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Competition between Syntax and Morphology

Peter Ackema and Ad Neeleman

Peter Ackema, University of Groningen, CLCG/Nederlands, PO Box 716,
9700 AS Groningen, The Netherlands
ackema@let.rug.nl

Ad Neeleman, Department of Phonetics and Linguistics, University College
London, Gower Street, WC1E 6BT, London, UK

ad@ling.ucl.ac.uk

tel. +44 171 419 3154 (office) / +44 181 364 8026 (home)

fax. +44 171 383 4108

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Competition between Syntax and Morphology

1. Introduction

Optimality theory usually deals with competition within grammatical components. In work on syntax, for instance, various syntactic structures are compared (globally) with respect to a number of syntactic constraints. In this paper, we will address the question whether there is also competition between components, in particular between syntax and morphology. Is it the case that a syntactic realization of some input competes with a morphological realization if both are in principle possible?

One complication in addressing this question concerns blocking effects related to the elsewhere condition (cf. Anderson 1969, Kiparsky 1973). This condition states that insertion of a general form A is blocked where a more specific form B can be inserted. As discussed by Di Sciullo and Williams (1987), Andrews (1990), Poser (1992), Sells (1997) and others, there are cases in which the specific form is morphological, whereas the general form is syntactic, so that morphology blocks syntax. A well-known example is comparative formation in English. The morphological comparative *-er* has a more limited distribution, and consequently, where it can attach, it blocks syntactic comparative formation with *more* (*bigger* excludes **more big*).

However, the effects of the elsewhere condition are not limited to morphology blocking syntax. Many familiar examples concern morphology-

internal blocking effects, in particular in inflectional paradigms: irregular forms like *went* block regular forms like **goed*. In addition, there may be cases in which the specific form is syntactic and the general form morphological. The English simple past, for instance, is morphological. Yet, in the perfect, it is blocked by a syntactic periphrastic construction, which is more specific as it roughly expresses past with present relevance. As pointed out by Williams (1997), there are also cases in which the elsewhere condition operates within syntax. For one thing, the minimal link condition (cf. Chomsky 1995) can be seen as an instance of blocking. A lower landing site can attract a subset of the elements that a higher landing site can attract, so in this sense the lower landing site is more specific than the higher one. Consequently, movement to a higher landing site is blocked by movement to a lower landing site.

In conclusion, the elsewhere condition is a general grammatical principle which states that specific forms block more general forms, but which does not have anything specific to say about the component in which the competing forms are generated. (In optimality theory, effects of the elsewhere condition can be captured by interaction between parse conditions and markedness conditions, as argued by McCarthy and Prince 1994 and Bresnan 1998.¹)

This leaves open the question whether syntax and morphology as such compete, apart from cases involving the elsewhere condition. At first sight, it seems unlikely that there is such competition, given that related words and phrases freely cooccur. For instance, *driver of trucks* and *truck driver* realize the same

head-complement relation, but neither one blocks the other. Nevertheless, in other examples exactly the relevant type of competition seems to occur. One could hypothesize, for instance, that the verbal compound **to truck-drive* is blocked by its syntactic counterpart *to drive trucks*. (Note that neither form is more specific than the other, so that the elsewhere principle does not apply). The hypothesis that we are dealing with competition here seems to be confirmed, at least at first sight, by the observation that N-V compounds are possible when there is no syntactic V-NP combination with the same semantics. An example is *to Chomsky-adjoin*, which exists in the absence of **to adjoin Chomsky* (on the intended meaning).

If there is competition between components, we must ask ourselves how it compares to competition within a component (the case most often discussed in optimality theory). Of course, the usual questions concerning the nature of the constraints governing competition must be addressed. We will argue that two constraints come into play: a constraint that favours syntactic realization and a constraint that requires satisfaction of selectional properties. In addition, it appears that a different notion of candidate set is required for competition between components, one that relies on local rather than global comparison. We will see that the two constraints mentioned above are evaluated locally: when an item is taken from the lexicon, the constraints determine in which component it is merged with other material without taking into account

the effects this has on the total derivation. In the next section we will outline the proposal in more detail.

2. The Proposal

In the generation of structures, three interacting systems play a role: syntax, morphology and the lexicon.² The central question of this paper is how they interact. We will argue for a model that can be characterized by the following four statements:

- (1) a. Syntax and morphology are independent generative systems.
- b. The lexicon is a list of syntactic and morphological irregularities.
- c. Syntactic generation of structures is unmarked with respect to morphological generation.
- d. Lexical items can be underspecified in various ways; one type of underspecification concerns their locus of realization (that is, syntax or morphology).

Although the statements in (1a) and (1b) may require some empirical and conceptual motivation, they are familiar from the literature. Di Sciullo and Williams (1987), for example, have presented arguments in favour of both of them. The statements in (1c) and (1d), however, are more controversial, and

perhaps it is not immediately clear what they amount to. For that reason, we will give a brief description of the various components and of their interaction.

Basic syntactic structures are built up by an operation of merger, which takes two expressions from the lexicon and puts them together in a binary-branching structure (cf. Chomsky 1995). It is important to realize that merger need not involve simplex expressions. In a sentence like *the cat ate the rat*, VP is merged with a complex subject, that is, a subject itself created by merger. It must therefore be possible to generate a complex expression by merger, and then store it temporarily while another complex expression is being built. The first expression can then be retrieved again, so that merger of the two becomes possible.

Like syntax, morphology is a generative system. Trivially, the generation of complex morphological expressions can be described in terms of merger. Two simplex expressions can be taken from the lexicon and merged into a complex word. This is not to say that syntax and morphology are identical. For example, the position of arguments in syntax is determined by case theory, whereas case features do not seem to play a role in morphology. Instead, word-internal order can be described in terms of the right-hand head rule (cf. Williams 1981). Such differences between syntax and morphology suggest that the two are separate structure-building components.³

The role of morphology in the derivation can now be understood as follows. Suppose that some complex expression has been generated in syntax

and is temporarily stored, so that another complex expression, with which it is to be merged, can be constructed. The latter can of course be built in syntax, but it is also possible to build it in morphology. The output of morphology can then be introduced into the syntax and undergo further operations of merger.

If the relation between syntax and morphology is as suggested, the two can be seen as competitors. For each lexical item, it must be decided whether it is merged with its dependents in syntax or in morphology. We assume that there is an important difference between those two alternatives. Continuation in syntax implies that only one rule system will be operative. Continuation in morphology implies that in addition to the syntactic rule system, a second rule system must be activated. From a computational point of view, this procedure would seem to be costly, and it will therefore be avoided if possible. Syntactic generation of structure can hence be seen as unmarked - morphological generation must be forced. This is formulated in the following constraint, which is a variation on a constraint proposed by Grimshaw (1997:382):⁴

(2) *No Morphology*

Do not build structures in the morphological component

The choice between a syntactic and a morphological continuation of the derivation is made locally. This means that the grammar does not compare complete derivations in which shifts to morphology are made with derivations

in which that is not the case. Rather, the choice to activate morphology at a particular point in the derivation is made on the basis of information available at that point. This issue is discussed further in section 7.

The question that now arises is what can trigger a shift to morphology. We will argue that such shifts are forced by the material picked from the lexicon. One option is that this material consists of an affix. Since affixes select a morphological host, taking an affix from the lexicon activates morphology.⁵ Thus, the principle in (2) can be overruled by the projection principle in (3).

(3) *Projection Principle*

Respect selectional requirements

Let us finally turn to the lexicon. Di Sciullo and Williams (1987) argue convincingly that the lexicon lacks generative capacity (see also Jackendoff 1997). It is a list of syntactic and morphological irregularities, containing heads (plus their selectional properties) and idiomatic expressions. These may be either words or phrases.

One issue concerning the lexicon deserves further attention. Is it the case that a particular complex lexical item (that is, an idiomatic expression) uniformly receives a particular (syntactic or morphological) realization, or may its realization differ in different circumstances? Most theories implicitly assume uniform realization, but given the model sketched above there is no reason to

do so. Lexical items can be underspecified in various ways; there is no reason why a complex lexical expression consisting of a head and a dependent could not be underspecified as to the component in which it is to be realized (see Groos 1989 and Ackerman and LeSourd 1997 for similar ideas).

Suppose that a complex lexical item $A^{\wedge}B$ is indeed underspecified with respect to its locus of realization. Its parts, A and B , may then be merged either in syntax (giving, for example, $[_{AP} A BP]$) or in morphology (giving, for example, $[_A B A]$). Of course, the unmarked status of syntactic merger has the effect that A and B will usually combine in syntax. Under specific circumstances, however, it is still possible for A and B to be merged in morphology and thus combine into a word. We will argue that, once the assumption of uniform realization is abandoned, certain linguistic paradoxes disappear.

We will now first present a piece of evidence for the claim that syntax and morphology are separate components, based on synthetic compounds.

2. Synthetic Compounds

A strong argument for nonsyntactic word formation, and thus for the separation of syntax and morphology, can be made on the basis of synthetic compounds in English and other Germanic languages. For the purposes of this paper, the question to be answered is how a compound like that in (4a) is related to the syntactic structure in (4b).⁶

- (4) a. truck driver
 b. to drive a truck

There are two basic possibilities. According to the first, the compound is generated in an independent morphological component and the shared semantics of the two constructions is explained by the system of interpretation. The second possibility is that the compound is derived in syntax and that the shared semantics follows from the presence of a VP like (4b) in the compound's underlying structure. An analysis along these lines was proposed by Baker (1988) for noun incorporation in polysynthetic languages.⁷

Clearly, these two analyses assign different structures to *truck driver*. The morphological analysis assumes a structure as in (5), which can be imported into syntax and then project an NP (see for instance Lieber 1983).

- (5) [N [V truck drive] er]

The syntactic analysis also assumes a structure as in (5), but this structure is not derived in morphology. Rather, it is derived by the syntactic operation of head-to-head movement. The suffix *-er*, the noun *truck* and the verb *drive* all start out as the head of an independent maximal projection, as in (6a). They are joined by movement of *truck* to *drive* and of the resulting complex

verb to *-er*, as in (6b). (Analyses of this type have been proposed regularly; an early example is Roeper and Siegel 1978).

- (6) a. [NP er [VP drive [NP truck]]]
 b. [NP [N [V truck drive] er] [VP t_V [NP t_N]]]

It will be clear that the morphological and syntactic analyses make rather different predictions. In particular, the syntactic analysis predicts that material which can be inserted in the maximal projections of nouns such as *truck* and verbs such as *drive*, can also be inserted in the structure underlying synthetic compounds. This material would then be stranded by the various head movements. The morphological analysis, on the other hand, predicts that the relevant syntactic material cannot be inserted: the structure that should host it is absent if synthetic compounds are not formed in syntax.

The data clearly support the morphological analysis. The insertion possibilities in the VP in (7a) do not reappear if a synthetic compound is formed, as in (7b) (see also Neeleman 1994 and Bresnan and Mchombo 1995; see Baker 1988, 1996 for a syntactic analysis, and Rosen 1989 and Ackema 1999a for a morphological analysis, of stranding in incorporating languages).

- (7) a. to [VP reluctantly drive [NP a rusty truck] [PP to Arizona]]
 b. *[NP a [N [V truck drive] er] [VP reluctantly t_V [NP a rusty t_N] [PP to Arizona]]]

Not all of the material that must be omitted in synthetic compounds falls into the same class. Some elements, such as the adverbial *reluctantly* and the PP *to Arizona*, are optionally inserted in syntax. Therefore, the fact that they must be omitted in compounds only raises the problem why such omission is necessary, rather than optional. Omission of the determiner *a* leads to the further problem of why it is allowed at all. Singular count nouns in English must always be accompanied by some determiner. Unless other assumptions are made (cf. Drijkoningen 1994), this implies that the representation in (6b) should be ruled out.

The obligatory omission of syntactic material is not the only fact that supports a morphological analysis. Although the suffix *-er* is combined with a complex verbal category in *truck driver*, it can also be combined with just a verb, as in *driver*. We will briefly discuss below how this type of optionality can be analyzed. For now, let us just point out that the two rival analyses make different predictions with respect to the way in which the internal argument of *driver* is realized. According to the morphological analysis, *driver* is a complex noun, which, like any other noun, projects an NP in syntax. Its arguments should consequently be licensed through *of* insertion, just like other nominal arguments. This is of course correct:

(8) [NP [N drive er] of a truck]

The syntactic analysis of *driver* would start out from the same structure as *truck driver* (cf. (6b)), but in this case only the verb moves to *-er*; the noun

remains in situ. Since the noun is in the complement position of a regular VP in this structure, it is incorrectly predicted to appear in the accusative:⁸

(9) * $[_{NP} [_N [_V \text{drive}]] \text{er}] [_{VP} t_V [_{NP} \text{a truck}]]]$

Facts like these can of course be reconciled with a syntactic analysis if further assumptions are made, but all in all they support the claim that there is no underlying verbal projection in nominals derived by *-er* suffixation. It seems, then, that there is empirical motivation for at least one aspect of the model discussed above: morphology and syntax are separate components of grammar (cf. (1a)).

There is one problem for the syntactic analysis of synthetic compounds that we have not mentioned yet. In many cases, the derivation of syntactic compounds seems to contain an ungrammatical intermediate step. The verbal compound **truck drive* does not exist, and in general verbal compounding is rather unproductive in English when compared to the formation of synthetic compounds. So, on the one hand noun incorporation must be ruled out in English (cf. (10)), while on the other hand it is an essential part of the derivation in (6).

(10) * $\text{to } [_{VP} [_{VP} [\text{truck drive}]_V] [_{NP} t_N]]]$

This problem also holds in the morphological analysis of synthetic compounds, as the structure in (5) contains the verbal compound in (11).

(11) *_[v] truck drive

The ungrammaticality of (11) might seem to indicate that *truck driver* is in fact an N-N compound, rather than a derivation based on a verbal compound. Dutch, however, provides a strong argument for the existence of verbal compounds inside larger words. As Di Sciullo and Williams (1987) argue, there is no inheritance from the left in compounds. This explains why **een bak-oven van brood* ‘a bake-oven of bread’ is ungrammatical: the compound *bak-oven* does not inherit the internal Θ -role of its left-hand part, the verb *bak* ‘bake’. This means that the complex compound *brood-bak-oven* ‘bread-bake-oven’ must be left-branching, since under a right-branching analysis, containing the compound *bak-oven* ‘bake-oven’, the occurrence of the internal argument of *bak* ‘bake’ is unexpected. That is, *brood-bak-oven* ‘bread-bake-oven’ must contain the verbal compound *brood-bak* ‘bread-bake’ (see Ackema 1999b for additional discussion).

If it is true that N-V compounds like *truck-drive* can be embedded under an affix but do not occur in isolation, this can be taken as evidence for another aspect of the model sketched in section 1, namely that syntax and morphology are competitors and that generation of structures in syntax is the default (cf. (1c)); *to drive a truck* seems to block *to truck drive*.⁹ As pointed out in the introduction, however, blocking does not always occur. With respect to the realization of the noun *truck*, *driver of trucks* can be seen as a syntactic alternative to *truck driver*, but the former does not block the latter. Below, we will first explain why syntax does not block morphology in this case. After that a

straightforward account for the ungrammaticality of the compound in (11) can be given.

Recall that the morphological component is only activated when it must be, and that this decision is taken locally. One way in which activation of morphology can be triggered is by taking an affix from the lexicon. So, if the suffix *-er* is at some point included in the derivation, morphology is activated in order to satisfy the selectional properties of this affix. The derivation can now be continued by importing a verb, say *drive*, from the lexicon and merging it immediately with the suffix. Since the resulting noun, *driver*, is well formed, it can be transferred to syntax and morphology can (and must) be deactivated. Any subsequent merger operation will take place in syntax, hence *driver of a truck* is derived.¹⁰

After *-er* is taken from the lexicon, the derivation can also be continued by importing both a verb and a noun, say *drive* and *truck*. If these two elements are merged first, a possibility that must be allowed on independent grounds, morphology will remain active because the suffix *-er* is not yet attached to a suitable host. The result of the first merger operation can hence be combined with this suffix into the synthetic compound *truck driver*. As will be clear, more morphological operations take place in this continuation of the derivation than in the one giving rise to *driver of a truck*. However, since the decision to activate or deactivate morphology is taken locally, at the point when the affix is taken from the lexicon, this fact does not lead to blocking effects. Such blocking would require global evaluation.

Consider now why the verbal compound in (11) is ungrammatical. Since no affix is taken from the lexicon, there is nothing that forces morphology to

become active (see section 6 for discussion of inflectional affixes). The verb *drive* clearly does not have affixal properties, and neither does the noun *truck*. The activation of morphology can also not be triggered by the impossibility of combining *drive* and *truck* in syntax. These two elements can be combined as the lexical heads in a regular transitive VP (cf. (4b)). Hence, morphology remains dormant, and the formation of a compound is blocked.¹¹

We will come back to compound formation in section 5. First, however, we will present some further evidence for the claim that syntactic generation of structure is the default (cf. (1c, 2)).

3. PARTICLE VERBS

Dutch particle verbs give rise to a paradox that is reflected by the term used for them in the traditional literature, namely ‘separable compounds’. The point is that particle verbs on the one hand must be classified as morphological constructs, the main reason being that they appear productively as hosts for derivational affixes. Some examples are given in (12).

- (12) a. opmerkelijk b. toelaatbaar
 up-notice-able *to-let-able*
 ‘remarkable’ ‘admissible’
- c. schoonmaker
 clean-make-er
 ‘cleaner’

On the other hand, the verb and the particle, in contrast to verbal compounds, can be separated by the syntactic rule of verb second, suggesting that they are generated in syntax.

- (13) a. De onderzoeker merkte dit feit niet [op t]
the researcher noticed this fact not up
 ‘The researcher did not notice this fact’
- b. Een agent laat zulk gedrag zelden [toe t]
a policeman lets such behavior seldom to
 ‘A policeman seldom allows such behavior’
- c. De badkamer maakt niemand [schoon t]
the bathroom makes nobody clean
 ‘Nobody cleans the bathroom’

The problem, of course, is that an expression cannot at the same time be generated in syntax and in morphology, at least not according to the generally accepted model of grammar.

We will argue that this paradox arises as a consequence of the assumption that lexical items must be realized uniformly, either in syntax or in morphology. Once this assumption is abandoned, the problem disappears. Before discussing why this is so, we will first consider analyses assuming uniform syntactic or uniform morphological realization of particle verbs.

Consider first the difficulties that arise when particle verbs are taken to be uniformly generated in syntax. Such analyses assume that the verb and the particle are inserted as separate heads. The verb heads a VP and the particle is

usually taken to head a small clause complement (see, for example, Den Dikken 1995):

- (14) dat Jan [[_{sc} boeken uit] geeft]
 that John books out gives
 ‘that John publishes books’

Although the verb and the particle originate in different positions, they can be combined into a complex verbal head by a process of head-to-head adjunction. In general, head-to-head movement is the way to derive complex words in theories of this type (compare Baker 1988):

- (15) dat Jan [[_{sc} boeken t_{prt}] [uit geeft]]
 that John books out gives

Since the complex head is created in syntax, it seems reasonable to assume that its internal structure is accessible to syntactic rules like verb second, and hence that excorporation of the verb is allowed:

- (16) Jan geeft [[_{sc} boeken t_{prt}] [_v uit t_v]]
 John gives books out

At the same time, it is expected that further processes of word formation can take place after the particle incorporates into the verb. The verb-particle

complex could, for instance, move to the affix *-er*, giving rise to the noun *uitgever* ‘publisher’:

- (17) [NP [N [V uit geef] er] [VP [SC ... t_{Prd}] t_V]]]
 out give er

This analysis gives rise to various problems. For a start, many particle verbs are unergative, not transitive. Yet, these verbs show exactly the same behaviour with respect to verb second and further word formation as other particle verbs. An example is *samen-werken* ‘together-work’ (cooperate), in which *samen* ‘together’ behaves like a particle in all respects:

- (18) a. dat Jan en Piet samenwerken
 that John and Pete together-work
 ‘that John and Pete cooperate’
 b. Jan en Piet werken samen
 John and Pete work together
 c. samenwerking
 together-work-ing
 ‘cooperation’

If particles head a small clause complement, this small clause should have a subject, and hence particle verbs should always be transitive or unaccusative. Since no independent source position for particles like *samen* can be motivated, the most straightforward analysis would be to say that they are base-generated

as adjuncts to the verb. But if that is the case, and if they behave just like other particles, there is no reason to assume an underlying small clause in examples like (14). (See Neeleman and Weerman 1993, to appear, for further argumentation to this effect).

More relevant to this paper, however, are difficulties having to do with the solution proposed for the paradox posed by particle verbs. As already argued in the previous section, the theory that word formation is a syntactic process of head-to-head movement faces the problem that evidence for the required underlying structures is absent. Since the analysis of *uitgever* depends on this theory, it inherits this problem. In particular, it incorrectly predicts that material that can (or must) be present in VPs containing a particle, can (or must) also be present in related derivational structures. However, derivations as in (19b) are systematically ruled out, even though structures like (19a) exist.

- (19) a. dat Jan [_{VP} al jaren [_{VP} [_{SC} prachtige boeken t_{Prd}] [_V uit geeft]]]
 that John for years beautiful books out gives
- b. *Jan is een [_{NP} [_N [_V uit geef] er] [_{VP} al jaren [_{VP} [_{SC} prachtige
 boeken t_{Prd}] t_V]]]
 John is a out give er for years beautiful books

It seems, then, that if a particle and a verb jointly appear within a larger word, they form a unit generated in morphology and not in syntax. Consequently, the other option to maintain the ‘uniform realization’ hypothesis is to assume that particle verbs are always realized in morphology, as verbal compounds. The fact that they can be separated by verb second then indicates

that the principle of lexical integrity must be abandoned (see Neeleman and Weerman 1993 and Ackema 1999a).

However, there are some empirical problems with such an analysis as well. There is strong evidence that Dutch has a syntactic process of complex predicate formation by which resultative expressions are base-adjoined to the verb (see Neeleman and Weerman 1993). Interestingly, this process is blocked when a particle is present: whereas (20a) is grammatical, (20b) is not (irrespective of the order of particle and resultative).

- (20) a. dat Jan en Piet zich [kapot werken]
that John and Pete themselves to-pieces work
- b. *dat Jan en Piet zich [kapot [samen werken]]
that John and Pete themselves to-pieces together-work

Neeleman and Weerman argue that this is due to a syntactic constraint which says that a complex head cannot have a head that is complex as well. This ‘complexity constraint’ also correctly rules out verbs taking two particles (irrespective of the order of the two particles):

- (21) a. dat Jan en Piet [samen werken]
that John and Pete together-work
- b. dat Jan en Piet het voorstel [uit werken]
that John and Pete the proposal out-work
 ‘that John and Pete develop the proposal’
- c. *dat Jan en Piet het voorstel [uit [samen werken]]

that John and Pete the proposal out-together-work

Now, in addition to particle verbs, Dutch has complex verbal heads which are uncontroversially derived by morphological processes. These fall into three groups: verbs derived by compounding, verbs derived by prefixation and verbs derived by suffixation. As it turns out, none of these verbs violates the complexity constraint when inserted in a larger verbal complex:

- (22) a. dat Jan [stijl danst]
that John style dances
 ‘that John is a ballroom dancer’
- a’. dat Jan zich [suf [stijl danst]]
that John himself drowsy style dances
- b. dat Jan de foto’s [ver groot]
that John the pictures en larges
- b’. dat Jan de foto’s [uit [ver groot]]
that John the pictures out en larges
 ‘that John completely enlarges the picture’
- c. dat Jan het gedicht [analyse eert]
that John the poem analysis izes
 ‘that John analyses the poem’
- c’. dat Jan het gedicht [stuk [analyse eert]]
that John the poem to-pieces analysis izes

One account of these data would be to say that the complexity constraint holds without exception, but that the internal structure of words is not visible in syntax, and that consequently compounds and verbs derived by affixation may head complex predicates. This, however, would lead to the conclusion that particle verbs are not words, at least not when they occur in isolation (that is, without an affix), as their structure must be visible in order to account for the data in (20) and (21). Obviously, this is at odds with the claim that particle verbs are uniformly generated in morphology. If this claim is maintained, then, the complexity constraint must be amended.

This is not sufficient, however. Another problem for theories assuming uniform morphological realization has to do with the X-bar theoretical status of the element adjoined to the verb. If particles are attached to the verb in morphology, the prediction is that they cannot project. This prediction is hard to test, since in many cases particle verbs are idiomatic, with the consequence that the particle cannot be modified. If the semantics of the particle is sufficiently transparent, however, modification *is* possible. This is observed by Lüdeling (1997) for German; a Dutch example is the verb *schoonmaken* ‘to clean’. It can be the basis for further derivation (cf. (23a)), but at the same time the adjective can be modified (cf. (23b)). Crucially, this type of modification is impossible if derivation takes place (cf. (23c)).

- (23) a. [[schoon maak] er]
 clean make er
 ‘cleaner’
- b. dat Jan de badkamer waarschijnlijk [[hardstikke schoon] maakt]

that John the bathroom probably incredibly clean makes

c. *[[[hardstikke schoon] maak] er]

incredibly clean make er

This combination of data can only be accounted for if in addition to a morphological variant of *schoonmaken*, a syntactic variant exists.¹²

A similar conclusion can be drawn on the basis of data discussed in Hoeksema 1991. In general, particles cannot be moved to spec-CP, presumably because their idiomatic status makes it impossible to focus them. Hoeksema observes, however, that if a particle can be contrasted with another particle, it can be fronted. An example is given in (24). Under the assumption that movement to spec-CP can affect maximal projections only, the moved particle in (24) must have projected. Again, this implies that in addition to the morphological variant of *uitvoeren* ‘to export’, a syntactic variant exists.

(24) Angola voert veel goederen in; uit voert het alleen koffie t_{Prt}

Angola moves many goods in; out moves it only coffee

‘Angola imports many goods; it only exports coffee’

Of course, the assumption that particle verbs can be generated in either syntax or morphology implies that the hypothesis of uniform realization must be abandoned (see Groos 1989 and Ackerman and LeSourd 1997 for related discussion). Let us therefore consider how an analysis of particle verbs based on the model sketched in section 1 fares when confronted with the above data.

According to this model, structure is only generated in morphology if that is required by the material taken from the lexicon. Suppose that particle verbs are underspecified with respect to their locus of realization. This means that, unless morphological realization is forced, the particle and the verb will be joined in syntax, thus forming a complex predicate comparable to the ones formed by merging a verb and a resultative expression. Now, as explained in section 2, the choice to activate morphology is made locally. This implies that importing a derivational affix from the lexicon will trigger a shift to morphology. Such a shift cannot be motivated by global considerations. The consideration that it avoids a fatal violation of syntactic constraints (that is, a crashing derivation) will in other words not be sufficient to activate morphology. These assumptions straightforwardly account for the data introduced above, as we will now explain.

Suppose that after the nominalizing suffix *-er* has been imported, the derivation is continued by importing a complex lexical item consisting of a particle (say *uit* ‘out’) and a verb (say *geven* ‘give’). These two elements can then be merged in morphology, given that this component must remain active as long as the affixal properties of *-er* are not satisfied. The result is a verbal compound *uitgeef* ‘publish’, which in turn can be combined with *-er*, yielding the noun *uitgever* ‘publisher’. The same procedure explains the existence of the words in (12).

Note that since the particle and the verb are merged in morphology in the cases at hand, it is predicted that neither the particle nor the verb can project to a full XP. This implies that modifiers and other material that can

otherwise accompany the particle or the verb cannot occur. The illformedness of examples like (19b) and (23c) thus follows.

In the absence of a derivational affix, there is nothing that triggers activation of morphology, and consequently, if the particle *uit* and the verb *geven* are taken from the lexicon, they must be merged in syntax. Crucially, the morphological analysis is not available. The result is that the particle and the verb form a complex predicate of the type required independently for resultative constructions. Of course, structure generated in syntax is accessible to syntactic operations, and therefore the particle and the verb are separated by verb second, as in (13). A further consequence is that the particle may project. This explains why, in the right contexts, it can be topicalized (see (24)) or be accompanied by modifiers and other syntactic material (see (23b)). Finally, the complexity constraint can be seen as a regular syntactic condition that applies to syntactic structures only.

An analysis of Dutch particle verbs in terms of nonuniform realization receives further support from the behaviour of particle verbs in Swedish. In this VO-language, syntactic dependents of the verb typically follow it. Hence, we expect the particle to follow the verb if the particle verb appears in isolation (as argued above, particle verbs in isolation must be realized syntactically). This is corroborated by examples like (25) (from Gunlög Josefsson, p.c., and Holmes and Hinchliffe 1994; see section 5 for further discussion).

(25)	stiga upp	‘rise’
	transportera bort	‘transport away’
	trubba av	‘blunt’
	hyra ut	‘hire out’
	gå vilse	‘get lost’

However, if the particle verb is selected as host by an affix and hence occurs within a larger word, the order between particle and verb is reversed:

(26)	upstigning	‘ascent’ (of an aeroplane)
	borttransportering	‘sending away’
	avtrubbning	‘blunting’
	uthyrare	‘letter’
	vilsegången	‘lost’

This is to be expected if particle verbs are realized morphologically when selected by an affix, since Swedish morphology is in general right-headed (cf. Josefsson 1998 and references cited there). The illustrated nonuniform realization of Swedish particle verbs thus corroborates our analysis.

The paradoxical behaviour of particle verbs thus supports the following assumptions.

First, it shows that syntax and morphology are separate modules, otherwise the absence of modifiers in the presence of a derivational affix could not be explained.

Second, it shows that syntactic and morphological merger are alternative ways of generating structure. If there were only one way of generating particle verbs, they should show uniform behavior. The data show, however, that particle verbs show syntactic behavior (separation by movement, projection, sensitivity to the complexity constraint and to syntactic ordering conditions) in some contexts and morphological behavior (no projection, no sensitivity to the complexity constraint, sensitivity to morphological ordering conditions) in others.

Third, it shows that syntactic realization is preferred over morphological realization and that the choice between the two is made locally. If syntactic realization did not block morphological realization in the absence of a derivational affix, we could still not account for the fact that particle verbs are subject to the complexity constraint. Their morphological alternant should freely combine with resultatives, contrary to fact (see (20b)). This morphological alternant could also undergo verb second as a whole, which is again impossible.

In the next section we will strengthen the argument, using clearly syntactic idioms which, in the presence of a derivational affix, must nevertheless be realized morphologically.

4. Verbal Idioms

If the analysis of particle verbs presented in the previous section is correct, complex lexical items containing a verb and a particle must be underspecified with respect to their locus of realization. This does not mean that underspecification is a necessity, as there are clearly syntactic and clearly morphological complex lexical items. However, the possibility of

underspecification is crucial as underspecified items allow us to study the competition between syntax and morphology. We will start this section by considering underspecification (or the lack thereof) in more detail. Then we will illustrate its consequences for verbal idioms.

Research into the form of lexical entries is guided by the assumption that lexical storage should be kept to a minimum. As a research strategy, it is assumed that knowledge that can be represented by rules should not be duplicated by lexical stipulations. Attempts have been made, for example, to derive categorial selection from semantic selection where possible (cf. Grimshaw 1981 and Pesetsky 1982).

It follows from this research strategy that only idioms and simplex words will be listed.¹³ This implies that the word *reattach*, which has completely transparent semantics, will not be in the lexicon as such (although *re-* and *attach* must of course be listed). On the same grounds there is no need to store the phrase *attach (something) again*.

A more interesting consequence of the strategy of lexicon minimization concerns the information stored in a lexical entry. It is well-known that the structural properties of at least some complex lexical items (that is, idioms) can be predicted on the basis of the pertinent grammar. The position of the verb in *pull someone's leg*, for example, is a consequence of the VO character of English. Similarly, the linear realization of *beef-eater* follows the right-hand head rule of English morphology. This suggests that, as long as an idiom adheres to syntactic or morphological wellformedness conditions, its internal structure will not be specified in the lexicon.

The minimum that each complex lexical item must contain is a specification of the grammatical relation between its parts. This hypothesis goes back to work on verbal idioms by Bresnan (1982) and Coopmans and Everaert (1988). In the examples at hand, the crucial relation is one of internal Θ -role assignment. In *beef-eater* the internal Θ -role of *eat* is bound by *beef*. Similarly, the DP headed by *leg* binds the internal Θ -role of *pull* in *pull someone's leg*. So, abstracting away from various details, the representation of the relevant lexical items is as in (27), where the brackets indicate junctures unspecified for type (syntactic or morphological) or ordering (head-first or head-last).

- (27) a. <<eat beef_i> er>
 (R, THEME_i); semantics: member-of-the-Royal-Guard (R)
- b. <pull leg_i>
 (AGENT, THEME_i); semantics: tease (AGENT)

As will be clear, the complex lexical items in (27) must contain an instruction concerning their interpretation. Similarly, it must be specified whether they are to be realized in syntax or morphology, an issue to which we will turn shortly. Once this is arranged, however, their internal structures need not be specified any further. These simply follow from the principles that govern the realization of arguments in morphology and syntax.

If complex lexical items can indeed be listed without structural specifications, it must be indicated whether they are to be realized in syntax or morphology. The simplest way of doing this is by adding diacritics, say ‘S’ for syntactic and ‘M’ for morphological realization. Simple as this may be, it is not

the most economical solution. If one of the two ways of realizing a complex lexical item is unmarked with respect to the other, only the marked option needs to be accompanied by a diacritic. Idioms that lack the relevant diacritic could in principle be realized either syntactically or morphologically. Confronted with this choice, however, the system will opt for the default realization. Thus, the amount of information stored in the lexicon can be further reduced.

This strategy ties in naturally with the model sketched in section 2. There, it was already claimed that of the two modes of structure generation, syntax is the default. If this is so, only morphological idioms need to be marked as such. This can be implemented by specifying the brackets in lexical entries like (27) with an *M* in case of morphological idioms (see (28)). Junctures encoded by unspecified brackets are underspecified with respect to their locus of realization, but due to the unmarked status of syntax these will give rise to a syntactic idiom.

- (26) <<_M eat beef;_i> er>
 (R, THEME_i); semantics: member-of-the-Royal-Guard (R)

To be sure, we are not claiming that syntactic idioms cannot be marked as such (through the diacritic ‘s’). The crucial point, however, is that underspecification with respect to locus of realization is to be expected in at least certain idioms.

A survey of words derived by suffixation in Dutch verifies the existence of such underspecification. There are several syntactic idioms in Dutch that may be realized morphologically in the presence of a derivational suffix. A first example is *iemand's hart breken* ‘to break someone’s heart’, which clearly is a

syntactic idiom, but which nevertheless can be part of the synthetic compound *hartenbreker* ‘heart breaker’.¹⁴

- (29) a. dat hij Marie’s hart vaak heeft gebroken
that he Mary’s heart often has broken
- b. Hij is een echte hartenbreker
he is a real heart breaker

Like particle verbs, these data give rise to a paradox in traditional theories of morphology. On the one hand, the idiom in (29) is clearly syntactic in nature. A specifier can accompany the noun and the verb can undergo movement to C in main clauses. On the other hand, the idiom can appear within a word derived by attachment of a suffix. However, whereas particle verbs could be analyzed in various ways (at least at first sight), the only plausible analysis of the data in (29) seems to be one in terms of nonuniform realization and lexical underspecification.

As far as we know, the existence of pairs like in (29) has not been discussed before. Before presenting the argument, we will therefore give a more complete overview of the data. The examples given below are extracted from Nieuwborg’s (1969) *Retrograde woordenboek*. What we have searched for are synthetic compounds that end in the deverbal affixes *-er*, *-end* and *-ing* and that seem to be derived from syntactic idioms. We have used Van Dale’s (1984) dictionary to check whether the relevant syntactic idioms exist. For each of the affixes, some examples are given below.

- (30) a. dat Jan iedereen stroop om de mond smeert
that John everyone syrup around the mouth smears
 ‘John flatters everyone’
- a’. Zo’n stroopsmeerder wekt altijd afkeer
such a syrup-smearer causes always disgust
 ‘Such a flatterer is disgusting’
- b. dat die mededeling grote onrust heeft gezaaid
that that announcement big unrest has sown
 ‘that that announcement has caused much anxiety’
- b’. Hij heeft met Piet een onrustzaaiër in dienst genomen
he has with Pete a unrest-sower in employment taken
 ‘In Pete, he has employed a trouble maker’
- c. dat Karel over deze brigade het bevel voert
that Karel over that brigade the order leads
 ‘that Karel commands that brigade’
- c’. Karel is de bevelvoerder over deze brigade
Karel is the order-leader over this brigade
 ‘Karel is the commander of this brigade’
- d. dat hij voor Picasso de weg bereidde
that he for Picasso the road prepared
 ‘that he paved the way for Picasso’
- d’. Hij was wegbereider voor Picasso
he was road-preparer for Picasso
 ‘he was someone who paved the way for Picasso’

- (31) a. dat deze voorstelling iedereen de adem heeft benomen
that this performance everyone the breath has taken
 ‘that this performance took everyone’s breath away’
- a’. De voorstelling was adembenemend
the performance was breath-taking
- b. dat Jan zich altijd over van alles het hoofd breekt
that John himself really about everything the head breaks
 ‘that John always worries about everything’
- b’. dat was werkelijk een hoofdbrekend karwei
that was really a head-breaking job
 ‘That really was a tough job’
- c. dat de uitslag van die wedstrijd veel opzien heeft gebaard
that the result of that match lots-of up-looking has given-birth-to
 ‘that the result of that match was very surprising’
- c’. De uitslag was opzienbarend
the outcome was up-looking-give-birth-to-ing
 ‘The result was surprising’
- d. dat haar kwaliteiten uiteindelijk de doorslag hebben gegeven
that her qualities eventually the through-bit have given
 ‘That her qualities eventually tipped the balance’
- d’. Haar kwaliteiten waren doorslaggevend
her qualities were through-bit-giving
 ‘Her qualities tipped the balance’

- (32) a. dat die lui altijd ergens de hand mee lichten
that such people always something the hand with lift
 ‘that such people always ignore some regulation’
- a’. Zo’n handlichting moet consequenties hebben
such a hand-lifting must consequences have
 ‘Ignoring regulations in this way must have consequences’
- b. Laten wij elkander de hand reiken
let we each-other the hand reach
 ‘Reach out and touch’
- b’. Zijn handreiking had weinig resultaat
his hand-reaching had few results
 ‘His concession has few results’
- c. dat de bestuursleden enige harde woorden wisselden
that the members-of-the-board some harsh words exchanged
- c’. Ik vond die woordenwisseling nogal gênant
I found that words-exchanging rather embarrassing
 ‘I found that argument rather embarrassing’
- d. dat dit gerecht de tong streelt
that this dish the tongue strokes
 ‘that this dish is delicious’
- d’. Dat was een ware tongstreling
that was a real tongue-stroking
 ‘that was really delicious’

Although the paradox these data give rise to is comparable to the one caused by particle verbs, at least one of the alternative analyses proposed for particle verbs cannot be extended to this case. In view of the material indicating a full-blown syntactic structure in every first example, it seems impossible to maintain that the idioms in (29) through (32) are uniformly realized in morphology. If one wants to hold on to uniform realization of lexical items, the only option seems to be that, if the idiom shows up word-internally, this is the result of head-to-head movement. Thus, the word *hartenbreker* could be derived as follows:

- (33) [NP [A [V harten_N breek_V] er_N] [VP t_V [NP t_N]]]
 heart break er

In sections 2 and 3 we have already considered to what extent head-to-head movement explains properties of particle verbs and (non-idiomatic) synthetic compounds. The problems this analysis faces are therefore familiar.

For a start, the incorporation analysis fails to explain why idioms are stripped of all material that can appear in syntactic projections when they appear as part of a word. If a full-fledged syntactic structure is present, there is no reason why such material cannot be stranded by the two head movements in (33). Nevertheless the example in (34), based on (29a), is ungrammatical.

- (34) *hij is een [NP [N [V harten breek] er] [VP vaak t_V [NP Marie's en
 Sue's t_N]]]
 he is a heart breaker often Marie's and Sue's

As in the case of particle verbs and non-idiomatic synthetic compounds, material that is obligatorily present in syntax (like determiners) must sometimes be omitted.

Even if problems of this type could be solved, it would have to be stipulated that of the two operations needed to derive *hartenbreker* in (33), the incorporation of the noun into the verb is impossible unless the resulting complex verb moves on to a derivational suffix. At least, the verbal compounds **hartenbreken* ‘heart-break’, **adembenemen* ‘breath-take’ and **handlichten* ‘hand-lift’ do not exist.

As it turns out, then, neither uniform morphological nor uniform syntactic realization of the idioms under discussion leads to a plausible analysis of the alternation found in (29) through (32). This alternation falls out naturally, however, from the model proposed here. Suppose that the idiom *iemand's hart breken* is stored in the lexicon without being specified for syntactic or morphological realization:

- (35) <breek hart_i>
 (AGENT, THEME_i); semantics: hurt-in-love (A)

Unless morphology is activated by the inclusion of an affix in the derivation, this idiom must be realized in syntax, given that this is the default option. Consequently, the verb will project a VP which contains a DP headed by the noun *hart* and, like other VPs and DPs, these projections allow insertion of further material, as illustrated by (29a). Crucially, in the absence of a derivational

affix a morphological realization of the idiom is excluded, which accounts for the absence of the compound **hartenbreken* ‘to heart-break’.

If a derivational affix, say *-er*, is taken from the lexicon, morphology must be activated. This implies that the idiom in (33) is now realized as a verbal compound, thus providing a category with which the suffix can be merged. In this way, generation of synthetic compounds like *hartenbreker* is possible. Since the idiom is now structurally realized in morphology, it is predicted that the material that usually accompanies it in syntax must be omitted. This accounts for the ungrammaticality of the example in (34) (where this material is stranded by alleged head movement) and of the ones in (36) (where it appears inside the compound).

- (36) a. **hij is een* [NP [N [VP [NP Marie’s hart] vaak breek] er]
he is a Mary’s heart often breaker
- b. **de voorstelling was* [AP [A [VP iedereen [NP de adem] beneem]
end]
the performance was everyone the breath taking
- c. **zo’n* [NP [N [VP altijd ergens [NP de hand] mee licht] ing] moet
consequenties hebben
such always something the hand with lifting must consequences have

So, once the assumption that complex lexical items are realized uniformly is abandoned, a simple account of the alternation in (29) through (32) can be given. This account runs parallel to the one given for particle verbs. It thus also supports the following aspects of the model defended here: (i) syntax

and morphology are alternative modes of generating structure, (ii) syntactic generation is unmarked with respect to generation in morphology and (iii) complex lexical items can be underspecified for their locus of realization.

There is a difference between particle verbs and idioms with respect to their occurrence within words. Particle verbs form a much more productive basis for further word formation. This need not be stipulated, however, as particle verbs and idioms have different properties anyway. Particle verbs are complex predicates, which means that they already have a structure that closely resembles that of verbal compounds when they are realized in syntax. Morphological realization would consequently seem unproblematic. Syntactic idioms, however, often consist of a verb that combines with more than one fixed expression (cf. *van een mug een olifant maken* ‘to make an elephant out of a mosquito’, that is ‘to make a big a fuss about nothing’). Usually it is not possible to create a wellformed morphological expression that can host all this idiomatic material, which means that a morphological realization of the idiom is ruled out. It is correctly predicted, then, that only simple idioms, consisting of just a verb and one dependent, can be realized within a synthetic compound.¹⁵

5. Compounds

So far, we have only considered the selectional properties of affixes as a reason for morphological realization. However, there is a second possibility: a complex lexical item can simply be listed as a morphological entity, a possibility that was already mentioned for idioms that can only be realized morphologically in section 4. Listing, however, only occurs when the listed item has a (partially) unpredictable interpretation. This implies that simple compounds, at least in

languages of the type under discussion here, can exist only if they have an idiomatic meaning. Conversely, a morphological process which has transparent semantics must involve affixation. (See section 6 for language variation on this point).

Starting with the latter point, it indeed seems to be the case that in the languages under discussion morphological operations which lead to predictable changes in meaning are always instantiated by affixation. For example, diminutive formation in Dutch is expressed by the suffix *-tje*, repetition of action is expressed by the prefix *her-*, and causativization is expressed by the suffix *-iseer*.¹⁶ Crucially, none of these processes can be expressed by compounding in Dutch (or in the other languages under discussion). The same point can be made on the basis of inflectional morphology, which is semantically fully transparent, and which never takes the form of compounding.

It also seems to be the case that those instances of simple compounding which are attested in the languages under discussion cannot be described on the basis of a predictable resultant meaning. The general right-headedness of morphological constructs ensures that the “IS A” relation holds between the compound and its right-hand member, but the relation between the right-hand and the left-hand part of a compound is unpredictable (see also Carstairs-McCarthy 1992). Consider the following examples of noun-verb compounding in English:

(37)	to breast-feed	to hand-make
	to play-act	to air-condition
	to window-shop	to c-command
	to base-generate	to chomsky-adjoin
	to head-adjoin	to head-govern

It is clear that no uniform characterization of the semantic relation between the members of these compounds can be given (cf. Preuss 1960). *To chomsky-adjoin*, for example, means “to adjoin in a certain way proposed by Chomsky”, but *to head-adjoin* does not have a meaning parallel to this; it means ‘to adjoin to a head’. In turn, *to head-govern* does not have an interpretation of this type, but means ‘to govern in the capacity of a head’.

There is one restriction on the semantics of N-V compounding, however: the noun cannot be interpreted as the internal argument of the verb (cf. Shimamura 1983). This can be understood if listing is costly. In that case, a form will not be listed if its meaning, using the same lexical material, can also be derived by regular processes independently available in the language. Since the internal argument relation has a fully compositional meaning, semantics cannot be used to motivate listing. There is, in other words, no option of listing a head and its internal argument as a morphological item. The other means to activate morphology, namely the presence of an affix, does not work in cases of simple compounding either. As a consequence, simple N-V compounds in which N is an argument of V are blocked.

This implies that whenever the noun in an N-V combinations is interpreted as the internal argument of the verb, the two must have been

combined in syntax. Indeed, Dutch N-V combinations in which the noun is an argument, such as *koffie-drinken* ‘to coffee-drink’ may behave as complex verbal heads, but they are, without exception, separable through head movement of the verb (cf. *Jan dronk gisteren koffie* ‘John drank yesterday coffee’ versus **Jan koffie-dronk gisteren* ‘John coffee-drank yesterday’). N-V combinations of the type in (37), on the other hand, behave as indivisible units (cf. *Jan adjungeert zijn topics altijd Chomsky* ‘John adjoins his topics always Chomsky’ versus *Jan Chomsky-adjungeert zijn topics altijd* ‘John adjoins his topics always Chomsky’). (See for more data Ackema 1999b, where this generalization is derived under different assumptions; incorporating languages will be discussed in section 6.)

The function of listing as a trigger for morphological activation can be further demonstrated when we return to verb-particle constructions in Swedish. In section 3 we derived the generalization that the particle follows the verb in the absence of an affix (verb and particle are merged in syntax), whereas the particle precedes the verb when an affix is present (verb and particle are merged in morphology). In fact, however, a qualification is in order: there are also cases in which the particle precedes the verb when no further affixation takes place. This shows that simple compounding of particle and verb is possible after all. Given what we have said so far, simple compounding of this type should only occur if the resulting word has a (partially) unpredictable meaning, which triggers listing. This prediction appears to be correct. With regard to Swedish verb-particle combinations, Holmes and Hinchliffe (1994:321) remark that “the separated form has a literal meaning [...], whereas the corresponding integrated form has a figurative meaning”. Examples are given below:

- (38) a. Jag bryter av kvisten
I break off the-branch
- a'. Jag avbryter samtalet
I off-break the-conversation
 'I interrupt the conversation'
- b. Han strök under ordet
he lined under the-word
 'He underlined the word'
- b'. Han underströk ordets betydelse
he under-lined the-word's meaning
 'He emphasized the word's meaning'
- c. Bordsbenet gick av
the-table-leg broke off
- c'. Statsministern avgick
the-prime-minister off-broke
 'The Prime Minister resigned'

Note, finally, that there can be other reasons for listing a complex form than unpredictable semantics. More specifically, it appears that some compounded particle verbs in Swedish have the same meaning as their syntactic counterparts. However, as observed by Holmes and Hinchliffe (p. 320), these “are reserved almost solely for official documents and more formal usage” and are not used in the spoken language. Under the plausible assumption that specialized, formal expressions must be listed, the fact that these forms are

compounds further corroborates the idea that listedness is a prerequisite for simple compound formation.

6. Inflection

If synthetic compounding is possible because of the presence of an affix, one may expect that inflection can license N-V compounding in English as well, contrary to fact:

(39) *John truck-drives all day long

Apparently, inflectional and derivational morphology differ in this respect. A closer look at the data reveals that in fact it is not this distinction which is crucial, but rather that between category-neutral and category-changing morphology.¹⁷ Thus, it turns out that in English synthetic compounding is never triggered by an affix that does not change the category of the verbal base:

- (40) a. *Mary re-truck-drives to Mississippi tomorrow
 b. *This system over-tree-generates

Indeed, in the languages under discussion so far the affixes involved in synthetic compounding are always category-changing.

What this indicates is that category-changing affixes trigger morphology in a way that does not, or not necessarily, carry over to non-category-changing ones. We suggest that the following rationale underlies this difference. If one wants to attach a category-changing affix to a base, one always has to leave the

syntactic representation and perform an operation in morphology. However, when a non-category-changing affix is to be attached, it is possible to do so without leaving the syntactic representation: one can simply apply the morphological rule system to a part of the syntactic tree (cf. Borer 1993).

Consider what would happen if one would try to attach a category-changing affix without leaving the syntactic tree. The node created by attachment of such an affix would have a different category than the projections that dominate it:

(41) INSERT FIGURE

The result is a structure that violates the principle of endocentricity. However, endocentricity is presumably part of GEN (Grimshaw 1997) and can therefore not be violated. As a consequence, attachment of category-changing affixes must take place outside the syntactic representation. In case of non-category-changing affixes, there is, at least in principle, a choice between independent application of morphology and application to the syntactic tree.¹⁸

The latter point, we propose, is subject to cross-linguistic variation. In languages like English, category-neutral affixes are attached to their host via application of morphology to the syntactic tree. In some other languages, they are attached via independent application of morphology. This variation can be captured by reformulating the No Morphology constraint as in (42a) and adding the constraint in (42b).¹⁹

(42) a. *No Morphology*

Operate on the syntactic tree

b. *Morphological Exclusivity*

Do not apply morphological operations to the syntactic tree

If (42a) outranks (42b), a language like English results. Synthetic compounding cannot be licensed by inflection, since inflection must be applied to the syntactic representation, and the syntax does not generate N-V compounds. For reasons outlined above, category-changing affixes are always attached to their host outside the syntactic representation, so they do license synthetic compounds.

In languages in which (42b) outranks (42a), non-category-changing affixes are predicted to license compounding of verbs and their internal arguments just like other affixes. This gives rise to incorporating languages such as Mohawk (Baker 1996), Hindi (Mohanan 1995), and many others (Mithun 1984).²⁰ Note that, indeed, whenever an inflectional affix and the incorporated noun appear on the same side of the verb, the inflectional affix is attached external to the noun. This follows if the inflectional affix is the trigger for compounding. An example from Mohawk is given below (from Baker 1988).

- (43) Yao-wir-a?a ye-nuhs-nuhwe?-s
PRE-baby-SUF 3FS/3N-house-like-ASP
 ‘the baby likes the house’

Thus the idea that syntax and morphology are competitors cannot only be used to capture data internal to Dutch and English, but also to capture cross-linguistic variation.

7. Concluding Remarks

Let us finally compare the kind of competition discussed above, that between two different rule systems in the grammar, with the more familiar type of competition, that between different structures generated by one rule system. The main difference between the two types of competition is that evaluation in the former type is local in character, while the latter involves global evaluation. In a modular grammar, rules contained within a component may not (directly) interact with rules external to that component. This means that if there are constraints that govern the competition between morphology and syntax, these constraints cannot interact with either syntax-internal or morphology-internal constraints. To put it differently, a prerequisite for (global) evaluation within a component is that all else is equal: candidates in syntactic evaluation differ only in the application of syntactic operations, candidates in morphological evaluation differ only in the application of morphological operations, etc. But competition between components concerns those cases where all else is not equal: candidates differ precisely in whether either syntactic or morphological operations apply. Hence, the question whether the syntactic or the morphological rule system is to be activated must be decided locally.

From this a further difference follows, namely one concerning the definition of candidate set. Within syntax and morphology, candidates are defined in terms of shared lexical material and shared semantics (cf. Grimshaw 1997). Such a definition is impossible in the case of competition between components, because at the moment of competition the overall semantics of the structure is unknown (the morphological output may give rise to a different semantics than the syntactic one). A similar remark can be made with respect

to the notion of numeration. However, as we have seen, competition is still limited to cases in which candidates share two lexical items (the ones to be merged either in syntax or in morphology) and a particular semantic relation between these items. For instance, competition is between alternative realizations of a verbal head and its internal argument. Of course, this is the most that can be shared between candidates in local evaluation.

What does not differ is the way language variation is handled: in optimality theory this is done by constraint reranking. As shown in section 6, constraints that trigger activation of a rule system and constraints that block this are indeed ranked differently in different languages.

Notes

1. Bresnan shows that this approach can in fact handle more cases of blocking than the elsewhere condition, as it also applies when the features of one of the competing forms are not a proper subset of the features of the other.
2. And of course semantics and phonology, but these are irrelevant to the present discussion.
3. This leaves open the question to what extent morphological and syntactic rules have the same format. See Sproat 1985, Di Sciullo and Williams 1987 and Ackema 1999a, among others, for various proposals.
4. Sells (1997) argues that morphological realization is preferred over syntactic realization. The cases he discusses can all be subsumed under the elsewhere condition, and consequently they do not bear on the issue at hand (cf. section 1).
5. We will only discuss overt affixes in this paper. In principle, insertion of silent

affixes should yield identical effects, but this might not be so if some of the selectional relations under discussion are partly phonological in nature. As discussed by Sproat (1985), Beard (1988) and others, there are morphosyntactic affixes and morphophonological ones and the mapping between the two is not necessarily one to one. We do not go into this issue here, but simply restrict the discussion to clear cases in which the mapping *is* one to one.

6. For an overview of theories of English synthetic compounds, see Spencer (1991:324ff).

7. Note, by the way, that Baker explicitly claims that synthetic compounds and simple N-V compounds in languages like English do not involve syntactic head-to-head movement.

8. Certain other affixes allow inheritance of accusative arguments. An example in English is *-ing* in *John's singing the Marseillaise*. Such affixes derive 'mixed categories', so called because the lower and higher parts of their projection seem to be of different categories. At first sight, mixed categories present a stronger argument for affixation in syntax (cf. Jackendoff 1977, Abney 1987, Hazout 1995 and others). However, two alternative analyses are available. One is that the stem and the affix introduce two sets of categorial features which are projected simultaneously at first. The affix's features project higher than those of the stem, due to independent wellformedness conditions on structure, as argued by Reuland (1988). The second alternative is provided by Bresnan's (1997) head-sharing analysis, which makes use of the modularity of grammar in LFG: two distinct heads in categorial structure are mapped onto a single word in functional structure. Neither analysis needs to resort to syntactic affixation.

9. This is not true for all languages; see section 6 for discussion.

10. Van Hout and Roeper (1998) argue that forms like *driver of a truck* must involve syntactic affixation of *-er* to a full-blown extended verbal projection, including at least VP and AspP. Their argument is based on a semantic contrast between *driver of a truck* and *truck driver*: only the former entails that there is a truck that has been driven at some point. According to Van Hout and Roeper, this necessitates the presence of AspP, as this is the locus of event interpretation. To us it seems that the contrast reduces to the presence of a determiner in *driver of a truck*. Nouns in compounds cannot be accompanied by determiners (cf. Hoeksema 1988), hence they must be interpreted as nonreferential.

11. Independent evidence for the assumption that it is the inclusion of an affix in the derivation that triggers morphology comes from the L1 acquisition of synthetic compounds as discussed by Clark et al. 1986. It turns out that children only acquire the morphological OV order after they have acquired suffixes like *-er*.

12. An alternative is that there is only one variant of particle verbs like *schoonmaken* ‘clean-make’, but that this form has special properties which make it transparent to both syntactic and morphological constraints. A proposal which comes close to this is made by Booij (1990), who introduces a V^* category, in between V^0 and V' . Such a proposal can be interpreted in one of two ways. On one interpretation, V^* behaves as a word if embedded under an affix, and as a syntactic unit otherwise. Since this in effect gives up on uniform realization, just like the analysis proposed in the main text, the introduction of a V^* category is rendered superfluous. On the other interpretation, V^* is subject to both syntactic and morphological constraints in all its occurrences. This is not in

accordance with the data discussed in the main text, however. These data show that if embedded in a word the particle verb behaves like any other compound. If it occurs without a suffix, it behaves like any other syntactic complex predicate.

13. This is orthogonal to the conclusion drawn by Baayen and Schreuder (1998) and others that frequently used rule-governed complex words are stored in order to minimize computational load. (The same may be true of frequently used phrases, cf. Jackendoff 1997). Although such forms may be stored with their (regular) semantics, this does not imply that they are stored with a complex structure. For all intents and purposes, such words function as simplexes. This is corroborated by the fact that frequently used compounds sometimes receive noncompound stress. Thus, inhabitants of Utrecht speak of the *domPLEIN* ‘dom-square’ (the name of the square next to the Dom tower in Utrecht), while strangers will ask for the *DOMplein*, with stress on the left-hand part, as in compounds.

14. The morpheme *-en-* that shows up in *hartenbreker* is a linking morpheme, not the plural.

15. In some cases it is possible, though, to suppress some of the material of the syntactic idiom when it is realized morphologically. In that case, we assume that the possibility of suppression must be stored as part of the morphological idiom. An example is the suppression of *om de mond* ‘around the mouth’ in the compound *stroopsmeerder* ‘syrup smearer’ (see (30a,a’)).

16. We are claiming that if a process is semantically transparent, it must be expressed by affixation. This does not imply that every single form derived by affixation must be semantically transparent. Like other expressions, derived

words can be listed with a particular, non-predictable, meaning. This is also true of the affixes mentioned in the main text.

17. Of course, it is often assumed that inflectional morphology is never category-changing. Whether this is correct or not is irrelevant to the argumentation in this section. (Haspelmath (1996), for example, discusses cases of mixed categories in terms of category-changing inflection; see also footnote 8).

18. Note that the hypothesis that morphology can apply to the syntactic tree does not mean that syntax and morphology are a single rule system.

19. Recall that No Morphology was motivated by the fact that it is more costly to activate two rule systems than it is to activate just one. Given the reformulation in (42a), we can be more precise: what is costly is leaving a rule system in the middle of a derivation and storing the state the derivation is in at that point in short term memory.

20. Somewhat surprisingly from a typological perspective, the Germanic language Frisian also appears to be of this type, see Dijk 1997.

References

- Abney, Stephen (1987). *The English Noun Phrase in its Sentential Aspect*. Ph.D. dissertation, MIT.
- Ackema, Peter (1999a). *Issues in Morphosyntax*. Amsterdam: John Benjamins.
- Ackema, Peter (1999b). The Nonuniform Structure of Dutch N-V Compounds. In: Geert Booij and Jaap van Marle (eds.), *Yearbook of Morphology 1998*. Dordrecht: Kluwer.
- Ackerman, Farrell and Philip LeSourd (1997). Toward a Lexical Representation of Phrasal Predicates. In: Alex Alsina, Joan Bresnan and Peter Sells (eds.), *Complex Predicates*, 67-106. Stanford: CSLI Publications.
- Anderson, Stephen (1969). *West Scandinavian Vowel Systems*. Ph.D. dissertation, MIT.
- Andrews, Avery (1990). Unification and Morphological Blocking. *Natural Language and Linguistic Theory* 8, 507-557.
- Baayen, Harald and Rob Schreuder (1998). The Balance of Storage and Computation in the Mental Lexicon: The Case of Morphological Processing in Language Comprehension. Talk presented at the Congress on Storage and Computation in Linguistics, Utrecht University.
- Baker, Mark (1988). *Incorporation*. Chicago: University of Chicago Press.
- Baker, Mark (1996). *The Polysynthesis Parameter*. Oxford: Oxford University Press.
- Beard, Robert (1988). On the Separation of Derivation from Affixation: Toward a Lexeme/Morpheme-based Morphology. *Quaderni di Semantica* 9, 3-59.

- Borer, Hagit (1993). *Parallel Morphology*. Ms., University of Massachusetts at Amherst.
- Bresnan, Joan (1982). The Passive in Lexical Theory. In: J. Bresnan (ed.), *The Mental Representation of Grammatical Relations*, 3-86. Cambridge, Mass.: MIT Press.
- Bresnan, Joan (1997). Mixed Categories as Head Sharing Constructions. In: Miriam Butt and Tracy Holloway King (eds.), *Proceedings of the LFG 97 Conference*. Stanford: CSLI Publications.
- Bresnan, Joan (1998). Explaining Morphosyntactic Competition. To appear in: Mark Baltin and Chris Collins (eds.), *Handbook of Contemporary Syntactic Theory*. Oxford: Blackwell.
- Bresnan, Joan and Sam Mchombo (1995). The Lexical Integrity Principle: Evidence from Bantu. *Natural Language and Linguistic Theory* 13, 181-252.
- Carstairs-McCarthy, Andrew (1992). *Current Morphology*. London: Routledge.
- Chomsky, Noam (1995). *The Minimalist Program*. Cambridge, Mass.: MIT Press.
- Clark, Eve, Barbara Hecht and Randa Mulford (1986). Coining Complex Compounds in English: Affixes and Word Order in Acquisition. *Linguistics* 24, 7-29.
- Coopmans, Peter and Martin Everaert (1988). The Simplex Structure of Complex Idioms: The Morphological Status of *laten*. In: M. Everaert, A. Evers, R. Huybregts and M. Trommelen (eds.), *Morphology and Modularity*, 75-104. Dordrecht: Foris.
- Di Sciullo, Anna-Maria and Edwin Williams (1987). *On the Definition of Word*. Cambridge, Mass.: MIT Press.

- Dijk, Siebren (1997). *Noun Incorporation in Frisian*. Ph.D. dissertation, University of Groningen (Ljouwert: Fryske Akademy).
- Dikken, Marcel den (1995). *Particles*. Oxford: Oxford University Press.
- Drijkoningen, Frank (1994). Affixation and Logical Form. In: Reineke Bok-Bennema and Crit Cremers (eds.), *Linguistics in the Netherlands 1994*, 25-36. Amsterdam: Benjamins.
- Grimshaw, Jane (1981). Form, Function, and the Language Acquisition Device. In: C.L. Baker and John McCarthy (eds.) *The Logical Problem of Language Acquisition*, 165-182. Cambridge: MIT Press.
- Grimshaw, Jane (1997). Projection, Heads, and Optimality. *Linguistic Inquiry* 28, 373-422.
- Groos, Anneke (1989). Particle-Verbs and Adjunction. In: Hans Bennis and Ans van Kemenade (eds), *Linguistics in the Netherlands 1989*, 51-60. Dordrecht: Foris.
- Haspelmath, Martin (1996). Word-Class-Changing Inflection and Morphological Theory. In: Geert Booij and Jaap van Marle (eds.), *Yearbook of Morphology 1995*, 43-66. Dordrecht: Kluwer
- Hazout, Ilan (1995). Action Nominalizations and the Lexicalist Hypothesis. *Natural Language and Linguistic Theory* 13, 355-404.
- Hoeksema, Jack (1988). Head-Types in Morphology. In: Geert Booij and Jaap van Marle (eds.), *Yearbook of Morphology 1988*, 123-137. Dordrecht: Foris.
- Hoeksema, Jack. (1991). Theoretische aspecten van partikelvooropplaatsing. *Tabu* 21, 18-26.
- Holmes, Philip and Ian Hinchliffe (1994). *Swedish; A Comprehensive Grammar*. London: Routledge.

- Hout, Angeliek van and Thomas Roeper (1998). Events and Aspectual Structure in Derivational Morphology. In: Heidi Harley (ed.), *Papers from the UPenn/MIT Roundtable on Argument Structure and Aspect*. MITWPL 32, 175-200.
- Jackendoff, Ray (1977). *X-bar Syntax*. Cambridge, Mass.: MIT Press.
- Jackendoff, Ray (1997). *The Architecture of the Language Faculty*. Cambridge, Mass.: MIT Press.
- Josefsson, Gunlög (1998). *Minimal Words in a Minimal Syntax*. Amsterdam: John Benjamins.
- Kiparsky, Paul (1973). Elsewhere in Phonology. In: Stephen Anderson and Paul Kiparsky (eds.), *A Festschrift for Morris Halle*, 93-106. New York: Holt, Rinehart and Winston.
- Lieber, Rochelle (1983). Argument Linking and Compounds in English. *Linguistic Inquiry* 14, 251-285.
- Lüdeling, Anke (1997). Between Particle Verbs and Resultative Constructions. Paper presented at the DGfS Jahrestagung, Düsseldorf.
- McCarthy, John and Alan Prince (1994). The Emergence of the Unmarked: Optimality in Prosodic Morphology. In: *NELS* 24, 333-379. Amherst: GLSA.
- Mithun, Marianne (1984). The Evolution of Noun Incorporation. *Language* 60, 847-894.
- Mohanan, Tara (1995). Wordhood and Lexicality: Noun Incorporation In Hindi. *Natural Language and Linguistic Theory* 13, 75-134.
- Neeleman, Ad (1994). *Complex Predicates*. Ph.D. dissertation, Utrecht University.

- Neeleman, Ad and Fred Weerman (1993). The Balance between Syntax and Morphology: Dutch Particles and Resultatives. *Natural Language and Linguistic Theory* 11, 433-475.
- Neeleman, Ad and Fred Weerman (to appear). *Flexible Syntax*. Dordrecht: Kluwer.
- Nieuwborg, E.R. (1969). *Retrograde Woordenboek van de Nederlandse Taal*. Antwerpen: Plantyn.
- Pesetsky, David (1982). *Paths and Categories*. Ph.D. dissertation, MIT.
- Poser, William (1992). Blocking of Phrasal Constructions by Lexical Items. In: Ivan Sag & Anna Szabolcsi (eds.), *Lexical Matters*, 111-130. Stanford: CSLI.
- Preuss, F. (1960). Backformation oder Noun-Incorporation. *Lebende Sprachen* 5, 110-112, 165-167.
- Reuland, Eric (1988). Relating Morphological and Syntactic Structure. In: Martin Everaert, Arnold Evers, Riny Huybregts & Mieke Trommelen (eds.), *Morphology and Modularity*, 303-337. Dordrecht: Foris.
- Roeper, Thomas and Muffy Siegel (1978). A Lexical Transformation for Verbal Compounds. *Linguistic Inquiry* 9, 199-260.
- Rosen, Sara Thomas. (1989). Two Types of Noun Incorporation: A Lexical Analysis. *Language* 65, 294-317.
- Sells, Peter (1997). Optimality and Economy of Expression in Japanese and Korean. To appear in: *Proceedings of the 7th Japanese/Korean Conference*. Stanford: CSLI Publications.
- Shimamura, R. (1983). Backformation of English Compound Verbs. In: J.F. Richardson, M. Marks and A. Chuckerman (eds.), *Papers from the*

Parasession on the Interplay of Phonology, Morphology and Syntax, 271-282.

Chicago: CLS.

Spencer, Andrew (1991). *Morphological Theory*. Oxford: Blackwell.

Sproat, Richard (1985). *On Deriving the Lexicon*. Ph.D. dissertation, MIT.

Van Dale (1984): *Groot Woordenboek der Nederlandse Taal*. Utrecht: Van Dale Lexicografie.

Williams, Edwin (1981). On the Notions “Lexically Related” and “Head of a Word”. *Linguistic Inquiry* 12, 245-274.

Williams, Edwin (1997). Blocking and Anaphora. *Linguistic Inquiry* 28: 577-628.

FIGURE: INSERT AS EXAMPLE (41)

