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CONSTRAINING THE RELATION BETWEEN MORPHOLOGY AND SYNTAX

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1. Introduction

The present state of morphological and syntactic theories gives rise to the following question: Given some surface structure of a sentence S , with (1a) its representation as a string of formatives, and (1b) the analysis of (1a) as a string of words, to what extent does (1b) constrain the analysis of (1a) at the phrasal levels (S-structure, D-structure, LF), and vice versa?

- (1) a. a_1, a_2, \dots, a_n
b. W_1, W_2, \dots, W_n , which corresponds to a partition of a_1, a_2, \dots, a_n into contiguous substrings with each W_i standing for a substring corresponding to a word.

Essentially, this question concerns the nature of the processes involved in the mapping between morphological and syntactic structures. We will consider this issue from a point of view from which it has received relatively little attention. Since Chomsky (1970) a lexicalist position has been widely adopted. Under this view, the grammar contains a separate component for word formation, which includes morphology. This component specifies the lexicon. Lexical items are inserted in D-structures (created by the interaction of lexical properties and grammatical principles such as

X'-theory, the notion of a projection, theta-theory, etc.). Lexically specified D-structures are mapped onto S-structures by Move alpha, and further onto PF and LF. There is, however, a tension between such a position and the syntactic properties of inflectional morphology. For instance, although Case is often morphologically expressed, the environment in terms of which Case is determined is often only present at S-structure; the verbal morphology may realize a syntactic category viz. Inflection (=I). The categories I and V give rise to different projections in the sense of X'-theory, and must be associated with different governing domains (Reuland (1983b)). For such reasons, the lexicalist position is often adopted in a weakened form (henceforth the weak LP: At D-structure lexical items are inserted uninflected. In addition, certain inflectional categories, such as I, despite the fact that they will be realized by a bound morpheme, are assigned a separate position. In the mapping from S-structure to PF they receive their final shape after a second lexical pass. In languages like Dutch this process must for instance allow the merger of V and I across a major constituent boundary as in (2).

- (2) a. (dat) (Jan) (boek)(en) (lees)(t)
 that Jan book s read s
 b. {{(dat)}} {{(Jan)}} {{(boek)(en)}} {{(lees)(t)}}
 c. [{{(dat)}} [{{(Jan)}} [{{(boek)(en)}} {{(lees)} (t)}}]]

In English the traditional rule of Affix Hopping (Rule R of Chomsky (1981)), even requires reordering of V and I, as in (3).

- (3) a. (that) (John) (read)(s) (book)(s)
 b. {{(that)}} {{(John)}} {{(read)(s)}} {{(book)(s)}}
 c. [{{(that)}} [{{(John)}} {{(s)} [(read)}} {{(book)(s)}}]]]

This brings us back to the question we started out with: Should the conditions on the mapping between Word structure and Phrase structure allow such operations? The processes involved are obviously subject to severe restrictions. There are many conceivable operations that never occur. In general, one sees that reorderings are subject to some sort of adjacency condition, and that it is inflectional, rather than derivational morphology that is involved in the second lexical pass. In order to be successful, the weak LP must be able to give a principled basis to the distinction between inflectional and derivational morphology, and it must give precise content to the nature of the adjacency required for word formation in the second lexical pass. Much of the morphological literature pays relatively little attention to the nature of the constraints on the relation between morphological and syntactic representations. Allen (1978) just states that she will assume that inflectional processes are properly within the domain of syntax. Lieber (1980) on the other hand, investigates both derivational and inflectional morphology and shows that also inflectional morphology must have a place in the lexicon. She does not address the relation

between the morphological and the syntactic roles of inflection. Kiparsky (1982) provides extensive support for Lieber's position, but does not address the syntactic role of inflectional morphology either. Selkirk (1982) goes even further and explicitly rejects a rule such as affix hopping being involved in the mapping between phrase structure and word structure. However, she does not address the question of how the syntactic properties of inflectional affixes can be accounted for. The line Lieber, Kiparsky, Selkirk can be characterized as leading to a strong version of the lexicalist position (strong LP), i.e. the lexicon makes available fully inflected words. Only fully inflected words are inserted into syntactic structures. Under such a view the analysis of a string of morphemes into syntactic phrases severely restricts the set of possible analyses of the string into syntactic phrases; i.e. at each syntactic level the representation must be word-preserving (in a sense which I take to be intuitively clear). The fact that Case assignment refers to S-structure environments is not problematic for this view if Case assignment is construed as Case checking. The fact that inflections and verbs may be associated with different domains is a problem, however, which has to be solved if the approach is to be viable. This point will be taken up in the third section. Borer (1984) and Fabb (1984) pursue the weak LP. Borer takes the position that "inflectional morphology falls within the class of rules that do not violate the projection principle" (i.e. the class of syntactic rules), and "where morphological affixation takes place in the syntax its output is transparent to further syntactic operations". According to Fabb "productive and regular word formation processes are generally syntactic processes". This position is somewhat weaker. Below I shall show that a much tighter relation between morphology and syntax exists. Borer's proposal concerning the distinction between derivational and inflectional morphology is very interesting. However, as we will see in the third section, her contention that inflectional affixation is transparent to further syntactic processes, cannot be maintained in general. Other proposals have been advanced, based on surface lexical insertion (e.g. Anderson (1982), Lapointe (1981), Pranka (1983)). Given certain additional assumptions about the relation between D-structure and S-structure, these proposals come down to versions of a strong LP, and also lead to the question of how to differentiate the syntactic domains of V and I. In the present article I will pursue a strong version of the LP and formulate an answer to this question. Direct empirical evidence will be presented for the solution to be advanced, based on a number of contrasts between Dutch and English. First, however, I will give some arguments of a more general nature against approaches based on a rule like Affix Hopping.

2. The Status of Affix Hopping

It is generally assumed in approaches based on some form of Affix Hopping that it is a post S-structure rule in English. In order to

account for the fact that in Italian a VP-internal subject may receive nominative Case, Chomsky (1981) proposes that the level at which R applies is subject to parametric variation, allowing R to apply in the syntax in languages like Italian. Thus, *I*, lowered onto the verb, governs a VP-internal subject at S-structure, and assigns it its Case. In Reuland (1985a) it is shown that in Dutch finite *I* is always on the verb. Somehow the Dutch equivalent of R must apply in the syntax obligatorily (a summary of the arguments will be given in section 3). If there is a rule like Affix Hopping, parametrized as to whether it may not, may, or must apply in the syntax, one would expect the same variation to obtain, regardless of the type of inflectional affix chosen, and the value of the parameter to be uniform for all inflectional affixes of a language. These expectations are not borne out. For instance, although there are salient differences between English and Dutch with respect to finite inflection, participial inflection behaves very much alike. Although in English finite inflection cannot be on the verb at S-structure, the most straightforward analysis of *-ing*-constructions in terms of Affix Hopping would require *-ing* sometimes to be and sometimes not to be on the verb at S-structure (see the next section for some more discussion). There is clear crosslinguistic variation between finite clause types; there appears to be some (but less extensive) variation between gerundival clause types (see Rizzi (1982) for some discussion), and even less, perhaps none at all, between participial clauses. None of these phenomena points towards a parameter involving Affix Hopping as such. Any parameter will have to take into account specific properties of the morphemes involved. In fact, the notion itself of a rule R applying in the syntax is problematic. It has often been noted that this rule shares virtually no properties with other rules that are involved in the mapping from D-structure to S-structure. The standard properties of Move alpha are summarized in (4a). By way of contrast, the properties of Affix Hopping are given in (4b).

(4) a. DS	----->	SS
	move alpha	
alpha in	movement forced by and subject	no restriction
canonical	to well-formedness conditions on	on distance
position	chains (as expressed by the	inherent in the
	theories of Case, theta-roles,	rule, except
	binding, bounding), leaves trace	for consequences
	which must be bound	of given subtheories
b. DS	----->	SS
	move affix	
unclear	movement forced by prohibition	must be moved
what	against bound morphemes being	onto
principles	free at S-structure (in Dutch),	adjacent X^0 -
would	or just against them being free;	constituent
determine	no chain formation; does not	
canonical	necessarily leave trace; no bind-	
position	ing requirement.	

It is perhaps not necessary that all rules involved in the mapping from D- to S-structure are of the same type. But the comparison at the least makes clear that R cannot be a movement rule in the strict sense, even when it applies in the syntax. More important, however, is that it does not do the job it is meant to do, without additional stipulation. Consider possible D-structure/S-structure mappings as illustrated in (5) with R applying in the syntax.

- (5) a. [_I".....[_I [_{VP}...V] I]]
 b. [_I".....[_I [_{VP}...V-I]]]
 c. [_I".....[_I [_{VP}...V-I]0]]

Let us assume (5a) is the D-structure, with separate V and I projections; and I"=S. Both projections in (5a) are headed. R is a lowering rule, hence the moved I does not c-command its former position. It has been noted that the vacated position cannot contain a trace in the standard sense of movement theory, because it would fail to be bound. Instead, either one must assume that R does not leave trace at all, or that the trace need not be bound. These options are rendered as (5b) and (5c) respectively. The result of the first option is that the INFL projection ends up being unheaded. Assigning S-structures like (5b) to such clauses leads to the prediction that they share significant properties with headless predications such as "small clauses", or else to the position that X'-principles (for instance that a projection has a head) are irrelevant at S-structure. The prediction seems wrong, the position undesirable. The real effect of R in the syntax appears to be a downward extension of the domain of I. The fact that the original part of the projection remains intact can only be captured by stipulating that the D-structure configuration is in some sense accessible at S-structure; i.e. for establishing the projection lines, unlike for Case assignment, the result of R must be "undone" at S-structure. If R leaves a trace, the conceptual problems remain. Usually, the content of an ec is required to be recoverable from its antecedent, or from its local environment. Q is not c-commanded by its antecedent, so it requires separate stipulation if the affix is to determine the content of Q. Having the local environment determine the content of Q requires a specific theory about the relation between Q and this environment. Again, this would come down to undoing the effect of R for that purpose. The point is this: Whatever principles allow us to reconstruct the content of Q from its environment in (1c), or make (5b) compatible with X'-theory, will have the same effect if applied to S-structures whose derivation does not involve Affix Hopping, but that are in fact derived from D-structures conforming to the strong LP (i.e. with base insertion of fully inflected verbs). In the next section a principle will be discussed allowing us to project structures with the required properties from configurations containing inflected verbs. The necessity for such a principle also follows from general learnability considerations. The primary data, after some initial

analysis can be viewed as strings of morphemes or words, including inflected verbs. The task of the learner is to project structures, given general grammatical principles and the specific properties of the lexical items the string contains. For English it is generally taken to be the case that there is ample syntactic evidence for an INFL/AUX node outside the VP. There is the existence of a separate class of auxiliaries, *do*-support, VP-deletion, tag-question formation, etc. In Dutch, on the other hand, auxiliaries share important properties with main verbs (cf. Reuland (1982)); there is no VP-deletion, there are no tag-questions parallel to English, there is no general *do*-support phenomenon. In fact, as noted earlier (and shown in Reuland (1985a)), in Dutch *I* is always realized on the verb at S-structure. So, the situation is as in (6) (NP being the direct object NP).

- (6) a. Word structure (NP),(V,I)
 b. S-structure (NP),(V,I)
 c. D-structure i. (NP,V),(I)
 ii. (NP),(V,I)

It is reasonable to assume that only evidence, or some independent principle can bring the language learner to adopting (6ci) rather than (6cii) as the D-structure for (6a,b). If properties of phrase structure are stipulated by rules, having PS rules such as $I' \rightarrow NP\ I'$ and $I' \rightarrow VP\ I$ would be sufficient for (6ci) to be chosen over (6cii). However, if properties of phrase structure are to be derived from lexical properties and grammatical principles (Stowell (1981)), such rules are not part of universal grammar. As a consequence, the lack of evidence in favour of (6ci) available to the Dutch language learner, must be an important consideration. Parts of lexical words are generally inaccessible for syntactic processes. This seems true regardless of whether a strong hypothesis such as Lapointe's Generalized Lexical Hypothesis, that no syntactic rule can refer to a morphological feature or category, can be fully upheld. Given the island character of words (7) seems to be at least a highly plausible null-hypothesis for the language learner.

- (7) Null-hypothesis: if a constituent is a lexical word, it is a word-type constituent at every syntactic level

If (7) is indeed correct, we will have to reject an account based on rule R for Dutch anyway.

3. The Domain of Affixes

3.1. Nominal Infinitives in Dutch

Dutch infinitival forms, generally with the affix *-en*, not only appear as full verbs; they also productively appear heading a nominal construction (henceforth NI) that is somewhat similar to

gerunds in English. Strikingly, the construction may exhibit a mixed nominal/verbal character. Some examples are given in (8).

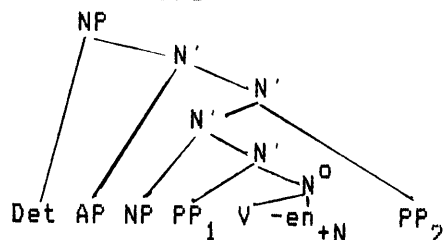
- (8) a. dat constante elkaars artikelen kopieren van die linguïsten
that constant each other's articles copy(ing) of those linguists
kost de universiteit fortuinen
costs the university fortunes
- b. dat vervelende stiekem stenen bij de buurman in de tuin
that annoying secretly stones at the neighbor in the garden
gooien van die kinderen moet maar eens afgelopen zijn
throw(ing) of those children should come to an end
- c. dit voortdurende wegmaken van mijn gereedschap
this continuous mislay(ing) of my tools
door onbekende daders gaat me vervelen
by unknown culprits begins to annoy me
- d. Karels nadrukkelijke zowel de burger als de dichter spelen
Karel's emphatical both the citizen and the poet play(ing)
beviel velen niet
did not please many people

Although the construction has many interesting properties, I will limit myself here to highlighting those characteristics that are relevant for the present discussion. It has many clear nominal characteristics (e.g. the presence of determiners such as dat, dit, or the genitive NP Karels). Its most striking verbal property is that it allows direct objects, or predicate nominals without a preposition (as in (8a,b and d)). As in ordinary clauses, these constituents then appear to the left of the head. This conforms with the head-final character of verbal projections in Dutch. Similarly PPs, whether they are prepositional objects or have adverbial function may appear to the left of the head. It should be noted that this order is impossible if the infinitive is replaced by a deverbal noun. For instance, (8a) with gekopieer instead of kopieren and (8b) with gegooi instead of gooien are ungrammatical. With the NP (then to be preceded by the preposition van (= 'of')) and the PP shifted to the right of the head, as is standard in NPs, the result is again O.K. It is not the case that the nominal infinitive requires direct object and PPs to be on its left. Either some, or all of them may appear on the right, with the proviso that the DO then requires van. As (8d) shows, a subject may appear as a genitive in the Det position. However, probably due to the fact that most NPs lack a genitive form, the standard expression of the subject is by either a door (= 'by')-phrase (favoured in post-head position) or van-phrase (only in post-head position). This use of van-phrases is never possible in standard clauses. It looks as if the construction is split: on the right of the head it is nominal, on the left it is verbal. It should be noted that the direct object on the verbal side is restricted as to choice of determiner. Easiest to get are bare plurals and mass nouns, i.e. determinerless NPs. However, as is shown by (8a) which shows the determiner elkaars, under certain conditions determiners may occur. In fact,

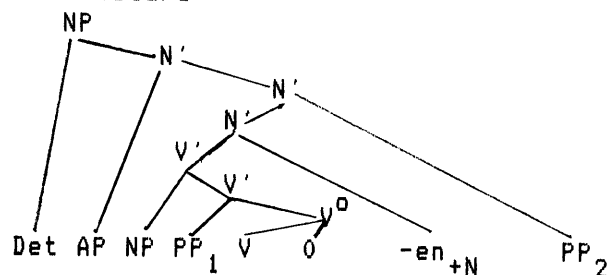
contexts can be found for virtually every determiner, provided it allows an interpretation that is (to formulate it briefly and loosely), not individuated. For our present purposes this brief remark suffices. I will continue with the characterization of the verbal/nominal split. It is an interesting fact that despite their clear adverbial function the modifiers constante, vervelende, voortdurende and nadrukkelijke bear the adjectival ending /schwa/. Taken together with the nominal form of the determiner this means that a verbal construction is embedded in a nominal one. Not all modifiers need to be adjectival. In (8b) stiekem, lacking the /schwa/, must be adverbial. The 'size' of the verbal part is not fixed; e.g. stiekem in (8b) could also appear as an adjective and bear the schwa. In all examples the adjectives can be replaced by the corresponding adverbs. However, the verbal domain must remain inside the nominal domain. The sequence [Adv [Adj ... NI]] is impossible. When no modifier of the NI has adjectival form (even if the NI has a Det) the restriction on the Det of the DO disappears. The Det position of the NI may be empty too. In that case the NI cannot have adjectival modifiers. This array of facts requires the following picture. The infinitival inflection -en is a nominalizing affix, which may nominalize not only just verbs, but also higher level V-projections, leaving their internal verbal character intact. Yet, morphologically, the affix is attached just to the verb. This state of affairs is problematic for Borer's position. Affixation of -en is neither fully transparent for syntactic processes, nor fully opaque. The facts are, however, highly reminiscent of bracketing paradoxes of the type recently studied in Pesetsky (1985). In the cases he studied involving the structure of e.g. words like unhappier, the starting point is that principles of word formation require -er to be attached to happy, with un- prefixed to the result, yielding [un[[happy]er]]. Principles of compositionality, however, require -er to be attached to unhappy, yielding [[un[happy]]er]. Pesetsky proposes that both types of principles can be satisfied, by assigning such words a dual representation. One representation, D-structure, is [un[[happy]er]] obeying principles of word formation; the other, LF, is derived by applying a Quantifier Raising type rule to -er, moving it from its base position, and adjoining it to a higher level, yielding [[un[happy]0]er]. So, the fact that er becomes operative at a point higher in the projection than its point of attachment is accounted for by a movement rule. Just like the English comparative suffix -er, the Dutch nominalizing affix -en apparently also may become operative at a point higher than its point of attachment. The difference is that -er is proposed to move at LF, whereas in the NI case the process crucially applies at S-structure. It is easily seen that the facts of (8) can be derived from the strong LP under the assumption that a Pesetsky type principle is also available in the mapping from D-structure to S-structure. This is illustrated in (9). It is assumed that -en is an affix with +N-properties in the sense of Lieber (1980) attaching to a verbal stem. By the percolation convention, this nominal character will be assigned to

the projection as a whole. Directionality and other requirements on Case and theta-role assignment will preclude NP and PP being licensed by N^0 .

(9) a. D-structure



b. S-structure



So, given a D-structure in which the head of the main projection is nominal, movement of the affix by QR at S-structure derives a configuration in which all necessary requirements are met. Under Pesetsky's analysis QR will leave a category neutral trace. Hence up to the position where the raised affix is attached, the projection will have a verbal character. Thus, NP and PP can be licensed. The facts about adjective-adverb sequences now fall into place. If two APs are present, after affix raising the situation of (10) may obtain.

(10) $[_{NP} \text{Det} [_{N'} \text{AP}_1 [_{N'} [_{V'} \text{AP}_2 [_{V'} \text{NP } V^0 \text{V } 0]]] -en_{+N}]]]$

Here AP_1 is governed by an N' , AP_2 by a V' . The reverse situation clearly cannot arise. An attempt to present a full explanation of the conditions causing the restriction on the Det of the DO would lead beyond the scope of the present article. It would require a more precise analysis of standard VPs, than is presently available. It is suggestive, however, that within VPs certain types of NPs, including bare NPs and other "nonindividuated" NPs tend to occupy positions close to the verb, whereas many of the NPs that are excluded under the conditions discussed tend to occur in the position at the left boundary of the VP. The absence of an adjectival modifier in an NI may well be compatible with a structure in which the nominalizing affix is attached high enough to give rise

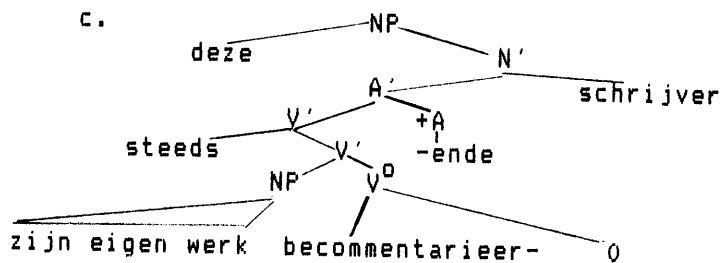
to a full-fledged VP, including the position for fully quantificational NPs. Adjectival endings on "adverbial" modifiers then signal the opposite: -en is attached to a V'-chunk not large enough to contain that position (cf. Bennis & Hoekstra (1984) for evidence that there is VP-internal movement of direct object NPs). So, the extension of Pesetsky's approach to include S-structure phenomena accounts for the properties of NIs quite well. If "QR" is involved in the analysis of the construction discussed, it is important to know to what restrictions it is subject. First, and this will become important below, it cannot be available for every affix. As we saw, the affix in a deverbal noun such as gegooi, gekopieer, etc. does not undergo QR (the distinction between prefixal and suffixal forms is irrelevant here). Just as in the cases discussed by Pesetsky, affix raising in the syntax is string-vacuous. Notice, that unlike movements at LF, which are by definition not reflected in surface order, S-structure movements are (if it exists, affix hopping in the syntax is the only exception to this), and string vacuousness can be assessed just by inspection. Pesetsky notes that the string vacuousness condition on Affix Movement raises a number of conceptual problems. Yet, in the discussion of the construction in the next section, it will be seen to play an essential role. Later on, we will use it to argue for a reinterpretation of the processes involved.

3.2. Participial Constructions

It is a traditional observation that participles combine verbal and adjectival properties. They can be generally used as adnominal modifiers, and then show adjectival agreement. On the other hand, they can assign Case just like the corresponding full verb forms. It has been proposed that they constitute a category in which the opposition between V (+V,-N) and A (+V,+N) is neutralized (Cf. Van Riemsdijk (1983)). Given our poor understanding of the notion of category neutralization, it is useful to pursue an alternative. In fact the assumption that the participial ending is an adjectivalizing affix attached to a verbal stem, which is subject to affix raising, gives a straightforward account of the properties of these constructions. So, the NP in (11a) will have the D-structure (11b) and the S-structure (11c).

(11) a. deze steeds zijn eigen werk becommentarierende schrijver
 this always (on) his own work commenting writer

b. [_{NP} deze [_N [_{AP} [_{Adv} steeds
 [_A [_{NP} zijn eigen werk] [_A [_V becommentarieer-]
 [_{+A} -ende]]]]] [_N schrijver]]]



Now, evidence that nonvacuous movement, even if it were abstract, is excluded, is found in the following phenomenon. Consider the construction in (12).

- (12) de gisteren door de auteur verscheurde artikelen
 the yesterday by the author torn up articles

The past participle *verscheurde* carries adjectival inflection in the form of a *schwa*. There is a general process in Dutch allowing PPs to appear to the right of a head. This process applies also in standard VPs, as in *Jan heeft het boek meegebracht voor Marie* 'John has the book brought for Mary'. It is excluded, however, in prenominal modifiers. So, (13a) with the modifier postnominal is O.K., (13b) is not.

- (13) a. de artikelen, gisteren verscheurd door de auteur
 the articles, yesterday torn up by the author
 b.*de gisteren verscheurde door de auteur artikelen

In Reuland (1979) it is argued that these and other cases fall under the generalization that prenominal modifiers must be able to carry adjectival inflection. This suggests that in Dutch the construal rule for such modifiers depends on the presence of this morpheme (see Reuland (1986) for evidence that the construal rule for prenominal modifiers differs from that for postnominal ones). It appears that this construal rule applies to just those constituents that are in the scope of the agreement morpheme. This effectively rules out (13b) given that there is no abstract movement at S-structure violating the string-vacuousness condition. Thus, (14a) is possible and (14b,c) are ruled out.

- (14) a. [_{NP} Det [_N [_A [_V ... PP [_{V0} V 0]] -e_{+A}] N]]
 b.*[_{NP} Det [_N [_A [_A [_V ... t [_{V0} V 0]] -e_{+A}] PP] N]]
 c.*[_{NP} Det [_N [_A [_V [_V ... t [_{V0} V 0] PP] -e_{+A}] N]]

These considerations are evidence that at least S-structure Affix movement is string vacuous.

3.3. Finite Inflection

As was mentioned earlier, there is evidence that in Dutch finite inflection must be on the verb at S-structure. A comprehensive treatment of the issue would lead us too far afield (for details etc. see Reuland (1983a), (1985a), (1985b)). The following is a brief sketch of the reasons for adopting the relevant structure. Two facts will be important here. First, in Dutch transitive clauses both long and short Wh-movement are possible with complementizer retention. This is illustrated in (15).

- (15) a. Ik vraag wie of t dat boek leest
 I ask who if that book reads
 b. wie denk je dat t dit boek leest
 who think you that this book reads

A similar extraction is impossible when the verb is intransitive as in (16).

- (16) a.*Ik vraag wie of t komt/danst
 I ask who if comes/dances
 b.*wie denk je dat t komt/danst
 who think you that comes/dances

These facts are extensively discussed in Reuland (1985a). Second, this transitive-intransitive asymmetry is paralleled with indefinite subjects. This is illustrated in (17).

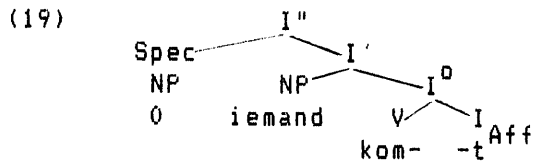
- (17) a. Karel denkt dat veel mensen dat boek lezen
 Karel thinks that many people that book read
 b.*Karel denkt dat veel mensen komen
 Karel thinks that many people come

With a definite subject (17b) is O.K. An indefinite subject of an intransitive verb requires the presence of the expletive element like er. This element also facilitates subject extraction in intransitive clauses. This is illustrated in (18).

- (18) a. Ik vraag wie of er t komt
 I ask who if there comes
 b. Wie denk je dat er t komt
 Who think you that there t comes
 c. Karel denkt dat er veel mensen komen
 Karel thinks that there many people come

It has been shown that in er constructions the thematic subject is in VP-internal position (Den Besten (1981, 1982)). These facts fall into place if the following can be maintained. 1) Finite inflection is a proper governor in Dutch and licenses a variable in the [NP,S] position. 2) If the verb is intransitive, the [NP,S] position cannot contain a variable. I will stipulate here that I can be a

proper governor in Dutch, but 2) will be derived. It follows from the conjunction of Burzio's generalization and the Extended Projection Principle (EPP), given an assumption that is immediately relevant for our present concerns, namely that the verb and inflection constitute a word at D-structure, defining one projection path, viz. an I-projection. Consider first a structure that is well-formed. A sentence such as dat er iemand komt will have a D-structure as in (19), leaving out the structure of Comp and the expletive.



I" corresponds to S, and [Spec,S] is the structural subject position [NP,S]. The finite verb, consisting of the verb stem and the I-affix is a lexical element of the category I⁰. The lexical properties of the V-stem, e.g. the theta-roles associated with it are part of I⁰. Because the NP within I' is governed by this material it receives the theta-role involved. Since I⁰ also contains the inflectional affix, and is of the latter's category, it assigns nominative Case to the NP it governs at S-structure. The [NP,S] position is non-thematic. This follows from Burzio's generalization, which will be read as in (20) (cf. this is quite close to the form it has in Chomsky (1981)).

- (20) If a verb (to be understood as a verbal grid) governs some NP, and it does not assign objective Case to any NP, then the [NP,S] position is non-thematic.

In (19) the verbal grid of I⁰ governs an NP, but does not assign objective Case to any NP, hence the [NP,S] position is non-thematic. It will now be shown that the argument cannot be base inserted in the [NP,S] position. Assume it is. I⁰ governs up the projection line. Hence, it also governs the [NP,S] position. It does not assign objective Case to any NP. So, the [NP,S] must be non-thematic. This contradicts the assumption that it contains a base inserted argument. Therefore, the construction cannot exist.² In order to show that the Spec-position in intransitives cannot contain a variable, we must demonstrate more, namely that the thematic subject in (19) cannot move to the [NP,S] position and be extracted from there. This follows from the EPP (cf. Chomsky (1981, 1982), Reuland (1985b)). The EPP expresses the fact that every sentence has an external argument. Two notions of externality are potentially relevant: 1) Structural externality and 2) Thematic externality. An argument is structurally external iff it is not governed by the verbal grid. It is thematically external iff its theta-role is compositionally determined, i.e. by properties of the verbal projection as a whole. It follows that in a configuration

like (21) an argument in the [NP,S] position cannot count as external at all.

(21) [_I" [_{NP} iemand] [_I, t [_Io kom- -t]]]

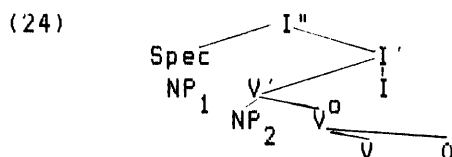
The position of *iemand* is governed (via the I-projection) by the verbal grid, hence it is not structurally external. Its theta-role is inherited from a trace which received it under direct government. Hence *iemand* is not thematically external either. As a consequence, (21) does not contain an external argument and violates the EPP. The sentences of (18), on the other hand, satisfy the EPP, since the position of the expletive is thematically external: its theta-role (i.e. the absence of one) is compositionally determined as a property of the projection as a whole. Assuming that a non-thematic [NP,S] position must be somehow spelled out (cf. Reuland (1985a) for details) the ungrammaticality of (17b) follows. The ungrammaticality of the sentences in (16) with a variable in the [NP,S] position follows on the same footing. Remains the question why intransitives with "definite" subjects appear to be exempt from the restriction. I will propose that the definite-indefinite asymmetry in intransitive clauses is parallel to the definite-indefinite asymmetry in transitive VPs. Suppose that definite (and specific indefinite) NPs in Dutch are subject to an S-structure version of QR (witness the fact that as noted in Bennis & Hoekstra (1984) certain VP-internal NPs support parasitic gaps and hence must be associated with a trace). In the case under consideration, this will yield a structure like (22), with the thematic subject Chomsky-adjoined to I".

(22) [_I" NP_i [_I" [_{Spec} 0] [_I, t_i [_Io V I]]]]

Since NP_i is adjoined it skips the Spec-position, leaving the latter occupiedⁱ by an expletive 0, which satisfies the EPP (from the considerations in Reuland (1985a) it follows that the preposed subject may perform the function of any other preposed constituent and obviate the need for an overt expletive). NP_i is in a relative A'-position, t_i is the head of the A-chain and hence the variable. This explainsⁱ the fact that whenever the thematic subject is not a definite NP the variable demonstrably ends up in the position of t_i. When the verb is transitive the following situation obtains. Irrelevant constituents and details omitted, a D-structure may look like (23).

(23) [_I" [_{Spec} NP₁] [_I, NP₂ [_Io V I]]]

NP₂ receives a direct object theta-role, NP₁ some compositionally determined theta-role. As it is, NP₂ will not receive Case, with I blocking Case assignment. It is Affix movement at S-structure, attaching I higher up in the projection, which will have the effect of freeing the way for NP₂ to receive objective Case. The structure is illustrated in (24).



V^0 governs NP_2 and assigns objective Case. I governs NP_1 , and in fact causes NP_2 it to be properly governed. Since NP_2 has objective Case, NP_1 is in a theta position as required. With the [NP,S] position¹ being thematically external, the construction meets the EPP. So, the crucial point is the following: due to the fact that V and Inflection are lexically merged, the verbal grid will always govern the [NP,S] position. Hence the EPP can be satisfied only on the basis of thematic externality. Notice, that the analysis immediately explains the fact that the generally found configurational asymmetries between unergatives and unaccusatives are lacking in Dutch. Both have VP-internal subjects.³ Since the relevant properties of transitive sentences here, are directly related to the verb's assigning objective Case, one will expect that constructions with an object receiving some other Case will side with the intransitives. This is borne out (cf. Reuland (1985a)). All of these facts would remain complete mysteries under any other analysis I am aware of. Finally, it should be remarked that the present analysis makes available a coherent theoretical interpretation of Taraldsen's 'Head-of-S'-parameter, to the effect that in Germanic languages V is the head of S , in contrast with English and Romance languages, where it would be I . Within an X' -framework, one would not expect such variation to be possible. If S is a category within the X' -system, one can no more accept this parameter, than one could accept a parameter that some category, say PP , sometimes has P and sometimes A as its head. The stronger position is that S does indeed fall within X' -theory; hence if it is an I -projection in some language it should be an I -projection everywhere. However, when understood as claiming that in Germanic languages verbal material governs the [NP,S], whereas in English and Romance languages it does not, the present approach seems the right way to express it.

4. A Contrast between Dutch and English

The proposal as developed so far meets a number of problems if applied to English. One problem is obvious: The LF Affix movement as discussed by Pesetsky is string-vacuous. The S -structure Affix movement discussed above has been shown to be necessarily string-vacuous too. Yet some putative rule yielding (26b) from (26a) in English, could not be string-vacuous.

- (26) a. [_{I''} NP [_I [₀ V I] NP]]
 b. [_{I''} NP [_I I [_V [₀ V O] NP]]]

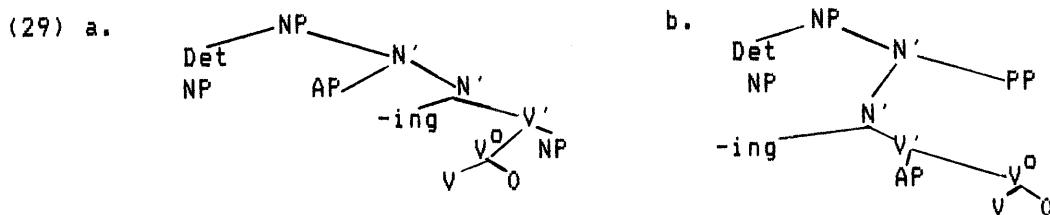
In addition the movement would have to be forced in order to prevent effects that do not occur in English. Comparing nominal infinitives in Dutch with gerunds in English, there is another important contrast. In Dutch the transition from a predominantly nominal to a predominantly verbal construction has a "gradual" character as we have seen. In English, it is so to speak "abrupt". Consider the examples in (27).

- (27) a. That malicious hunting of (the) poor little mice (by Tom)
 b.*That malicious hunting (the) poor little mice (by Tom)
 c.*That maliciously hunting of (the) poor little mice (by Tom)
 d.*That maliciously hunting (the) poor little mice (by Tom)

The corresponding Dutch sentences ((27b and d) without the article and the order adapted) are all grammatical. Presence of an article-like determiner forces the -ing construction to have only nominal characteristics. QR-ing -ing leftward and attaching it at various points should make available the other options of (27). The paradigm of (28) illustrates the same point with a somewhat different construction.

- (28) a. Tom's malicious hunting of (the) mice
 b.*Tom's maliciously hunting of (the) mice
 c. Tom's maliciously hunting (the) mice
 d.*Tom's malicious hunting (the) mice

With a process like that in (29) again, all variants of (28) should be derived.



With a genitive NP as the specifier (subject) there are just two options, as we see: Either the whole projection of the head is nominal, or there is a full-fledged VP. I.e. it looks as if the affix either stays down, or has to move up completely. The paradigm in (30), finally, is as expected.

- (30) a. (We watched) Tom maliciously hunting (the) mice
 b.* " Tom malicious hunting (the) mice
 c.* " Tom maliciously hunting of (the) mice
 d.* " Tom malicious hunting of (the) mice

The ACC-ing construction is verbal at the top, and hence does not allow nominal properties downstairs. The paradigms given show that allowing the affix to undergo leftward movement and attachment at

S-structure will cause considerable overgeneration. I will now proceed developing a proposal that accounts for the differences between English gerunds and Dutch nominal infinitives in a natural fashion. For a start, I will come back to an issue raised earlier, namely, that whatever principle affects NIs must not affect deverbal nouns. Hence, a principled distinction is needed between affixes that do, and affixes that do not move at S-structure. The proposal to be developed will be based on the assumption that the phenomenon of an affix behaving as if attached higher up the projection line does not actually involve a QR-type movement, but rather restructuring in the sense discussed in Manzini (1983). The set of affixes that may be involved in such restructuring, I will propose, is as a matter of principle the set of affixes that are members of a syntactic category, i.e. possible heads of a projection. In the cases under consideration this means that the affixes involved are those that are members of the syntactic category *I*. In Reuland (to appear) it is shown that a principled approach to categorial features make available just the following syntactic categories: N(ame), C(ommon) N(oun), A(djective), V(erb), P(reposition), D(eterminer), C(omplementizer), and I(nflection), each of them with its own independently motivated combinatorial properties. So, I(inflection) is used here not for just a set of verbal affixes, but for a set of elements with certain given syntactic properties, which happen to be bound morphemes. This means that there is an essential difference between the inflectional character of morphemes like -ed, or -ing in refused and refusing, and the nominal character of e.g. -al in refusal. -ed and -ing stand in the "is a" relation to *I*, but -al "is" not "a" *N*. Its nominal properties just reside in what it contributes to the character of the projection of the element it is attached to. -en in Dutch NIs "is an" *I*. In addition, it contributes a nominal character to a projection. Given that "is an I" is a syntactic predicate, appearing in phrase markers, we can account for the Dutch facts under the hypothesis that *V* and *I* give rise to restructuring phrase markers, that is, phrase markers that map into dual tree representations. Consider a phrase marker in the sense of Lasnik & Kupin (1977) of the string of morphemes in (31).

(31) (dat) (constante) (hond)(en) (pest)(en)
 that constant dog s teas -ing

This phrase marker will contain among others the following monostrings (recall, -en is an *I*, and contributes nominality).

(32) a. dat constante honden pest I
 b. dat constante honden V en
 c. dat constante honden I⁰
 d. dat constante V' en
 e. dat constante I'

(32) contains just the relevant "is a" relations. It simultaneously expresses the fact that pesten is a word, and the fact that both the

V and the I it contains project up. Notice that this is possible, just because Dutch is both morphologically and syntactically righthanded in the constructions involved. It is easily seen that a similar result cannot be obtained when the position of a head is different in morphology and syntax. Consider for instance an English -ing construction, with -ing assumed to realize I (with nominal properties).

- (33) John's constant teas ing dogs
 (34) a. John's constant teas I dogs
 b. John's constant V ing dogs
 c. John's constant I⁰ dogs
 d. John's constant V'
 e. John's constant I'

Clearly, what is lacking in English is the possibility to add a monostriug like (32d) to a phrase marker. Crucially, it is impossible to form a subtree dominated by an I-projection which contains a V-projection. If the projection of V-I is verbal at any point, it will remain so. This implies that for English an optimal grammar may as well be taken to contain two homophonous morphemes -ing, one syntactically transparent, the other a syntactically opaque nominalizer. Under this option, Borer's claim that inflectional affixes are transparent follows as a corollary, valid for certain morpho-syntactic configurations. A further conclusion is then that there will be no evidence for the English language learner to ever postulate that verbal affixes realize the syntactic category I. That is, affixed verb forms are simply classed as representing the category V throughout. In that respect English turns out to be the mirror image of Dutch: In Dutch there is no evidence that I is ever not on the verb, in English there is no evidence that it is ever on the verb. This will hold true not only for gerunds, but also for finite verb forms. So, forms like hits in John hits the ball, or worked in John worked will just be verb forms syntactically. They head V-projections, and all phrase markers of terminal strings containing a substring of the type V-s or V-ed will contain a monostriug with V dominating that substring. This leads to the question of what the status is of the category I in English. For under the present analysis a sentence like John hits the ball does not contain any overt realization of the category I. Instead, I will propose, it contains a 0-realization of that category, in what is generally taken to be the canonical I-position, i.e. as in (35). So, 0 and do are allomorphs realizing nonmodal I.

- (35) [_I John [_I⁰ 0] [_{VP} [_V hit-s] the ball]]

The idea of a 0-allomorph of do here is fully comparable to that of a 0-allomorph of the plural morpheme in words like deer or that of the use of 0-forms in non 3rd person sing. cases of finite inflection. The answer to the question of how the language learner arrives at a representation like (35) without overt evidence for the

presence of I cannot be given without a theory of what the category I contributes to the sentence. In Reuland (to appear) such a theory is given. It is shown there that for reasons inherent in the categorial features themselves a predication structure containing just an NP and a VP is ill-formed unless under conditions irrelevant here. The presence of an occurrence of I is needed in order for the structure to be well-formed. Hence, general principles of grammar will force the language learner to assign a structure with a O-INFL to the string John hits the ball as in (35). This process will apply throughout, whenever a predication between an NP and a VP obtains, regardless of whether this is in finite, participial, or the gerundial clauses of the various types. A number of matters of execution remain. For instance, under what conditions will the O-allomorph of I appear. How do we account for the 'agreement' between the subject and what is now a mere verb form in John talks. How do we account for the fact that an -ing clause differs from a finite clause, despite the fact that they both have a O-INFL. Such matters all seem to fall out easily under the Affix Hopping approach. It is straightforward, however, to see that the theory as it is already contains the machinery to account for such correlations. In general, heads of certain types may select/subcategorize complements with certain, but not other heads. So, some verbs require complement clauses headed by to as a realization of I, others require a clause headed by -ing (cf. Reuland (1983b)). Given that O-morphemes have syntactic properties just like any other morpheme, the facts can be accounted for by assuming that similar relations exist between values of I and the form of the verb they govern (under head-head government, and not unlike Fabb's (1984) Case relation). 'Subject-verb' agreement can be handled similarly as being mediated by the O-INFL: the subject requires an I with certain features, I in turn requires the concomitant verb form. The choice between do and Q can be handled in terms of an adjacency condition of the type usually taken to be involved.

5. Conclusion

One might feel it as a drawback of the present approach that it leads to an apparent duplication of syntactic elements. I.e. the approach based on Affix Hopping has an inventory of inflectional elements, -ing, -s, -ed, etc. to be inserted in one position, and a rule attaching them to a verbal stem; the present approach has an inventory of inflectional elements, which we may informally represent as O +ing, O +s, O +ed, etc., and an inventory of verbal elements, which we may represent as V-ing, V-s, V-ed, etc. related by a selection, or agreement process. The duplication of this inventory, is a small price to pay, however, for the conceptual clarity resulting from replacing an account requiring a rule representing a specific rule type all by itself, by an account requiring nothing but a core syntactic relation. The way in which the present account enables us to explain differences in possible

domains between verbal affixes in Dutch and English, shows it to have considerable empirical advantages as well, thus supporting the ideal that conceptual clarity and empirical adequacy go hand in hand. I wish to conclude by saying that, of course, the theory advanced here will have consequences for the analysis of other syntactically head-initial, but morphologically head-final languages., e.g. Scandinavian and Romance languages. In particular, it will have consequences for the study of the role of the clitic system in the latter type languages. Similarly, it leads to particular expectations about what to find in languages that are both morphologically and syntactically head-initial, if there are any. These questions, however, will have to wait for other occasions.

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7. Footnotes

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1. The same reasoning applies if one simply assumes, as in Reuland (1979), that the affix and N' must be adjacent.
2. The reference in (20) to a verbal grid instead of a categorial verb seems plausible given the fact that for instance in the standard analysis of passive, it is assumed that passive morphology is category changing to the extent that it blocks Case assignment. Still, it does assign its theta-role and does trigger dethematization of the [NP,S].
3. Other differences are unaffected, witness the impossibility for unaccusatives to impersonally passive.
4. Notice, that if Lebeaux (1984) is right, some of those affixes that do not move in the syntax must be allowed to move at LF.
5. Independently, Schein (1984) has developed a specific semantic interpretation for the finite members of this category. It does not seem unlikely that all elements share common semantic characteristics.