January 1997
Appeared in Miriam Butt and W. Geuder (eds.) *The Projection of Arguments,* CSLI Publications, Stanford, 1998, pp 309-353.

Scrambling and the PF Interface

AD NEELEMAN & TANYA REINHART

1. **Introduction**

The position in which an argument is projected is usually assumed to be determined strictly by conditions of the computational system (X-bar theory) and the LF interface (Θ-theory). We will argue that these systems, although they obviously restrict the distribution of arguments, still allow in many cases a range of positions in which a given argument can be generated (merged). In the structures we will consider here, the choice between these is made, perhaps surprisingly, at the PF interface, where the syntactic tree is mapped onto a phonological representation.

Our case is based on the phenomenon of scrambling, the option of placing adverbials between the object and the verb in OV languages like Dutch. The prevailing assumption among theoretical linguists has been for years that the scrambled word order - *subject-object-adverbial-verb* - is derived from the base order - *subject-adverbial-object-verb* - by movement of the object DP (to either an A- or an A'-position). We will argue that both orders are base-generated - an instance of the basic flexibility of the computational system. This, however, implies that restrictions on scrambling, and possibly other instances of word-order variation, cannot be explained in the syntactic part of the derivation. Such restrictions, we argue, follow from two types of PF considerations.

The major factor that determines word-order variation across languages is case checking, which, in turn, is sensitive to prosodic phrasing (as defined in Selkirk 1986). Case can be checked either in prosodic or in syntactic domains. Given that the derivation tries to reach the articulatory system as soon as possible, preference is given to prosodic checking. We argue that the generalization that VO languages do not allow scrambled word order follows from the fact that prosodic checking can, and therefore must, take place if the object follows the verb. In OV languages prosodic checking is impossible, and the system must consequently resort to the broader, syntactic domain.

Next, when a language allows for the scrambled word order, the choice between the two derivations is known to be sensitive to discourse conditions, often described as `definiteness effects'. We argue that such effects cannot be derived from considerations of the syntactic

derivation, as commonly assumed in movement analyses. Rather, they are a direct consequence of the system of stress assignment, in conjunction with considerations of interface economy.

2. **Scrambling**

In Dutch and many other languages, objects may be freely separated from the verb by adverbial material. The structure in (1a) exists alongside the one in (1b). The second structure is commonly referred to as `scrambling', a term which we will maintain for convenience.

(1)a. Dat Jan [langzaam [het boek las]]
that John slowly the book read
b. Dat Jan [het boek [langzaam las]]

Adverbials do not interfere with the basic architecture of the clause. They do not block movement, nor do they affect the thematic or case-assigning properties of the verb. One may be inclined to conclude from this that adverbials are freely attached at various places in the structure, with scrambling as one of the permitted results. (1a) and (1b) would then reflect high and low attachment of *langzaam* respectively.

This, however, is not the analysis usually adopted in the literature. Until recently, most linguists studying the issue have assumed that the example in (1b) is derived from the one in (1a) by movement, as illustrated in (2). The main topic of discussion for them has been which kind of movement is responsible for the separation of verb and object.

(2) Dat Jan [[het boek]$_i$ [langzaam [t_i las]]]
that John the book slowly read

The movement analyses of scrambling are theoretically motivated by the hypothesis that the verb and its objects form a core constituent that excludes all adverbial material. This hypothesis goes back to Chomsky (1965), in which the basic structure in (3) was proposed for English. Later, it was argued that verb and object must form a deep structure unit because of an adjacency condition on structural case assignment (cf. Stowell 1981), or a condition of structural sisterhood on direct Θ-role assignment (cf. Chomsky 1986a).

(3) [$_{PredP}$ Adverbials [$_{VP}$ V Arguments] Adverbials]

English provides empirical support for the `core constituent hypothesis'. This language differs from Dutch in that adverbials may not appear between a verb and its direct object:

(4)a. John read the book slowly
b. *John read slowly the book

The contrast in (4) is not a peculiarity of English. Neeleman & Weerman (1996) observe that there is a strong typological correlation between OV order and scrambling on the one hand, and VO order and verb-object adjacency on the other. Once the option of V-to-I movement is controlled for, it can be observed that scrambling exists in all Germanic OV languages (that is, Dutch, German, Frisian and Old English), and in none of the VO languages (Danish, English, Norwegian and Swedish). A similar pattern holds outside Germanic. OV languages like Japanese, Korean and Turkish have scrambling; VO languages like Berbice Dutch, French and Italian do not.

If facts like (4) justify the conclusion that verb and object universally form an underlying unit, scrambling must indeed be analyzed as obtained by movement. The structure in (1b) cannot be base-generated, since the object would then remain caseless or would not be assigned a Θ-role (or both). The question then arises which type of movement is most successful in explaining the various properties of the phenomenon. In the remainder of this section, we will very briefly discuss some proposals

In the early eighties, scrambling was analyzed as the result of optional A'-movement (cf. Bennis & Hoekstra 1983). The argument went as follows. The acceptability of (1a) shows that case is available in the object's base position. This implies that if the object moves, it leaves behind a case-marked variable, which is possible only if the movement targets an A'-position.[1] Although this analysis is straightforward, it does not sufficiently account for the properties of scrambling. For a start, it begs the question why the same type of A'-movement does not exist in English. In order to exclude the representation in (5), an additional stipulation seems to be necessary.[2]

(5) *John read t_i slowly [the book]$_i$

[1] The main argument for the A'-movement analysis was that scrambling can license parasitic gaps (cf. Bennis & Hoekstra). However, it can be shown that what seem to be parasitic gaps in Dutch can be A-bound in several constructions (involving, for instance, NP raising and nominalization). This suggests that we are not really dealing with parasitic gap constructions here (see Neeleman 1994 for discussion).

[2] At first sight, heavy NP shift may be analyzed on a par with scrambling in Dutch, but this is problematic, because the two processes have different properties, and because Dutch also has a rule of heavy NP shift, which places heavy material to the right of the verb.

Moreover, evidence has accumulated since the beginning of the nineties, that scrambled objects occupy an A-, rather than an A'-position. We will review some of this evidence in the next section, but it should be mentioned now that if it is correct, scrambling cannot be A'-movement.[3]

The conclusion drawn from this by Vanden Wyngaerd 1989 and Mahajan 1992 was that in constructions like (1b) the object moves from a Θ-position to a position in which case is available. The representation in (2) was claimed to contain an agreement projection in which structural accusative was assigned. The object moves to the A-specifier of this projection, as in (6). (Note that at this point in time it was still assumed that OV order was base-generated).

(6) Dat Jan [$_{AgrOP}$ [het boek]$_i$ [$_{VP}$ langzaam [$_{VP}$ t_i las]] AgrO]
that John the book slowly read

Although this analysis explains the A-properties of scrambling, it faces some serious difficulties. For a start, if case is assigned in Spec-AgrO, how can the acceptability of (1a) be explained? The proposal entertained at the time was that case is optionally assigned to the complement of V or to the specifier position in (6), thus blocking or forcing movement. This, however, is not much more than a precise description of the problem.

For the analysis to explain the typological relation between scrambling and OV order, it has to be stipulated that in VO languages the verb never moves to AgrO. If it did, adverbials adjoined to VP would separate the object and the verb, as shown by the example in (7).

(7) *John [$_{AgrOP}$ [$_{AgrO}$ read] [$_{VP}$ slowly [$_{VP}$ t_V the book]]]

In effect, then, we only have empirical evidence against verb movement to AgrO, and no direct evidence that such movement could in principle take place. This contrasts with the better motivated functional projections C and I, where we find direct evidence in the form of overt movement.

A solution for the first problem, that of optionality, was developed in the framework of the early minimalist program by Zwart (1993). Following Chomsky (1993) and Kayne (1994), Zwart assumes that objects are generated postverbally in both VO and OV languages; OV order

[3] Additional support for this conclusion comes from `focus scrambling', an A'-movement operation discussed in detail in Neeleman 1994. This operation has syntactic properties that differ radically from those of regular scrambling. So, if focus scrambling is indeed an A'-movement, it is impossible to analyze regular scrambling in this way. In the examples discussed here and below we have controlled for focus scrambling, and added footnotes where the operation may be relevant.

is derived by overt movement of the object to spec-AgrO. If adverbials can be freely attached to all (and only) maximal projections, the data in (1) can be analyzed as below:

(8)a. Dat Jan [$_{AgrOP}$ langzaam [$_{AgrOP}$ [het boek]$_i$ AgrO [$_{VP}$ las t_i]]]
that John slowly the book read
b. Dat Jan [$_{AgrOP}$ [het boek]$_i$ AgrO [$_{VP}$ langzaam [$_{VP}$ las t_i]]]

As we have shown, earlier analyses derived (1b) from (1a). The optionality of the movement responsible for this is at odds with economy conditions proposed by Chomsky (1995). In the analysis in (8), however, scrambling follows from free attachment of adverbials. There is no derivational relation between (8a) and (8b). The immediate consequence is that the coexistence of the two constructions is no longer problematic.

Like earlier analyses, however, the one in (8) does not capture the typological relation between OV order and scrambling. Note that for checking of the accusative feature, not only the object, but also the verb must move to AgrOP. While Mahajan's approach needed to disallow this only in VO languages (for the problem in (7)), it must now be stipulated that the verb cannot move overtly in any language, including OV languages.[4] If an OV language has overt V-to-AgrO movement, yielding a structure like (9), then scrambling will never be allowed in this language, since there is no attachment site (maximal projection) for adverbials between the object and the verb. But as far as is known, all OV languages do, in fact, have scrambling.

(9) Dat Jan [$_{AgrOP}$ [het boek]$_i$ [$_{AgrO}$ las] [$_{VP}$ langzaam [$_{VP}$ t_V t_i]]]
that John the book slowly read

As mentioned, the fact that V is never allowed to move to AgrO overtly in any language, weakens the case for AgrOP considerably. The methodological guideline that no more structure be assumed than is motivated by the data would then argue against agreement projections. That these lack substantial motivation has been concluded on various grounds by Iatridou (1990), Ackema et al. (1992), Grimshaw (1991, 1995) and Chomsky (1995).

We conclude that although progress has been made in understanding scrambling, the movement analyses either fail to capture all properties that should be captured, or do so at the high cost of unwarranted stipulations. In the following section, we will therefore explore an alternative account.

---

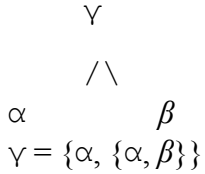
[4] It is an open question whether locality conditions allow movement of the object to spec-AgrO without accompanying verb movement. If they do not, an additional problem arises.

3. **Merger and Θ-Role Assignment**

As would be clear by now, all analyses of scrambling so far start out from the assumption that the object and the verb form a unit at the beginning of the derivation. However, there is less agreement about the principle responsible for this. Both case adjacency and the sisterhood condition on Θ-role assignment are candidates. It is necessary, therefore, to first clarify this issue. In this section, we will argue that, assuming the view of merging in the minimalist program, it cannot be Θ-considerations that impose adjacency. The sisterhood condition on verb-object relations, as originally stated, turns out to be not in spirit of this framework. As far as Θ-assignment is concerned, scrambling orders can simply be base-generated, with many empirical advantages as a result. This will leave us with the question of case, to which we turn in sections 4 and 5.

If two categories α and *β* are merged to form a complex category γ, the properties of γ are inherited from either α or *β*. In Chomsky (1995), this is expressed by saying that if α projects, γ is assigned the label {α, {α, *β*}}:

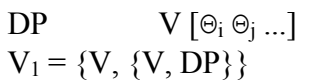
(10)



γ = {α, {α, *β*}}

It is an open question how the operation depicted in (10) interacts with conditions on Θ-role assignment. Let us assume, as a starting point for the discussion, that an argument can only satisfy the Θ-role of a predicate if the argument and the predicate are sisters. Thus, the relation between a direct object and the verb can be represented as in (11) (where order is irrelevant). Given that the verb is the head of the construction, its properties are copied onto the node dominating object and verb. However, as indicated by the #-sign, the verb's internal Θ-role is satisfied and can no longer be used to license an argument.

(11) V_1 [$\Theta_{i\#}$ Θ_j...]



V_1 = {V, {V, DP}}

Obviously, adjuncts differ from arguments in that they do not satisfy any of the verb's Θ-roles. If an adjunct is attached to a verbal category, the resulting category has exactly the same thematic properties as the category it is derived from. This is indicated in (12) by the absence of

a #-sign on any of the verb's Θ-roles.

(12) V_1 [Θ_i Θ_j ...]

/ \

AdvP V [Θ_i Θ_j ...]
V_1 = {V, {V, DP}}

As desired, this distinguishes adjunction and projection. V_1 in (11) inherits its label from V, as does V_1 in (12). However, in (12) the two verbal nodes have identical properties, and they can therefore be seen as a single category. In (11), on the other hand, the direct Θ-role of V is satisfied through merger with a DP, and hence V_1 and V must be different categories.[5]

The theory also imposes a strict locality condition on Θ-role assignment. When two nodes are merged, only the properties of the head are copied onto the newly formed complex category. This implies that no thematic information can be inherited from a verbal category if it is merged with a category X, and X projects, as in (13). In conjunction with the standard condition of sisterhood, this leads to the conclusion that no verbal Θ-role can ever be saturated by an argument outside the verb's maximal projection.[6]

(13) * X_1 [Θ ...]

/ \

X V [Θ ...]
X_1 = {X, {X, V}}

These conclusions are all straightforward and uncontroversial. The next question is whether additional restrictions (such as verb-object sisterhood) must be imposed on Θ-role assignment, as in previous analyses. To answer this question, let us examine some of the empirical consequences of the assumptions above for the structures under consideration, in which the

[5] Note that no conflict arises with respect to approaches in which adjuncts are analyzed as predicates taking a verbal argument. It may well be that V in (13) satisfies some variable in AvdP, but as this does not effect the properties of either V or V_1, these nodes still count as a single category.

[6] It may be that external Θ-roles are different in this respect, depending on one's view of predication, but we cannot address this issue here.

verb combines with both an argument and an adjunct.

Obviously, if the verb first combines with an object and then with an adverbial, as in (14), the derivation will converge. In line with what has been argued above, one of the verb's Θ-roles is saturated when it merges with a DP. The remaining Θ-grid is first copied onto V_1, the category dominating the object and the verb, and after that to V_2, the category dominating the adverbial and V_1, because adverbials do not affect thematic information.

(14) V_2 [$\Theta_{i\#}$ Θ_j ...]

AdvP V_1 [$\Theta_{i\#}$ Θ_j ...]

DP V [Θ_i Θ_j ...]

V_1 = {V, {V, DP}}
V_2 = {V_1 {$_{V1}$, AdvP}}

More controversially, the minimal theory also allows the verb to be combined with an adverbial before it merges with the object. Since adverbials are thematically inactive, the Θ-grid of the verb is simply copied onto V_1 in (15). There is nothing in the theory that makes it impossible for V_1 to then combine with a DP. After all, the relation between V_1 and that DP is formally identical to that between a simplex verb and its object: V_1 and DP are sisters, as are DP and V in (11). Consequently, DP can be used to satisfy one of V_1's internal Θ-roles:

(15) V_2 [$\Theta_{i\#}$ Θ_j ...]

DP V_1 [Θ_i Θ_j ...]

AdvP V [Θ_i Θ_j ...]

V_1 = {V, {V, AdvP}}
V_2 = {V_1 {$_{V1}$, DP}}

Despite its controversial nature, it is hard to find independently motivated restrictions that rule out the structure in (15). The traditional sisterhood condition is irrelevant, since V_1 and DP are in fact sisters. Except for the problem of adjunct intervention in English, the assumption that adjuncts cannot be attached to Θ-related nodes (Chomsky 1995:330) does not seem to be motivated by any requirements of Θ-theory. It appears that this assumption could be derived from the fact that adjunction destroys the local relation between an argument and its predicate.

However, it is not V that assigns a Θ-role to DP in (15), but rather V_1. No questions of locality therefore arise.

A question of strategy then presents itself. Given that it is problematic to rule out adjunct intervention in (15), should one accept stipulations that force verb and object to be adjacent, or should one try to use the possibility of adjunct intervention to analyze phenomena that were hitherto problematic? Unless empirical evidence (for instance case considerations) force us to adopt the former strategy, the latter is to be preferred. In fact, the theory of merger provides a natural explanation for scrambling in the Germanic OV languages. As we have shown in the previous section, objects can be separated from the verb by adverbial material in Dutch. We can now understand this by saying that (16a) corresponds to (14), and (16b) to (15).

(16) a. Dat Jan [$_{V2}$ langzaam [$_{V1}$ het boek [$_{V}$ las]]]
that John slowly the book read
b. Dat Jan [$_{V2}$ het boek [$_{V1}$ langzaam [las]]]

As far as Θ-assignment is concerned, then, there is no problem in assuming base generation of scrambling structures. Furthermore, as we shall now show, there are many advantages to this line of account.

A base-generation analysis captures the basic properties of scrambling. First, it explains why scrambling is optional. The structures in (14) and (15) are derived from the same numeration, and no economy considerations favor one order of selection from the numeration over another in this case. This means that, as far as the computational system is concerned, both orders are acceptable.

Second, the analysis explains why scrambling is strictly clause-bound, as originally observed by Ross (1967). The example in (17) shows that it is impossible to scramble an object that belongs to an embedded verb into the matrix clause. This restriction can now be seen as a direct consequence of the locality of Θ-role assignment (cf. 13).[7]

(17) *dat Kees [dat artikel]$_i$ dacht [t_i dat hij t_i gelezen had]
that Kees that article thought that he read had

[7] It is argued in Den Besten & Rutten (1989) that scrambling out of infinitival constructions is possible in Dutch. However, this analysis must be rejected since elements that cannot be scrambled otherwise would have to be moved in the so-called `third construction'. An alternative analysis is that different parts of the infinitival verbal projection may be extraposed in Dutch, with the effect that objects and other material can be stranded. This possibility can perhaps be derived from the theory of case developed in section 4. We will leave this issue to future research.

Third, the analysis accounts for the fact that scrambled DPs occupy an A-position. This property of scrambling can be illustrated in various ways. To give two examples, scrambled DPs can bind a pronominal variable, as in (18a,a') and they can be the subjects of secondary predication, as in (18b,b'). Both possibilities are typical of A-positions.

(18) a. Dat ik iedereen$_i$ namens zijn$_i$ kinderen feliciteerde
that I everyone on-behalf-of his children congratulated
a'. *Dat ik namens zijn$_i$ kinderen iedereen$_i$ feliciteerde
b. Dat ik Marie$_i$ dronken$_i$ ontmoette
that I Mary yesterday drunk met
b'. *Dat ik dronken$_i$ Marie$_i$ ontmoette

Fourth, it follows that scrambling observes the thematic hierarchy. When two DPs are scrambled, their respective order is always preserved in Dutch, as in (19). This need not surprise us, since in any analysis it is assumed that Θ-roles must be discharged in a particular order (that is, that selection from the numeration is determined, for arguments, by an independently motivated thematic hierarchy). Obviously, this order will remain the same, whether or not the verb combines with an adverbial first:

(19) a. Dat ik gisteren Marie de foto toonde
that I yesterday Mary the picture showed
b. Dat ik Marie de foto gisteren toonde
c. *Dat ik de foto Marie gisteren toonde

Given the extensive literature on scrambling, these arguments all require further discussion. In languages with morphological case, for example, the word order in (19c) is possible. This can be explained once the relation between case and Θ-role assignment is clarified, but it would take us too far afield to do so here (see Neeleman & Weerman 1996 for discussion and further argumentation). For the moment, we simply conclude that, as far as Θ-assignment is concerned, a straightforward and empirically adequate analysis of scrambling can be obtained once the condition that objects form a `core constituent' with the verb is abandoned. This appears a welcome result, since this condition has no conceptual basis if phrase markers are generated by the merge operation.

At this point one question remains: why must objects in English appear adjacent to the verb? This issue will be addressed in the next section.

4. **Case and Adjacency**

The contrast in (20), discussed in Chomsky (1995), suggests that the adjacency of the object and the verb in English must indeed have its source in case theory. Otherwise, the fact that PP complements behave differently would remain unexplained.

(20) a. *John read slowly the letter
b. John read slowly to his children

In this section, we will discuss how available minimalist analyses of case account for this contrast. We should mention here that such analyses are usually based on some form of Kayne's (1994) hypothesis of antisymmetry, according to which objects are uniformly generated postverbally. In the course of the derivation, the object's features are checked by leftward movement to a checking position. If this movement is overt, an OV language is derived; if checking is covert, VO order is maintained at the surface. Our proposal that scrambling follows from properties of the merge operation is clearly at odds with the antisymmetry hypothesis, since it presupposes that objects in Dutch can be merged with a verbal category to their left. For the sake of the discussion, we will ignore this issue temporarily.

If the difference between OV and VO languages is explained in terms of movement, it would seem that case theory is irrelevant to the contrast in (20). The verb in English does not entertain a relation of case checking with its complement and hence no adjacency condition can be imposed. Nevertheless Chomsky (1995) argues, correctly in our view, that case theory is responsible for the fact that (20) crashes.

Consider first (20b). Antisymmetry has the consequence that the simplest analysis of this example, which would involve a left-branching VP, must be rejected. Chomsky instead proposes that in this structure the adverbial is generated as the specifier of VP, while the PP is the verb's complement. Surface order is then derived by movement of the verb to a light verb *v*, as in (21).

(21) John [$_{vP}$ *v*-read [$_{VP}$ slowly [$_{V'}$ t$_{V}$ to his children]]]

If the verb can move away from its complement in a structure like (22), the question arises why the same operation results in an illegitimate structure when the complement needs to check case, as in (22).

(22) *John [$_{vP}$ *v*-read [$_{VP}$ slowly [$_{V'}$ t$_{V}$ the letter]]]

Chomsky's suggestion is that the adverbial in (22) blocks movement of the object to its

checking position at LF. A similar movement would be blocked in (21), but this is irrelevant because PPs do not have case features that must be checked through raising.

The status of the adverbial in (21) and (22) is not uncontroversial. In preminimalist terms, the movement of the object would be ruled out on a par with cases of superraising. This implies that the adverbial occupies an A-position. Hence, a movement of the object that crosses the adverbial would violate relativized minimality. However, as is well known, adverbials do not block A-movement in other structures. In (23), for example, an object is moved to subject position across two adverbials:

(23) John_i has probably been rudely criticized t_i

To rephrase the issue in terms of the minimalist program, the adverbial in (22) can only block raising of the object if it has features that are attracted by the position in which the object's case is usually checked. The adverbials in (23), on the other hand, should lack features that are attracted by the position to which *John* is moved (the EPP position). In the absence of a theory of adverbial features, it is not obvious why this would be so.

Assuming adverbial features comes at a cost. Consider, for example, the derivation in (24), which should converge. Here, the case features of the object can be checked without any difficulty because the adverbial does not occupy an intervening position. However, if the adverbial indeed has features, these should be checked as well. The familiar procedures seem inapplicable, however, which means that an additional system of checking must be introduced. This system should be inaccessible to the object in (22), since otherwise verb-object adjacency can no longer be guaranteed.

(24) John [$_{vP}$ *v*-read [$_{VP}$ the letter [$_{V'}$ t_V slowly]]]

A further complication concerns double object constructions. Within the minimalist program, the null hypothesis is that both objects check their case feature by entering into a spec-head relation with the verb. In OV languages, for instance, both are moved to a preverbal position, presumably to facilitate feature checking. If this is so, accusative case can be checked even though the Goal intervenes between the Theme's checking position and Θ-position:

(25) John [$_{vP}$ *v*-showed [$_{VP}$ Mary [$_{V'}$ t_V a picture]]]

The question to be answered, then, is why an object can be related to a checking position across an argument, but not across an adverbial - the opposite of what one would expect.

In sum, the minimalist theory of case can give an explanation for verb-object adjacency in

English, but only at a certain cost. In addition to the standard assumption that PP complements do not need to check case, it must be argued that ...

(26) a. adverbials have features that can be attracted by the accusative case position,
b. adverbials do not have features that can be attracted by the nominative case position, even though sentential adverbs can also occur in I projections,
c. there is a checking procedure other than spec-head agreement for adverbials,
d. this alternative checking procedure is not accessible to objects, and
e. the way by which an object can check its case across another object does not allow checking across an adverbial.

Of course, the necessity of arguing for these claims does not show that the overall approach is incorrect, but it does provide some motivation for reconsidering the hypotheses that gave rise to it: antisymmetry and checking by movement. As we pointed out above, the proposal that scrambling is a result of merger also goes against antisymmetry. Let us therefore see whether an alternative case theory can be constructed, one based on a flexible merge operation.

5. **Case Checking Without Movement**

If scrambling reflects properties of merger, this operation must be highly flexible. Objects may not only be merged with verbal elements to their left, as is usually the case in English, but also with verbal elements to their right. This ties in with the suggestion, made in Chomsky 1995, that order does not play a role in the computational system (that is, in the derivation connecting the numeration to LF). Order is imposed by PF procedures that map syntactic structures to phonological ones. In this section, we will consider how this mapping procedure should be organized in order to explain why scrambling is restricted to OV languages. We will adopt here a variant of the theory of Neeleman 1994 and Neeleman & Weerman 1996 about the role of case at PF.[8]

This theory does not rely on agreement projections or checking by movement. Instead, its basic ingredients are a directionality parameter and a universal strategy concerning the domain in which case is checked. The directionality parameter states that in any given language the verb checks its case either to the right or to the left. Thus a specific order is imposed on the object and verb at PF, even though this order is irrelevant to the computational system. The universal strategy has to do with the type of domain in which case is checked. This domain is rather narrow in some languages, with the result that of the various object positions in VP, only

[8] The main difference with Neeleman & Weerman's proposal is that they do not assume case checking or case assignment, but a system of argument licensing. For our present purposes this is irrelevant.

the ones adjacent to the verb may be used. Crucially, Neeleman & Weerman argue that there is an implicational relation between the direction and the domain of case checking: checking to the left implies a larger domain than checking to the right. Let us see how this follows.

Suppose that case checking is universally defined as in (27), where (27a) represents the directionality parameter.

(27) *Case Checking*
V may enter into a checking relation with a constituent C iff
a. V precedes/follows C, and
b. V and C are contained in the same local domain

By necessity, both syntactic and phonological information must be accessible at the PF interface. Therefore, the local domain mentioned in (27a) can either be defined syntactically or phonologically. However, it is the task of the PF interface to prepare sentences for pronunciation, and consequently there is a strong inclination to shift to phonological information as soon as possible. Syntactic information can be accessed, but this will be avoided unless other options fail. The checking domain that will be preferred, therefore, is the phonological phrase, φ. Only if checking in this domain is impossible will the system resort to the dispreferred domain, the syntactic phrase.

Furthermore, we make the following assumptions about case checking. As in the framework of the minimalist program, the verb and its internal arguments enter the numeration already marked with case features. The case feature of the verb may be complex (consisting of dative and accusative). Arguments each carry a single simplex case feature. If there is any category in the verb's checking domain, the whole complex of the verbal case features is deleted (that is, checked). Arguments are more choosy: they can only check their features against matching features on the verb. This appears to relate to the visibility condition of Chomsky (1986b), which states that arguments must have case in order to be visible for Θ-assignment. Possibly, the case features of internal arguments are checked but not deleted, since they are interpretable at the LF interface. No visibility requirement holds of verbs in this sense.

Selkirk (1986) motivates the following mapping procedure for φ-formation:

(28) *φ-Formation*
Close φ when encountering $]_{XP}$

The procedure in (28) has the effect that the right edges of phonological phrases coincide with the right edges of syntactic phrases. Consider the example in (29a). The mapping device opens a prosodic phrase at the beginning of the sentence. It then moves rightward until it encounters

the first right XP bracket, that of *Mary's*. At that point, it closes the first prosodic phrase and opens a new one. The mapping device proceeds in this fashion until the entire syntactic string is scanned. The result is the prosodic structure in (29b), where curly brackets indicate φ-boundaries.[9]

(29) a. [[A friend of [Mary's]] [gave [a book] [to [Sue]]]]
b. {A friend of Mary's} {gave a book} {to Sue}

The system entails that in English case checking always takes place in prosodic domains. In simple example like (29b) the object is in the phonological domain of the verb. Since the verb may check its features in this domain, it must do so, with the consequence that the objects features are checked as well.

Now, let us see what happens if an adverbial separates the verb and the object, as in (30a). Since the verb and the adverbial that follows it form a prosodic phrase, the adverbial enables deletion of the case features of the verb and hence this must take place. As a result of this operation, the verb looses the ability to check the case features of the object. When we reach the object, its features need checking as well. Although in principle case checking could take place in the broader syntactic domain, this is no longer possible in practice, since the verb's features are already deleted. The derivation therefore does not converge.

(30) a. *[[John] [read [slowly] [the book]]]
b. *{John} {read slowly} {the book}

This problem does not arise if the adverbial appears to the right of the object, as in (31a). As before, the verb checks its features in its prosodic domain. Since the object and the verb form a prosodic phrase in (31b), the object's features can be checked as well, and consequently the structure converges. It is predicted that in languages like English, the object and the verb must always be adjacent, that is, case adjacency is derived.

(31) a. [[John] [read [the book] [slowly]]]
b. {John} {read the book} {slowly}

So, in English, the system of case checking is specified as in (32), Note, however, that only (32a) is a parametric factor that requires learning. (32b) is an entailment of the system.

[9] Phonological procedures following the PF interface have this structure as their input, and may change it when necessary. This does not affect the argumentation in this paper.

(32) *Case Checking* (VO)
V may enter into a checking relation with a constituent C iff
a. V precedes C
b. V and C are contained in the same φ

In an OV language like Dutch, checking can never take place in prosodic domains. Even in a simple sentence like (33a) the verb is the only element in its prosodic domain, as the corresponding phonological structure in (33b) shows.

(33) a. [Dat [Jan] [[het boek] las]]
b. {Dat Jan} {het boek} {las}
that John the book read

The reason for this is that in an OV language the object precedes the verb (due to the case parameter). However, the right edge of any constituent preceding the verb will close the previous φ, thus separating this constituent from the verb. Consider, then, what happens if the verb tries to check (delete) its features in its phonological domain. Since there is never any other element to its left in this domain, the verb cannot get rid of its features in this way, and the system must resort to the more costly syntactic domain. The entailment is that case checking in an OV language must always take place in the syntactic domain. We can summarize this as in (34). Again (34a) is a specification of the parametric clause, whereas (34b) is just an entailment of the system.

(34) *Case Checking* (OV)
V may enter into a checking relation with a constituent C iff
a. V follows C
b. V and C mutually m-command each other

It follows that there is no adjacency requirement between the verb and the object in Dutch. Recall that we have never imposed any independent adjacency requirement. The only requirement for checking is inclusion in the verb's checking domain. This means that all nodes in this domain are equally available for the checking operations. Since the checking domain in Dutch is the broader syntactic one, the verb can check the case of an object even if an adverbial intervenes. This, of course, explains the existence of scrambling in OV languages:

(35) a. [Dat [Jan] [$_{VP}$ [langzaam] [het boek] las]]

that John slowly the book read

b. [Dat [Jan] [$_{VP}$ [het boek] [langzaam] las]]

So, as desired, there is an implicational relation between OV order and case checking in syntactic domains and between VO order and a prosodic definition of the checking domain. In both languages, the verb tries to check its features in its prosodic domain. In VO languages it can always do so, and therefore it must. In OV languages, the verb's prosodic domain contains no material other than the verb, and therefore the system must resort to checking in syntactic domains. The possibility of scrambling is a consequence.

Neeleman & Weerman are able to explain a number of other differences between OV and VO languages in terms of their respective checking domains. We cannot discuss all of these here, but it is important to point out some. For one thing, the system does not rule out scrambling in English across-the-board. If case checking is the crucial procedure, one would expect scrambling of PPs to be possible. It is irrelevant whether PP are in the checking domain of the verb, since they do not need to check case, and hence (36) should be as acceptable as the structure in which the PP occurs adjacent to V.

(36) V_2 [$\Theta_{\#}$ Θ ...]

V_1 [Θ Θ ...] PP

V [Θ Θ ...] AdvP

V_1 = {V, {V, AdvP}}

V_2 = {V_1 {$_{V1}$, PP}}

This, of course, explains the contrast in (20) (repeated as (37a,b) below). Recall that it was this contrast that forced Chomsky (1995) to the conclusion that adverbials have features that are attracted by the accusative checking position.

(37) a. *John read slowly the letter

b. John read slowly to his children

b'. John read to his children slowly

The system of case checking can also be used to solve an important paradox concerning phrase structure. The data in (38) show that the order of postverbal time and manner adverbials in English is the mirror image of the order found in Dutch.

(38) a. dat Jan [gisteren [vurig [een meisje kuste]]]
that Jan yesterday passionately a girl kissed
a'. *dat Jan [vurig [gisteren [een meisje kuste]]]
b. John [[[kissed a girl] passionately] yesterday]
b'. *John [[[kissed a girl] yesterday] passionately]

This would seem to support the traditional view of phrase structure, according to which elements can be attached at either side on the verb. If in the postverbal domain structures are left-branching, mirror image effects like those in (38) follow naturally (cf. 39).[10]

(39) [XP [YP [V] YP] XP]

Note that our argumentation so far is also based on this view of syntax. However, this view is not uncontroversial. The order found in double object constructions in English is not the mirror image of that found in Dutch. As (40) shows, the Goal precedes the Theme in both languages.

(40) a. Dat Jan zijn vader een boek geeft
that John his father a book gives
a'. *Dat Jan een boek zijn vader geeft
b. John gives his father a book
b'. *John gives a book his father

Data of the type in (40) form the strongest evidence for Kayne's (1994) antisymmetry hypothesis, according to which linear order coincides with c-command relations universally. But on the other hand, Kayne's theory faces difficulties when applied to the examples in (38). The challenge, then, is to find a theory that explains both the mirror image effects in (39) and the anti-mirror image effects in (40).

Since we have not assumed antisymmetry in this paper the data in (39) come for free. Now what about Dutch and English double object constructions? Dutch linguists have never considered these constructions particularly problematic, since their properties follow from the simplest possible analysis. One can just assume that both the Goal and the Theme argument are contained in VP, such that the Goal (DP_G) c-commands the Theme (DP_T). This analysis differs only minimally from the traditional analyses of Blom & Daalder (1977) and De Haan (1979):

(41) a. $[_{VP}\ DP_G\ [DP_T\ V]]$

[10] This argument is developed in more detail in Ackema & Neeleman 1996.

b. {DP_G} {DP_T} {V}

The null hypothesis is that in the double object constructions the verb must not only check the case of the Theme, but also that of the Goal argument. For Dutch, this is unproblematic. In (41a), the case of both arguments can be checked. As the corresponding prosodic structure in (42b) shows, the verb is the only element in its prosodic domain. Hence, it can check none of its features there, and must resort to syntactic checking. The consequence is that, since both objects are contained in the verb's m-command domain, both are licensed.

Let us now turn to English. The structure in (42), which corresponds most directly with the structure motivated for Dutch, crashes in English. The reason for this is that if both objects are generated to the right of the verb, only the case of the Theme can be checked. The prosodic domain of the verb will be closed after the right XP bracket of this DP. The verb can (and therefore must) check its entire set of case features against the Theme. Hence, its full feature complex is deleted, according to our assumptions above. The effect is that the features of the Goal can no longer be checked, even if the system resorts to syntactic checking. (42), then, is ruled out on a par with (30).

(42) a. *[$_{VP}$ [V DP_T] DP_G]
b. *{V DP_T} {DP_G}

Double object constructions in English can only licensed if a VP shell is formed. Let us see how this works. Recall that Θ-theory does not impose any linear order. This implies that objects in English do not necessarily follow the base position of the verb. They may be generated in any position that can be licensed at PF. So, instead of (42a), the derivation could start out from (43a), given that those two structures have identical hierarchical properties. As such, (43a) does not solve the problem that in a double object construction two arguments must be checked while the verb's prosodic domain can only contain one. However, it makes it possible to solve this problem by a simple leftward movement of the verb, as in (43b). This movement creates the familiar VP shell structure for double objects.[11]

(43) a. [$_{VP}$ DP_G [V DP_T]]
b. [$_{VP}$ V [$_{VP}$ DP_G [t_V DP_T]]
c. {V DP_G} {t_V DP_T}

[11] The exact way in which VP shells are projected is discussed in Ackema et al. (1993), Koeneman (1996) and Neeleman & Weerman (1996).

In the structure thus derived, the verb is in the same prosodic domain as the Goal, and its trace is in the same domain as the Theme. If movement is a copying operation with an instruction to not pronounce the trace, as proposed in Chomsky (1995), it follows that the cases of both arguments can be checked. The Theme can check its case against the verb's trace, the Goal can check it against the verb itself.[12]

So, from the system of case checking discussed here, it does not only follow that only OV languages have scrambling, but also that the linear order of arguments of the verb is identical in OV languages and OV languages, while the order of adjuncts (which do not need to check case) shows mirror image effects. For further discussion we refer to Neeleman & Weerman 1996.

6. **Scrambling and Definiteness**

The movement approach to scrambling has appeared to find support in the discourse behavior of scrambled structures, most notably in its definiteness effects. As with other aspects of the movement analysis, incorporating this sort of support into the system requires a substantial enrichment of machinery while the empirical coverage thus obtained is less than one would hope for.

In the following sections, we will argue that in order to understand the relation between scrambling and definiteness closer attention than usual must be payed to the PF interface. The discourse properties of scrambling follow from the different stress patterns assigned by the computational system to scrambled and unscrambled derivations, independently of whether scrambling is generated by movement or not. Having established this, we will show that many of the discourse properties of scrambling follow from economy considerations that cannot be stated if scrambling is derived by movement.

Let us first consider the problem in some detail. It has been widely observed that scrambling is associated with definiteness. While scrambling is possible when the object is definite, it is not possible with indefinites, as (44) shows.

(44) a. Dat de politie gisteren taalkundigen opgepakt heeft
that the police yesterday linguists arrested has

---

[12] The claim that the direct object in (43) checks its case against the trace of the verb presupposes that traces are visible at PF. This must be assumed independently. Chomsky (1981) shows that the phonological process that changes *want to* in *wanna* is sensitive to the presence of intervening traces. It is blocked in (i), but not in other contexts.

(i) a. Who do you want t_i to kiss her
b. *Who do you wanna kiss her

b. *Dat de politie taalkundigen gisteren opgepakt heeft

Traditionally, such effects were viewed as strong support for an analysis of scrambling as movement. The assumption was that the properties that trigger movement over adverbials are coded in the syntax of DPs. The most sophisticated analysis of this type is that of De Hoop (1992), who formulates the following generalization:

(45) Only strong DPs can undergo scrambling (that is, leftward movement over adverbials)

Of course, this generalization is nothing but a description of (a certain perspective on) the facts, and it cannot, by itself, favor a movement analysis over base generation. However, De Hoop offers a fully developed system which derives this generalization from the theory of case and movement. She assumes that corresponding to the semantic distinction between weak and strong DPs, there are two types of case that an object can get: strong case and weak (partitive) case (a distinction originally proposed by Belletti). She further assumes that weak case can only be licensed in the base position of the object, while strong case is freer. Hence, definite DPs appear both in scrambled and nonscrambled position, while weak DPs must remain adjacent to the verb.[13]

De Hoop notes that indefinite (weak) DPs can sometimes also scramble, particularly in their generic use (which we cannot discuss in detail here). For this, she follows a popular line that encodes discourse features of the use of indefinites (specificity, familiarity, etc.) into their syntax. More specifically, De Hoop proposes that indefinites are lexically and syntactically ambiguous between a `weak' entry and a `strong' entry. `Strong' indefinites, like definite DPs, get strong case. Hence they can scramble. But `weak' indefinites get weak case, and must therefore stay in situ.

Thus, a substantial enrichment of the computational system is needed to derive the generalization (45) within the assumptions underlying the movement analyses of scrambling. Note, however, that despite this the analysis does not tell us much about the actual availability of scrambling. If we focus on definite DPs for the moment, the analysis entails fully optional scrambling. But when we look at actual contexts, it turns out that there are cases where scrambling is highly favored, and others where it is highly disfavored.

An example of a context which favors scrambling is given in (46). There is a clear contrast between the (46a), where the object is scrambled, and (46b), where it is not. (We mark inappropriateness with `#', in order to remain neutral on the syntactic or pragmatic nature or the

[13] Diesing (1992) proposes a different, and less well defined, machinery to derive the generalization in (45). For a survey of problems with Diesing's mapping hypothesis, see Reinhart 1995, chapter 4.

violation.)

(46) Speaker A: Hoe gaat het met de review van Jan's boek?
how goes it with the review of Jan's book
a. Speaker B: Ik heb het boek eindelijk gelezen
I have the book finally read
b. Speaker B: #Ik heb eindelijk het boek gelezen

One cannot resort to claiming that scrambling is obligatory with definite DPs in general, in view of the fact that the context in (47) gives rise to the opposite pattern. Here, the scrambled version is highly disfavored.[14]

(47) Speaker A: Heeft je buurman gisteren de deur geverfd?
has your neighbor yesterday the door painted
a. Speaker B: #Nee, hij heeft het raam gisteren geverfd
no, he has the window yesterday painted
b. Speaker B: Nee, hij heeft gisteren het raam geverfd

We will argue that the same generalization which governs permissible scrambling with definite DPs explains the distribution of indefinites. In fact, the discourse effects of have nothing to do with syntactic properties of the object, and hence a movement analysis is irrelevant in accounting for it. Rather, they follow from PF considerations having to do with main sentential stress. Given some current assumptions about stress shift operations and economy, the intonational patterns of structures with and without scrambling can be used to explain the definiteness effects discussed above without appeal to the machinery assumed in movement analyses. Before we can do so, an outline must be given of the theoretical framework we adopt, which is developed in Reinhart (1996, forthcoming).

---

[14] It is important to keep in mind that we are talking about regular scrambling here. It has been argued in detail by Neeleman (1994) that there is a operation of `focus scrambling' with radically different syntactic properties (it is an A'-movement. The scrambling order is appropriate here as a case of focus scrambling, with a very noticeable pitch accent on the object, and at least some stress on the verb (cf. i). If we control for movement of this type, the scrambling order cannot be used in the relevant context.

(i) Nee, hij heeft [het RAAM]$_i$ gisteren t_i **geverfd**
no, he has yesterday the window painted

7. **Stress and Stress-Shifting Operations**

In a pioneering study, Cinque (1993) proposes a perspective on the nuclear stress rule that has many implications for the theory of focus and the PF interface. In essence, it provides evidence for the view of the relation between stress and focus as perceived in Chomsky (1971). This line was further developed in Zubizarreta 1995) and Reinhart (1995, forthcoming). Here, we will only present the basic ideas schematically.

7.1 *Cinque's Theory of Sentence Stress*

The basic framework of Cinque's analysis is the metrical grid theory of Halle and Vergnaud 1987. Previous analyses in this framework had to assume that the nuclear stress rule is parametrized in order to account for the varying stress patterns across languages. In the VP cycle, for example, stress falls on the right node in the English, but on the left node in the Dutch (throughout we will use **bold** to indicate sentence stress):

(48) a. I read the **book**
b. dat ik het **boek** las
that I the book read

Cinque's insight is that, in fact, no parametrization of the stress rule is needed. Such parametrization in fact only duplicates the mechanism which independently governs word order variation in syntax. Abstracting away from technical details, the procedure Cinque proposes starts the assignment of stress with the most deeply embedded constituent. The outcome will be, then, that the most prominent stress falls on this constituent.

Of course, this does not yet take us very far with the analysis of (48), since in the structures given here the object and the verb are sisters, and hence equally deeply embedded. The gist of Cinque's analysis is that the depth of embedding (in the case of sisters) is determined by the direction of selection (or recursion, as he phrases it). Given two sisters, the most deeply embedded one is selected by the other (and hence it occurs on the recursive side of the tree). At first sight, this may seem like begging the question, but Cinque's point is that the order of recursion (i.e the distinction between OV and VO languages) is a problem independent of stress. Whatever determines this parametrization will also determine the stress pattern. So, both in a VO language like English and in an OV language like Dutch, the most deeply embedded constituent is the object. Hence, in both, the object receives main stress:[15]

[15] Many problems left open by this analysis, particularly with respect to adjunct stress, are addressed and further developed in Zubizarreta 1995.

(49) a. [$_{V'}$ V **DP**]
b. [$_{V'}$ **DP** V]

The stress facts are of course not new. Only their theoretical account is, and its implications for the theory of focus. In fact, Cinque's rules find confirmation in earlier findings on Dutch, as described in Gussenhoven 1984. The relevant data are the following:

(50) a. Dat ik op een bankje **wacht**
that I on a bench wait
`that I am waiting on a bench'
b. Dat ik op een **bankje** wacht
`that I am waiting for a bench'

When stress falls on the verb, as in (50a), the PP is interpreted as a locative adjunct. This follows, since only when the PP is not selected will the verb become the most embedded constituent. In (50b), where stress falls on the PP, the most natural interpretation is that in which this constituent is a complement. This is so, since under this interpretation, it is the most deeply embedded constituent.[16]

7.2 *Stress and the Focus Set*

In Chomsky 1971, focus was viewed as a property defined on PF structures. The basic idea was that sentence stress is autonomously assigned by phonological rules, and that the interface systems make use of this in relating a sentence to its context: stress is used to signal the focus and presupposition structure of a sentence. The focus of a sentence was defined as any constituent containing its intonational center.

Obviously, this view rests on the notion of `neutral intonation'. That is to say, a distinction was needed between automatically assigned, neutral stress and marked stress options required by discourse needs. In later work, this distinction was found problematic, and a common claim was that it is impossible to distinguish `neutral' and `marked' intonation patterns. Hence, focus intonation cannot be assigned independent of the semantics of the sentence. It must be the other way around: sentence intonation reflects its independently determined focus structure. However, Cinque (1993), Zubizarreta (1995) and Reinhart (1995, 1996) argue that it is not only

[16] The expected judgments for (50b) are less clear, since, as we just noted, the analysis of adjunct stress in Cinque's framework is incomplete. It has been observed that sometimes adjuncts appear to get main stress. But (50a) behaves clearly as predicted by Cinque's analysis.

possible, but also necessary, to maintain the distinction between neutral and marked stress. Let us first see how this is implemented.

Reinhart (1996) proposes that each derivation is associated not with an actual focus, but with a set of possible foci, that is, a set of constituents that can serve as the focus of the derivation in a given context. This set is determined by the computational system at the stage where both the syntactic tree and stress are visible. In other words, focus selection applies to a pair <PF, LF> of sound and configurational structure. The focus set is defined, then, in (51) (which is a reformulation of the focus generalization proposed by Chomsky (1971) and Cinque). If stress falls on the object, either in English SVO structures, or in Dutch SOV structures, the focus set defined by (51) is the one in (52b).

(51) The focus set of IP consists of the constituents containing the main stress of IP.

(52) a. [$_{IP}$ Subject [$_{VP}$ V **Object**]]
a'. [$_{IP}$ Subject [$_{VP}$ **Object** V]]
b. *Focus set*: {IP, VP, Object}

This means that in actual use, any of the members of the set in (52b) can serve as focus. At the interface, one member of the focus set is selected, as the actual focus of the sentence. For example, the structure in (53a), which is generated with stress on the object, can be used as an answer in the any of the contexts in (53). (Throughout, we will use underlining for the constituent which is the focus selected in a given context.)

(53) a. Speaker A: What's this noise?
Speaker B: My neighbor is building a **desk**
b. Speaker A: What's your neighbor doing?
Speaker B: My neighbor is building a **desk**
c. Speaker A: What's your neighbor building?
Speaker B: My neighbor is building a **desk**

At this stage, it is up to the discourse conditions, rather than syntax, to determine whether a derivation with a particular stress is appropriate in a given context. The derivation is inappropriate if no member of its focus set can be used as an actual focus in that context. The answer in (53), for example, cannot be used in either of the contexts of (54).

(54) a. Speaker A: Has your neighbor bought a desk already?
Speaker B: #No, my neighbor is building a **desk**

b. Speaker A: Who is building a desk?
Speaker B: #My neighbor is building a **desk**

This is so because in the context of (54a), the verb should be the focus, but the verb is not in the focus set generated for sentences in which the object bears stress (cf. 52). The same holds for the subject in (54b).

For such cases, where the focus set defined by the neutral stress does not contain the desired focus, special stress-shifting operations apply. We will turn to these operations directly, but for the moment it suffices to state them schematically, as in (55).

(55) Relocate the main stress.

In the context of (54a), extra stress is assigned to the verb (cf. 56a). As a result, the verb is in the focus set, and the derivation is appropriate in this context. In (56b), the same operation applies to the subject.

(56) a. Speaker A: Has your neighbor bought a desk already?
Speaker B: No, my neighbor is **building** a desk
b. Speaker A: Who is building a desk?
Speaker B: My **neighbor** is building a desk

The outcome of stress-shifting operations is what is called marked stress. Although they sound perfectly natural in their context, the foci in (56) are marked, since they are obtained by a special operation that undoes the results of the nuclear stress rule. We will turn to the question what markedness means here in section 6.2.

7.3 *The Stress-Shifting Operations: Focus and Anaphora*

Cinque (1993) argues that stress shift in fact involves two distinct operations, which we so far collapsed under (55). One is the destressing of a stressed element; the other is the strengthening of an element that does not bear the main stress. Cinque does not elaborate on the way the two procedures differ. But Reinhart (1996, forthcoming) argues that they do not only have different prosodic properties, but also completely independent discourse functions. Stress strengthening is an operation on the focus set, employed to derive foci not in the set, while destressing is an anaphoric process, independent of the focus set.

Anaphoric destressing applies when a DP (or another constituent) denotes an entity already in the context set, that is, an entity previously mentioned in the discourse or available in the situation (we will elaborate on this notion below). A denotation of this type is often found with

definite DPs, as can be observed in (57), but it is most noticeable with pronouns. Whether a definite DP is anaphoric depends on previous context. Hence, without such context, judgments are not always clear. But pronouns are mainly used anaphorically and hence they are almost obligatorily destressed. If the object is destressed, the stress of the verb becomes the prominent stress in VP, as illustrated in (58).[17] Needless to say, precisely the same stress operation applies in Dutch, as illustrated by the Dutch examples in (57) and (58).

(57) a. Speaker A: That man over there is a famous writer
Speaker B: I was just thinking that I **know** that face
b. Speaker A: Die man daar is een beroemde schrijver
that man there is a famous writer
Speaker B: Ik dacht al dat ik dat gezicht **kende**
I already thought that I knew that face

(58) a. #Max saw **her/it**
a'. Max **saw** her/it
b. #Max heeft **haar/het** gezien
Max has her/it seen
b'. Max heeft haar/het **gezien**

The other stress operation assigns an extra stress to the verb (or any other element selected as focus), without destressing the object (or whatever other element bears neutral stress). The result is that the object carries less stress than the verb, but that secondary stress is still present on it, unless the object is independently destressed for reasons of anaphora. Typically, stress strengthening applies when it is needed to create a focus not already in the focus set. In (59a), for example, the verb *seeing* is by itself not a possible focus with neutral stress. Strengthening its stress enables it to serve as the only focus.

(59) a. Max can only afford **seeing** cars
b. Max can afford **seeing** her

(60) a. Only **Max** can afford buying *cars*

[17] An independent question we leave open here is how precisely the verb gets this stress. There are two options. Either destressing forces a stress shift, or, perhaps more realistically, anaphoric destressing applies before the nuclear stress rule assigns main stress to the sentence. The most deeply node with a stress will then be the V, whose stress will be moved to the next line, etc.

b. Only **Max** can afford *seeing* her

When stress shift takes place inside the VP, as in (59), it may be difficult for the unarmed ear to distinguish the effects of destressing and stress strengthening. In both one hears a stronger stress on the verb than the nuclear stress rule would assign to it. Thus, in (59b) a destressing operation has applied to *her*, independently of any focus requirement. But it is difficult to hear a difference between the resulting prosodic pattern and the pattern in (59a). The difference is easily observed, however, when stress strengthening applies further away from the object, as in (60a), where the subject is strengthened. Here the secondary stress that remains on the object is audible. In contrast, the pronoun in (60b), which is independently destressed, does not carry any stress at all.[18] (60b), then, is an in instance of the not uncommon situation where both stress reduction and stress strengthening apply in the same sentence. In principle, however, the two procedures are independent, and it is possible for only one of them to apply to a given derivation.

In (60) and hereafter, we mark secondary stress with *italics*. An example from Dutch with the same effect of preservation of stress when strengthening applies is given in (61).

(61) Zelfs die **milieu-fanaat** heeft nu een *auto* gekocht
even that environment-fanatic has now bought a car

A systematic explication of the effects of what we have called stress strengthening on the focus structure of a sentence is provided by Williams (1995). Williams argues (basing himself on a detailed analysis of more elaborate examples) that stress strengthening creates a new focus, but does not eliminate the previous focus structure. When this operation takes place, the `presupposition' part of the sentence typically contains a focus and presupposition itself. That is to say, there is a subordinate focus. Thus, the fact that stress strengthening does not eliminate the original stress, as we argue, finds a direct correlation in the focus interpretation of the derivation.

A special instance of stress strengthening, which we will return to later, can be observed in (62).

(62) a. I think I have to **eat** *something*
b. Ik denk dat ik *iets* moet **eten**
I think that I something must eat

[18] Rather it is the verb that carries secondary stress. The way this is obtained is addressed in the next subsection.

The object here is certainly not anaphoric. But since it is devoid of any specific content, it is an unlikely focus by itself. These cases seem to be related to the contrast Bolinger (1972) found between the sentences in (63) (quoted by Zubizarreta and Cinque). In (63a), the candidate for neutral stress does not merit a focused status because it is semantically uninformative. In such cases no subsidiary focus structure is derived, although stress is obtained by the same stress-strengthening operation.

(63) a. I have a **point** to make
b. I have a *point* to **emphasize**

The standard view relates all stress operations to just focus structure. More generally, most attention in studies of stress centered around the relation between stress and focus. A notable exception is Selkirk (1984) who argues that there must be some independent procedure of anaphoric destressing.[19] We believe that the lack of a systematic distinction between the two has led to many problems in the theory of both sentence stress and focus. Stress patterns provide many more interface clues than just focus structure. The task of anaphora resolution, relevant to even the simplest discourse, involves a complex procedure of associating expressions with their potential antecedents, which, at times, may all be of the same number and gender. Without some means of signalling anaphoric relations, this task would seem impossible to compute. One of these means is signalling by stress.

That accent patterns indeed have a crucial role in discourse anaphora, independently of focus, has been confirmed in several experimental studies of Nooteboom et al. (see, for example, Nooteboom & Kruyt 1987 and Terken & Nooteboom 1988). They found that subjects tended uniformly to associate deaccented DPs with discourse entities. Comprehension time was substantially longer when DPs representing discourse entities were not destressed. The converse also holds: comprehension is slower when a destressed DP refers to an entity first mentioned. In practice, speakers operate by the assumption that a DP is destressed if and only if it is discourse-given.

Naturally, work in this area must focus on the question when an entity counts as discourse-given. In fact, anaphoricity, or previous mention, are not a sufficient condition for this type of destressing. A DP referring to an entry which has not been active for a while, or has been mentioned too far back, is not normally destressed. Rather, destressing is governed by the accessibility of the antecedent, as defined in Ariel's (1990) analysis of anaphora resolution. This

[19] Williams (1995) acknowledges the central role of anaphora in stress. However, he follows the tradition of viewing anaphora and focus as one unified problem. For him, the whole issue of focus is an instance of anaphora.

definition also takes `topics' into account (a DP is highly accessible if it is either the topic, or has been mentioned very recently.) Furthermore, we assume following Pesetsky's (1987) view of D-linking, that the accessible entity need not be an antecedent in sense of strict identity. Thus, a DP may be D-linked also if only its common noun set is already in the context set. With this assumed, we may state a first approximation of the generalization governing destressing in (64).

(64) A DP is destressed if and only if it is D-linked to an accessible discourse entity.

Note that this is an if-and-only-if condition. If a DP is appropriately D-linked, it must be destressed, and if it is not D-linked it cannot be fully destressed, regardless of the focus structure of the sentence. Though anaphoric status of expressions may have an effect on their focus structure, the crucial point is that something along the lines of (64) must be operative independently, as should be clear from the data discussed in this section.[20]

7.4 *Economy and Markedness*

Our analysis is based on the assumption that the computational system always assigns main stress in the same way. This stress is referred to as `neutral stress'. Special stress-shifting operations, viewed as `marked', may then apply if this is necessary for discourse reasons. As we mentioned, the idea that a systematic distinction can be drawn between marked and neutral stress has been often challenged. The central argument against markedness was that in the appropriate context marked sentences may sound as innocent as neutral sentences. Hence, we can never know whether a given stress is marked or not, and, consequently, a theory assuming this distinction is unfalsifiable.

Attempts to decide on this matter have often revolved around the issue of focus projection. The proponents of the distinction (such as Cinque and Zubizarreta) have argued that main stress derived by a stress-shifting operation corresponds generally to narrow focus, that is, it does not project. The opponents have come up with ample examples showing that this cannot be always true. We believe that this debate could not be successfully concluded because of the lack of an explicit distinction between anaphoric destressing and focus strengthening. As we will see, anaphoric destressing has no effect on focus projection, but strengthening does.

Recall that the focus set of IP consists of the constituents containing the main stress of IP. For a structure like (65a), three possible foci can thus be identified (cf. 65a'). The minimal assumption would be that the definition of possible foci (that is, of the focus set) remains

[20] There are some apparent exceptions to (64), most notably with stressed (contrastive) pronouns and other instances where a D-linked DP is stressed for focus reasons. We will offer an account for these in section 7.4.

constant no matter how stress is derived. If so, destressing of the object, as in (65b), should lead to the focus set in (65b'). This focus set differs from that in (65a') in only one construal: (65b') allows the verb, but not the object, to be focus (since the object does not contain the main stress). (65a'), in contrast, allows the object as focus, but not the verb. But in both derivations IP and VP are equally defined as possible foci, i.e. nothing blocks focus projection in either structure.

(65) a. Max likes **cars**
a'. *Focus set*: {IP, VP, Object}
b. Max **likes** her
b'. *Focus set*: {IP, VP, V)

When stress shift is obtained by anaphoric destressing, this is the right result, as essentially argued by Selkirk (1984). In fact, many of the cases raised against the idea that stress shift blocks focus projection involve anaphoric destressing. Consider the examples below, from Schmerling 1976 and Ladd 1980 respectively.

(66) I'd give the money to Mary, but I don't **trust** Mary

(67) Speaker A: Has John read `Slaughterhouse five'?
Speaker B: No, John doesn't **read** books

(66) is an obvious case of anaphoric destressing, since *Mary* has been directly mentioned. In (67), there is a more complex case of D-linking (an instance of the common noun set already being in the context set). The point of both examples is that the whole IP is the focus, even though stress shift has applied.

But stress strengthening, as we saw, is specifically used to alter the focus options. Generally, this does effect focus projection. In (68), for instance, *Lucie* is focus, but the IP is not.

(68) Only **Lucie** passed the exam

This result does not follow from the definition of focus sets: both the subject *Lucie* and the whole IP as possible foci, since both contain the main stress. The question, then, is how this difference in the effects of destressing and stress strengthening can be derived.

This question ties in with the more general question of what it means for stress to be marked. Recall that this question still must be answered for the analysis to be nonvacuous. The issue of marked stress should be placed in the broader perspective of interface economy. As argued in

Reinhart (forthcoming), optional operations, like stress shift at the PF branch, or QR at the LF branch, are always economy violations. Of course, arbitrary violations of economy yield infelicitous derivations, but if using an uneconomical optional operation is the only way to satisfy a certain interface need, the derivation sounds perfectly fine. It is therefore a defining trait of marked operations that in the appropriate contexts they yield results indistinguishable from derivations involving no violations, whereas their output is noticeably bad when they are applied needlessly.[21]

To see how this entails the result in (68), let us look at the stress shift from (69a) to (69b). The definition of focus sets is blind to how stress is assigned. Hence, for the derivations at hand the sets in (69a') and (69b') are obtained.

(69) a. Lucie passed the **exam**
a'. *Focus set*: {IP, VP, Object}
b. **Lucie** passed the exam
b'. *Focus set*: {IP, Subject}

These focus sets intersect in the case of IP. Suppose now that in a given context we want IP to be the focus. We could obtain this result by using (69a), without applying the uneconomical stress shift. Hence, applying stress shift in this context goes against the notion of economy. The only focus of (69b) not already in the focus set of (69a) is the subject. Hence, it is only the need to use this focus that can motivate the stress shift. If this is the contextual need, as in (68), the result sounds perfectly normal.

Though it is just a straightforward entailment of the interface economy view, let us summarize the derived generalization as in (70).

(70) Economy entails that stress strengthening applies only to derive foci not already in the focus set.

The reason that anaphoric destressing does not block focus projection lies in the fact that it applies independently. It is governed by the discourse anaphora generalization in (64), which stated that a DP is destressed if and only if it is D-linked to an accessible discourse entity.

If (64) can be met without applying destressing, the derivation will indeed sound bad. (This

[21] A different implementation of the idea of interface economy is proposed by Chomsky (1995) for quantifier raising. Chomsky makes use of the numeration, arguing that features that motivate specific operations are included in the numeration only if their inclusion has an effect on the interface. (The motivation for the general idea and its two implementations are discussed in Reinhart (forthcoming), chapter 2.)

is the case when a scrambling structure is available, to which we return.) But as long as destressing is necessary to satisfy (64), it never violates economy. In Schmerling's example, repeated below as (71), the focus set of the second conjunct includes, along with V, also IP and VP. Although VP and IP are also in the focus set of the derivation without a stress shift, destressing still does not block the selection of IP as the focus, since applying this uneconomical operation is the only way to satisfy (64).

(71) I'd give the money to Mary, but I don't **trust** Mary

In sum, applying an optional stress-shifting operation yields a bad derivation if and only if it is superfluous, namely in case the same interface needs could be satisfied by maintaining the `neutral' stress assigned by the nuclear stress rule.

Let us look now at an apparent violation of (64). In an appropriate context, even the most obviously anaphoric DPs, like pronouns, can be stressed. (72) is an example.

(72) Speaker A: Let's invite Max and Lucie
a. Speaker B: No, let's just invite **her**
b. Speaker B: I only invited **him**

It is usually assumed that in such contexts the pronoun is contrastively focused, that is, it does not project. How does this follow? We know already that destressing and strengthening apply independently. Though other implementations are conceivable, let us assume, for brevity of exposition, that destressing always applies first. (Perhaps, it applies even before the nuclear stress rule - see footnote 17). The default value of a pronoun is anaphoric, so it will first be destressed. The output of this operation is (73).

(73) a. Let's **invite** her
b. *Focus set*: {IP, VP, V}

If we need either IP or VP as foci, (73) can be used as is. There is only one context in which (73) is not appropriate, namely, when we want the pronoun to be the focus by itself. For this context, strengthening applies, with (74) as a result. But it then follows from (70) that the pronoun must be the only focus.

7.5 *Summary*

We summarize below all the assumptions outlined in this section.

(74) Main stress assigned by the nuclear stress rule falls on the most deeply embedded constituent (cf. Cinque 1993).

(75) The focus set of IP consists of the constituents containing the main stress of IP.

(76) There are two stress-shifting operations:
   a. destressing, which is governed by (79), and
   b. stress strengthening, which is governed by (80).

(77) A DP is destressed if and only if it is D-linked to an accessible discourse entity.

(78) Economy entails that stress strengthening applies only to derive foci not already in the focus set.

As we saw, under the markedness view, stress-shifting operations are uneconomical. Reinhart (forthcoming) argues that an operation can only be viewed as marked if there is some evidence for its processing cost, though the evidence may sometimes be indirect. One prediction is that if some language A has the means to satisfy a given interface need without applying some uneconomical derivation, and language B does not, then this derivation will sound fine in B, but awkward in A. We will now argue that this is exactly what happens in Dutch scrambling environments.

8. **Deriving the Definiteness Effects of Scrambling**

Cinque's stress rule entails that main (neutral) stress is located differently in scrambled and nonscrambled structures. While in (79a) it falls on the object, in (79b) the verb is the most deeply embedded constituent, and hence this element receives main stress. This entailment holds regardless of whether (79b) is base-generated or derived by movement. The different properties of the two types of derivations, with neutral stress, are schematically represented in (80) and (81).[22]

---

[22] Zwart (1995) argues that scrambled objects can get neutral stress, even though they are not the most deeply embedded constituents. He claims that the object in (i), for example, bears neutral stress.

(i) ?dat de politie **illegalen** altijd arresteert
that the police illegals always arrest

To the extent that stress can fall on *illegalen* at all, this is not neutral stress but the stress that results from a special operation. As argued at length in Neeleman (1994), Dutch has an operation of A'-adjunction (or focus scrambling) with syntactic properties that differ dramatically from the ones of neutral scrambling. What is relevant here, is that the element that is focus-scrambled usually bears a heavy pitch accent, while neutral stress is originally assigned to some other element in the sentence. This property can also be observed in the example in (i): the example is only

(79) a. dat Jan gisteren het **boek** gelezen heeft
that John yesterday the book read has
b. dat Jan het boek gisteren **gelezen** heeft

(80) **Nonscrambled structure**
a. *Syntax*: [$_{V'}$ AdvP [$_{V'}$ **DP** V]]
b. *Focus set*: {IP, VP, Object}
c. *Object*: Stressed

(81) **Scrambled structure**
a. *Syntax*: [$_{V'}$ DP [$_{V'}$ AdvP **V**]]
b. *Focus set*: {IP, VP, V}
c. *Object*: Destressed

The difference in stress entails two differences between the discourse potential of the two derivations. First, they differ in their focus set. Due to the definition in (75), the object is included in the focus set in (80), but the verb is not. In (81), it is the other way around: the verb is in the set, but the object is not. Next, they differ in the status of the object. In the scrambled derivation the object is fully destressed, since it cannot be assigned stress by the unmarked procedure.

Given our assumptions, the difference in the focus set can only have a marginal effect on the choice between these two structures. As we saw, the focus always projects. (The definition in (75) is constant, regardless of which constituent gets main stress). So, VP and IP are possible foci in both derivations. In this regard, we could only expect a preference for scrambling when the verb needs to be contrastive (the only focus), or a preference for nonscrambling when the object needs to be the sole focus.

Though not particularly interesting, this is generally true. In section 6 we observed that there are contexts where scrambling of a definite is highly disfavored. The example in (47) is repeated here as (82).

---

well formed if the object bears heavy stress, while the trace of the regular sentence stress is assigned to the verb (cf. ii). The example is ruled out when the verb bears no stress. We therefore conclude that Zwart's example is a case of focus scrambling, and hence irrelevant to the present discussion.

(ii) dat de politie **illegalen**$_i$ altijd t$_i$ *arresteert*
that the police illegals always arrests

(82) Speaker A: Heeft je buurman gisteren de deur geverfd?
has your neighbor yesterday the door painted
a. Speaker B: #Nee, hij heeft het raam gisteren **geverfd**
no, he has yesterday the window painted
b. Speaker B: Nee, hij heeft gisteren het **raam** geverfd

In (82) the context selects the object as the focus. However, in the scrambled version the object is not part of the focus set since it is not stressed. (82a) can therefore not be used in this context. In (82b), by contrast, the object receives main stress. Hence, it is in the focus set and the derivation is appropriate.

Conversely, when the verb needs to be the sole focus, English must use a stress-shifting operation of strengthening the verb, as in (83a). Without it, the intended focus constituent - *read* - does not carry main stress (cf. 83b).

(83) a. I have **read** the book yesterday, and did not tear it up
b. #I have read the **book** yesterday, and did not tear it up

In Dutch, the same result can be obtained with scrambling, as can be seen in (84a), the translation of (83). In (84b), neutral stress falls on the object, hence the verb is not in the focus set, but in (84a) the verb is stressed, with no appeal to the special stress shift operation.

(84) a. Ik heb het boek gisteren **gelezen**, en niet verscheurd
I have the book yesterday read, and not torn-up
b. #Ik heb gisteren het **boek** gelezen, en niet verscheurd

However, this effect of scrambling on the focus set cannot explain the definiteness effects, nor the exact relation between scrambling and definiteness. In (46), repeated below as (85), scrambling is the preferred order. The most reasonable construal of the answer to the question posed is with the whole IP as focus. IP is in the focus set of both the scrambled version (85a), and the nonscrambled (85b). Why, then, is (85a) so clearly preferred?

(85) Speaker A: Hoe gaat het met de review van Jan's boek?
how goes it with the review of Jan's book?
a. Speaker B: Ik heb het boek eindelijk **gelezen**
I have the book finally read
b. Speaker B: #Ik heb eindelijk het **boek** gelezen

The answer lies in the second discourse effect of the nuclear stress rule. The object in scrambling structures is destressed, while it is stressed in their nonscrambled counterparts. In (85), the book is clearly anaphoric. Using it with stress, as in (83b), violates the discourse anaphora generalization in (77), which states that a DP is destressed if and only if it is D-linked to an accessible discourse entity.

Again, English would have to use here a stress shift operation. In order to conform with (77), the book must be destressed (cf. 86). But in Dutch, the same effect can be obtained without destressing, by using the scrambled derivation, as in (85b). Conforming with (77), then, is the crucial discourse motivation for using the scrambled derivation in Dutch.

(86) Speaker A: Any progress on the review of John's book?
a. Speaker B: I've finally **read** the book
b. Speaker B: #I've finally read the **book**

Let us further illustrate the effects of scrambling by considering two cases in which stress shift is obligatory in English. As we have seen, destressing is obligatory with pronouns. When no adverbial is present, destressing applies in Dutch just as it does in English (cf. 87a). However, if an adverbial is present, scrambling has the same effect as destressing. The scrambling order must therefore be used: it avoids the application of a marked operation (cf. 87b).

(87) a. Ik heb het **gelezen**
I have it read
b. Ik heb het gisteren **gelezen**
I have it yesterday read

By contrast, stress shift obtained by strengthening of the verb retains a secondary stress on the object, as we argued above. So, its effect is not identical to that obtained by scrambling, where the object is essentially destressed. This is illustrated for `light' indefinites below. As we saw in the discussion of (62), with such objects, stress strengthening is obligatory in English.

(88) a. Have you **eaten** *anything* this morning?
b. Heb je vanmorgen *iets* **gegeten**?
have you this-morning anything eaten
b. #Heb je iets vanmorgen **gegeten**?

(89) a. Have you **seen** *anybody* here?

b. Ben je hier *iemand* **tegengekomen**?
are you here someone met
b'. #Ben je iemand hier **tegengekomen**?

In the (88a,b) and (89a,b), strengthening of the verb has applied. In the (88b') and (89b'), an apparently similar stress pattern is derived by scrambling order and neutral stress assignment. Nevertheless, these latter structures are bad since they violate the condition in (77). The objects in these structures end up fully destressed. (77) requires that they should therefore be interpreted as D-linked, but this is impossible. The only way to obtain a derivation that can be used in discourse is to strengthen the stress of the verb, as in (88b) and (89b). Although secondary stress within VP may not be easily detectable, its existence is verified in other contexts, for instance that in (60). Since the objects in (88b) and (89b) are, thus, not fully destressed, they meet the requirement in (77).

We may return, now, to the definiteness effects of scrambling. The fact that it is so much easier for definite objects to occur in a scrambled derivation than for indefinites follows directly from (77). Recall that (77) is an if-and-only-if condition. It entails not only that a D-linked DP is destressed, but also that a destressed DP is D-linked. If the speaker uses a destressed DP, he thus instructs the hearer to look for an accessible discourse entity that this DP may be linked to. While in actual use definite DP's are most standardly D-linked, it is much harder for indefinites to be used in this way. In De Hoop's example in (44b), repeated here as (90b), the indefinite *linguists* occurs unstressed. (77) entails that it must be D-linked. Since no evidence is provided by the context to any such D-linking, the derivation is inappropriate for use at the interface.

(90) a. dat de politie gisteren **taalkundigen** opgepakt heeft
that the police yesterday linguists arrested has
b. #dat de politie taalkundigen gisteren **opgepakt** heeft

De Hoop's version of the definiteness effect stated that only strong DPs can undergo scrambling. Recall that De Hoop uses an ad hoc definition of `strong', which groups together definite NPs, partitives, and specific indefinites (we return to the generic case directly). While in terms of their semantics, these three do not form any known set, they may share a discourse property in the appropriate context. In partitive DP's, the way De Hoop uses this term, the common noun set has been previously assumed in the discourse - a typical instance of Pesetsky's D-linking. `Specific indefinites' is not an independently defined notion, but, as is known, indefinites can be D-linked in the same way, in which case one may call them specific, if preferred. There is, then, no reason to assume that these discourse options are coded in any way in the computational system.

The other case De Hoop (and Diesing) include in the `strong DP' set, is generic indefinites. The context where it is easiest for indefinites to occur in a scrambled position is with adverbs of quantification. The scrambled structure in (91b), for example, sounds fine even without context. ((91) is based on an example of Diesing's.)

(91) a. Dat Max altijd boeken over **Freud** leest
that Max always books about Freud reads
b. Dat Max boeken over Freud altijd **leest**

(92) a. Dat Max soms boeken over **Freud** leest
that Max sometimes books about Freud reads
b. Dat Max boeken over Freud soms **leest**

Diesing and De Hoop, assume that what enables scrambling here the universal force of generic contexts, which makes it possible for indefinites to have special properties. These properties are labelled `strong'. One should note, though, that it is not the universal force of genericity that is crucial. Any adverb of quantification allows indefinites to scramble. (92) is a clear case where the temporal quantification is existential rather than universal. So, under the common analysis the indefinite has existential rather than universal force. Still, this has no effect on the availability of scrambling.

Although the strength of the scrambled DP seems irrelevant for the problem, we have to ask ourselves how the observed freedom of indefinites in the context s at hand is reconciled with (77). How come they occur in an unstressed position. A first clue is that the difference in meaning between the scrambled and nonscrambled structures closely resembles the contrast found in the following English examples:

(93) a. Max always reads books about **Freud**
b. Max always **reads** books about Freud

These data illustrate the fact that stress has dramatic effects on the interpretation of sentences with adverbs of quantification, determining the division into focus (scope) and presupposition (restriction). The two stress patterns in (93) correspond to the two informal construals in (94) respectively. Similarly, the scrambled structure in (91b) is interpreted along the lines of (94b), while the nonscrambled order receives the interpretation in (94a).

(94) a. Whenever Max is doing anything, it is reading books about Freud
b. Whenever there are books about Freud, Max reads them

The issue of what presupposition means in contexts of adverbs of quantification is a subject of extensive research and debate. For now, we will have to leave the answer partly open. We suspect, however, that the structure in (92b) is not possible in actual discourse, unless the issue of books about Freud (or Freud himself) has somehow been a topic of discussion. In other words, we believe that this type of presuppositional construal is only possible under D-linking.

It is difficult to be fully committal, since proving the point would require looking at actual discourse contexts, something we cannot do within the limits of the present paper. Nevertheless, it seems to us that in the following monologues the scrambled structure is inappropriate. This is so, because the previous context does not mention books, Freud, or books about Freud.

(95) a. Het is onmogelijk met Max een afspraak te maken
It is impossible with Max an appointment to make
#Hij heeft nooit tijd, omdat hij boeken over Freud altijd **leest**
He has never time, since he books about Freud always reads
En zoals je weet zijn er talloze boeken over Freud
And as you know there are numerous books about Freud

b. Het is onmogelijk met Max een afspraak te maken
Hij heeft nooit tijd, omdat hij altijd boeken over **Freud** leest
En zoals je weet zijn er talloze boeken over Freud

If study of actual discourse contexts will not support our expectation, this may suggest that anaphora and D-linking are not the only conditions for destressing.[23] The standard view of presuppositions is that they correspond to propositions or entities already in the context set (cf. Stalnaker 1978). If it turns out that *books about Freud* in both the English and the Dutch examples can be presuppositional without meeting this condition, this requires a new definition of presuppositions. Consequently, (77) would have to associate destressing with presupposition, under the new definition.

9. **The Effects of Economy**

So far we focused on the question when scrambling order can be used, but the evidence for the stress-based analysis is much stronger. As mentioned in section 6 and as implied by the analysis in the previous section, there are environments where scrambling is not only allowed, but in fact

[23] Ruys (1996) cites many instances of scrambling with adverb of quantification for which it appears difficult to argue that they require some sort of D-linking. However, he does not actually examine possible contexts for their utterance, so the question is still open.

obligatory. This can be witnessed, first, in the case of pronouns.

In the discussion of (87) above, we have seen that when an object pronoun cooccurs with an adverb scrambling has the same effect as destressing of the pronoun in English. In fact, the scrambling order is the only one permitted in this case. This does not mean that the operation of anaphoric destressing does not exist in Dutch. In (96b) it applies obligatorily, precisely as in its English equivalent in (96b). Nevertheless, when an adverb is present, destressing cannot apply. (97a) is highly unacceptable. Instead, the scrambling order in (97b) must be used.

(96) a. I **saw** him
b. Ik heb hem **gezien**
I have him seen

(97) a. #Ik heb gisteren hem **gezien**
I have yesterday him seen
b. Ik heb hem gisteren **gezien**

This follows directly from the concept of economy adopted in section 7.4. We have argued that stress shift operations, like other optional operations, are uneconomical. Applying them arbitrarily induces a noticeable economy violation. They can only be applied when this is the only way to reach a certain interface need. In that case, the result sounds as `normal' as a derivation not employing the operation. In (96) destressing of the pronoun is the only way to conform with the discourse anaphora generalization in (77). If this does not happen, the sentence will be unusable at the interface. However, when an adverb is present, as in (98), destressing can be avoided by placing the adverb after the pronoun. Since the merging position of the adverb is completely free, the derivation in which the adverb is selected from the numeration before the pronoun blocks the one in which the pronoun is selected first.

Note that the problem cannot be dismissed as some peculiarity of pronouns. The same effect can be observed with epithets. Like pronouns, these are elements that are necessarily D-linked. In English and in Dutch sentences without an adverbial, epithets are destressed by the marked operation (imagine that the sentences below are answers to the question: what did you do with that blundering employee?). In Dutch sentences with an adverbial, however, the application of this operation is avoided by using the scrambling order. So, as with pronouns, scrambling is obligatory with epithets:

(98) a. I **fired** the fool yesterday
b. Ik heb de idioot **ontslagen**
I have the fool fired

c. #Ik heb gisteren de *idioot* **ontslagen**
I have yesterday the fool fired
d. Ik heb de idioot gisteren **ontslagen**

The generalization at work is stronger. In fact, whenever scrambling with neutral stress is permitted, it is obligatory. This is so, since it is only possible when the object is required by the discourse requirement (77) to be destressed. (If it is not required to be destressed, it should carry some stress, hence it cannot occur with neutral stress in this position.) But then, if the object has to be destressed, avoiding the scrambling order will require a destressing operation, hence it is blocked. The reason why the obligatoriness of the scrambling order has not been observed, is that with definite DPs, whether they are anaphoric or not, is always context dependent. Hence, with no context, both orders seem equally possible. Once we control for the context, so that the definite object is clearly D-linked, no optionality is left.

This can be illustrated when we return once more to the example in (99). What this example showed so far is that the unscrambled structure with neutral stress, as in (99b), is ruled out by the discourse anaphora generalization in (77). *The book* is anaphoric and must hence be destressed, a condition met in the scrambled structure.

(99) Speaker A: Hoe gaat het met de review van Jan's boek?
how goes it with the review of Jan's book?
a. Speaker B: Ik heb het boek eindelijk **gelezen**
I have the book finally read
b. Speaker B: #Ik heb eindelijk het **boek** gelezen

This, however, is only part of the story. The fact is that (99a) is the only appropriate answer in this context. While English would use destressing in this case, as in (100a), the option of unscrambled order and destressing is not available in Dutch, as can be observed in (100b).

(100) a. I have **read** the book finally
b. #Ik heb eindelijk het boek **gelezen**
I have finally the book read

We may note, in conclusion, that this type of economy effects strongly supports the nonmovement analysis of scrambling developed in this paper. The stress effects we have discussed can perhaps also been described under a movement analysis. The crucial generalization would then be: `move in order to avoid destressing'. However, this generalization is rather awkward. Why should we move in order to avoid destressing? Wouldn't it be simpler

to just destress in order to avoid movement? Under our approach, the attachment site of the adverbial is free - neither order is more costly than the other from a syntactic point of view. If choosing the one can avoid a costly PF operation, this is the rational move to take in an economical system.

Acknowledgements
We would like to thank Hubert Haider, Helen de Hoop, Eddy Ruys and two anonymous reviewers for useful comments.

References

Ackema, P., & A. Neeleman 1996. Asymmetric Parsing of Symmetric Syntax. Ms., Utrecht University/OTS. To appear in *Proceedings of WECOL*.

.Ackema, P., A. Neeleman & F. Weerman 1992. Deriving Functional Projections. In *Proceedings of NELS 23, Volume One*, University of Massachusetts, Amherst

Ariel, M. 1990. *Accessing Noun Phrase Antecedents*. Routledge, London/New York.

Belletti, A. 1988. The Case of Unaccusatives. *Linguistic Inquiry* 19, 1-34.

Blom, A., & S. Daalder 1977. *Syntactische Theorie en Taalbeschrijving*. Muiderberg

Bolinger, D. 1972. Accent is Predictable (If You are a Mind Reader). *Language* 48, 633-644.

Chomsky, N. 1965. *Aspects of the Theory of Syntax*. MIT Press, Cambridge.

Chomsky, N. 1971. Deep structure, Surface Structure and Semantic Interpretation. In D. Steinberg and L. Jakobovits (eds.) *Semantics, An Interdisciplinary Reader In Philosophy, Linguistics and Psychology*, Cambridge University Press.

Chomsky, N. 1981. *Lectures on Government and Binding*. Foris, Dordrecht.

Chomsky, N. 1986a. *Barriers*. MIT Press, Cambridge.

Chomsky, N. 1986b. *Knowledge of Language; Its Nature, Origin and Use*. Praeger, New York.

Chomsky, N. 1995. *The Minimalist Program*. MIT Press, Cambridge.

Cinque, G. 1993. A Null Theory of Phrase and Compound Stress. *Linguistic Inquiry* 24, 239-298.

De Haan, G. 1979. *Conditions on Rules; The Proper Balance between Syntax and Semantics*. Foris, Dordrecht.

De Hoop, H. 1992. *Case Configuration and NP Interpretation*. PhD dissertation, University of Groningen.

Den Besten, H., & J. Rutten 1989. On Verb Raising, Extraposition and Free Word Order in Dutch. In D. Jaspers et al. (eds.) *Sentential Complementation and the Lexicon; Studies in Honour of Wim de Geest*, Foris, Dordrecht.

Diesing, M. 1992. *Indefinites*. MIT Press, Cambridge.

Grimshaw, J. 1991. Extended Projections. Ms., Brandeis University

Grimshaw, J. 1995. Projection, Heads, and Optimality. Ms., Rutgers University. To appear in *Linguistic Inquiry*.
Gussenhoven, C. 1984. *On the Grammar and Semantics of Sentence Accents in Dutch.* Foris, Dordrecht.
Halle, M. and J.R. Vergnaud. 1987. *An Essay on Stress*. MIT Press, Cambridge.
Iatridou, S. 1990. About Agr(P). *Linguistic Inquiry* 21, 551-577.
Kayne, R. 1994. *The Antisymmetry of Syntax*. MIT Press, Cambridge.
Koeneman, O. 1996. Flexible Syntax and proposition Marking. Ms., Utrecht University.
Ladd, A., 1980. *The Structure of Intonational Meaning*. Indiana University Press, Bloomington.
Mahajan, A. 1992. *The A/A-bar Distinction and Movement Theory*. PhD dissertation, MIT.
Neeleman, A. 1994. *Complex Predicates*. PhD dissertation, Utrecht University/OTS.
Neeleman A., & F. Weerman 1996. *Case and Arguments in a Flexible Syntax*. Ms., Utrecht University/OTS.
Nooteboom, S.G, & J.G. Kruyt 1987. Accents, Focus Distribution, and the Perceived Distribution of Given and New Information. *Journal of the Acoustical Society of America* 82(5), 1512-1524.
Pesetsky 1987. WH-in-Situ; Movement and Unselective Binding. In E. Reuland & A. ter Meulen (eds.) *The Representation of (In)definites*, MIT Press, Cambridge.
Reinhart, T. 1995. *Interface Strategies* (first draft). OTS Working Papers TL-95-002, Utrecht University/OTS.
Reinhart, T. 1996. Interface Economy: Focus and Markedness. In C. Wilder, H.M. Gaertner & M. Bierwisch (eds.) *The Role of Economy Principles in Linguistic Theory*, Akademische Verlag, Berlin.
Reinhart, T. forthcoming. *Interface Strategies*. MIT Press, Cambridge
Ross, J. 1967. *Constraints on Variables in Syntax*. PhD dissertation, MIT.
Ruys, E. 1996. Dutch Scrambling and the Strong-Weak Distinction. Ms., Utrecht University/OTS.
Schmerling 1976. *Aspects of English Sentence Stress*. University of Texas Press, Texas.
Selkirk, E.O. 1984. *Phonology and Syntax: The Relation between Sound and Structure*. MIT Press, Cambridge.
Selkirk, E.O. 1986. On Derived Domains in Sentence Phonology. *Phonology Yearbook* 3, 371-405.
Stalnaker, R. 1978. Assertion. In P. Cole (ed.) *Pragmatics: Syntax and Semantics, Volume 9*, Academic Press, New York.
Stowell, T. 1981. *Origins of Phrase Structure*. PhD dissertation, MIT.
Terken, J., & S.G. Noteboom 1988. Opposite Effects of Accentuation and Deaccentuation on Verification Latencies for Given and New Information. *Language and Cognitive Processes*

2(3/4), 145-163.
Vanden Wyngaerd, G. 1989. Object Shift as an A-Movement Rule. *MIT Working Papers in Linguistics* 11, 256-271.
Williams, E. 1995. Blocking and Anaphora. Ms., Princeton University. To appear in *Linguistic Inquiry*.
Zubizarreta, M.L. 1995. Word Order, Prosody, and Focus. Ms., University of Southern California.
Zwart, C.J.W. 1993. *Dutch Syntax; A Minimalist Approach*. PhD dissertation, Groningen University.
Zwart, C.J.W. 1995. Word Order, Intonation and Noun Phrase Interpretation in Dutch. Ms., University of Groningen.