with this argument, they mark positions of the argument other than its surface position. This test was applied to two domains: the middle field in Dutch and successive cyclic movement. As for the middle field, the test confirms the structure proposed in Chomsky (1993), in which there are two positions for the subject and two positions for the object, and in which the object crosses the base-position of the subject when it moves to its higher position. As for successive cyclic movement, the test confirms the analysis in Chomsky (1986) in which a constituent extracted from an embedded clause adjoins to the matrix VP on its way up to the matrix [spec,CP]. Applying the PSI to these configurations gave us an explanation of certain properties of factive islands.

In chapter 4, another instance of a configuration in which an adjunct acts as a qualifier was discussed: PPs adjoined to VP and PP Extraposition. First, it was shown that the distribution of focus particles in PP Extraposition contexts provides evidence against analyses of PP Extraposition that involve rightward or leftward-movement of PP, and in favor of an analysis in which VP moves into the specifier of the PP that is adjoined to it. This unusual kind of movement is allowed according to Kayne's definition of c-command and its modified version adopted here. The trigger of this VP-movement is to establish a qualification relation between PP and VP. The analysis was shown to explain Koster's (1974) mirror effect, restrictions on topicalization of VP including one or more PPs, and the impossibility to extrapose a small

clause PP in Dutch. The analysis was then extended to PP Extraposition from DP. Under the assumption that PP and associated DP can be base-generated discontinuously, PP Extraposition from DP was analyzed as involving movement of AgrOP or AgrSP to the specifier of an adjoined PP. Among other things, this analysis explains the interpretive nesting requirement observed in Rochemont and Culicover (1990).

To provide independent evidence for movement to the specifier of an adjunct, a new type of scrambling in Dutch was presented. It was shown that adverbial expressions that are at first sight embedded within a DP act as a matrix adverbial semantically and syntactically. An analysis was proposed in which the DP moves into the specifier of the projection of such an adverbial. This analysis is confirmed by the stranded focus particle test developed in chapter 3.

Finally, in chapter 5 the syntax and semantics of modal verbs in Dutch was investigated. Dutch modals turned out to be very different from for instance English or French modals in that they allow a non-verbal complement. At first sight, the selectional restrictions on the complement of a modal are complicated, but it was shown that they can be captured in the requirement that the complement must denote a value on a bounded lattice, in most cases a linearly ordered scale from 0 to 1.

The traditional distinction between root and epistemic modality was argued to require refinement. Four different modal interpretations were distinguished, along two parameters: (i) the subject-orientation of the modal, and (ii) the involvement of a polarity transition or switch of truth value in the modal interpretation. These semantic parameters were shown to correspond to two different syntactic configurations. Subject-orientation is the result of certain syntactic relations (in the sense of the PSI) between the subject, the modal and an abstract determiner. The complement of the modal determines whether or not modal interpretation involves a polarity transition. A parallel was drawn between the interpretation of a modal with a definite nominal complement and a modal with a verbal complement in the probability (= epistemic) interpretation, and a parallel was drawn between an indefinite nominal complement and a modal with a verbal complement in the polarity (= non-epistemic) interpretations. In the analysis, all qualification relations mentioned in the inventory in chapter 2 play a crucial role. Abundant empirical evidence was provided for this analysis, and it was shown that the analysis is superior to the traditional analysis of modal ambiguity in terms of raising and control, i.e. in terms of theta-theory.

The three case studies show that the PSI explains the intricate and subtle syntactic and semantic properties of different empirical domains in a straightforward way. A choice was made for an in-depth study of syntactic and semantic phenomena in Dutch, but this does not mean that the PSI

only applies to Dutch. On the contrary, many of the properties of focus particles and PP Extraposition discussed in this thesis are not specific to Dutch. They hold for German and English as well and it is likely that the analysis carries over directly. I end this conclusion by mentioning a number of phenomena in languages other than Dutch that are likely to be easily analyzable in terms of the PSI. Adverb placement in English exhibits clear mirror effects (cf. Bowers 1993). Costa (1995) shows that many of the properties of adverb placement in English are explained by the PSI. Barbiers and Costa (1995) show that the different orderings of subject, object, subject-oriented, object-oriented and manner adverbs in European Portuguese (and Dutch) follow directly from the PSI. Like in many languages, adjectives within DP in Modern Greek exhibit mirror effects. The analysis of Modern Greek DPs proposed by Androutsopoulou (1994) can be easily reformulated in terms of the PSI.



# References

- Abney, S. (1987): *The English noun phrase in its sentential aspect*. PhD. Diss. MIT.
- Altmann, H. (1976): *Die Gradpartikeln im Deutschen: Untersuchungen zu ihrer Syntax, Semantik und Pragmatik*. Tübingen, Niemeyer.
- Anderson, S. (1972): 'How to get even'. *Language* 48, 893-906.
- Androutsopoulou, A. (1994): 'The distribution of the definite determiner and the syntax of Greek DPs'. Proceedings of CLS 30.
- Bach, E. and G. Horn (1976): 'Remarks on "Conditions on transformations"'. *Linguistic Inquiry* 7, 265-300.
- Baker, M. (1985): 'The mirror principle and morphosyntactic explanation'. *Linguistic Inquiry* 16 (3), 373-415.
- Baker, M. (1988): *Incorporation, A theory of grammatical function changing*. Chicago: University of Chicago Press.
- Baltin, M.R. (1981): 'Strict Bounding'. In C.L. Baker & J.J. McCarthy, eds., *The logical problem of language acquisition*, 257-295. Cambridge, Massachusetts: MIT Press.
- Barbiers, S. (1995): 'An antisymmetric analysis of PP Extraposition'. Paper presented at the 10th Comparative Germanic Syntax Workshop, Catholic University of Brussels.
- Barbiers, S. (1995): 'PP Extraposition and the interpretation of X-bar structure'. Paper presented at the 18th GLOW Colloquium, University of Tromsø. GLOW Newsletter 34.
- Barbiers, S. (1995): 'Another case of scrambling'. In M. den Dikken & K. Hengeveld, eds., *Linguistics in the Netherlands 1995*, 13-25.
- Barbiers, S. & J. Costa (1995): 'Word order and VP-adjuncts in Dutch and Portuguese'. Ms. HIL, Leiden University.
- Bayer, J. (1990): *Directionality of government and logical form: A study of focusing particles and WH-scope*. Habilitationsschrift, Universität Konstanz.
- Belletti, A. and L. Rizzi (1988): 'Psych verbs and theta theory'. *Natural Language and Linguistic Theory* 6-3, 291-352.
- Bennis, H. (1986): *Gaps and dummies*. Dordrecht, Foris.
- Bennis, H. (1995): 'The meaning of structure: the *wat voor*-construction revisited. In M. den Dikken & K. Hengeveld *Linguistics in the Netherlands 1995*.
- Bennis, H. (to appear): 'Adjectival arguments'. In P. Coopmans et al. *Lexical specification and insertion*.
- Bennis, H. & T. Hoekstra (1989): *Generatieve grammatica*. Dordrecht, Foris Publications.
- Bowers, J. (1993): 'The syntax of predication'. *Linguistic Inquiry* 24, 591-656.
- Brennan, V. (1993): *Root and epistemic modal auxiliary verbs*. PhD thesis, GLSA, University of

- Massachusetts.
- Broekhuis, H. (1995): 'Nogmaals Verb Projection raising'. Ms. University of Amsterdam.
- Büring, D. and K. Hartmann (1995): 'Extraposition, QR and association with focus'. Paper presented at the 10th Comparative Germanic Syntax Workshop, Catholic University of Brussels.
- Chomsky, N. (1965): *Aspects of the theory of syntax*. Cambridge, Massachusetts, MIT Press.
- Chomsky, N. (1981): *Lectures on government and binding*. Dordrecht, Foris.
- Chomsky, N. (1986): *Barriers*. Cambridge, Mass., MIT Press.
- Chomsky, N. (1993): 'A minimalist program for linguistic theory'. In K. Hale and S.J. Keyser, eds., *The view from building 20: Essays in linguistics in honor of Sylvain Bromberger*, 1-52. Cambridge, Mass., MIT Press.
- Chomsky, N. (1995): 'Categories and transformations'. Ms., MIT.
- Cinque, G. (1990): *Types of A-bar dependencies*. Cambridge, Massachusetts, MIT Press.
- Cinque, G. (1995): 'Adverbs and the universal hierarchy of functional projections'. Paper presented at the 18th GLOW Colloquium, University of Tromsø. GLOW Newsletter 34.
- Coopmans, P. and I. Roovers (1986): 'Reconsidering some syntactic properties of PP-Extraposition'. In: *Utrecht Formal Parameters Yearbook II*, 21-35.
- Costa, J. (1995): 'On the behavior of adverbs in sentence-final context'. Ms. HIL/Leiden University.
- Cremers, C. (1983): 'On two types of infinitival complementation'. In F. Heny and B. Richards, eds., *Linguistic categories: Auxiliaries and related puzzles*.
- Corver, N. (1990): *The syntax of left-branch extractions*. PhD thesis, University of Tilburg.
- Diesing, M. (1992): *Indefinites*. Cambridge, Mass., MIT Press.
- Dikken, M. den (1987): 'Secundaire predicatie en de analyse van small clauses'. In *GLOT 10*, 1-28.
- Dikken, M. den & R. Mulder (1991): 'Double object scrambling'. MITWPL 14. Cambridge, Massachusetts.
- Dikken, M. den (1994): 'Minimalist (Verb) Projection raising'. In J.W. Zwart *Groninger Arbeiten zur Germanistischen Linguistik, Minimalism and Kayne's antisymmetry hypothesis*, 71-88.
- Dikken, M. den (1995): 'Copulas'. Paper presented at the 18th GLOW Colloquium, University of Tromsø. GLOW Newsletter 34.
- Dikken, M. den (1995a): *Particles, On the syntax of verb-particle, triadic and causative constructions*. New York, Oxford University Press.
- Dikken, M. den (1995b): 'Extraposition as intraposition and the syntax of English tag questions'. Ms. Vrije Universiteit Amsterdam.
- Dikken, M. den & E. Hoekstra (1995): 'Parasitic participles'. Ms. HIL/Vrije Universiteit Amsterdam.
- Feldman, F. (1986): *Doing the best we can*. Philosophical Studies 35. Dordrecht, Reidel.
- Foolen, A. (1993): *De betekenis van partikels*. Dissertatie, Katholieke Universiteit Nijmegen.
- Franck, J. (1936): *Etymologisch woordenboek der Nederlandsche taal*. 's-Gravenhage.
- Freeze, R. (1992): 'Existentials and other locatives'. *Language* 68, 553-595.
- Geerts G., et al. (1984): *Algemene Nederlandse Spraakkunst*. Groningen, Wolters-Noordhoff.
- Grice, H.P. (1975): 'Logic and conversation'. In P. Cole & J. Morgan, eds., *Syntax and Semantics 3: Speech acts*. New York, Academic Press.
- Guéron, J. (1980): 'On the syntax and semantics of PP Extraposition'. *Linguistic Inquiry* 11-4, 637-677.
- Haegeman, L. (1991): *Introduction to government and binding theory*. Oxford, Blackwell.
- Hale, K. and S.J. Keyser (1993): 'On argument structure and the lexical expression of syntactic relations. In K. Hale and S.J. Keyser, eds., *The view from building 20: Essays in*

- linguistics in honor of Sylvain Bromberger*, 53-109. Cambridge, Mass., MIT Press.
- Higginbotham, J. (1983): 'The logic of perceptual reports: An extensional alternative to situation semantics'. *The Journal of Philosophy*, 100-127.
- Hoeksema, J. (1989): 'Only in Dutch: A comparison of three adverbs'. Ms. University of Pennsylvania.
- Hoekstra, T. (1984): *Transitivity. Grammatical relations in GB theory*. Dordrecht, Foris.
- Hoekstra, T. (1994): 'The active passive configuration'. Ms. University of Leiden.
- Hoekstra, T. (1995): 'HAVE as BE plus or minus'. In G. Cinque et al., eds. *Paths towards universal grammar, Studies in honor of Richard S. Kayne*, 199-216.
- Hofmann, T. (1966): 'Past tense replacement and the modal system'. Reprinted in J. McCawley, ed., *Syntax and Semantics* Vol.7. New York, Academic Press.
- Hoop, H. de (1992): *Case configuration and noun phrase interpretation*. PhD thesis, University of Groningen.
- Hoop, H. de, et al. (1989): 'Syntaxis en semantiek van de vandie-constructie'. Ms. Groningen University.
- Hornstein, N. (1990): *As time goes by, Tense and Universal Grammar*. Cambridge, Mass., MIT Press
- Jackendoff, R. (1972): *Semantic Interpretation in generative grammar*. MIT, Cambridge, Massachusetts.
- Jacobs, J. (1983): *Fokus und Skalen: Zur Syntax und Semantik der Gradpartikeln im Deutschen*. Tübingen, Niemeyer.
- Karttunen, F. and L. Karttunen (1977): *Even questions*. *NELS* 7: 115-134.
- Kayne, R. (1984): *Connectedness and binary branching*. Dordrecht, Foris.
- Kayne, R. (1993): 'Toward a modular theory of auxiliary selection'. *Studia Linguistica* 47, 3-31.
- Kayne, R. (1995): *The antisymmetry of syntax*. Cambridge, Mass., MIT Press.
- Khalaily, S. (1994): 'A syntax of verbs from a nominal point of view'. In R. Bok-Bennema & C. Cremers *Linguistics in the Netherlands* 1994, 95-106.
- Klein, M. en M. van den Toorn (1979): 'Vooropplaatsing van PP's'. *Spektator* s7, 423-433.
- Klooster, W. (1986): 'Problemen met complementen'. In: *TABU* 16, 112-132.
- König, E. (1981): 'The meaning of scalar particles'. In: H.-J. Eikmeyer & H. Rieser, eds., *Words, worlds, and contexts: New approaches in word semantics*, 107-132. Berlin, de Gruyter.
- Kooij, J.G. en E. Wiers (1978): 'Vooropplaatsing, verplaatsingsregels en de interne structuur van nominal groepen'. In: J. Kooij (ed.) *Aspekten van woordvolgorde in het Nederlands*, 105-143. Leiden.
- Koster, J. (1974): 'Het werkwoord als spiegelcentrum'. *Spektator* 3, 601-618.
- Koster, J. (1995): 'Extrapolation as coordination'. Paper presented at the Vrije Universiteit Amsterdam, June 1995.
- Kratzer, A. (1977): 'What Must and Can must and can mean'. *Linguistic and Philosophy* 1, 337-355.
- Kratzer, A. (1991): 'The representation of focus'. In A. von Stechow and D. Wunderlich, eds., *Semantics, An international handbook of contemporary research*. Berlin, de Gruyter.
- Laka, I. (1990): *Negation in syntax: On the nature of functional categories and projections*. PhD thesis, MIT, Cambridge, Massachusetts.
- Lees, R.B. (1960): *The grammar of English nominalizations*. Den Haag, Mouton.
- Lyons, J. (1977): *Semantics*. Cambridge, Cambridge University Press.
- McDowell, J. (1987): *Assertion and modality*. PhD thesis, University of Southern California.
- Mahajan, A. (1993): 'The ergativity parameter'. *NELS* 23.
- Meulen, A. ter (1990): 'English aspectual verbs as generalized quantifiers'. *WCCFL* 9.
- Mulder, R. & P. Wehrmann (1989): 'Locational verbs as unaccusatives'. In H. Bennis & A.

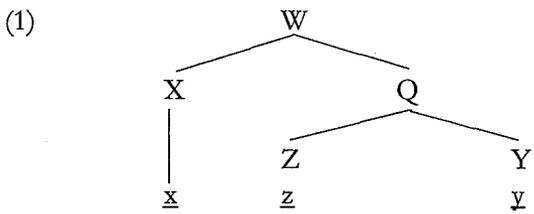
- van Kemenade, eds., *Linguistics in the Netherlands 1989*.
- Muromatsu, K. (1995): 'The classifier as a primitive: individuation, referability and argumenthood'. GLOW Newsletter 34.
- Neeleman, A. (1994): *Complex predicates*. PhD thesis, University of Utrecht.
- Paardekooper, P.C. (z.j.): *Beknopte ABN-syntaxis*. Eindhoven.
- Palmer, F. (1986): *Mood and modality*. Cambridge, Cambridge University Press.
- Partee, B. et al. (1990): *Mathematical methods in linguistics*. Dordrecht, Kluwer Academic Publishers.
- Perlmutter, D. (1970): 'The two verbs **begin**'. In R. Jacobs and P. Rosenbaum, eds., *Readings in English transformational grammar*. Boston, Ginn.
- Picallo, C. (1990): 'Modal verbs in Catalan'. In *Natural Language and Linguistic Theory* 8-2, 285-312.
- Pollock, J.-Y. (1989): 'Verb movement, universal grammar and the structure of IP'. *Linguistic Inquiry* 20, 365-424.
- Pollock, J.-Y. (1994): 'Notes on clause structure'. Ms. Université de Picardie, Amiens.
- Postma G.J. (1995): *Zero Semantics, A study of the syntactic conception of quantificational meaning*. PhD thesis, University of Leiden/HIL.
- Reichenbach, H. (1947): *Elements of symbolic logic*. Reprinted in 1966 by Free Press.
- Reinhart, T. (1980): 'The position of extraposed clauses'. *Linguistic Inquiry* 11, 621-624.
- Reinhart, T. and E. Reuland (1993): 'Reflexivity'. *Linguistic Inquiry* 24-4, 657-720.
- Riemsdijk, H. van (1974): 'De relatie tussen postposities en partikels'. *Spektator* 3, 447-462.
- Rochemont, M. (1978): *A theory of stylistic rules in English*. New York, Garland Press.
- Rochemont, M. and P. Culicover (1990): *English focus constructions and the theory of grammar*. Cambridge: Cambridge University Press.
- Rooryck, J. (1995): 'On passive as partitive quantification'. To appear in A. di Sciullo, ed., *Projection and interface conditions*. Oxford University Press.
- Rooryck, J. (1995): 'Focus as a primitive of raising verbs'. Paper presented at the 18th GLOW Colloquium, University of Tromsø. GLOW Newsletter 34.
- Rooth, M. (1985): *Association with focus*. PhD thesis. GLSA, University of Massachusetts, Amherst.
- Rooth, M. (1992): 'A theory of focus interpretation'. *Natural Language Semantics* 1, 75-116.
- Ross, J.R. (1967): *Constraints on variable in syntax*. PhD thesis. MIT, Cambridge, Massachusetts.
- Ross, J.R. (1969): 'Auxiliaries as main verbs'. In W. Todd, ed., *Studies in Philosophical linguistics* Series 1.
- Rothstein, S. (1992): 'Predication and the structure of clauses'. In J. de Caluwe et al., eds., *Predication*. Brussels.
- Sproat, R. & C. Shih (1988): 'Prenominal adjective ordering in English and Mandarin'. In *Proceedings of NELS 1988*, 18 (2), 465-489.
- Stechow, A. von (1991): 'Current issues in the theory of focus'. In A. von Stechow and D. Wunderlich, eds., *Semantics, An international handbook of contemporary research*. Berlin, de Gruyter.
- Steedman, M. (1977): 'Verbs, time and modality'. *Cognitive science* 1, 216-234.
- Szabolcsi, A. (1983): 'The possessor that ran away from home'. *The Linguistic Review* 3, 89-102.
- Szabolcsi, A. and F. Zwarts (1992): 'Weak islands and an algebraic semantics for scope taking'. *Natural Language Semantics* 1, 235-284.
- Sportiche, D. (1988): 'A theory of floating quantifiers and its corollaries for constituent structure'. *Linguistic Inquiry* 19: 425-449.
- Sportiche, D. (1994): 'Adjuncts and adjunction'. Paper presented at LSRL XXIV, UCLA.

- Stowell, T. (1981): 'Origins of phrase structure'. PhD thesis, MIT, Cambridge, Massachusetts.
- Travis, L. (1984): *Parameters and effects of word order variation*. PhD dissertation, MIT.
- Vendler, Z. (1967): *Linguistics in Philosophy*. New York, Cornell University Press.
- Verdam, J. (1911): *Middelnederlandsch Handwoordenboek*. 's-Gravenhage, Martinus Nijhoff.
- Williams, E. (1980): 'Predication'. *Linguistic Inquiry* 11, 203-238.
- Wyngaerd, G. vanden (1989): 'Object shift as an A-movement rule'. *MIT Working Papers in Linguistics* 11: 256-271. Cambridge, Massachusetts.
- Wyngaerd, G. vanden (1994): *Pro-legomena, distribution and reference of infinitival subjects*. Berlin/New York, Mouton de Gruyter.
- Zwart, C.J.W. (1993): *Dutch Syntax: A minimalist approach*. PhD thesis. University of Groningen.
- Zwarts, F. (1986): *Categoriale grammatica en algebraïsche semantiek*. PhD thesis. Rijksuniversiteit Groningen.
- Zwicky, A. & J. Sadock (1975): 'Ambiguity tests and how to fail them'. In J. Kimball, ed., *Syntax and semantics* 1, 1-36. New York, Seminar Press.



# Samenvatting

Dit proefschrift verschaft een maximaal minimalistische theorie van de correspondentie tussen syntactische structuur en semantische interpretatie. In hoofdstuk 1 wordt deze theorie geïntroduceerd. De hypothese is dat een X-bar structuur een verzameling *syntactische relaties* tussen knopen definieert die direct correspondeert met een verzameling *semantische relaties* tussen die knopen. De eenvoudigst denkbare (linguïstische en niet-linguïstische) *relatie* bestaat uit drie elementen: een relator en de twee objecten die de relator aan elkaar relateert. Als X-bar structuur een verzameling relaties tussen knopen is, bestaat de syntactische structuur die nodig is om precies één semantische relatie uit te drukken uit drie knopen. Anders gezegd, het syntactische en semantische atoom is ternair. Als voorts wordt aangenomen dat de semantische inhoud van een relatie (maar niet de relatie zelf) wordt bepaald door de eindsymbolen (de morfemen), dan heeft een syntactisch en semantisch atoom de abstracte structuur in (1), waar Z een syntactische relatie legt tussen X en Y, hetgeen correspondeert met een semantische relatie  $\underline{z}$  tussen  $\underline{x}$  en  $\underline{y}$ :



Er bestaan semantische relaties die schijnbaar binair in plaats van ternair zijn, zoals de relatie tussen een adjectief en een door dit adjectief gemodificeerd nomen, of de relatie tussen een PP en een door deze PP gemodificeerde VP, of de semantische relatie tussen een small clause predicat en zijn subject. Als alle relaties fundamenteel ternair zijn dan moeten deze schijnbaar binaire relaties in dit proefschrift samengenomen

onder de noemer *kwalificatie-relatie*, worden geanalyseerd als een speciaal geval van een ternaire relatie, namelijk als een atoom zoals in figuur 1 waarin de knopen X en Y identiek zijn. Doordat X en Y identiek zijn wordt de ternaire relatie gereduceerd tot een binaire. Dit is bijvoorbeeld het geval wanneer Y een spoor of kopie van X is.

Deze theorie van de correspondentie tussen syntactische structuur en semantische interpretatie is minimaal omdat er slechts één syntactische relatie is die correspondeert met slechts één semantische relatie. Ze is ook minimaal omdat de syntactische relaties direct de semantische relaties tussen de lexicale betekenis van morfemen bepalen. De semantische relaties worden in deze theorie niet bepaald door inherente eigenschappen van lexicale elementen, zoals het vermogen om theta-rollen toe te kennen. De theorie kan worden samengevat in de hypothese in (2):

(2) **Principe van Semantische Interpretatie (PSI)**

- I. Een knoop Z legt een S(EMANTISCHE)-RELATIE tussen een knoop X en een knoop Y als X de knoop Z onmiddellijk c-commandeert, en Z de knoop Y onmiddellijk c-commandeert
- II. Een knoop Z is een KWALIFICEEERDER van een knoop X als Z een S(emantische)-relatie legt tussen de knopen X en Y, en X en Y zijn gecoïndiceerd

In hoofdstuk 2 wordt de hypothese technisch uitgewerkt. De definitie van c-commanderen die Kayne geeft in *The antisymmetry of syntax* wordt aangepast om c-commanderen uit PP, meervoudige adjunctie, en aan c-commandeerrelaties deelnemende segmenten mogelijk te maken. Daarna worden de syntactische configuraties geïnventariseerd en besproken die volgens de PSI een kwalificatie-relatie uitdrukken. Er wordt een perspectief geboden op syntactische verplaatsing dat verschilt van het minimalistische perspectief. Niet de noodzaak om morfosyntactische kenmerken te checken veroorzaakt syntactische verplaatsing, maar de noodzaak om kwalificatie-relaties te bewerkstelligen.

De PSI roept een aantal interessante vragen op voor twee omvangrijke theoretische domeinen die niet gedetailleerd onderzocht konden worden binnen het bestek van dit proefschrift: theta-theorie en de theorie van functionele projecties. Er wordt daarom volstaan met een indicatie. Met betrekking tot theta-theorie wordt gesuggereerd dat er een kwalificatie-relatie is tussen de wortel van een transitief werkwoord (als bedoeld in Hale en Keyser 1993) en dat deze kwalificatie-relatie moet worden bewerkstelligd door verplaatsing van het interne argument van V naar [spec,VP]. In de syntactische analyse van modalen in hoofdstuk 5 wordt betoogd dat de

semantische relatie tussen een werkwoord en zijn subject wordt gelegd door een abstracte D(eterminer), de D waarvan Kayne (1993) veronderstelt dat ie aanwezig is in de representatie van het hulpwerkwoord en het possessief werkwoord *hebben*. Aldus wordt een begin gemaakt met het elimineren van theta-theorie ten gunste van een benadering in termen van S-relaties en kwalificatie.

Voor functionele projecties wordt aangetoond dat de Head Movement Constraint (Travis 1994) en het Mirror Principle (Baker 1985) direct volgen uit de PSI. Het is daarom aannemelijk dat functionele hoofden eveneens als kwalificeerders moeten worden geanalyseerd: een functioneel hoofd kwalificeert het hoofd dat eraan adjugeert. De PSI verschaft ook een verklaring voor de aanwezigheid van Agreement-hoofden. Een Agreement-hoofd is noodzakelijk wanneer een constituent één of meer potentiële landingsposities overslaat, want zo'n lange verplaatsing zal niet tot een kwalificatie-relatie leiden, tenzij Agreement aanwezig is om coindexatie mogelijk te maken.

De consequenties van de PSI worden gedetailleerd onderzocht in drie case studies. Hoofdstuk 3 is een case study van focus partikels in het Nederlands. Er wordt in gedemonstreerd dat de semantische en syntactische eigenschappen van focus partikels op een eenvoudige wijze volgen uit de PSI. Uitgangspunt van deze case study zijn de scalaire focus partikels en hiervan weer het voor deze klasse representatieve partikel *pas*. De semantische descriptie van *pas* leidt op het eerste gezicht tot de conclusie dat *pas* minimaal viervoudig lexicaal ambigu is. Nadere beschouwing leert echter dat deze ambiguïteit het resultaat is van de interactie tussen één eenvoudige lexicale betekenis en de syntactische positie van *pas*. Wanneer de syntactische structuur een kwalificatie-relatie bewerkstelligt tussen *pas* en een constituent die een temporeel object denoteert, krijgt *pas* een temporele interpretatie, bijvoorbeeld 'recent'. Wanneer de syntactische structuur een kwalificatie-relatie vastlegt tussen *pas* en een constituent die een telwoord bevat, krijgt *pas* de interpretatie 'niet meer dan'. Localiteitsbeperkingen op de relatie tussen het partikel en zijn syntactisch en semantisch argument worden onmiddellijk verklaard door de PSI.

Een interessant bijkomend resultaat van dit onderzoek naar focus partikels is dat gestrande focus partikels kunnen worden gebruikt als een diagnostiek voor verplaatsing. In dit opzicht zijn ze vergelijkbaar met floating quantifiers in bijvoorbeeld het Frans (Sportiche 1988). Omdat een focus partikel zijn semantische argument of het spoor daarvan onmiddellijk moet c-commanderen om kwalificeerder van dit argument te kunnen zijn, kan het andere posities dan de oppervlaktepositie van dit argument markeren. Deze diagnostiek wordt toegepast op twee domeinen: het Mittelfeld in het Nederlands, en successief cyclische verplaatsing. Voor het Mittelfeld

bevestigt de diagnostiek de structuur die Chomsky (1993) voorstelt, waarin een zin twee posities voor het subject en twee posities voor het object bevat, en waarin de paden van object en subject elkaar kruisen. Voor successief cyclische verplaatsing bevestigt de diagnostiek de analyse van Chomsky (1986), waarin een constituent die verplaatst wordt uit een ingebedde zin op zijn weg naar de matrix [spec,CP] moet adjungeren aan de matrix-VP. Toepassing van de PSI op deze configuratie verklaart bepaalde eigenschappen van factieve eilanden.

Hoofdstuk 4 is een case study van PP Extrapositie. PP Extrapositie wordt geanalyseerd als verplaatsing van VP, of een uitgebreide projectie daarvan, naar de specificerder van een adjunct-PP. Kayne's definitie van c-commanderen en de aangepaste versie daarvan die in hoofdstuk 2 ontwikkeld is laten dergelijke verplaatsingen toe. Deze verplaatsing is nodig om een adjunct-PP interpreteerbaar te maken als kwalificeerder van VP, en kan plaats vinden op oppervlaktestructuur of op LF. De distributie van focus partikels in extrapositiecontexten ondersteunt de correctheid van deze analyse. Deze analyse verklaart vrijwel alle in de literatuur genoemde eigenschappen van PP Extrapositie. Het spiegeleffect dat optreedt bij extrapositie van meer dan één PP, zoals geobserveerd in Koster (1974), volgt op dezelfde wijze uit de PSI als het spiegeleffect dat optreedt bij de verplaatsing van hoofden (Baker 1985). De *interpretive nesting requirement* die optreedt bij extrapositie van zowel een met het subject als een met het object geassocieerde PP (Rochemont and Culicover 1990) kan op precies dezelfde wijze worden verklaard. Een belangrijk voordeel is dat in deze analyse van PP Extrapositie geen gebruik wordt gemaakt van rechtsadjunctie of verplaatsing naar rechts. In dit opzicht is de analyse in overeenstemming met Kayne's antisymmetrische theorie.

Als onafhankelijke evidentie voor het bestaan van verplaatsing naar de specificerder van een adjunct wordt een niet eerder geobserveerd type scrambling geïntroduceerd. Er wordt betoogd dat adverbiale expressies die op het eerste gezicht ingebed zijn in een DP zich zowel in syntactisch als in semantisch opzicht gedragen als matrix adverbialia. De voorgestelde analyse van dit type scrambling is dat DP verplaatst wordt naar de specificerder van de adverbiale expressie. De juistheid van deze analyse wordt bevestigd door de diagnostiek van gestrande focus partikels.

Hoofdstuk 5 tenslotte is een case study van modale werkwoorden in het Nederlands. Nederlandse modalen blijken echte niet-werkwoordelijke complementen te kunnen selecteren en verschillen in dit opzicht dramatisch van bijvoorbeeld Engelse en Franse modalen. Op het eerste gezicht lijken de selectie-restricties die een modaal werkwoord in het Nederlands oplegt aan zijn complement nogal ingewikkeld, maar nader onderzoek leert dat het complement moet voldoen aan één simpele eis: het moet een *bounded lattice*

denoteren.

Verder wordt er betoogd dat het traditionele onderscheid tussen root modaliteit en epistemische modaliteit verfijning behoeft. Twee parameters leveren vier verschillende modale interpretaties: (i) de modaal kan wel of niet subject-gericht zijn, en (ii) een polariteitstransitie (oftewel een verandering van waarheidswaarde) is wel of niet een ingrediënt van de modale interpretatie. Deze semantische parameters blijken te corresponderen met twee verschillende syntactische configuraties. Subjectgerichtheid is het resultaat van bepaalde syntactische relaties (relaties zoals gedefinieerd in de PSI) tussen het subject, de modaal en een abstracte determiner. Het complement van de modaal bepaalt daarentegen of er een polariteitstransitie is. Er wordt een parallel getrokken tussen een modaal werkwoord met een definitief nominaal complement en een modaal werkwoord met een verbaal complement in de waarschijnlijkheidslezing (= de epistemische lezing). Ook wordt er een parallel getrokken tussen een modaal werkwoord met een indefinitief nominaal complement en een modaal werkwoord met een verbaal complement in de niet-epistemische lezingen. In de analyse spelen vrijwel alle kwalificatie-relaties die besproken worden in hoofdstuk 2 een cruciale rol. Empirische evidentie voor de correctheid van de analyse wordt in ruime mate verstrekt, en er wordt aangetoond dat de analyse superieur is ten opzichte van de traditionele analyse van modale ambiguïteit in termen van theta-theorie, dat wil zeggen in termen van raising en controle.

De drie case studies laten zien dat de PSI de ingewikkelde en subtiële syntactische en semantische eigenschappen van drie verschillende empirische domeinen op een eenvoudige wijze verklaart. In dit proefschrift is gekozen voor een diepgaande analyse van bepaalde syntactische en semantische eigenschappen van het Nederlands. Dat wil echter geenszins zeggen dat de PSI alleen geldig is voor het Nederlands. De hier gegeven analyse van focus partikels en PP Extrapositie kan bijvoorbeeld gemakkelijk worden uitgebreid naar het Engels en Duits, die in deze twee domeinen weinig van het Nederlands verschillen. Het feit dat de Head Movement Constraint en het Mirror Principe, die beide gemotiveerd zijn voor andere talen dan het Nederlands, direct volgen uit de PSI vormt een aanwijzing dat de PSI onderdeel is van de universele grammatica.

# Curriculum vitae

Sjef Barbiërs werd geboren op 23 augustus 1959 te Amsterdam. Na het behalen van het diploma Atheneum B (Sint Joriscollege te Eindhoven, 1977) studeerde hij een jaar aan de Landbouwwuniversiteit te Wageningen (natuurwetenschappelijk maatschappelijke richting). Vervolgens was hij, tot 1986, werkzaam als psychiatrisch verpleegkundige in psychiatrisch ziekenhuis Sancta Maria (thans Langeveld) te Noordwijk. Van 1986 tot 1990 studeerde hij Nederlandse taal- en letterkunde aan de Rijksuniversiteit Leiden. Tijdens deze studie was hij tevens actief als free-lance docent Nederlands aan diverse instituten. Op 30 november 1990 studeerde hij *cum laude* af op een doctoraalscriptie over de syntaxis van nominale groepen in het Nederlands, Engels en Chinees. Het thans voor u liggende proefschrift is het resultaat van het promotieonderzoek dat de auteur vanaf 1 april 1991 verrichtte als assistent-in-opleiding aan de Rijksuniversiteit Leiden. De auteur is gehuwd met Anneke van Tol, met wie hij twee zonen heeft, Daan en Koen.