A prosodic approach to particle verbs

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1 Introduction

In the Germanic languages, there exists a class of verbs that combine with a particle to form a lexical entry. Typical examples are *to look up* in English, or *voorschrijven* 'to prescribe' in Dutch. Without the particle, these verbs have a different meaning: *to look* does not mean the same thing as *to look up*, *schrijven* 'to write' does not mean the same as *voorschrijven*. This suggests that the particle+verb combination is a morphological constuction. However, syntactically, particle verbs sometimes behave in ways that would not be expected if they are indeed morphological. Verb and particle are sometimes separated from each other, and it is possible to modify the particle alone.

For these reasons, the morphosyntactic analysis of particle verbs is problematic. It is not clear whether they belong to morphology or to syntax. In this paper, I argue that the properties of particle verbs follow from their prosodic structure. Morphosyntactically, they have a hybrid character, which means that the mapping to phonology has a choice between creating a morphophonological or a phrasal phonological structure. Additional phonological factors in some cases disable the phrasal option so that a morphophonological option necessarily arises.

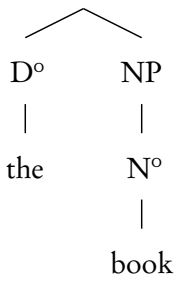
2 Background

The analysis to be presented in section 3 assumes a *bare phrase structure* approach to syntax and a system of mapping rules that map syntactic structures onto phonological ones. In this section, I discuss both these assumptions.

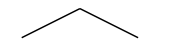
2.1 Bare phrase structure

Two points are essential to Chomsky's (1995) *bare phrase structure* approach: **a)** projection levels are derivative; and **b)** category labels do not exist. This means that the tree structure of a DP such as *the book* should no longer be represented as in (1), but rather as in (2):

(1)



(2)



Point **(a)** means that whether a node in a tree is a terminal node (a "head", in traditional terms) or a maximal projection (a "phrase") is not an inherent property of the node but something that is merely "read off" the tree. In the G&B-type structure in (1), the noun *book* is a head because it is an N°-node. In the structure in (2), the head status of *book* is not explicitly indicated. It must be read off the structure on the basis of the fact that the node *book* is simplex, i.e., not created by Merge. The same is true for the lower *the*-node in (2).

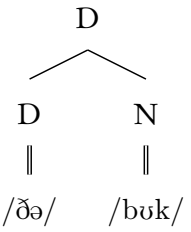
Similarly, the fact that the root node in (1) is a phrase is explicitly marked by the DP label. In the tree in (2), the fact that the root node is a phrase is determined by the fact that it is the maximal projection of *the*: because it does not project any further, we establish that it is a maximal projection.

Note that the node *book* in (2) also does not project any further. That means

that *book*, even though it is a simplex form and therefore a minimal projection, is *at the same time* a maximal projection. This point is crucial to the analysis presented below.

Chomsky still assumes some form of lexicalist hypothesis, so that the standard approach to bare phrase structure uses the actual lexical items to build trees. The category of lexical items, Chomsky assumes, is uniquely determined by their feature matrix. Nouns, for example, must have person and/or number features, so that there is no need to explicitly mark them as nouns. I do not follow this assumption, however. Instead, I adopt a version of the Separation Hypothesis (Beard 1988), an approach that is more in line with assumptions in for example *Distributed Morphology* (Halle & Marantz 1993) but also (albeit more implicitly) in Jackendoff (2002) and Ackema & Neeleman (2004). This approach states that syntactic structures do not contain the phonological information associated with a node. A syntactic node consists of morphosyntactic features; it is the mapping to phonology that associates a node with phonological features. I assume that categorial features are part of the syntactic structure, so that *the book* may be represented as in (3):[1]

(3)



In (3) I indicate the mapping to phonology with double lines. That is, everything below the double lines is not actually part of the syntactic structure. This is discussed in more detail in the next section.

[1] In DM approaches, categorial features are often derived as well: lexical nodes are roots without categorial specification, it is the functional structure dominating the root that determines whether it is realised as a 'noun' or a 'verb'. I do not follow this approach, but the current analysis would be compatible with it.

2.2 Mapping to phonology

Given the assumption that syntactic structures do not contain phonological material, we need mapping rules to map syntactic structure onto phonological structure. I adopt the assumption of Jackendoff (2002) that mapping rules in fact link three types of structure: semantic, syntactic, and phonological. That is, the lexical entry for a noun such as *man* looks like (4):

(4) $\text{MAN}_{\langle e,t \rangle} \leftrightarrow \text{N[sg,count]} \leftrightarrow /\text{mæn}/$

This rule states that the semantic predicate MAN maps onto a syntactic structure consisting of a nominal head with the features [sg] and [count], which in turn maps onto the segmental phonological structure /mæn/.

In Jackendoff's model, and in Ackema & Neeleman's (2004) extension of it, the phonological part of the mapping rule refers to segmental information. But there is good reason to assume that it can also refer to *prosodic* information, i.e., information about the division of the phonological string into intonational Phrases (IntP) phonological phrases (φ), prosodic words (ω), syllables (σ), etc. We need to make this assumption in order to capture the data that prosodic morphology models describe (cf. McCarthy & Prince 1996). For example, Arabic verbs contain a morpheme that indicates finiteness. This morpheme consists of a single short syllable, without any segmental specification (see Kremers 2007 for details). We can represent this with the following mapping rule:[2]

(5) $\text{V[+fin]} \leftrightarrow \sigma_{\mu}$

The rule in (5) does not contain a semantic part, because finiteness does not seem to have a semantic component. (5) is therefore a mapping rule that operates between syntax and phonology alone.

We can use this idea to express the head-initial character of English. All we

[2] The representation σ_{μ} indicates a syllable with only one mora, i.e., a short syllable.

need to do is to posit a mapping rule that captures the prosodic structure of a head-complement structure. We can do this with the rule in (6):

(6) $[_{XP}\ X^1\ YP^2\ ] \leftrightarrow \omega^1\ \varphi^2$

(6) states that a syntactic structure consisting of a head X and its complement YP is mapped onto a structure consisting of a prosodic word ω *followed* by a phonological phrase φ. The syntactic structure specifies only hierarichical relations, but the prosodic structure is linearly ordered. Therefore, this mapping rule establishes the order between head and complement in that the ω onto which the head X is mapped precedes the φ onto which the complement YP is mapped.

The superscript indices in (6) mark correspondences. The head X thus corresponds to the prosodic word ω, while the complement YP corresponds to the phonological phrase φ. This notation is adopted from Jackendoff (2002).[3]

For the analysis of the particle verb data we must introduce two more mapping rules. Both these rules express generalisations that are well-known from the phonological literature (cf. Selkirk 1981 and later work, Nespor & Vogel 1986, Truckenbrodt 1995, etc.) The first rule expresses the observation that syntactic heads generally correspond to prosodic words, the second that syntactic phrases (maximal projections) correspond to phonological phrases:[4]

(7) a. $X \leftrightarrow \omega$

b. $XP \leftrightarrow \varphi$

Note that we must inevitably assume that these rules are voilable. Prosodic structure is not recursive: one phonological phrase cannot contain another, a prosodic

[3]Most likely these indices are not actually needed in the model, because there are additional rules that map heads onto prosodic words and maximal projections onto phonological phrases, as discussed below. I assume throughout that association indices are merely mnemonic devices, not theoretical constructs, but I will not discuss this point further here.

[4]This is especially true of lexical phrases, but I ignore this refinement in the current paper.

word cannot contain another prosodic word, etc.[5] Since syntax *is* recursive, it is obvious that a VP of the form [$_{VP}$ V DP] must violate the rule in (7b) at least once: either the VP corresponds to a φ, or the DP does. It is not possible that *both* do.

When such conflicts in mapping options arise, they must obviously be resolved in some way. In general, other rules or (phonological) principles will favour one option over the other or will actually disfavour one option. A detailed discussion of this topic is beyond the scope of this paper, but an example of this effect will be discussed below.

One additional principle underlying the mapping between syntax and phonology needs to be introduced at this point. Ackema & Neeleman (2004) argue that the mapping of affixes is governed by several principles, one of which is Input Correspondence. This principle is defined in (8):

(8) Input Correspondence:
If a syntactic affix A selects (a category headed by) X, then Φ(A) takes Φ(X) as its host.

Here, Φ is the mapping funcion that maps syntactic structures onto phonological structures. The idea behind (8) is that an affix may attach to a phrase *in syntax*, but when this affix is mapped onto phonology, it must attach to the element corresponding to the *head* of the phrase it is attached to.

The idea that an affix can attach to a phrase as well as to a head has already been proposed by Abney (1987), who argues that the English gerund suffix *-ing* can attach to V, to VP or to IP, producing different gerund constructions. Ackema & Neeleman adopt this idea and argue that Input Correspondence ensures that in phonology, the affix attaches to (the prosodic word corresponding to) V in each case.

[5] It is sometimes argued that a limited form of recursion is possible, usually with phonological phrases. It never includes more than one level, however, and it seems that it always the case that either the right or the left edge of the embedded phrase coincides with the right/left edge of the containing phrase.

3 The data

As stated, particle verbs are essentially lexical items that consist of two separate elements: a verb and a particle. Syntactically, the particle sometimes behaves like a head that is adjoined to the verb, and sometimes like an independent element that can be modified directly and seems to project its own phrase.

It is this dual behaviour of the particle that causes problems for the analysis. Let us look at some of the data.[6] The first typical characteristic of particle verbs is that the particle may either appear adjacent to the verb or in a position separated from it. In both English and Norwegian, the orders verb-particle-object and verb-object-particle are allowed:

(9) a. Mannen har drukket opp vinnen
the.man has drunk up the.wine

b. Mannen har drukket vinnen opp
the.man has drunk the.wine up
'The man has drunk up the wine'

(Svenonius 1996, 10)

(10) a. John drank up his beer

b. John drank his beer up

In Dutch, a similar phenomenon can be observed. In multi-verb complexes, Dutch has optional verb raising:

(11) a. dat Jan een boek lezen wil
that Jan a book read.INF wants

b. dat Jan een boek t_i wil $lezen_i$
that Jan a book wants read.INF
'that Jan wants to read a book'

When a particle verb raises, it may either pied-pipe the particle, as in (12a), or strand it, as in (12b):

[6] Most of the data in this section is taken from Zeller (2002).

(12) a. dat Jan zijn moeder t_i wil op-bellen$_i$
that Jan his mother wants PRT-phone

b. dat Jan zijn moeder op t_i wil bellen$_i$
that Jan his mother PRT wants phone
'that Jan wants to call his mother'

(Neeleman 1994, 24)

Another well-known property of particle verbs is that the particle can be modified by certain types of adverbials, but interestingly only in one position. In English, modificiation is only allowed when the particle appears after the object:

(13) a. John threw the ball right in

b. *John threw right in the ball

Norwegian also allows modification of the particle when it follows the object:

(14) Jon sparka hunden langt ut
Jon kicked the.dog far out
(Åfarli 1985, 76)

In Dutch verb raising constructions, modification is only allowed when the particle is stranded, i.e. when the particle appears before the matrix verb:

(15) a. dat Jan de bal t_i heeft [over geschoten]$_i$
that Jan the ball has over shot
'that John kicked the ball over the goal'

b. dat Jan de bal vlak over t_i heeft [geschoten]$_i$
that Jan the ball right over has shot

c. *dat Jan de bal t_i heeft [vlak over geschoten]$_i$
that Jan the ball has right over shot
'that John kicked the ball just over the goal'

(den Dikken 1996)

So far, the data is not very problematic. Zeller (2002) points out that particles appear to have a dual status: in examples such as (13a), (14) and (15b) they appear

to be phrases, given that they can be modified, while in (13b) and (15c), they appear to be heads that cannot be modified. The idea that particle verbs can appear both as heads and phrases goes back to Larson (1989) and Baltin (1989). Zeller extends the analysis to apply to Dutch verb raising constructions. The idea is that if the particle moves with the verb when the latter undergoes head movement, the particle is necessarily a head. If it does not move with the verb, it can project a PrtP.

That Dutch verb raising is head movement is a common assumption. In English, we can attribute the effect to V-to-*v* movement of the verb, by now a standard assumption in minimalist syntax. If the verb takes the particle along when it moves to *v*, the particle is a head. If not, it can project a phrase.

Problems arise, Zeller notes, when we take inflection in consideration. Inflectional affixes invariably adjoin to the verb stem, even if the particle has moved along with the verb and should, by the assumptions above, be part of the (complex) V° head. The effect is visible in Dutch, where the infinitive marker *te* intervenes between particle and head, even if verb raising applies to both:

(16) a. omdat hij mij t_i probeert [op **te** bellen]$_i$
because he me tries PRT to ring

b. *omdat hij mij t_i probeert **te** [op-bellen]$_i$
because he me tries PRT to ring
'because he tries to call me'

The same effect can be observed in English. If the particle moves along with the verb to *v*, the past tense affix *-ed* still attaches to the verb, not to the particle:

(17) a. John [look**ed** up]$_i$ the information t_i

b. *John [look up-**ed**]$_i$ the information t_i

In order to account for these facts, Zeller argues that particles verbs are associated with *two* syntactic trees: one in which the particle is a head adjoined to V° and one in which it projects a phrase PrtP. The syntactic module can realise either tree, but the morphology is only sensitive to the one in which Prt projects, thus ensuring that

the inflectional morphology attaches to the verb stem, excluding the particle.

The dual-tree model is unattractive because it raises questions about how it can be constrained and how we can make sure that the morphological component only considers one tree, not the other. An alternative model with a single syntactic representation would therefore certainly be preferable.

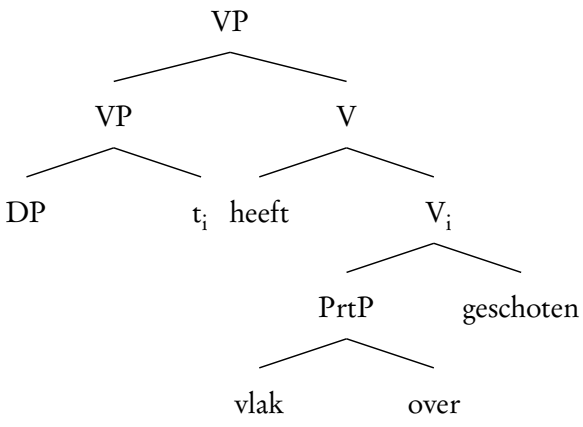
4 Prosodic frames

The idea that particles in particle verbs can be either heads or phrases cannot be expressed as a *syntactic* fact when we adopt a bare phrase structure approach. Rather, it must be expressed as an optionality in the mapping rules that involve particles. I propose that particles in particle verbs can be subject to the standard rule that maps heads to prosodic words in (7a), or they can be subject to a specific rule that maps them onto a phonological phrase:

(18) Prt $\leftrightarrow \varphi$

In itself, (18) does not predict the data we observe. If a particle can optionally map onto a φ, we would expect that it can project syntactically and thus be modified in any position it appears in. Because the notion of "head" is a derived notion, as discussed in section 2.1, a syntactic derivation along the lines of (19), which would yield the ungrammatical order in (15c), cannot be excluded:

(19)



The question then becomes how we can constrain the application of the rule in (18). There is one interesting aspect about the Dutch facts observed above: the particle can project to PrtP only if it appears on the side of the (matrix) verb where the (embedded) verb's object(s) appear, i.e., to its left. It seems obvious that this relates to the well-known fact that the Dutch verb phrase is verb-final. How can we express this in our current model?

The verb-final order of the Dutch verb phrase can be captured through a mapping rule which targets the VP:

(20) $[_{VP}\ V_1\ XP_2\ ] \leftrightarrow \varphi_2\ \omega_1$

(20) establishes the order object-verb, but as it stands, it does not seem to allow verb raising, because the rule has room for only one ω. In order to capture verb raising, the mapping rule must specify that ω may be repeated:

(21) $[_{VP}\ V_1\ XP_2\ ] \leftrightarrow \varphi_2\ \omega_1^*$

The option of repeating an element in a prosodic frame is indicated here with a star on the repeating side. That is, (21) indicates that in the mapping of a VP, the ω corresponding to the V head may actually be a sequence of ωs, as long as the ω corresponding to V is the first one in this sequence.

Suppose now that Prt raises with the verb:

(22) dat Jan $[_{VP}$ [zijn moeder t_i] wil op-bellen$_i$]
that Jan his mother wants PRT-call

The matrix VP in (22) is mapped onto phonology by rule (21), which produces the following structure:[7]

[7]Obviously, a phonological readjustment rule will apply to (23), because the prosodic words must be contained in a phonological phrase. (23) shows the structure that results from applying the syntax/phonology mapping rules, before adjustment.

(23) zijn moeder wil op bellen

$\{\ \omega \quad \omega\ \}_{\varphi}$ ω ω ω

At the same time, the particle *op* is subject to a mapping rule. If *op* does not project, the default mapping rule in (7a) may apply to it.[8]

But what would happen in the case of (19)? Here, rule (21) applies to the matrix VP, while at the same time the rule in (7b) applies to PrtP. However, both rules cannot apply together: (21) requires that the verbal complex be mapped onto a series of prosodic words. Applying (7b) would require that this series of prosodic words is broken up by a phonological phrase. Because of this conflict, (7b) cannot apply in this case, so that Prt cannot project when it moves along with the verb.

The proposal thus far describes the behaviour of particles that move along with the verb in Dutch verb raising constructions, but it is not clear yet how it deals with particles that remain in their base position:

(24) dat Jan zijn moeder op t_i wil bellen$_i$
that Jan his mother PRT wants phone
'that Jan wants to call his mother'

As it stands, the rule in (21) makes the wrong prediction. In essence, the rule does not have any room for the particle. If the particle is mapped onto a prosodic word, (21) disallows it because the first ω in the sequence must be the verb. If the particle maps onto a phonological phrase, through the alternative mapping rule in (18), it still conflicts with the the rule in (21), because this rule only allows one φ before the verb, which has to be the object.

Note, however, that this latter aspect of the rule cannot be right in any case. At the very least we need to allow more than one phrase in the VP for verbs that take more than one internal argument and for optional adverbial modifiers. But furthermore, Dutch has pseudo-scrambling in the middle field, so that the XP left-

[8] In fact, this rule applies to *all* heads in the example, of course.

adjacent to the verb is not necessarily the object:

(25) dat Jan zijn auto gisteren heeft verkocht
that Jan his car yesterday has sold
'that Jan has sold his car *yesterday*'

In (25), it is not the direct object *zijn auto* 'his car' that is left-adjacent to the verb, but the AdvP *gisteren* 'yesterday', which as a consequence receives a focus interpretation. In order to accommodate such facts, the rule in (21) needs to be modified. It must allow a sequence of phonological phrases without specifying any position for the verb's complement:[9]

(26) $[_{VP}\ V_1\ XP_2\ ] \leftrightarrow {}^{*}\varphi^{*}_{2}\ \omega^{*}_{1}$

With this modified formulation of the mapping rule for VP, we can accommodate cases such as (25), but it also allows us to deal with the particle in particle verbs. If the particle is mapped onto phonology by the rule in (18), so that it is mapped onto a phonological phrase, the rule in (26) can apply without problems.

The English facts can be handled in essentially the same way. All we need to do is to change the mapping rule for the VP. Note that English needs a different VP mapping rule anyway because of its VO structure:

(27) $[_{VP}\ V_1\ XP_2\ ] \leftrightarrow \omega^{*}_{1}\ \varphi^{*}_{2}$

Two things are different in (27): the order on the phonological side is «$\omega\ \varphi$» rather than «$\varphi\ \omega$» as in Dutch, and the φ repeats to one side only.[10] Other than that, everything proceeds as in Dutch. If the particle remains with the verb, the rule

[9]Note that this rule is oblivious to the actual linear order of phrases in the VP. Other mapping rules are responsible for this. The rule in (i) just provides the prosodic frame in which those rules can operate.

[10]It is not unlikely that both facts are related, as argued for by e.g. Neeleman & Weerman (1999). How exactly this relation can be expressed in the current model is left open for future research.

in (27) ensures that it is mapped onto a ω, not a φ. As a result, the particle cannot project, so that (28) is ungrammatical:

(28) *John threw right in the ball

Note that this result is achieved by the requirement expressed in the mapping rule in (27) that the first φ to follow the verb in the phonological structure is the object. Obviously, this is an independent requirement given the observation that objects in English are right-adjacent to the verb.

If the particle remains in a lower position, it ends up after the object,[11] where it must then map onto a φ. Mapping onto a ω is not possible in this case, because the frame in (27) does not allow for a ω to follow the object φ. The fact that the particle is mapped onto a phonological phrase allows it to project and thus be modified, making (29) grammatical:

(29) John threw the ball right in.

One final remark about the order of postverbal elements in English is in order here. Although the standard order in English has the object follow the verb directly, it is a well-known fact that other factors influence the order in the postverbal field in English (cf. Wasow 2002). I assume that such variant orders are derived orders that do not invalidate the rule in (27). Presumably, they are derived through prosodic readjustment rules.[12]

[11] I intentionally leave the exact syntactic structure open, as it is not directly relevant to the discussion. Obviously, the form of the mapping rules must be adjusted to accord with the syntax, but that is a trivial matter.

[12] A possible alternative in the current model would be that there are general phonological principles that the system attempts to apply *in competition with* a mapping rule such as (27).

5 Mapping restrictions

The previous section outlines the basic analysis that I propose in this paper. In various specific situations, however, additional mapping rules or principles apply that restrict the mapping possibilities of the syntactic particle structures. Three such instances, wich account for some well-known facts about particle verbs, are discussed here.

5.1 Inflection

The main reason why Zeller (2002) assumes a dual tree structure for particle verbs lies in their behaviour with respect to inflection. The relevant data is repeated here:

(30) a. omdat hij mij t_i probeert [op **te** bellen]$_i$
because he me tries PRT to ring

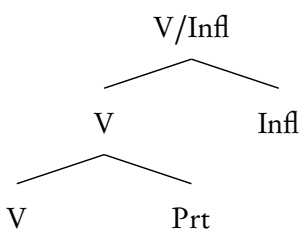
b. *omdat hij mij t_i probeert **te** [op-bellen]$_i$
because he me tries PRT to ring
'because he tries to call me'

(31) a. John [look**ed** up]$_i$ the information t_i

b. *John [look up-**ed**]$_i$ the information t_i

In the current model, these facts are straightforward. We can simply apply Ackema & Neeleman's (2004) principle of Input Correspondence. Consider the structure of the verb head in (31):

(32)



A direct linearisation of this structure would yield the linear string «verb PRT suffix», i.e. *look up-ed* in the case of (31). However, Input Correspondence requires that the inflectional affix *-ed* attach to *look*, the head from which the structure in (32)

is projected. The same follows in Dutch if we assume that in phonological terms, the infinitive marker *te* is actually a prefix. Nothing seems to speak against this assumption: *te* is phonologically part of the prosodic word formed by the infinitive, and nothing can intervene between *te* and the verb.[13]

5.2 The Verb-second effect

Another issue that needs to be accounted for is why the V2-effect only targets the verb stem, not the particle. In main clauses in both Dutch and German, particle verbs move to the C position, but strand the particle:

(33) a. Jan belt_i zijn moeder op t_i
Jan calls his mother PRT

b. *Jan op-belt_i zijn moeder t_i
Jan PRT-calls his mother
'Jan calls his mother'

In the current model, this fact can be accounted for if we assume that the C°-position is mapped onto a prosodic word that does not repeat. That is, we must assume the following rule:

(34) $C \leftrightarrow \omega$

Given that the particle of a particle verb always maps onto a ω of its own, there is simply no room for both the verb and the particle in C°.

This of course makes two predictions. First, we predict that complementisers in Dutch and German consist of at most one prosodic word. This seems to be correct. It also predicts that verbs that move to the C°-position consist of one prosodic word.

[13] Dutch does not allow constructions with split infinitives such as *to boldly go where no-one has gone before*. Note that it might be more plausible to assume that *te* + infinitive form a Clitic Group, a prosodic structure that is larger than a prosodic word but smaller that a phonological phrase (cf. Nespor & Vogel 1986). The existence of the Clitic Group is disputed, however, so I will not pursue this option here.

We have seen that this is indeed the case with particle verbs, but is it true for other verbs as well?

Most verb stems consist of a single prosodic word, but there are a few verbs in Dutch that are compounds, either of the type N+V or of the type V+V. Examples include *stofzuigen* 'to vacuum' (lit. 'to dust-suck'), *autorijden* 'to drive (a car)' (lit. 'to car-ride') and *zweefvliegen* 'to fly a glider' (lit. 'to float-fly'). Interestingly, such verbs are known to be defective, existing either in just infinitival form or in infinitival and participial forms. In V2-position, these verbs are bad:

(35) a. ik moet elke week stofzuigen.
I must every week vacuum
'I need to vacuum (the house) every week'

b. *ik stofzuig elke week.
I vacuum every week
'I vacuum (the house) every week'

(36) a. ik ga elke week zweefvliegen.
I go every week fly.glider
'I go glider-flying every week'

b. *ik zweefvlieg elke week.
I fly.glider every week
'I fly glider every week'

Interestingly, the finite forms improve when they appear in clause-final position, i.e., when V-to-C raising has not taken place:

(37) a. hij beweert dat hij elke week stofzuigt.
he claims that he every week vacuums.
'he claims that he vacuums every week.'

b. ?hij beweert dat hij elke week zweefvliegt.
he claims that he every week flies.glider
'he claims that he goes glider-flying every week.'

While these examples are not perfect, they are certainly better than those in (36). They confirm the idea that the C°-position may be associated in phonology with exactly one prosodic word, so that particle verbs can only move the verb stem to this

position, having to strand the particle.[14]

5.3 Prefix verbs

A final issue involves prefix verbs. As is well-known, Dutch and German have a class of prefix verbs, which are superficially similar to particle verbs. In (38) and (39), the particle verb is on the left, the prefix verb on the right (bold indicates main stress):

(38) Dutch:

voorkomen	voor**komen**
to occur	to prevent

(39) German:

durchkämmen	durch**kämmen**
to comb thoroughly	to search through

The differences in Dutch and German between prefix verbs and particle verbs are the position of main word stress when the particle attaches to the verb (on the particle in particle verbs and on the verb in prefix verbs, as shown in (38) and (39)), and the fact that the prefix cannot be detached from the verb. That is, it cannot be left behind in verb raising (40) or V2 constructions (41):[15]

(40) a. dat Jan zijn auto t_i wil verkopen$_i$
that Jan his car wants sell

b. *dat Jan zijn auto ver t_i wil kopen$_i$
that Jan his car PRT wants sell
'that Jan wants to sell his car'

(41) a. Jan ver-koopt$_i$ zijn auto t_i
Jan PRT-sells his car

[14]Note that German generally shows the same facts, with the exception that *staubsaugen* 'to vacuum', which is structurally identical to its Dutch counterpart, is marginally acceptable in V2-position to many speakers. Since I assume that mapping rules are in principle violable, this can be considered an instance where the mapping rule formulated in (34) is overridden by some salience principle.

[15]Note that the prefix verb *verkopen* 'to sell' in Dutch consists of the verb *kopen*, which in itself means 'to buy', and the prefix *ver-*.

b. *Jan koopt$_i$ zijn auto ver t$_i$
Jan sells his car PRT
'Jan sells his car'

Furthermore, the infinitival prefix (*te* in Dutch and *zu* in German) appears before the prefix, not in between prefix and verb stem:

(42) a. **te** verkopen – *ver**te**kopen, 'sell' (*Dutch*)

b. **zu** verkaufen – *ver**zu**kaufen, 'sell' (*German*)

The facts are all easily accounted for on the —standard— assumption that the prefix in a prefix verb maps onto a syllable in phonology, not onto a prosodic word. Being a syllable, it must be incorporated into a prosodic word, which means that prefix and verb stem form a single prosodic word. Whenever the verb moves, the prefix moves along with it, because as a syllable it cannot stand on its own. When the verb moves to C°, the prefix can also move along, because it does not map onto a separate ω.

The stress facts also follow: the prefix does not affect word stress, so that stress remains on the verb stem. In the case of particle verbs, particle and verb form two prosodic words. This situation is similar to that of compounds, which also form two prosodic words in Dutch and German. Interestingly, compounds have stress on the first word:

(43) a. **huis**sleutel – 'house key' (*Dutch*)

b. **Wein**keller – 'wine cellar' (*German*)

If prefix verbs behave like compounds prosodically, we expect stress to appear on the prefix when prefix and verb appear together. As (38) and (39) show, this is indeed the case.

6 Conclusions

In this paper, I have argued for a prosodic account of particle verbs. A particle verb is a lexical item consisting of a verb stem and a particle. The particle is a head but at the same time a maximal projection, so that in the mapping to phonology, it may correspond to different prosodic structures, either a prosodic word or a phonological phrase. Adjacent to the verb (in English) or when the particle is raised with the verb (in Dutch), the latter mapping is excluded, however, because other mapping rules require a prosodic word in those positions.

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