

Syntactic and Phonological Verb Movement

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1. Introduction *

Noam Chomsky has in a series of recent publications drawn attention to the fact that movement of syntactic heads is radically different from movement of syntactic phrases (Chomsky 1995, Chomsky 1998, Chomsky 1999). Since head movement has no effect on interpretation, Chomsky proposes that it is not part of ‘narrow syntax’, i.e. the part of the grammar that feeds the conceptual/intentional component of the mind/brain. The picture of the grammar that ensues relegates a number of word order phenomena, including those described in terms of head movement, to a part of the grammar feeding the perceptual/articulatory component of the mind/brain only. This part of the grammar deals with linearization phenomena, and is referred to as ‘phonology’ (where the quotation marks are used to distinguish it from phonology in the strict sense, the part of the grammar dealing with segmental and suprasegmental properties of linguistic signs).

The objective of this article is twofold. First, I want to support the idea that a significant part of verb movement phenomena is phonological, in the sense that the position where a verb is observed is generally determined by requirements of phonological interpretability. Second, I want to argue *against* the idea that verb movement takes place in a separate component ‘phonology’.

This article presents a theory of verb movement which involves the notion ‘F(eature)-relatedness’, referring to a syntactic relation among lexical and functional heads, and a phonologically conditioned algorithm governing the spelling out of the members of a chain of F-related heads. The formal properties of F-relatedness, and the interaction between syntax and phonology in this domain, are best understood in terms of feature movement, but F-relatedness is intended to cover all possible formalizations of the relatedness among functional and lexical heads (head government, movement by adjunction or substitution, agreement, feature sharing, etc.).

I demonstrate how the theory accounts for verb placement phenomena in Dutch and related languages, in both finite and nonfinite clauses. I argue that F-relatedness is a precondition for restructuring phenomena, demonstrating its essentially syntactic nature. The separation of F-relatedness (syntactic verb movement) and spell-out (phonological verb movement) allows us to draw two conclusions. First, verb movement is much more pervasive than meets the eye (i.e. it may take place without effect on spell-out). Second, spell-out can only affect one of a set of F-related heads.

The article leads to the following conclusion. The special properties of head movement can be understood once the syntactic and phonological aspects of head movement have been clearly delineated. The phonological contribution to verb movement phenomena is restricted to the question which of a chain of F-related heads will be spelled out. There is no evidence in the domain of head movement that supports the existence of a quasi-syntactic component ‘phonology’ regulating linear order.

2. Syntax and linear order

Chomsky (1995, section 4.8) argues that there is no evidence to suggest that linear order plays a role in syntax. If that is correct, linear order must be a function of the conversion of syntactic structure to acoustically perceptible signs. Let us call the entire process of converting elements of the syntactic structure to strings of phonemes 'PF'.

Within PF, we may make a distinction between the actual conversion of syntactic elements to strings of phonemes on the one hand, and processes having to do with the interaction of phonemes on the other. I call the conversion process Morphology and the phoneme interaction process Phonology. Within PF, Morphology feeds Phonology.

The process whereby syntactic elements are converted into strings of phonemes is called Morphology because a process of morphological selection is an essential ingredient of the conversion. Thus, a syntactic terminal containing the lexical features of a root meaning 'go' and the morphosyntactic feature PAST will be converted to a string /wɛnt/, a process typically regarded as morphological.

This example suggests that the way Morphology operates is as follows. First, a paradigm is selected on the basis of the lexical features. In the case of *went*, the paradigm includes *go, goes, went, gone, going*. Then, a form is selected from the paradigm that best matches the morphosyntactic features of the syntactic element, in this case *went*. It will be seen from this that it is necessary to distinguish two sets of features contributed by syntax: a set of lexical features (hence *LEX-features*) and a set of formal features (hence *F-features*). Syntactic elements not containing *LEX-features* cannot be processed by Morphology.

In the ideal case, the conversion from syntax to phonology is automatic. This ideal situation is captured by the *Linear Correspondence Axiom (LCA)* of Kayne (1994), which is paraphrased in (1):

- (1) *Linear Correspondence Axiom*
 - (i) any pair of terminals (α, β) in syntactic structure is defined by a hierarchically asymmetric relation R holding between α and β ;
 - (ii) R in syntax is equivalent to temporal precedence in phonology.

The ideal case, then, does not allow for any processes in phonology disturbing the relation of temporal precedence between two elements α and β which is the equivalent of the asymmetric hierarchic relation $\alpha R \beta$ in syntax.

Likewise, the ideal case prescribes an automatic conversion process internal to Morphology. In the default situation, then, one expects regular morphology instead of suppletion, and some correspondence between the representation of morphosyntactic features in syntax and in morphology (perhaps along the lines of the Mirror Principle of Baker 1985). This ideal situation, however, is generally not effectuated, presumably because Morphology interacts with the Lexicon, the inventory of words and word forms, which is a generally accepted source of irregularity.

Language variation, then, is expected to derive from two factors:

- (2) (i) the Lexicon

- (ii) the position of LEX-features in syntactic structure at the Spell-Out point

Factor (2ii) has received much attention in the Principles and Parameters framework and in the framework of the Minimalist Program, mainly pursuing the idea that syntactic elements may move before or after the point of Spell-Out. Other approaches are conceivable, but will not be discussed in the context of this article (see e.g. Koster 1999).

Both (2i) and (2ii) may count as instances of ‘easily detectable properties of utterances’, featuring in the uniformity principle (3) guiding the study of language (Chomsky 1999:2):

(3) *Uniformity principle*

In the absence of compelling evidence to the contrary, assume languages to be uniform, with variety restricted to easily detectable properties of utterances.

The ‘phonological component’ envisioned by Chomsky (1999:30) constitutes a significant departure from the ideal case sketched here. In addition to the conceptually necessary process of converting syntactic elements to strings of phonemes, the ‘phonological component’ would include processes affecting linear order, such as ‘verb second’ (verb movement to second position). Since the ‘PF-syntax’ implied is largely uncharted territory, any proposal connected with it is hard to evaluate.

The main reason for Chomsky (1995, 1999) to distinguish ‘PF-syntax’ from ‘narrow syntax’ is that some syntactic processes appear to have an effect on semantic interpretation, and others do not. In Chomsky’s view, all syntactic processes are driven by the requirement of Full Interpretation, which leaves no room for syntactic processes having no semantic effect. It should be noted, however, that Chomsky employs the Full Interpretation requirement in a somewhat extended sense: elimination of non-interpretable morphosyntactic features is taken to contribute to Full Interpretation. This is a rationalization of movement processes which crucially depends on the linguist’s judgment as to the interpretability of particular morphosyntactic features, a nontrivial issue.

Skirting issues of interpretability, it remains difficult to employ the criterion of ‘contributing to semantics’, for two reasons. First, many aspects of semantic interpretation appear to be a function of Merge rather than Move. Thus, the argument status of a noun phrase and the temporal, aspectual, etc. features of the clause are not affected by movement. Similarly, interrogative force or subjunctive mood or certain focus properties of sentences are arguably the effect of merging a relevant functional element to the clausal structure, rather than the effect of movement. And many movement processes, such as movement to subject position, can only be regarded as contributing to semantic interpretation in the extended sense of eliminating uninterpretable features. Second, since ‘PF-syntax’ is uncharted territory, it is going to be difficult to assess the contributions to semantic interpretation made by movement processes allocated there.

Chomsky’s attempt to keep syntax ‘narrow’, though defensible from a minimalist point of view, has the perhaps unwanted side effect of contaminating the definition of PF, ideally an automatic process of mapping syntactic terminals into strings of phonemes, subject to the LCA (1).

3. The theory of head movement

Let us assume, with Chomsky (1995), that syntactic displacement (movement) is the function of a requirement of feature valuation (feature value assignment, checking, or matching). In connection with this, I propose the terminology in (4) and the principle in (5):

- (4) α and β are *F-related* if α is involved in a feature valuation operation involving F , where F is a formal feature of β
- (5) Let γ be a chain of F -related elements (α, \dots, β) , where α c-commands β . Then α must contain *LEX*-features, and β is spelled out in the highest position of γ containing the *LEX*-features of β .

If *LEX*-movement is a last resort operation, triggered by ‘phonological’ requirements having to do with the spell-out procedure, the principle (5) predicts two possibilities for a chain of F -related elements $\gamma = (\alpha, \dots, \beta)$ (hence, an *F-chain*). Either α has *LEX*-features of its own; in that case no movement of the *LEX*-features of β is triggered, and β is spelled out in the lowest position of the chain (i.e. in β). Or α has no *LEX*-features of its own; in that case the *LEX*-features of β move to α , and β is spelled out in the highest position of the chain (i.e. in α). No other cases are predicted to occur.

Let us also assume, as is standard, that there are two types of displacement: head movement and phrasal movement (XP-movement). Assuming that features move as heads (Chomsky 1995:271), it follows that feature movement and head movement are formally identical, and that phrasal movement is fundamentally different from both feature movement and head movement.

It is clear, then, that the principle in (5) has no bearing on XP-movement. Consider the fundamental question which elements move where. Elements in syntax are (i) *features* or (ii) *bundles of features*. Bundles of features are either (a) heads (X° s) or (b) phrases (XPs). Let us assume now that the features involved in syntactic displacement are F -features only. Then, ideally, both head movement and XP-movement should start out as pure F -movement, that is, as head movement of formal features (Chomsky 1995:262). It then follows that in the process of XP-movement the F -features are separated from the phrase as a whole, as the former move as heads and the latter as phrases. Assuming the spell-out procedure discussed above, this implies that the moved F -features of XPs are either ignored (if not hosted by a terminal carrying *LEX*-features of some other element) or spelled out in conjunction with the *LEX*-features of some other element (cliticization). In both cases, the movement of the XP itself (more exactly, the movement of the *LEX*-features of the XP) appears not to be triggered by ‘phonological’ requirements having to do with the spell-out procedure, which does not look at phrases but at terminals only.

With head movement, the situation is entirely different. All types of features move as heads, so the F -features and *LEX*-features are never moved to different (kinds of) terminals. The movement of the *LEX*-features appears to be triggered by requirements of the spell-out procedure only. As discussed in the previous section, this procedure needs both *LEX*-features (to select a paradigm) and F -features (to select the optimal form from

the paradigm). Only if both types of features move do we get observable head movement. This leaves open the possibility of unobservable syntactic head movement (i.e. movement of F-features only, stranding LEX-features), and I show in the following sections that unobservable syntactic head movement is much more pervasive than generally thought. The main point here is that observable head movement—unlike observable XP-movement—is triggered by requirements of a ‘phonological’ type, namely requirements having to do with the spell-out procedure. This, then, appears to be the main difference between head movement and XP-movement.

The principle in (5) predicts that observable head movement either targets the position of the highest member in the F-chain, or, in case the highest member of the F-chain has lexical features of its own, does not take place at all (in which case the head is spelled out in the position of the lowest member of the F-chain). I show in the next three sections that this prediction describes correctly the syntax of verb movement asymmetries in Germanic, both with finite verbs and with infinitives, as well as the syntax of so-called restructuring constructions (yielding transparency of embedded clauses).

4. Finite verb placement in Continental West Germanic

The Continental West Germanic languages (Dutch, Frisian, German) show a verb placement asymmetry between main and embedded clauses illustrated in (6) (cf. Koster 1975, Den Besten 1977, Zwart 1993a):¹

- (6) a. subject initial main clauses: SUBJECT—VERB—ETC
 Jan kust Marie
 John kisses Mary
- b. inversion main clauses: (XP)—VERB—SUBJECT—ETC
 (Waarom) kust Jan Marie?
 why kisses John Mary
 ‘(Why) does John kiss Mary?’
- c. embedded clauses: COMPLEMENTIZER—SUBJECT—ETC—VERB
 ..dat Jan Marie kust
 that John Mary kisses
 ‘..that John kisses Mary’

A common ingredient of analyses of this pattern since Den Besten (1978) is that it involves F-relatedness of V and the functional elements INFL (TENSE, AGR) and C(OMP). The F-relatedness of V and INFL is standard, and needs no illustration. The F-relatedness of V and C is mediated through the F-relatedness of INFL and C, suggested by the covariation of complementizers and inflectional elements in (7) (Den Besten 1978):

- (7) a. C = *dat* (‘that’) → INFL = tense/agreement inflection on the verb
 b. C = *om* (‘for’) → INFL = *te* (‘to’)

The F-relatedness of V and C is furthermore shown by the phenomenon of complementizer agreement, appearing in a number of Continental West Germanic dialects (see Den Besten 1978, Hoekstra & Maracz 1989, Zwart 1993a and references cited there):

- (8) a. ..dat ze (ETC) komt
 that she comes-3SG
 b. ..datte ze (ETC) komme
 that-PL they come-PL

We conclude, then, that the pattern in (6) involves the chain of F-related elements in (9a), or, if C is absent in subject initial main clauses, the F-chain in (9b):

- (9) a. {C, INFL, V}
 b. {INFL, V}

That C is absent in subject initial main clauses is suggested by the nature of the structure building process of the grammar proposed in Chomsky (1995:226), where lexical elements and syntactic constituents are combined in a bottom-up fashion (by the operation Merge). Since (6a) lacks a complementizer or any other element (an interrogative feature or a topic feature) standardly associated with C, there is no reason to combine the clause *Jan kust Marie* in (6a) with a C head, yielding a CP. I therefore assume that (6a) is an IP (TP, AGRP), while (6b) and (6c) are CPs.

Assuming the subject to occupy the structural subject position (specifier of INFL) in all constructions in (6) (Travis 1984, Zwart 1993a), it appears that the verb is spelled out in each of the three F-related heads in the F-chains in (9), according to the schema in (10):²

(10)

<i>clause type</i>	<i>finite verb spelled out in</i>
subject initial main clause	INFL
inversion main clause	C
embedded clause	V

As shown in Zwart (1997a), the distribution in (10) follows from the theory of head movement proposed in section 3.

In subject initial main clauses (6a), the F-chain is (9b). Adopting the descriptive device of feature movement, we say that the F-features of the verb move to INFL. Since INFL lacks LEX-features of its own, spell out requirements trigger subsequent movement of the LEX-features of the verb. The result is observable head movement, with the verb spelled out in the highest member of the chain (INFL), in accordance with (5).

In inversion main clauses (6b), the F-chain is (9a), containing the additional element

C as highest member of the F-chain. Otherwise, the derivation runs exactly like in (6a) and the verb is spelled out in the highest member of the F-chain (C), as prescribed by (5).

In embedded clauses (6c), the F-chain is again (9a), as shown by the C-INFL covariation in (7) and the phenomenon of complementizer agreement in (8). Embedded clauses differ from inversion main clauses in that C has LEX-features of its own (the LEX-features of the complementizer). As a result, movement of the LEX-features of the verb to the highest position of the F-chain is not triggered, and the verb gets spelled out in the lowest position of the chain, by (5).

The phenomenon of complementizer agreement in (7) receives a straightforward account under the analysis proposed here. Inflected complementizers simply combine the LEX-features of a complementizer and the F-features of a verb.

The correctness of this analysis is shown by the fact that complementizer agreement and verb movement to INFL are mutually exclusive. This is suggested by the distribution of complementizer agreement, occurring only in languages and dialects showing the verb placement pattern in (6) (Zwart 1993b). It is also demonstrated more conclusively in Frisian, a language showing both complementizer agreement and, under certain conditions, embedded verb movement (i.e. the main clause pattern (6a) in an embedded clause introduced by a complementizer). In those cases, complementizer agreement is absent (Zwart 1993a:198):

- (11) a. C-*(AGR)—SUBJECT—ETC—VERB
 ..{datsto/*dat do} soks net leauwe moast Frisian
 that-2SG/that you such not believe must-2SG
 ‘..that you should not believe such things’
- b. C-(*AGR)—SUBJECT—VERB—ETC
 ..{dat do/*datsto} moast soks net leauwe
 that you/that-2SG must-2SG such not believe
 ‘..that you must not believe such things’

The absence of complementizer agreement in the embedded verb movement example (11b) shows that in this case, C is not included in the chain of F-related elements associated with the verb (i.e. the F-chain is (9b), not (9a)). As predicted by (5), the embedded clause now behaves like a subject initial main clause, with the LEX-features of the verb moving to the highest member of the chain, INFL, with subsequent spell out of the verb in INFL. In (11a), C is included in the F-chain (now of the type (9a), as discussed above), no movement of the verb’s LEX-features is triggered, and the verb gets spelled out in the position of the lowest member of the chain (v).

More generally, it seems that an ‘electric current’ is running through all the members of an F-chain, and that in a *syntactic* sense, head movement takes place through all the elements of the F-chain (in the form of feature movement, or agreement). *Observable* head movement is much more limited, as determined by the principle (5), i.e., ultimately by requirements of interpretability at PF. In the Frisian example (11a), the current runs through the F-related heads V, INFL, and C, but the middle element in the F-chain, INFL, is not visible here (or in the standard Dutch construction (6c)). However, when the current is interrupted between INFL and C, as in (11b), INFL suddenly resurfaces, made visible by the movement of the LEX-features of the verb to what is now the highest

member of the F-chain.

I would like to draw the following conclusion regarding the nature of head movement. A large part of head movement is phonologically (actually, morphologically) motivated. This is the movement of LEX-features yielding observable head movement. Also, a large part of syntactically triggered head movement (F-movement) is not observable. But, crucially, there can be no observable head movement (LEX-movement) *without* covert head movement (F-movement). Hence, there is no evidence in the head movement phenomena discussed here that suggests the possibility of verb movement to positions that are not heads in the syntactic phrase structure.

5. Infinitive placement in Dutch and Frisian

It is often implicitly assumed that verb movement is related to finiteness, to the effect that the factors triggering verb movement do not affect infinitives. To the best of my knowledge, there is no theoretical basis for this asymmetric treatment of finite verbs and infinitives (see also Vangsnes 1999:86). Absence of displacement is standardly related to absence of a feature triggering the displacement, but not to a particular *value* of the feature triggering displacement. If the verb and INFL are F-related through the feature [TENSE], it is not clear why a negative value of this feature (the [-FINITE] of infinitival clauses) should block the F-relatedness.

The analysis of finite verb placement in section 4 covers the distribution of infinitives in Continental West Germanic without further assumptions.

The main fact to be explained is that infinitives virtually always occupy the base position of the verb. Two situations need to be distinguished, depending on the presence or absence of a complementizer:

- (12) a. +complementizer: C—(SUBJECT)—ETC—V-INF
 ..om het boek te kopen
 for the book to buy-INF
 ‘..(in order) to buy the book’
- b. -complementizer: V—(SUBJECT)—ETC—V-INF
 ..(danze) willen dienen boek kuopen West Flemish
 that-3PL they want-PL that book buy-INF
 ‘..(that they) want to buy that book’

The position of the infinitive is identical to the position of the finite verb in embedded clauses (cf. (6c)), as could be seen in the relative position of the finite verb and the infinitive with respect to complements, adverbs, negation, and extraposed material. As this is uncontested, it will go without demonstration here. The example in (12b) is taken from the West Flemish dialect, as it shows that an infinitival (*kuopen*) dependent on a matrix verb (*willen*) does not form a cluster with the matrix verb, as could easily be concluded by looking at Standard Dutch facts (such as (13)) alone:

- (13) ..dat ze het boek willen (*ETC) kopen Dutch
 that they the book want-PL buy-INF

‘..that they want to buy the book’

In section 4, F-relatedness of finite V and C was supported by the covariation of complementizer and tense/agreement realization observed in (7). Since the covariation can only be established by comparing finite and nonfinite verbs with the corresponding complementizers, it serves to demonstrate F-relatedness to C of finite and nonfinite verbs alike. We must conclude, then, that the infinitival verb in (12a) is F-related to C, via INFL, forming an F-chain of the type in (9a). As with finite verbs, we may describe the F-relatedness as movement of the formal features of the infinitive, via INFL, to C. Since the complementizer *om* has LEX-features of its own, we expect the LEX-features of the verb to remain in the V-position (the lowest position of the F-chain), which is where the verb is ultimately spelled out.³

The sentence final position of the infinitive in (12b) follows if the infinitive is F-related to the higher verb. In that case, an F-chain exists of the type in (14):

(14) (V, INFL, V-INF)

Again, since the highest member of the F-chain, the matrix verb, has LEX-features of its own, the LEX-features of the infinitive remain in the lowest position of the chain (by (5)), and the nonfinite verb gets spelled out in its base position.

That the verb (or INFL) of a nonfinite, complementizerless embedded clause is somehow linked to the verb of the higher clause has been proposed many times, most recently by Chomsky (1999:6). Chomsky distinguishes two types of inflectional functional heads, $T_{\text{COMP(LETE)}}$ and $T_{\text{DEF(ECTIVE)}}$, completeness/defectivity referring to the presence of a full set of ϕ -features (1999:4). T_{COMP} appears in finite clauses and control complement clauses, T_{DEF} in raising and Exceptional Casemarking (ECM) complement clauses. Chomsky (1999:6) describes the relation between T and a higher C/V element as one of ‘selection’:

(15) a. C selects T_{COMP}
b. V selects T_{DEF}

In our analysis, the concept of selection (especially in (15a)) is replaced by the concept of F-relatedness, suggesting the state of affairs in (16):

(16) a. T_{COMP} is F-related to C
b. T_{DEF} is F-related to V

If this is correct, T is always F-related to a higher head, regardless of finiteness. Clause (16a) generalizes over finite complement clauses and nonfinite control complement clauses, and clause (16b) applies to only a subclass of nonfinite complement clauses, namely those lacking a complementizer.

The analysis proposed here entails that the default syntax for infinitives in both cases involves movement (i.e. F-movement *and* LEX-movement) to INFL, just like in (6a) with finite verbs. This default situation is never observed since nonfinite INFL (whether complete or defective) is always F-related to a higher head hosting its own LEX-features

(i.e. C or V). Therefore, the F-features of the infinitival invariably end up in a terminal hosting LEX-features of its own (a complementizer in (12a), a higher verb in (12b) and (13)).

A curious construction from Frisian, called the *Imperativus pro Infinitivo* (IPI) construction, discussed in Hoekstra (1997), suggests that this view of infinitives in Continental West Germanic as undergoing covert (syntactic) head movement is correct. This construction shows that the default syntax of infinitives does involve verb movement, which is normally blocked because the highest member of the F-chain has its own lexical features.

The IPI-construction is a variant of a control construction, where the complementizer (*om*, as in (12a)) is replaced by a coordinating conjunction *en* ‘and’ (in (17), *IMP* = imperative):

(17) *The Frisian IPI Construction*

- a. with *om* ‘for’: (i) C—(PRO)—ETC—V-INF, (ii) *C—(PRO)—V-INF—ETC
- (i) (Ik ried jimme oan) *om* net te folle kofje te **drinken**
 I advise you for not to much coffee to drink-INF
 ‘(I advise you) to drink not too much coffee.’
- (ii) * (Ik ried jimme oan) *om* te **drinken** net te folle kofje
 I advise you for to drink no too much coffee
- b. with *en* ‘and’: (i) &—(PRO)—V-IMP—ETC, (ii) *&—(PRO)—ETC—V-IMP/INF
- (i) (Ik ried jimme oan) *en* **drink** net te folle kofje
 I advise you and drink-IMP not too much coffee
 ‘(I advise you) to drink not too much coffee.’
- (ii) * (Ik ried jimme oan) *en* net te folle kofje **drink/te drinken**
 I advise you and not too much coffee drink-IMP/to drink-INF

The IPI effect is illustrated in (17bi), compared with (17ai): the complementizer *om* is replaced by the conjunction *en* ‘and’, and the infinitive *te drinken* ‘to drink’ is replaced by the imperative form *drink*. Remarkably, the imperative shows up in what looks like the second position of the embedded clause (assuming a covert subject PRO in first position. ((17aai) and (17bii) are included to show that the infinitive is in final position when the complementizer *om* is used (as in Dutch (12a)), and that the imperative or nonfinite verb cannot remain in final position when the conjunction *en* is used.)⁴

The verb placement in (17bi) is reminiscent of similar verb placement phenomena appearing in the second conjunct of a coordination of two embedded clauses:

- (18) C—[[SUBJECT—INFL—ETC—VERB]—&—[SUBJECT—VERB—ETC]]
 Als je te laat thuis *komt* en je *hebt* geen sleutel bij je... Dutch
 when you too late home come-2SG and you have-2SG no key with you

The verb placement in (18) is readily explained if we assume, with Johannessen (1993), that the second member of a coordinated construction may show default syntax. In the domain of verb placement, this can be described as follows.

The verb of the first member of the coordinated construction in (18) is in an F-chain with INFL and C. Since C has LEX-features of its own, the LEX-features of the verb are not

triggered to move, and the verb gets spelled out in its base position. In the second member, the F-chain of the verb does not extend to C, so that the highest member of the F-chain is INFL. Since INFL has no LEX-features of its own, the LEX-features of the verb move to INFL (by the principle in (5)), and the clause shows the verb placement of an independent clause (cf. (6a)).

I would like to propose that the presence of the conjunction replacing the complementizer in (17bi) is the key to our understanding of the IPI-construction. The explanation of the verb placement in (18) tacitly assumed that the conjunction *en* is not included in the F-chain of the verb of the second conjunct. (If it were, it would be the highest member of the F-chain, hosting LEX-features of its own, and blocking movement of the LEX-features of the verb, yielding spell out of the verb in its base position, contrary to fact.) In the absence of evidence to the contrary, I will assume that conjunctions are never included in the F-chain of a verb. This, then, yields an asymmetry between (17a) and (17b). In (17a), the embedded clause is introduced by a complementizer *om*, which we assumed is included in the F-chain of the nonfinite verb. But in (17b), the embedded clause is introduced by the conjunction *en*, which we assumed is *not* included in the F-chain of the verb. The position of the verb in (17bi) now follows if there is an F-chain including the verb and INFL, so that the LEX-features of the verb are forced to move to INFL (which lacks LEX-features of its own) and observable verb movement results.

The Frisian IPI-construction supports the idea that syntactic head movement (i.e. F-movement) is as pervasive in infinitival clauses as in finite clauses. The circumstance that *observable* head movement is so limited in infinitivals appears to be an epiphenomenon, due to the presence of lexical elements in the highest position of the F-chain of an infinitival verb.

6. Defective tense and restructuring

In section 5, the nature of the relation between INFL (T_{DEF}) and the higher verb in raising/ECM constructions has remained unclear. In particular, it is not clear that the relation between T_{DEF} and V is one of feature valuation (a defining characteristic of F-relatedness by (4)).

According to Chomsky's (1999:6) proposal, T_{DEF} cannot have an EPP-feature (i.e., it cannot license a subject in its specifier position). As a result, the subject of the embedded clause is licensed in the functional domain of the higher verb, the two clauses sharing a single functional domain ('restructuring'):

- (19) a. ..dat ik Jan gisteren zag werken Dutch, ECM
 that I John yesterday saw work-INF
 '..that I saw John work yesterday'
- b. ..dat Jan niet schijnt te werken Dutch, raising
 that John not seems to work-INF
 '..that John did not seem to work'

In (19), the adverbs *gisteren* 'yesterday' and *niet* 'not' are interpreted as belonging to the matrix clause, indicating that the external argument of the embedded clause has been

displaced to a position in the matrix clause (an object position in (19a), a subject position in (19b)). Assuming that T_{DEF} is F-related to a higher verb, as in (14)/(16), allows us to formulate the following generalization:

- (20) All arguments of the members of an F-chain C are licensed in the functional domain of the highest verb in C

The generalization in (20) entails that the crucial factor in restructuring is not selection of T_{DEF} by a higher verb, as suggested by Chomsky (1999), but F-relatedness. That the selection relation between T_{DEF} and v does not suffice is shown by the fact that restructuring affects not only the subject of the embedded clause, but the object as well.⁵

- (21) a. ..dat ik Jan Marie gisteren zag kussen
 that I John Mary yesterday saw kiss-INF
 ‘..that I saw John kiss Mary yesterday’
 b. ..dat Jan Marie niet schijnt te kennen
 that John Mary not seems to know-INF
 ‘..that John does not seem to know Mary’

The restructuring facts show that in restructuring situations, the entire functional domain of the embedded clause is defective, not just T_{DEF} , as described in (20).

I would like to propose that in restructuring configurations, the members of the F-chain of the embedded clause transfer the capacity to license noun phrases (as subjects or objects) to the (F-chain of the) matrix verb. As a result, the arguments of the embedded verb can be licensed in the functional domain of the matrix verb. This implies that the relation between the matrix verb and T_{DEF} is indeed one of F-relatedness, as the matrix verb (and its functional heads) is involved in the valuation of the features of T_{DEF} (cf. (4)).⁶

The proposal in (20) to relate defectiveness to F-relatedness has the advantage that restructuring can be linked to verb placement in a straightforward way. In restructuring constructions, the verb stays in its base position, as may be concluded from (22):

- (22) a. ..dat ik Jan het boek zag uit lezen (*uit)
 that I John the boek saw out read-INF out
 ‘..that I saw John finish the book’
 b. Jan (*uit) las het boek uit
 John out read-PAST the book out
 ‘John finished the book.’

(22b) shows that verb movement to INFL strands a verbal particle (Koster 1975). Since the verb does not precede the particle in (22a), we must conclude that it has not moved. Assuming the principle (5), the placement of the embedded verb *lezen* ‘read’ follows if the F-features of *lezen* move via INFL (T_{DEF}) to the higher verb *zag* ‘saw’, which has LEX-features of its own (as discussed in section 5).

The defective character of the functional domain of the embedded clause in restructuring configurations (especially of T_{DEF}) is also proved by the absence of the IPI-

effect in restructuring constructions in Frisian. Next to the pattern in (17), with a control complement involving nondefective T, we would expect the ECM pattern in (23). Note, however, that (23b), the IPI case, is not grammatical (Hoekstra 1997:33):

- (23) Ik seach Sytske in gripe krijen en Frisian
 I saw Sytske a handful take-INF and
 ‘I saw Sytske take a handful and...’
- a. it nylhoars fuorjen
 the hippo feed-INF
 ...feed the hippo.’
- b. * fuorje it nylhoars
 feed-IMP the hippo
 ...feed the hippo.’

A parallel treatment of the ECM case in (23) to the control case in (17) would lead us to expect that IPI (verb movement and replacement of the infinitive morphology by imperative morphology) is at least an option, contrary to fact. As in the control case, the option would involve an F-chain that stops short of reaching the matrix verb, just like in (17b) the F-chain stops short of reaching the complementizer *om*. Such cases do exist, as illustrated by the pair in (24) (Hoekstra 1997:31-33):⁷

- (24) De plysje soe by him komme en
 the police would at him come-INF+E and
 ‘The police would come to his place and...’
- a. him op helje
 him up pick-INF+E
 ‘...pick him up.’
- b. helje him op
 pick-IMP him up
 ‘...pick him up.’

We can describe (24a) as involving two F-chains, one including the embedded verb of the first conjunct *komme* ‘come’, the embedded INFL, and the matrix verb *soe* ‘would’, and another one containing the embedded verb of the second conjunct, *helje* ‘pick’, instead of *komme*, and again the embedded INFL and the matrix verb *soe*. The IPI-construction in (24b), then, occurs when the second F-chain stops short of reaching the matrix verb *soe*, making embedded INFL the highest head in the chain (essentially the same phenomenon as in (18)). This triggers movement of the LEX-features of *helje* to INFL, since INFL, unlike the matrix verb *soe*, does not have LEX-features of its own.

The possibility of (24b) makes the impossibility of (23b) puzzling. I would like to propose the following solution.

In (23b), the external argument of the embedded verbs, *Sytske*, is licensed in the functional domain of the matrix verb *seach* ‘saw’ (hence, we are dealing with a restructuring construction involving defective tense in the embedded clauses). Crucially,

Sytske is outside the domain of coordination, illustrated in (25) (= (23a)):

- (25) Ik seach Sytske [[in gripe krijen] en [it nylhoars fuorjen]]
 I saw Sytske [[a handful take] and [the hippo feed]]

Raising of *Sytske*, then, takes place in an Across-The-Board fashion out of both coordinated embedded clauses. Therefore, restructuring must involve both members of the coordination, i.e., in both embedded clauses T_{DEF} must be F -related to the matrix v . In (23b), restructuring involves the first member of the coordinated embedded clauses only, so that Across-The-Board restructuring/object raising is impossible. Thus, the crucial distinction between (23) and (24) is that (23), but not (24), involves Exceptional Casemarking (ECM) of the external argument of the embedded clauses.

These examples show that restructuring and observable infinitive movement exclude each other mutually. This is explained if restructuring involves F -relatedness of the embedded T_{DEF} and the matrix v , assuming that observable verb movement takes place in the absence of such F -relatedness to a lexical category.⁸

The discussion of ECM in Frisian can be repeated for raising constructions, which involve restructuring as well. As shown in (26), no IPI-movement takes place in the second conjunct of coordinated raising complements (Hoekstra, p.c.):

- (26) Jeltsje skynt butendoar te wêzen en
 Jelstje seems outside to be-INF+EN and
- a. * fervje de kezingen (or: de kezingen fervje)⁹
 paint-IMP the window frames the window frames paint-IMP
- b. de kezingen te fervjen
 the window frames to paint-INF+EN

‘Jeltsje seems to be outside painting the window frames.’

(26a) shows movement of the infinitive (turned imperative) *fervje* ‘paint’ to a position to the left of its internal argument *de kezingen* ‘the window frames’. The ungrammaticality of this sentence can be explained along the same lines as the ungrammaticality of (23b). The subject of (26), *Jeltsje*, is raised in an Across-The-Board fashion from both coordinated embedded infinitival clauses. This requires restructuring, hence F -relatedness of the defective tense of the embedded clauses and the matrix v . Through this F -relatedness the infinitives are F -related to the matrix verb, yielding a chain like (14), and making observable verb movement (movement of the LEX -features of the infinitives) unnecessary. (26b) shows the grammatical example without IPI.

We also expect epistemic modal verbs, which are taken to involve raising and restructuring, not to allow IPI-movement (unlike the deontic modals illustrated in (24)). This prediction is again born out (Hoekstra, p.c.):

- (27) Jeltsje koe wel butendoar wêze en
 Jelstje could MODAL outside be-INF+E and
- a. * drink kofje (or: kofje drink)⁹
 drink-IMP coffee coffee drink-IMP
- b. kofje drinke
 coffee drink-INF+E

‘Jelstje might be outside drinking coffee.’

In (27), the modal particle *wel* triggers the epistemic reading. Assuming that epistemic modal verbs are raising verbs, the explanation for the ungrammaticality of (27a) is the same as that for (26a).

I conclude from the distribution of IPI in Frisian that observable movement of an embedded infinitival verb occurs only when embedded INFL does not host a defective TENSE, i.e. in control cases only. In these cases, the F-chain associated with the embedded infinitival is headed by C, which has LEX-features of its own, blocking movement of the LEX-features of the verb (i.e., blocking observable head movement). In coordination constructions, however, the second conjunct may fail to interact with whatever is outside the conjunction phrase (as in Johannessen 1993), and we expect default syntax to show up. In this particular case, the F-chain of the embedded infinitival does not connect with the complementizer outside the conjunction phrase, and the LEX-features of the infinitive must move to INFL, yielding observable head movement (IPI). In restructuring cases, INFL hosts defective TENSE, which enters into an F-chain with the matrix verb, and movement of the LEX-features of the infinitival is blocked because the matrix verb has LEX-features. Here, however, coordination does not yield the IPI-effect, since failure to establish an F-chain between the second conjunct and the matrix verb will have the effect that the arguments of the verb in the second conjunct cannot be raised to the matrix functional domain, where they need to be licensed.

These patterns are understandable if we assume that restructuring is a function of F-movement, yielding an F-chain like (14). If so, the analysis of the distribution of finite verbs in Continental West Germanic languages covers the distribution of nonfinite verbs as well. Approaches linking verb movement to finiteness appear to miss this important generalization (a point we owe to Hoekstra 1997:19).

7. Head Movement and Phonology

So far, we have seen that the placement of both finite and nonfinite verbs in Continental West Germanic is influenced by two factors. First, feature valuation requirements establish a chain of F-related heads, consisting of lexical and functional heads connected through movement of formal features (or some other mechanism that would be a notational variant of feature movement, such as agreement). Feature movement is *syntactic* head movement, triggered by syntactic feature valuation requirements. Second, the principle in (5) forces the verb to be spelled out in the position of the highest member of the F-chain, unless the highest member of the F-chain hosts lexical features

of its own. In that case, the verb is spelled out in the position of the lowest member of the F-chain. This has been described in terms of movement of the lexical features of the verb, a last resort operation triggered by PF-requirements. This movement of lexical features is *phonological* head movement. The phonological requirements in question have to do with the conversion of syntactic terminals into phonetic strings. We have described this as a two-step process, with lexical features identifying a paradigm from the lexicon, and formal features serving to select the best form from that paradigm (cf. Zwart 1997a).

We are now in a position to address the special properties of head movement discussed in Chomsky (1999:30f), a rejoinder of an earlier suggestion in Chomsky (1995:368). In Chomsky's view, these special properties lead one "to suspect that a substantial core of head raising processes [...] may fall within the phonological component" (1999:30). In our view, this 'substantial core' is limited to phonological head movement, i.e. movement of lexical features to the position of the highest member of a chain established through syntactic head movement.

Chomsky (1999) mentions the following special properties of head movement:

- (28) a. "semantic effects of head-raising in the core inflectional system are slight or nonexistent" (1999:30)
- b. "the strong v-feature is satisfied by v-raising to T [...], no VP-raising to Spec,T" [suggesting it has more to do with affixation than with feature valuation] (1999:31)
- c. "there is no natural syntactic notion 'second'" [suggesting that phenomena such as verb second belong to the phonological component] (1999:31)
- d. "the head raising rule [...] differs from core rules of the narrow syntax in several respects" (1999:31)

In addressing these special properties, we have to distinguish covert, syntactic head movement from observable, phonological head movement.

I have already discussed the methodological status of (28a) in section 2. On the one hand, many movements contribute to interpretability merely by eliminating [-interpretable] features. It is not clear that (syntactic) head movement does not serve the same purpose in standard cases. On the other hand, little is known about the semantic effects of 'displacements' taking place in the PF-component, simply because the relevant class of phenomena has not been defined.

To this we can now add that the question of semantic effects must be asked of syntactic head movement only, which is much more pervasive than previously thought, if we are right. In particular, if restructuring is a function of syntactic head movement, the semantic effects of head movement are considerable. Thus, consider the well-known pair in (29):

- (29) a. I heard that you sang in the Concertgebouw
- b. I heard you sing in the Concertgebouw

Only in the restructuring case (29b) is the semantic effect of temporal coincidence obtained. (Perhaps for this reason, Chomsky 1999:30 wants to exclude incorporation phenomena from the set of head movements that appear to fall within the phonological

component.) But one might also argue that ordinary movement from *v* to INFL serves the semantic purpose of combining a predicate with some time/event referentiality. Chomsky's error is that he is looking for a semantic effect of the presence or absence of *observable* head movement, which is a function of LEX-movement, where we do not expect a semantic effect. It is precisely because syntactic head movement is quite generally covert, that we are allowed to conclude that its semantic effects are significant.

The second point (28b) would be well taken, if it were correct. However, the possibility of checking 'v-features' like TENSE through XP-movement has been so little explored that the conclusion seems premature. Recent work by Koster (1999), however, suggests that the choice of licensing v-features through head movement or XP-movement is a major instance of parametric variation, potentially replacing the purely descriptive parametrization in terms of 'strong' or 'weak' features. Koster (1999) proposes that English differs from Dutch in that in English, the features of INFL are checked through VP-movement ('collective licensing'), whereas in Dutch, they are checked through verb movement ('individual licensing'). Among other things, this explains the obligatory adjacency of verb and object in English but not in Dutch (30), and the distribution of adverbs in the two languages (31):

- (30) a. John kissed (*yesterday) Mary (yesterday)
 b. Jan kuste (gisteren) Marie
 John kissed yesterday Mary
 c. ..dat Jan Marie (gisteren) kuste
 that John Mary yesterday kissed
- (31) a. John kissed Mary (yesterday)
 b. ..dat Jan Marie (Gisteren) kuste (*Gisteren)
 that John Mary yesterday kissed yesterday

The obligatory adjacency of verb and object in (30a) is not explained in accounts involving overt movement of the object and the verb individually (such as Johnson 1991). The derivation in (32), proposed by Koster (1999) explains it straightforwardly:

- (32) [_{AgRP} John [_{TP} [_{VP} kissed Mary]_i T [yesterday t_i]]]

Koster's analysis also accounts for the fact that the sentence final adverb can carry focal pitch accent in (31a), but not in (31b). The explanation is that sentence final adverbs in Dutch can only appear in 'parallel construal' (Koster's reanalysis of extraposition), while sentence final adverbs in English can simply be in their sentence internal position.

Koster's account of these basic phenomena hinges on the possibility of v-feature checking through XP-movement, a possibility that would need to be explored more before the point in (28b) could be conceded.

The point in (28b) is apparently inspired by the 'weak lexicalist' view on the relation between morphology and syntax, where inflectional affixes are taken to be generated in functional heads and need to be combined with the verbal stem through head movement. This view was prevalent in the Government and Binding framework, but is abandoned in most minimalist work, which takes the 'strong lexicalist' position where lexical heads are fully inflected, and functional heads host formal features only (cf. Chomsky

1995:195). As argued above, I believe the proper division of labor between phonology, morphology, and syntax would not involve any form of lexicalism, but abstract syntactic operations feeding into morphological and phonological spell-out procedures.¹⁰

The next point, (28c), presupposes that the notion ‘second’ is relevant to the discussion of certain head movement phenomena (in particular the ‘verb second’ phenomenon of Continental West Germanic). I have argued elsewhere (Zwart 1993a, 1997a) that ‘verb second’ is an accidental result of XP-movement and head movement targeting the same functional projection. In addition, it must be born in mind that the position of the verb is only ‘second’ in a circumscribed, syntactic sense: it is a root position right adjacent to the first root constituent. There is no evidence that phonological operations are sensitive to the notion ‘second’ in this particular sense. Clearly, there is no room for it in the minimalist view on phonology proposed in section 2.

This point is intimately connected with the theory of phrase structure, which in earlier approaches (e.g. Chomsky 1986:3) guaranteed a regular alternation of heads and phrases. If the head and the specifier of the highest projection are both filled, the element occupying the head position is automatically in the second position in the circumscribed syntactic sense. Chomsky (1999:31) argues that in the bottom-up structure building process adopted in the minimalist program, this regular alternation of heads and phrases is no longer guaranteed. Chomsky’s assumption here is that a minimalist theory of phrase structure should not stipulate an arbitrary restriction of the number of specifiers to each head (cf. Chomsky 1998:42).

This argument presupposes that the restriction to a single specifier in earlier theories of phrase structure (cf. Fukui & Speas 1986:133, Hale & Keyser 1993:65) was axiomatic rather than empirically or conceptually motivated. This presupposition is clearly false, as nothing in the formalism of rewrite rules prohibits the introduction of multiple specifiers (even observing binary branching).

The fourth point, (28d), refers to differences between head movement and XP-movement in general. Unlike XP-movement, head movement does not observe the extension condition of Chomsky (1995:190), the raised head does not c-command its trace (essentially the same point, if Epstein *et al* 1998 are correct), and head movement is subject to stricter locality conditions than XP-movement. But showing that a phenomenon is different does not suffice to conclude that it does not exist.

If head movement is described in terms of F-movement or agreement, the technical problems disappear. We may view F-movement (or agreement) as a process of feature transmission, rather than adjunction, simply adding a feature of the raising element to the feature set of the target. Viewed in this way, the Extension Condition is not violated, the c-command problem does not arise, and the process is sufficiently dissimilar from XP-movement to expect different locality conditions to apply.

In sum, I believe the essentially syntactic nature of head movement to be uncontested. It yields effects of word order, such as verb second, that do not find a natural place in phonology, defined as the conversion of syntactic terminals to strings of phonemes. In addition, it feeds syntactic processes such as movement of noun phrases in restructuring constructions. The only ‘phonological’ aspect to verb movement involves the fluctuating spell-out positions of the verb. Assuming the principle in (5), this fluctuation is extremely limited, and entirely understandable from the nature of the spell-out procedure at PF.

8. Consequences

The theory of head movement proposed here makes the strong prediction that partial head movement (i.e. observable head movement to intermediate positions in the F-chain) does not exist. A verb, for instance, is spelled out in the position of the highest member of its F-chain (F-movement *and* LEX-movement) or, in case the highest member of the F-chain has LEX-features of its own, in its base position (F-movement *without* LEX-movement). Since LEX-movement is triggered by defectivity of the head of the F-chain only (i.e., the head of the F-chain has F-features but no LEX-features), LEX-movement to intermediate positions in the F-chain will never take place.

Many well studied verb movement phenomena suggest that this is too strong a conclusion. For example, the word order in the Frisian example (11b), repeated here as (33), suggests observable verb movement to INFL (or T, AGR), potentially an intermediate position in an F-chain {C, INFL, V}:

- (33) ..dat do moast soks net leauwe
that you must-2SG such not believe
'..that you must not believe such things'

However, as discussed above, the complementizer in (33) cannot take complementizer agreement morphology, suggesting that the relevant F-chain does not include C. As a result, the verb *moast* in fact occupies the highest position of the F-chain, INFL.

More generally, it must be shown that apparent cases of head movement to an intermediate position in an F-chain in fact target the highest position of a shortened F-chain. I suspect that this applies to cases of embedded verb movement in the Mainland Scandinavian languages, which is subject to the same conditions as embedded verb movement in Frisian.¹¹

The Mainland Scandinavian languages (Norwegian, Danish, Swedish), show the same pattern of verb placement as the Continental West Germanic languages (Dutch, Frisian, German), illustrated in (6) above (Kosmeijer 1986). The parallelism between the two groups is somewhat obscured by the absence of object shift in the Mainland Scandinavian languages (see Zwart 1997b). Thus, the pattern of (6) can be repeated for Mainland Scandinavian as in (34):

- (34) a. subject initial main clauses: SUBJECT—VERB—ETC
Rasmus har ikke set filmen Danish
Rasmus has not seen the-movie
- b. inversion main clauses: (XP)—VERB—SUBJECT—ETC
Hvorfor har Rasmus ikke set filmen?
why has Rasmus not seen the-movie
- c. embedded clauses: COMPLEMENTIZER—SUBJECT—ETC—VERB—ETC
..at Rasmus ikke har set filmen
that Rasmus not has seen the-movie

This suggests that in (34a), like in Dutch (6a), the F-chain is {INFL, V}, and in (34b) and (34c), like in Dutch (6b) and (6c), the F-chain is extended to {C, INFL, V}. As in Dutch, the highest position of the F-chain in (34a) and (34b) is spelled out by the verb (*har*), yielding observable head movement. In (34c), the highest position of the F-chain has LEX-features of its own, making movement of the LEX-features of the verb superfluous. In certain contexts indentified by Hooper and Thompson (1973) as allowing embedded root phenomena, Mainland Scandinavian languages have observable verb movement in embedded clauses (just like Frisian, illustrated above, and spoken Dutch, for which see Zwart 1993a:287f):

- (35) embedded root clauses: COMPLEMENTIZER—SUBJECT—VERB—ETC
 (Vi ved) at Rasmus har ikke set filmen Danish
 (We know) that Rasmus not has seen the-movie
 ‘We know that Rasmus has not seen the movie.’

We can analyze this in the same way as Frisian (11b): the F-chain of the embedded verb stops short of reaching C, yielding an F-chain {INFL, V}, of which the highest member lacks LEX-features of its own. As a result, movement of the LEX-features of the verb is triggered, yielding observable embedded verb movement.

It is tempting, then, to propose that languages like Icelandic and Yiddish, which have generalized embedded verb movement, never include C in the F-chain of an embedded verb. As a result, the pattern in (11b)/(35) will be generalized in these languages, yielding consistent observable embedded verb movement.

In this context, it is interesting to note that Icelandic control complement clauses quite clearly involve movement of infinitives, supporting our earlier conjecture that the theory of movement should not treat finite and nonfinite verbs differently (Thráinsson 1979, chapter 5; see also Vangsnes 1999:86f):

- (36) a. embedded finite clause: COMPLEMENTIZER—SUBJECT—VERB—ETC
 ..að jólasveinarnir borðuðu aldrei búaðing Icelandic
 that the Santa Clauses ate never pudding
 b. embedded nonfinite clause: COMPLEMENTIZER—SUBJECT—VERB—ETC
 (Jólasveinarnir lofuðu) að PRO borða aldrei búaðing
 the Santa Clauses promised to eat never pudding

The parallelism is captured if we say that F-chains in Icelandic consistently exclude C. These Icelandic phenomena, then, do not necessarily involve verb movement to an intermediate position in an F-chain. It would need to be investigated whether similar considerations apply to other cases of partial head movement.¹²

Finally, one may expect head movement within noun phrases to be subject to principle (5) as well. The idea would be that languages vary in the length of the F-chains that are created among the lexical and functional heads within noun phrases, but not in the mechanism governing spell out of the lexical head (the noun). As in clauses, we expect the noun to be spelled out in the determiner position D (assuming D to be the highest member of the F-chain of the noun N), unless D has lexical features of its own.

Testing this prediction would take us too far afield at this stage, especially since much

is still unclear about the amount of head movement within noun phrases. But the noun placement pattern in (37), studied in Longobardi (1994:623), is suggestive of the same kind of mechanisms that we have discussed above in connection with verb placement:

- (37) a. Il mio Gianni Italian
the my John
b. * Mio Gianni
my John
c. Gianni mio
John my

Longobardi suggests that the N *Gianni* in (37c) needs to move up to the D-position occupied by *il* in (37a). In Longobardi's analysis, the movement of N to D is triggered by the need to fill the empty D-position. In the system of head movement proposed here, *Gianni* (or, rather, the F-features of *Gianni*) moves to D in both (37a) and (37c), and only in (37c) is additional movement of *Gianni*'s LEX-features required (as D has no LEX-features of its own), yielding observable noun movement.

9. Conclusion

In this article I have argued that the placement of finite and nonfinite verbs in various Germanic languages can be explained on the following assumptions. (i) Lexical and (certain) functional heads are related through a process of feature valuation (best described as feature movement from the lexical to the functional heads), yielding a chain of F(EATURE)-related heads (an F-chain). (ii) The highest position of the F-chain must be spelled out (i.e., converted by Morphology into a string of phonemes available from the Lexicon). (iii) Observable head movement takes place only if the element in the highest position of the F-chain cannot be spelled out (and it targets the highest position of the F-chain).

Point (i) is uncontroversial within generative grammar, and the notion of F-relatedness introduced here can be replaced by more articulate descriptions of the relation between lexical and functional heads, such as agreement, head government, or feature movement. Point (ii) is underived at this stage. It assumes a certain view on the interaction of syntax, morphology, and phonology, to the effect that morphology functions as an interface between syntax and phonology, taking syntactic terminals as input and yielding strings of phonemes as output. Point (iii) limits observable head movement to cases where morphology fails to interpret the highest position in an F-chain.

The system of head movement proposed here accounts for the absence of observable verb movement to C in embedded clauses in Dutch, Frisian, German, and Mainland Scandinavian, while allowing observable verb movement to INFL in subject initial main clauses in the same languages. The pattern follows on the assumption that the relevant F-chain stretches from V to C in embedded clauses, but only from V to INFL in subject initial main clauses. These assumptions are empirically supported by the phenomenon of complementizer agreement in Frisian and dialects of Dutch and German, and by the

lack of evidence suggesting the presence of a C-projection in subject initial main clauses in these languages. The assumption of a similar F-chain stretching from V to C in embedded clauses explains the placement of infinitives in the same group of languages along identical lines. Complementizerless infinitival clauses fall in the same pattern if we assume that the F-chain stretches to the matrix V in these (restructuring) cases. In this case, the analysis is empirically supported by movement of infinitivals in the second conjunct of coordinated control complement clauses in Frisian (the so-called Imperativus Pro Infinitivo or IPI phenomenon), on the understanding that second conjuncts may reveal default syntax (default syntax in this case meaning that the F-chain from the second conjunct does not reach the matrix V, so that the highest element of the F-chain is the embedded INFL, which must then be lexicalized by movement of the infinitival verb). The analysis of restructuring as involving an F-chain running from the embedded verb to the matrix verb is supported by the absence of the IPI-effect with restructuring verbs in Frisian (showing that in restructuring cases, the embedded F-chain must reach the matrix V, barring observable infinitive movement).

I believe that these observations shed some light on the division of labor between syntax and phonology in the domain of verb movement. Verb movement that is actually observed is triggered by a requirement of phonological (actually, morphological) interpretability of the highest position in an F-chain (point (ii) and (iii) above). We may call this observable verb movement ‘phonological verb movement’. However, the target of this ‘phonological verb movement’ is set by other, purely syntactic mechanisms, namely those yielding an F-chain of heads related through feature valuation. Assuming, with Chomsky (1995), that feature valuation is obtained through feature movement, we may call the relevant process yielding F-chains ‘syntactic verb movement’. It follows that ‘phonological verb movements’ are a subset of ‘syntactic verb movements’.

This conception of ‘phonological verb movement’ differs from the one proposed in Chomsky (1995, 1999), where it is suggested that verb placement may be the result of a reorganization of linear order taking place at PF. The linearization envisioned by Chomsky is powerful enough to insert a verb between two specifier positions in a multiple specifier configuration (Chomsky 1995:368). The analysis of verb placement proposed in this article, while accepting that observable verb movement is triggered by factors having to do with interpretability at PF, has no room for linearization processes of the type proposed by Chomsky. Observable verb movement may be triggered by PF considerations, but it must target a head position that is part of the verb’s F-chain.

This view of head movement allows for a more minimalist approach to the relation between syntax and PF, where the latter simply converts syntactic terminals into strings of phonemes, and involves only the most straightforward linearization process, in accordance with the Linear Correspondence Axiom of Kayne (1994).

The theory of head movement developed here has been applied to a limited empirical domain, and much more work needs to be done to assess its general tenability. However, I felt it to be of some significance to be able to show that precisely in ‘verb second’ languages, where the suspicion that something ‘phonological’ is determining the verb placement (cf. Chomsky 1999:31), there is no evidence to suggest that ‘phonological’ processes act in such a way that syntactic design becomes obscured.

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Notes

- * Thanks to Noam Chomsky, Jaume Solà, and Jan Koster for discussion, and to Jarich Hoekstra for valuable input on the Frisian data. Part of this material was presented at the Frisian Academy, Ljouwert, in January 1998, and at the University of Leiden, November 1999. The author's research is sponsored by the Netherlands Organization of Scientific Research (NWO), grant # 300-75-027.
1. In the example headers, the m-dash indicates obligatory adjacency, and ETC indicates sentence material not explicitly mentioned (e.g. adjuncts, objects, negation).
 2. Earlier analysis have assumed that the finite verb is spelled out in C in all main clause types (indeed, that this is a typological characteristic of Continental West Germanic languages), but this leaves the position of the subject in (6a) unaccounted for. See Travis (1984) and Zwart (1993a, 1997a) for extensive discussion.
 3. I am ignoring here potential other processes affecting the position of the infinitive. Infinitives and nonfinite verbs in general give rise to complications that cannot be addressed here, and that may or may not have a bearing on the theory of head movement. I am referring to phenomena of verb 'clustering' in Continental West Germanic languages, illustrated in (13) in the text. The impression of clustering may be the result of A-movement of the arguments of the embedded nonfinite verbs positions in the matrix clause. In that case, no movements need to be assumed. But the dialects of Continental West Germanic show a bewildering variety of verb orderings in these 'clusters', suggesting that some movements must take place (see Zwart 1996 for a survey of the phenomena). Traditionally, these movements are described as head movements (called 'verb raising'), but current research suggests that some, and perhaps all, of the relevant displacements involve XP-movement (Zwart 1996, Haegeman 1997, Hinterhölzl 1999).
 4. As discussed by Hoekstra (1997:35f) the morphological conversion of the infinitive to an imperative is not essential to the syntax of the construction. In earlier stages of Frisian, the same construction is found with an infinitive instead of an imperative. Consequently, the placement of the verb in (17bi) (the IPI construction) cannot be a function of the (finite) imperative morphology of the verb.
 5. The English examples are less instructive here, as objects in English appear to occupy their argument position rather than their licensing position.
 6. Consequently, we need not stipulate that T_{DEF} lacks an EPP feature, as Chomsky 1999:6 does, just that it *transfers* its EPP feature.
 7. The infinitive in (24a) ends in *-e*, whereas in earlier examples the infinitives end in *-en*. The distribution of the two endings, glossed as INF+E/INF+EN where necessary, is entirely regular, with *-en* appearing after the infinitival marker *te* and in ECM, and *-e* in the complement of modal verbs (cf. Tiersma 1985:125f., Hoekstra 1997:3f.).

8. The potential interaction of verb movement and object shift, in particular to positions in the matrix clause, leads to some uncertainty about the position of the various elements in the Frisian examples discussed here. For instance, it could be that the level of coordination in (23) is actually the *matrix* AgrOP, so that both *in gripe* ‘a handful’ and *it nylhoars* ‘the hippo’ are actually in the functional domain of the matrix clause. In that case, we would not expect the IPI-verb *fuorje* ‘feed-IMPERATIVE’ to precede *it nylhoars*, but to follow it. This yields the equally ungrammatical word order *..it nylhoars fuorje* [the hippo feed-IMP] instead of (23b), confirming the incompatibility of restructuring and IPI. Note that the only distinction between this example and (23a) is the infinitival vs. imperative morphology (-*en* vs. -*e*).
9. The alternative order in (26) and (27) is given in connection with the uncertainty w.r.t. the relevant word order discussed in note 7.
10. The weak lexicalist position is maintained in Bobaljik (1995), leading to the incorrect prediction that Continental West Germanic languages feature right headed functional projections (cf. also Bobaljik & Thráinsson 1998:66; on the position of functional heads in Dutch, see Zwart 1997a:107-154).
11. In both Frisian and Mainland Scandinavian, embedded verb movement is of the ‘limited embedded V2’ type discussed by Vikner (1995:84). See also Zwart (1997a:230) and references cited there. These languages are contrasted with Icelandic and Yiddish, where embedded verb movement is generalized.
12. The idea that head movement always targets the highest position of the F-chain was advanced earlier by Solà (1996), who discusses evidence to show that a verb is always spelled out in the position of the highest functional head represented in the verb’s inflectional morphology. I take Solà’s discussion to support the system of head movement proposed here.

