

Postsyntactic morphology and the syntax of verb clusters

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1. Nonfinite tense

The simple past tense in Dutch expresses that the event referred to is cotemporaneous with a reference point in the past. Other than in English, the simple past cannot be used when the reference point is the here and now and the event referred to takes place prior to the here and now (anteriority). To express anteriority, a periphrastic construction (involving a past participle and the auxiliary *have* or *be*) must be used, and we may refer to this construction as expressing a relative tense.

In the following examples, the reference point in the past is indicated by the time adverbial *toen ik binnenkwam* ‘when I came in’. (1) shows the use of the simple past to express cotemporaneity with this reference point in the past.

- (1) Toen ik binnen kwam
when 1SG.NOM in come:PST.SG
- a. * slaap-t hij
sleep-3SG 3SG.M.NOM
- b. sliep hij
sleep:PST.SG 3SG.M.NOM
- c. * heeft hij ge-slap-en
AUX:3SG 3SG.M.NOM GE-sleep-PRT

‘When I came in, he was sleeping.’

In contrast, when the reference time is the here and now (as must be presupposed in the following example), and the event referred to is situated prior to that reference point, the simple past cannot be used:¹

- (2) a. Heb je lekker ge-slap-en ?
AUX:2SG.INV 2SG well GE-sleep-PRT
‘Did you sleep well?’
- b. # Sliep je lekker ?
sleep:2SG.INV 2SG well

These facts are robust and independent of the lexical aspect (Aktionsart) of the predicates in question.

We will say that morphological adjustment of a verb to express cotemporaneity with a

¹ (2b) is felicitous when a reference point in the past is presupposed, such as *when the storm made landfall*. In that case (2a) is ungrammatical.

reference point in the past is indicative of the presence of a tense feature in (the minimal clause containing) that verb. As can be seen in (3), the tense of an embedded clause may be distinct from that of a matrix clause.

- (3) Hij beweert dat hij, toen ik binnen
 3SG.M.NOM claim-3SG COMP 3SG.M.NOM when 1SG.NOM in

 kwam, { sliep / *slaap-t }
 come:PST.SG sleep:PST.SG / sleep-3SG

This allows us to deduce the presence of a tense operator (T) internal to the embedded clause.

This now also gives us a simple test for establishing the presence of tense in nonfinite clauses (cf. Hoffmann 1966:8, Palmer 1974:54-55). If the nonfinite clause contains an element introducing a reference point in the past, and the event is interpreted as cotemporaneous with that reference point, then any morphological adjustment of the infinitive must be an expression of the value PAST of the feature tense. This is indeed what we find (Zwart 2014):

- (4) Hij beweert toen ik binnen kwam
 3SG.M.NOM claim-3SG when 1SG.NOM in come:PST.SG
 { ge-slap-en te heb-ben / * te slap-en }
 GE-sleep-PRT INF INF AUX-INF INF sleep-INF
 ‘He claims that he was asleep when I came in.’

In (4), like in (3), the tense in the matrix clause is present, so that the time adverbial phrase *toen ik binnen kwam* ‘when I came in’ is an unambiguous embedded clause constituent. To express cotemporaneity with this past reference point, the embedded infinitive *te slapen* ‘to sleep’ is turned into a periphrastic past tense infinitive *geslapen te hebben* ‘to sleep-PAST’.

As we have seen, the periphrastic past tense in the finite paradigm expresses anteriority (relative past). This interpretation is also available with the periphrastic past tense infinitive, as in (5).²

- (5) Hij beweert lekker ge-slap-en te heb-ben
 3SG.M.NOM claim-3SG well GE-sleep-PRT INF AUX-INF
 ‘He claims that he slept well.’

This means that the nonfinite paradigm is simplified with respect to the finite paradigm, but at the same time not to the extent that tense distinctions are leveled:

² In fact, the periphrastic past tense infinitive is used for anteriority with respect to a reference point in the past as well (‘plusquam perfectum’). Changing *toen* ‘when’ in (4) to *voor* ‘before’ yields the relevant example (meaning ‘... that he had slept before I came in’).

(6) finite paradigm

3SG	UNMARKED	ANTERIOR
UNMARKED	slaapt	geslapen heeft
PAST	sliiep	geslapen had

(7) nonfinite paradigm

	UNMARKED	ANTERIOR
UNMARKED	te slapen	geslapen te hebben
PAST	geslapen te hebben	geslapen te hebben

If the tense operator T is represented as a functional head in our analysis of clause structure, the findings indicate that nonfinite clauses (may) have T. We may then survey the various types of nonfinite clauses and decide which ones have T and which ones do not (and might then plausibly be analysed as bare verb phrases). This work has been done by Ter Beek (2008), who concludes that not only propositional verbs like *beweren* 'claim', but also raising verbs and epistemic modal verbs take infinitival TP-complements in Dutch. We return to the implications of this finding below.

The presence or absence of T inside infinitival clauses informs the structural analysis of infinitival complements. On a cartographic approach to syntactic structure, absence of T leads to the hypothesis of a truncated clause structure, where the infinitive fails to grow into a full-sized clause. On this approach, the structure of the clause with its functional projections is universally given, so that absence of a low functional projection necessarily implies absence of all higher projections in the universal structure.

This cartographic approach to infinitival clause structure underlies the analysis of Wurmbrand (2001) (and, to a lesser extent, also Ter Beek 2008), who assumes a functional domain as in (23a) below, where the projection for licensing objects vP is lower than the projection of the tense operator TP. As we will see below, objects in German and Dutch typically cannot be realized internal to an infinitival complement clause, suggesting to Wurmbrand that in those situations the truncation point is below vP, and absence of object licensing and absence of tense go hand in hand. As we will see below, an independent tense operator can be present inside the infinitival complement, even if objects cannot be licensed internal to the infinitival clause, suggesting that the cartographic approach, where size of the infinitival clause is determined by an implicational hierarchy, is unsuccessful in this domain.

This paper proposes an alternative, more dynamic approach to clause structure, capitalizing on the idea, tacitly assumed in most approaches, that a derivation must be a *network* of derivations ('layered derivations', cf. Zwart 2009), with subsidiary derivations feeding into a main derivation at various points. On this approach, infinitival tense points

to the construction of a tensed verb cluster in a separate derivation.³

2. Tenselessness

We have seen that infinitives in Dutch undergo morphological adjustment to express the feature PAST (i.e. cotemporaneity with a reference point in the past). This does not happen in nominal infinitives. Compare:

- (8) [Dat ik sliep toen hij binnen kwam]
COMP 1SG.NOM sleep:PST.SG when 3SG.M.NOM in come:PST.SG

maak-te een slecht-e indruk
make-PAST.SG INDEF bad-AGR impression

‘That I was sleeping when he came in created a bad impression.’

- (9) [Dat { slap-en / *ge-slap-en heb-ben } toen hij binnen
DEM.N sleep-INF GE-sleep-PRT AUX-INF when 3SG.M.NOM in

kwam] maak-te een slecht-e indruk
come:PST.SG make-PST.SG INDEF bad-AGR impression

‘Sleeping when he came in created a bad impression.’

In (8) we have a finite subject sentence with an explicit reference point in the past given by the time adverbial *toen hij binnen kwam* ‘when he came in’, and the verb *slapen* ‘sleep’, referring to an event that is cotemporaneous with the reference point in the past, must be in the simple past form. In (9), the subject is a nominal infinitive (nominalization), including the same time adverbial making the reference point in the past explicit, yet the infinitive does not undergo any morphological adjustment.

We conclude from this that nominalizations, unlike infinitival complements, lack tense altogether (see also Alexiadou 2001:59f).

Notice that the morphological adjustment in (9) does take place to express anteriority:

- (10) [Dat ge-slap-en heb-ben voor hij binnen kwam]
DEM.N GE-sleep-PRT AUX-INF before 3SG.M.NOM in come:PST.SG

was geen slecht idee
be-PST.SG INDEF:NEG bad idea

‘To have slept before he came in was not a bad idea.’

This is consistent with the findings of Ter Beek (2008), who identifies anteriority in several infinitival complements that do not allow the morphological expression of past tense (e.g.

³ Ter Beek (2008:240) assumes that infinitives unable to license objects have a defective vP, so that the presence of T in these infinitives is not determined by the possibility of object licensing.

deontic modals and irrealis control verbs).⁴

3. Postsyntactic morphology

So far we have seen that the periphrastic past in Dutch (formed by the combination of a past participle and an auxiliary *have* or *be*) expresses anteriority (in all domains), but also past tense (i.e. cotemporaneity with a reference point in the past) in nonfinite clauses. This leads to the question how synthetic and analytic tenses are realized in the model of grammar we assume. Concretely, how can a single feature value (PAST) give rise to both synthetic and periphrastic realization?

In the current minimalist model of grammar, we assume that the entities manipulated in syntax are just (bundles of) features, which receive a morphological realization after completion of the syntactic derivation ('postsyntactic morphology'). We refer with 'V' to the bundle of features that receives a morphological realization as a verb form. V does not inherently have any tense features, but it may inherit tense features from the tense operator T. (I assume that the relation of c-command between T and V suffices for V to inherit the relevant feature values from T.) If T has the feature value PAST, then V also acquires PAST, and morphological realization involves the selection of the best form from the verbal paradigm to express the feature value PAST (as well as the other features carried by V).

In this model, what we need to assume is that the verbal paradigms from which forms are selected for morphological realization of syntactic terminals like V contain both synthetic and periphrastic forms (Zwart 2017a). That is, the paradigms look more or less like (6)/(7).⁵ This view of paradigms as consisting of both synthetic and periphrastic forms is independently supported from morphological research on periphrasis, e.g. Chumakina and Corbett (2013).

On this approach, the auxiliary involved in the formation of the periphrastic past has no independent syntactic status. In terms of the minimalist model of grammar (see below, section 10), it is not an (independent) element in the Numeration and it does not undergo merge by itself. The auxiliary is, for all intents and purposes, just a piece of morphology, similar to a bound morpheme.⁶

The reason this approach seems attractive to me (apart from its consistency with current views on periphrasis in theoretical morphology) is that it is unclear on what grounds the

⁴ Whether or not tense is expressed in an embedded infinitival clause also seems to depend on the nature of the complementizer. Complementizers like *door* 'by' and *na* 'after' force a simultaneous and an anterior reading, respectively, in the sense that the event referred to in the infinitival clause introduced by these complementizers is interpreted in relation to the tense of the matrix clause (comparable to the use and interpretation of the gerund and the absolute constructions in Latin). The facts are that infinitival clauses introduced by *na* 'after' feature the infinitival past, while infinitival clauses introduced by *door* 'by' must have an unmarked infinitive (even in the presence of a time adverbial introducing a reference point in the past). I am not aware of any detailed analyses of these effects.

⁵ Note that the paradigm in (6) is incomplete, showing only the forms for 3SG.

⁶ Clearly, auxiliaries and bound morphemes differ in a number of potentially important respects. For example, the auxiliary undergoes verb movement and can be stranded under ellipsis (e.g. in English and Afrikaans). While these facts may indicate that the approach contemplated here is wrong headed, they may also be taken to endorse the view that verb placement and ellipsis are not processes of narrow syntax, but phenomena belonging to the spell-out process. We set these issues aside in the context of this article.

auxiliary would have to be included in the Numeration, and merged in a separate syntactic position in nonfinite clauses, but not in finite clauses, when the tense features in both types of clauses have exactly the same value.⁷

It should be pointed out, perhaps, that the fact that periphrastic expressions are clearly structured does force us to describe them as the output of some syntactic derivation. However, nothing prevents us from assuming that the syntactic derivation in which periphrastic expressions are created is a stand-alone derivation, feeding into the morphological paradigms (Zwart 2017a). Something similar must be assumed for every structured lexical item (such as compounds), not to mention lexicalized phrasal expressions (such as *a little bit*). In other words, assuming that periphrastic expressions populate paradigms does not reduce us to any simple form of lexicalism.

This presupposes a model of grammar in which derivations are layered, involving subderivations which may have various points of contact (Zwart 2009, 2011, 2017a). Concretely, a derivation may feed into any component interfacing with narrow syntax, i.e. into the Numeration or into components accessed during externalization, like Morphology (i.e. the collection of word forms), but not, I would like to maintain, into narrow syntax directly. The idea that the word forms in Morphology are generated by separate derivations of an essentially syntactic nature is implicitly assumed more generally, I believe, and 'lexicalism' (e.g. Chomsky 1970) is to be understood as an approach in which derivations for separate domains (syntax and morphology) are not mixed but have strictly defined points of contact.

The assumption that the periphrastic past is not created in narrow syntax, but in a separate derivation feeding the morphological paradigms, does make a prediction that a traditional, weak-lexicalist analysis would not make. This prediction is that we may expect to find morphological ideosyncrasies in the elements constituting the periphrastic past (i.e. the participle and the auxiliary) that we do not find elsewhere. This relates to the assumption, often made in both traditional and generative analyses, that the auxiliary *have* is (derived from) the possessive verb *have* (e.g. Vendryes 1937, Benveniste 1960), and shows similar syntax, e.g. in that both possessive and auxiliary *have* are the result of conflation of *be* and a preposition (Kayne 1993, Hoekstra 1999).

But Afrikaans shows that auxiliary *have* has moved away from possessive *have* to such an extent that assuming the lexical status of the periphrastic past tense is warranted. In Afrikaans the simple past tense has all but completely disappeared, so that both anteriority and cotemporaneity with a reference point in the past are expressed by the periphrastic combination of a past participle and auxiliary *have*. This auxiliary invariably takes the form *het* (derived from the Dutch finite form *heeft*), also in infinitival contexts (Donaldson 1993:239):⁸

⁷ An alternative would be to assume that the auxiliary (or the features corresponding to the auxiliary) is merged separately in both finite and nonfinite clauses, and that the simple past is the result of a conflation of V and the auxiliary that takes place in finite clauses but is somehow blocked in nonfinite clauses (something like this is proposed in Embick 2000 for synthetic and periphrastic perfects in Latin). But this alternative is more complicated in that it has to assume both syntactic conflation (as proposed in Distributed Morphology) and a blocking factor, the latter not independently established.

⁸ In Afrikaans, the past participle is marked only by the prefix *ge-*, which is no more than a secondary marker in Dutch, next to the participial ending *-d/-t/-en*.

- (11) a. Ek wil dit hê Afrikaans
 1SG.NOM want DEM have:INF
 ‘I want to have this.’
- b. Hy moet die bok ge-skiet { het / *hê }
 3SG.M.NOM must DEF buck PRT-shoot AUX / AUX:INF
 ‘He must have shot the buck.’

In Afrikaans, *have* is one of the few verbs that still shows a morphological finiteness distinction (infinitive *hê* vs. finite *het*). As expected, *have* selected by a modal verb takes the infinitive form (11a), but the auxiliary selected by a modal verb does not (11b). This shows that (at least in Afrikaans, but presumably elsewhere as well), the auxiliary cannot be equated with the possession verb, and has become a mere past tense marker.

Thus, the periphrastic expression shows morphological ideosyncrasies that are unexpected if the auxiliary is still an independent syntactic element (Zwart 2017b).

4. Tense in verb clusters

If we now continue to assume that the periphrastic past in Dutch is a morphologically complex lexical item, occupying a cell in the inflectional paradigm, it follows that no syntactic process of verb clustering (‘verb raising’) needs to be assumed in order to derive participle-auxiliary strings. These strings show up in embedded clauses, where the verb-second rule shifting a finite element to the left does not apply:

- (12) ... dat hij lekker ge-slap-en heeft
 COMP 3SG.M.NOM well GE-sleep-PRT AUX:3SG
 ‘... that he slept well.’

In narrow syntax, the string *geslapen heeft* is represented by just a single terminal (V), marked by the feature value ANTERIOR giving rise to periphrastic morphological realization (cf. (6)).⁹ While it is not clear at this point that the same can be said about other verb clusters in Dutch, it does already promise a considerable reduction in the notorious complexity of these verb clusters (cf. Evers 1975, Rutten 1991, Zwart 1996).

Consider, for example, the (seemingly) three-verb cluster in (13).¹⁰

⁹ I’m ignoring the distinction between V and *v* (‘little *v*’) here, for reasons of exposition.

¹⁰ The string of numbers on the right indicates the relative position of each verb in the syntactic structure, where higher numbers indicate deeper embedding.

- (13) ... dat hij lekker moet heb-ben ge-slap-en (1-2-3)
 COMP 3SG.M.NOM well must:SG AUX-PL GE-sleep-PRT
- toen ik binnen kwam
 when 1SG.NOM in come:PST.SG

‘... that he must have been sleeping well when I came in.’ (epistemic)

Syntactically, *moet hebben geslapen* involves at most two verbs, the modal auxiliary (*moet*) and a V with the feature PAST that gives rise to periphrastic spell-out.¹¹

Wurmbrand (2001:185) analyses constructions like (13) as involving a syntactically independent temporal auxiliary, which can occupy various functional head positions associated with different modal interpretations.¹² This yields the effect that the order of the modal and the temporal auxiliary forces a particular interpretation on the modal. Wurmbrand argues that the higher modal position is associated with epistemic modality, so that if the temporal auxiliary takes that position (and hence precedes the modal), the modal can no longer be interpreted epistemically. This is correct:

- (14) ... dat hij hard heeft moet-en werk-en (1-2-3)
 COMP 3SG.M.NOM hard AUX:SG must-INF work-INF
- ‘... that he had to work hard.’ (deontic/*epistemic)

In (13), on the other hand, the modal may be taken to occupy the higher position associated with epistemic modality, the auxiliary is pushed down to a lower modal position, and it follows that the epistemic reading becomes available.¹³

This analysis, relying on the independent syntactic status of the auxiliary, is not compatible with our approach to periphrastic tense morphology. Can we derive the constraints on the interpretation of the modal auxiliary without assuming any variation in the syntactic position of the temporal auxiliary? I believe we can. Two independent observations regarding modal interpretation are relevant here. First, deontic modality requires a temporal association between the modal auxiliary and the verb in its complement domain, in the sense that the verb cannot have a tense reference independently from the modal auxiliary. It follows that when the modal in (13) combines with a PAST-marked infinitive, the deontic reading is not available.¹⁴ Second, epistemic modality is closely associated with the speaker, hence with the here and now. As a result, epistemic modality,

¹¹ As before, the infinitival past has both a simple past and an anteriority reading, but the simple past reading is forced by the explicit reference point in the past marked by *toen ik binnen kwam* ‘when I came in’.

¹² In these constructions, where the embedding predicate is a modal auxiliary, Wurmbrand (2001) does not assume a truncated structure for the embedded infinitival like (23b), but she assumes that the most deeply embedded predicate is V and that the higher predicates occupy positions in the functional domain of V (‘functional restructuring’).

¹³ A deontic reading is in principle also available, but only with an anterior tense interpretation of the periphrastic past infinitive (so it is not available in [13], where a simultaneous reading is forced).

¹⁴ Where the infinitive receives an anterior reading, the anteriority must be interpreted with respect to the here and now when the modal is in the present tense, and with respect to a reference point in the past when the modal is in the past tense, confirming the tense association in the case of deontic modality.

reflecting a commitment by the speaker, may be incompatible with the past tense to begin with.¹⁵ But as the speaker may conceive the probability of past events, no temporal association between matrix and embedded tense is required, making the epistemic interpretation available for (13). On the other hand in (14), where the entire cluster *moeten werken* is marked by the feature PAST, which is fine for a deontic reading, the epistemic reading is blocked because of the incompatibility of past tense with epistemic modality.

It follows that we do not need to assume that the temporal auxiliary is an independent syntactic element (in the derivation of the clause in which it appears) in order to explain the interpretation of modal auxiliaries. More generally, we may now assume that the feature tense is always present in the complement of modal verbs, albeit that the interpretation of the modal auxiliary is restricted when the value of tense in the complement of the modal verb is independent of the value of tense associated with the modal verb itself.

The simplest assumption consistent with these findings is that a verb in the complement of a modal auxiliary may (perhaps: must) always have its own tense operator, the value of which may be independent, or dependent on the value of the tense operator associated with the modal auxiliary. If independent (and PAST), the verb in the complement of the modal auxiliary is realized periphrastically, yielding (13), and giving rise to epistemic interpretation. If dependent, the tense features are morphologically realized on the modal auxiliary only, yielding (14).¹⁶ In other words, dependent tense is morphologically unmarked.

5. Finiteness and tense

By now it should be clear that tense and finiteness must be sharply distinguished. Nonfinite verbs may have tense, realized periphrastically in languages like Dutch. Two factors conspire to lead us to believe (erroneously) that infinitives lack tense: the tense of an infinitive may have an unmarked value (PRESENT) which does not receive any particular morphological realization, or the tense of an infinitive may be dependent (on the tense of a matrix clause), in which case again an unmarked realization ensues. So the only context in which we find nonfinite tense clearly expressed is (in Dutch) where the tense of the infinitive is not dependent and its value is PAST (i.e. expresses unique cotemporaneity with a reference point in the past).

This raises the question how finiteness is to be defined, if not via reference to tense. One way would be to capitalize on the intuition that finiteness is a property of clauses in which both a subject and a predicate are expressed. More precisely, the predicate must be a dependent of the subject, in the sense that the reference of the subject delimits the

¹⁵ This does not preclude the spurious past tense of inner thoughts and sequence of tense contexts, where epistemic modality does arise, but the feature PAST is arguably absent. If we force a situation where the past tense modal is interpreted as cotemporaneous with a reference point in the past, the epistemic interpretation is not available.

(i) ... dat hij in die jar-en rijk { moet zijn ge-wees-t / *moest zijn }
 COMP 3SG.M.NOM in DEM:PL year-PL rich must AUX:INF GE-be-PRT / must:PST be:INF
 ‘... that he must have been rich in those years.’ (intended: epistemic)

¹⁶ Note that the feature ANTERIOR *can* be expressed morphologically in the complement of a deontic modal auxiliary, again by the infinitival past (see (7)). In this case, the reference point with respect to which anteriority is computed must be dependent on the tense of the modal auxiliary for a deontic interpretation to be felicitous.

interpretation of the predicate. If the predicate refers to a set of events, the combination with the subject restricts the interpretation of the predicate such that the proposition as a whole refers to a single event.

While this needs further elaboration, it does express the intuition that finiteness is a function of a subject-predicate nexus, suggesting that what infinitives lack most of all is not tense, but a subject. In this connection, I take it to be significant that the subject of control infinitives, PRO, is never morphologically realized.¹⁷ While various effects internal to a control infinitive suggest the presence of an empty subject, this empty subject lacks the property that overt subjects have of delimiting the reference of the predicate in the sense described above.¹⁸ Apparently, we need an overt subject to achieve finiteness.¹⁹

Continuing along this line, it is clear that infinitives are propositionally deficient in some way. This, I believe, cautions against a clausal analysis of infinitives (and hence against a bi-clausal analysis of constructions involving infinitival complements). On the other hand, if infinitives are in some way less than full clauses, we must still accommodate the presence of tense inside infinitives. As we will see, infinitives can have tense in spite of them being unable to license objects, so that a simple cartographic analysis of infinitives as truncated clauses of various sizes (VP, vP, TP, CP; cf. Wurmbrand 2001) seems to fall short.

6. Restructuring

An infinitive can be more or less integrated with the verb that selects it as its complement. In Dutch, the distinction is clearly marked:

(15) *integrated*

... dat Cook het Zuidland weer probeer-t te vind-en
COMP Cook DEF:N South Land again try-3SG INF find-INF
'... that Cook is trying to find the South Land again.'

(16) *non-integrated*

... dat Cook weer probeer-t (om) het Zuidland te vind-en
COMP Cook again try-3SG COMP DEF:N South Land INF find-INF
'... that Cook is trying to find the South Land again.'

In the integrated construction (15) the infinitive *te vinden* 'to find' and the verb selecting it *probeert* 'tries' form a string, typically referred to as a verb cluster. The object associated with *vinden* 'find', *het Zuidland* 'the South Land', appears to the left of the cluster, possibly even preceding a matrix clause adverbial like *weer* 'again'. In the non-integrated construction (16), the verbs do not form a cluster and the object *het Zuidland* 'the South

¹⁷ Except in so-called backward control constructions (Fukuda 2008), where the nonfinite control complement arguably contains an overt subject, controlled by a zero element in the matrix clause. I leave this as a subject for further study.

¹⁸ Hence we may contemplate an analysis of predication in control constructions in terms of function composition instead of through a controlled empty subject (Jacobson 1992).

¹⁹ Obviously an overt subject may be zero, as in prodrop, but unlike PRO this involves zero realization in the context of a set of oppositions making up the pronominal paradigm.

Land' of *vinden* 'find' is inside a nonfinite clause, optionally introduced by a nonfinite complementizer *om*.²⁰ This construction is typically described as involving extraposition, rightward movement of the infinitival complement clause, and we can use the term 'extraposition' as a shorthand for the non-integrated type of the infinitival complement.²¹ Note that Dutch, other than German, lacks the 'intraposition' variant in (17), where the infinitival complement clause appears to the left of the matrix verb:

(17) *not integrated, intraposition*

* ... dat Cook weer [het Zuidland te vind-en] probeer-t
 COMP Cook again DEF:N South Land INF find-INF try-3SG
 (intended) '... that Cook is trying to find the South Land again.'

The question now is how the integrated infinitive (cf. (15)) needs to be analyzed.

On a bi-clausal analysis of infinitives, (15) is derived from (16) (or (17)) through some operation manipulating the structure (typically involving raising of the infinitive to adjoin to the matrix verb, as in Evers 1975; see Wurmbrand 2001:11f for a survey). As a result, the two verbs are reanalysed as a cluster, and the derivation (raising plus clustering) is referred to as 'verb raising'. In Dutch, the hallmark of verb raising is the IPP-effect, i.e. in the periphrastic past the participle (*geprobeerd* 'tried') is replaced by an infinitive (*proberen* 'try', marked IPP in the glosses):²²

(18) ... dat Cook het Zuidland heeft probeer-en te vind-en
 COMP Cook DEF:N South Land AUX:3SG try-IPP INF find-INF
 '... that Cook tried to find the South Land.'

Exactly what explains the effect is unclear, but as it never occurs with 'extraposition', it appears to be a function of verb clustering.

On a mono-clausal analysis, the infinitival complements in the integrated (15) and non-integrated (16) constructions are of different sizes. In particular, the infinitival complement in the integrated construction (15) is not a full clause, and in most analyses it is a mere VP (see Wurmbrand 2001:10-11 for a survey; we will take Wurmbrand's 2001 analysis as a point of reference).²³

²⁰ Note that the position of the matrix adverb *weer* 'again' shows that the verb *probeert* 'tries' has not undergone embedded verb movement in (16).

²¹ On the traditional assumption that the VP in Dutch is head-final (Koster 1975), the infinitival clause undergoes extraposition from a position to the left of the matrix verb *probeert* 'tries'. Assuming head-initial structure of the VP in Dutch (with Zwart 1993), no rightward movement needs to be involved in the derivation of (16).

²² Some verb showing the alternation between 'verb raising' (15) and 'extraposition' (16) apply the IPP-effect optionally. When they do not, we speak of the 'third construction' (Den Besten et al 1988). This term also refers to a relatively large class of predicates that select an infinitival complement whose object is licensed in the matrix clause, as in 'verb raising', but that never show the IPP-effect when expressing the relative past. These verbs are typically implicative, irrealis, or propositional control verbs (see Rutten 1991 and Ter Beek 2008 for surveys).

²³ Wurmbrand (2001) makes a distinction between two classes of predicates taking integrated infinitival complements, which she calls lexical and functional restructuring predicates. The former take a reduced clausal complement, in fact a VP; the latter are plain and simple monoclausal structures where the matrix predicate occupies one of the functional heads (including 'little v') in the extended projection of a nonfinite verb. Functional
 (continued...)

Basing ourselves on Wurmbrand (2001) and Bobaljik and Wurmbrand (2005) we may distinguish three basic diagnostics characteristic of restructuring (at least in Continental West Germanic):²⁴

(19) restructuring diagnostics

- a. licensing of the object of the embedded predicate in the functional domain of the matrix clause ('object shift')
- b. scope of the embedded object over the matrix predicate ('wide scope')
- c. raising of the embedded object to the status of matrix subject when the matrix predicate is passive ('long passive')

These diagnostics all hinge on a single property, namely the inability of the embedded predicate to license its object (where licensing means: provide a position expressing its grammatical function). As a result, the object of the embedded predicate must shift into the functional domain of the matrix clause (19a), takes scope from that position (19b), and shifts to subject position where the object licensing position is suppressed under passive (19c).

The diagnostics are illustrated for German in (20)-(22).

(20) *object shift*

... dass er den traktor bereits zu reparier-en
 COMP 3SG.M.NOM DEF.M.SG:ACC traktor already INF repair-INF
 versuch-t hat
 try-PRT AUX.3SG
 '... that he already tried to repair the tractor.'

(21) *wide scope of shifted object*

... dass er nur ein-en traktor zu reparier-en
 COMP 3SG.M.NOM just INDF.M.SG-ACC traktor INF repair-INF
 verges-sen hat
 forget-PRT AUX:3SG
 '... that he forgot to repair only one tractor.' (*only* » *forget* ; *forget* » *only*)

(22) *long passive*

... dass die traktor-en zu reparier-en versuch-t wurd-e/en
 COMP DEF.PL tractor-PL INF repair-INF try-PRT AUX.PASS-SG/PL
 '... that they tried to repair the tractors.'

In (20) the object *den traktor* 'the tractor' of the embedded verb *reparieren* 'repair' appears to the left of the matrix adverb *bereits* 'already', suggesting movement into the matrix clause. In (21) we see that the shifted object *nur einen traktor* 'just a single tractor' may

²³ (...continued)

restructuring predicates include modal auxiliaries, raising verbs, and verbs of causation/perception ('Exceptional Casemarking verbs').

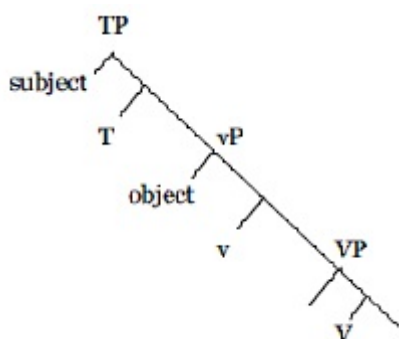
²⁴ I'm ignoring a fourth diagnostic criterium, pronoun fronting across the subject, which is absent from Dutch.

take scope over the matrix predicate *vergeffen* ‘forget’.²⁵ In (22) the passive auxiliary *wurden* can show plural agreement with *die traktoren* ‘the tractors’, suggesting *die traktoren* has now moved into the subject position of the matrix clause (‘long passive’).²⁶

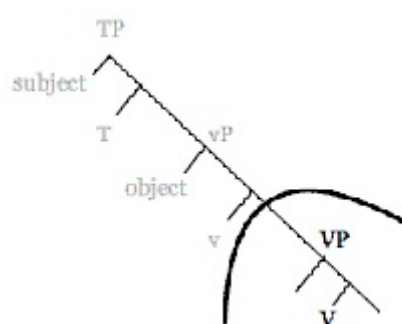
In a cartographic approach to syntactic structure, assuming a richly articulated functional domain, minimally containing licensing positions for the subject (Spec,TP) and object (Spec,vP), with a functional head for tense T in between (23a), restructuring points to the absence of vP in the functional domain associated with the embedded predicate (hence the object shift)(23b). But then the higher functional projection TP (and others) must also be absent, and this is what Wurmbrand (2001) concludes.

(23)

a. full structure



b. restructuring



Hence it is imperative, on this cartographic approach, that the embedded predicate, having no room for TP, lacks tense. This is even more dramatically imperative with what Wurmbrand (2001) calls ‘functional restructuring’ predicates (see notes 12, 23), where the embedded predicate occupies the V-position and the restructuring predicate occupies some functional position in its extended projection; here the structure provides just a single TP for both predicates, and we expect no independent tense properties with the embedded predicate. Yet this is what we clearly find, even with functional restructuring predicates, such as modal verbs.

7. Restructuring in Dutch

To better appreciate the restructuring diagnostics listed and illustrated for German in the previous section, consider how these diagnostics play out in Dutch.

In Dutch, the object of a predicate embedded under a modal auxiliary must be realized in the functional domain of the matrix clause (criterion (19a), object shift):

²⁵ See note 26 on the narrow scope reading of the embedded object.

²⁶ When the auxiliary is marked singular, the structural analysis is completely different. In this case, *die tractoren* remains inside the complement clause, which appears to the left of the matrix verb (‘intraposition’), and the construction is an impersonal passive (arguably with a zero expletive subject in the matrix clause). See (26) below, and Wurmbrand (2001) for much discussion. Intraposition also yields the narrow scope reading of the embedded object in (21). See below.

(24) *object shift with modals in Dutch*

- a. ... dat Cook het Zuidland niet kan vind-en
COMP Cook DEF.N South Land NEG AUX:MOD find-INF
'... that Cook cannot find the South Land.'
- b. * ... dat Cook niet kan het Zuidland vind-en
COMP Cook NEG AUX:MOD DEF.N South Land find-INF
(intended) '... that Cook cannot find the South Land.'

We saw the same object shift with control predicates like *proberen* 'try', at least in the 'integrated' construction (cf. (15)), but here the alternative possibility of extraposition exists (cf. (16)), where the embedded predicate has a full functional structure associated with it, and the object is licensed in the embedded clause.

An object of an embedded predicate, licensed in the matrix clause, has scope over the matrix predicate (criterion (19b)):

(25) *wide scope with object shift*

- a. ... dat hij elk-e knop
COMP 3SG.M.NOM every-ARG button
was vergeten in te druk-ken
AUX:PST.SG forget:PRT in INF press-INF
'... that he forgot to press every button.' (*every* > *forget*)
- b. ... dat hij was vergeten
COMP 3SG.M.NOM AUX:PST.SG forget:PRT
elk-e knop in te druk-ken
every-ARG button in INF press-INF
'... that he forgot to press every button.' (*forget* > *every*)

Other than in English and German, there is no structural ambiguity in the string giving rise to the wide or narrow scope interpretations. In the integrated ('verb raising') construction (25a), the embedded object *elke knop* 'every button' shifts to the matrix clause functional domain and takes scope over the matrix predicate *vergeten* 'forget' to its right (i.e. as a function of c-command). In the non-integrated ('extraposition') construction (25b) the object stays inside the embedded clause and is in the scope domain of the matrix verb *vergeten* 'forget'.²⁷

A crucial difference between Dutch and German here is that German allows the intraposition order, in which the embedded clause precedes the matrix predicate (cf. (17), (22)). As a result, the string *dass er nur einen traktor zu reparieren vergessen hat* 'that he forgot to repair just one tractor' of (19b) is ambiguously integrated (26a) and non-integrated *cum* intraposition (26b):

- (26) a. ... dass er nur einen traktor [zu reparieren vergessen hat]

²⁷ As Bhatt & Keine (2014) show, we get the same scope effects with adjuncts such as 'five times'. These can shift to the matrix clause as well, taking scope over the matrix predicate (yielding a reading 'five times forget to press') or, in case of extraposition, remain in the embedded clause and be interpreted in the scope of the matrix predicate ('forget to press five times'). As Bhatt & Keine conclude, the fact that adjuncts also shift suggests that denying an object licensing position to the embedded clause can only be part of the story.

b. ... dass er [nur einen traktor zu reparieren] vergessen hat

Nur einen traktor ‘just a single tractor’ has scope over the matrix predicate *vergessen* ‘forget’ only in the integrated construction (26a), where it is licensed in the matrix clause. Arguably, then, Dutch and German do not differ in the presence or amount of restructuring with these predicates, but in the linear order of the elements in the non-integrated (non-restructuring) construction.

Dutch lacks the long passive construction, a fact that weighs heavily in the analysis of Wurmbrand (2001):²⁸

(27) *long passive in Dutch*

* ... dat de traktor-en ge-probeer-d werd-en te reparer-en
COMP DEF:PL tractor-PL GE-try-PRT AUX.PASS:PST-PL INF repair-INF
(intended) ‘... that they tried to repair the tractors.’

In the integrated construction in Dutch (cf. (15)), it is impossible to passivize the higher of the two predicates. The intended reading can only be expressed by passivizing the matrix predicate in the non-integrated construction (cf. (16)). This yields an impersonal passive construction with clausal embedding:

(28) *impersonal passive with clausal embedding in Dutch*

... dat (er) ge-probeer-d werd de traktor-en te reparer-en
COMP EXPL GE-try-PRT AUX.PASS DEF:PL tractor-PL INF repair-INF
‘... that they tried to repair the tractors.’

In impersonal passives in Dutch, the subject is an expletive, which may be left out in constructions with clausal embedding. German also knows this alternative to the long passive construction, albeit that the expletive is always left out. When the embedded clause is extraposed, no string ambiguity arises (29), but when the embedded clause is intraposed, as in (30), the elements line up in the same way as in the integrated construction (cf. (26)), and only the agreement on the passive auxiliary can distinguish the integrated (long passive) and the non-integrated (impersonal passive) construction (cf. (31)).²⁹

(29) *non-integrated construction, extraposition (German)*

... dass versuch-t wurd-e die traktor-en zu reparier-en
COMP try-PRT AUX.PASS:PAST-SG DEF:PL.NOM tractor-PL INF repair-INF
‘... that they tried to repair the tractors.’

(30) *non-integrated construction, intraposition (German)*

... dass die traktor-en zu reparier-en versuch-t wurd-e
COMP DEF:PL.NOM tractor-PL INF repair-INF try-PRT AUX.PASS:PAST-SG
‘... that they tried to repair the tractors.’

²⁸ See Wurmbrand (2001:24-25) for a brief discussion.

²⁹ This is because the impersonal passive invariably triggers default (singular) agreement.

(31) *integrated construction, long passive (German)*

... dass die traktor-en zu reparier-en versuch-t wurd-en
COMP DEF:PL.NOM tractor-PL INF repair-INF try-PRT AUX.PASS:PAST-PL
'... that they tried to repair the tractors.'

So again, what distinguishes Dutch and German is the distribution of the embedded clause in the non-integrated construction, as well as a range of other surface distinctions, such as the realization of the expletive in impersonal passives.

We may add to this a further, important but potentially superficial difference (in the sense that it reflects linearization rather than a structural difference), namely that the order of the verbal elements in the integrated construction (i.e. in the verb cluster) is much more varied in Dutch than in German. Simplifying somewhat, we can say that the order is fixed and 'descending' (3-2-1) in German, and varied with a tendency to ascend (1-2-3) in Dutch (see Zwart 1996 for some more detail, and Wurmbrand 2005 for a more general survey).

(32) *order of elements in the verb cluster* (higher number is more embedded)³⁰

- a. two-verb cluster
 - German: 2-1
 - Dutch: 2-1 or 1-2
- b. multi-verb cluster
 - German: 3-2-1
 - Dutch: 1-2-3

For Wurmbrand (2001:25) the absence of long passives in Dutch unavoidably leads to the conclusion that Dutch lacks the bare VP-infinitives that are the hallmark of restructuring in her analysis (see (23b)). It follows that the object in (15) cannot have undergone object shift, as the embedded predicate now must have a vP in its functional domain, in which the object is licensed locally.

However, this cannot be right, since the object in the integrated construction does take scope over the matrix predicate (see (25)), just like in German. Since the scope properties are tied to the position of the object in syntactic structure (wide scope with object shift, narrow scope without object shift), it must be the case that object placement in Dutch and German is essentially the same, involving licensing of the embedded object in the matrix clause.³¹

8. The absence of long passives in Dutch

We have seen that two of the three criteria diagnosing restructuring (object shift and wide scope of the embedded object) are found in Dutch, suggesting that Dutch and German both have restructuring, however analysed. The only difference between Dutch and German is

³⁰ Systematic deviations from this simplified picture are: (i) in German, the hierarchically higher element may come first in the string, yielding patterns like 1-3-2 and even 1-2-4-3 and other variants (see Bech 1955); (ii) in Dutch, the most deeply embedded element, when a participle, may float to the left, ideally all the way, yielding 3-1-2 or 4-1-2-3, but with intermediate surfacings not wholly excluded.

³¹ See also VandenWyngaert 1989, Zwart 1993, Den Dikken 1996.

that Dutch lacks, but German has long passives.

While Wurmbrand (2001) takes the absence of long passives in Dutch as an indication that Dutch lacks restructuring, an obvious alternative approach would be to explain the absence of long passives in Dutch away, and retain the basic commonality of restructuring in the two languages. And I believe that the absence of long passives in Dutch can be explained away quite easily if we refer to the superficial differences between Dutch and German noted above.

If the absence of long passives is not indicative of the absence of restructuring, we have to explain why, in Dutch, in spite of restructuring having occurred (i.e. the clauses are integrated and the verbs form a cluster), passivization yields no result. If the crucial factor distinguishing Dutch and German in this domain is not structural, it must be morphological (in the sense of having to do with the externalization of the syntactic structure derived by narrow syntax). Recall that verb clusters in Dutch are by and large ascending (1-2-3) vs. descending (3-2-1) in German (cf. (32)). Let 1 be the passive auxiliary and 2-3/3-2 the cluster to be passivized. Passivization involves morphological marking of the verb cluster, in particular on the right edge of the higher of the two predicates (i.e. 2).³² In both Dutch and German 1 and 2 are adjacent, but only in German is the passive auxiliary 1 adjacent to the passive suffix on 2:

(33) *passivizing a verb cluster*

- a. German [V-inf V-pass] **Aux**_{PASS}
b. Dutch **Aux**_{PASS} [V-pass V-inf]

This suggests (at least as a possibility) a constraint on the realization of passive morphology on verb clusters:³³

- (34) If C is a verb cluster consisting of n verbs, such that V_n is the hierarchically highest verb in C, and C has the feature passive F_p , and F_p is realized by a suffix on V_n and by a passive auxiliary A_p , V_n and A_p must be string adjacent in the morphological realization of C.

To see if (34) is an attractive principle in our model of grammar, we need to consider how clusters are dealt with in the process of morphological realization assumed in this model. We return to this question below (in section 10).

For now, our hypothesis is that there are morphological restrictions on passivizing a cluster. These restrictions allow the passivization in (35), and disallow the passivization in (36):

³² Crucially, morphology in Continental West Germanic is suffixing. I take the participial ending to be the morpheme expressing passive, and the *ge*-prefix to be a residue of aspectual morphology independent of voice.

³³ The constraint in (34) does not apply to the morphological realization of a single verb, given the free variation in auxiliary/participle order in Dutch (although spoken Dutch clearly prefers the 2-1 order here). It must be a function of the representation of clusters in the verbal paradigms, therefore.

(35) German
 active: [to repair forget]
 passive: [to repair forget-PASS] auxiliary

(36) Dutch
 active: [forget to repair]
 passive: auxiliary [forget-PASS to repair]

There is one context in which we can test the merits of this morphological approach to the absence of long passives in Dutch. Participles can appear in topic position (i.e. leftmost in the clause), resumed by a demonstrative pronoun:³⁴

(37) Ge-lez-en dat HEEFT hij dat boek niet
 GE-read-PRT DEM.N AUX:3SG 3SG.M.NOM DEM.N book NEG
 ‘He didn’t (actually) read that book.’

The presence of the resumptive pronoun suggests that the participle is not construed with the auxiliary in this case, but ‘base-generated’ in the topic position. If so, the ban on passivization should not apply to topicalized verb clusters, i.e. next to active (38) we expect passive (39). This prediction is borne out:

(38) Verget-en te reparer-en dat HEEFT hij de tractor-en
 forget-PRT INF repair-INF DEM.N AUX:3SG 3SG.M.NOM DEF.PL tractor-PL
 niet
 NEG
 ‘He didn’t (actually) forget to repair the tractors.’

(39) Verget-en te reparer-en dat WERD-en de tractor-en niet
 forget-PRT INF repair-INF DEM.N AUX.PASS:PL DEF.PL tractor-PL NEG
 ‘They didn’t (actually) forget to repair the tractors.’

This suggests that the absence of long passive in Dutch is indeed a function of the morphological realization of the clusters involved.³⁵

8. Restructuring and tense

Since the absence of long passives in Dutch can be explained away, we no longer need to resign to the conclusion that Dutch differs from German in having no restructuring. One way to proceed now would be to assume that restructuring in both languages involves reduced syntactic structure of the embedded clause, as assumed by Wurmbrand (2001) for

³⁴ This example and the ones following all require high pitch on the auxiliary, which is indicated in small capitalization.

³⁵ Note that the passive and the relative past in Dutch involve the same participle, so that the fronted cluster in (39) is essentially underspecified for voice.

German, and illustrated in (23).³⁶ But this cannot be right, since we have seen that the embedded predicate may have its own tense interpretation.

To see this once more, we present examples where object shift and wide scope of the shifted object coincide with independent tense interpretation of the embedded predicate.

As demonstrated by Ter Beek (2008), there are three classes of verbs in Dutch where object shift is combined with independent tense interpretation of the embedded infinitival: these are epistemic modal verbs (like *moeten* ‘must’), raising verbs (like *schijnen* ‘seem’), and propositional control verbs (like *beweren* ‘claim’). Of these, only the propositional control verbs allow construal of separate scope domains for the matrix and embedded predicates, as the modal and raising verbs lack the variant with ‘extraposition’ needed to bring out the scope ambiguity (cf. (25)).³⁷

The following examples illustrate object shift in combination with independent tense interpretation of the embedded infinitival.³⁸

(40) *object shift with epistemic modal and independent tense interpretation*

... dat hij de aandel-en moet ge-kocht heb-ben
 COMP 3SG.M.NOM DEF.PL stock-PL AUX GE-buy:PRT AUX-PL
 toen de beurs op instort-en stond
 when DEF exchange on collaps-INF stand:PST.SG
 ‘... that he must have bought the stocks when the exchange was about to collapse.’

(41) *object shift with raising verb and independent tense interpretation*

... dat hij de aandel-en schijn-t ge-kocht te heb-ben
 COMP 3SG.M.NOM DEF.PL stock-PL seem-3SG GE-buy:PRT INF AUX-PL
 toen de beurs op instort-en stond
 when DEF exchange on collaps-INF stand:PST.SG
 ‘... that he appears to have bought the stocks when the exchange was about to collapse.’

(42) *object shift with propositional control verb and independent tense interpretation*

... dat hij de aandel-en beweer-t ge-kocht te heb-ben
 COMP 3SG.M.NOM DEF.PL stock-PL claim-3SG GE-buy:PRT INF AUX-PL
 toen de beurs op instort-en stond
 when DEF exchange on collaps-INF stand:PST.SG
 ‘... that he claims that he bought the stocks when the exchange was about to collapse.’

These examples show that shift of the embedded object *de aandelen* ‘the stocks’ into the matrix clause goes together with an independent tense interpretation of the embedded

³⁶ The reader is reminded that the tree structure in (23b) applies to lexical restructuring only (found with control verbs like *try* and *forget*). For restructuring with modals, raising verbs and ECM-predicates, (‘functional restructuring’), Wurmbrand (2001) assumes that the embedding predicate is a functional head in the extended projection of the embedded predicate.

³⁷ The classes of restructuring control verbs like *proberen* ‘try’ and non-restructuring implicative verbs like *vergeten* ‘forget’ do allow us to show the scope ambiguity in addition to object shift, but the infinitival complement invariably has a dependent tense interpretation. This is the case with all predicates that give rise to the ‘third construction’ (i.e. object shift but no IPP-effect), except the propositional control infinitives like *beweren* ‘claim’.

³⁸ Functional restructuring also takes place with ECM-predicates (verbs of perception and causative verbs), but these force a dependent tense interpretation on the embedded predicate.

predicate, conveyed by the past tense infinitive triggered by the adjunct *toen de beurs op instorten stond* ‘when the exchange was about to collapse’ that makes the reference point in the past explicit. Since in these examples we have two different tense interpretations for the matrix and the embedded predicate, it cannot be the case that these constructions involve just a single T operator, as one would expect on Wurmbrand’s (2001) analysis.

More precisely, Wurmbrand (2001) assumes a ‘functional restructuring’ analysis for the modal and raising constructions in (40)-(41), where the modal and raising verbs occupy positions in the functional domain of the infinitival predicate.³⁹ Propositional control predicates like *beweren* ‘claim’ (German *behaupten*) are taken to be non-restructuring predicates in Wurmbrand (2001:286), as they fail all her restructuring tests (including ‘non-focus scrambling’ i.e. object shift). But object shift is perfectly grammatical with propositional control predicates in Dutch, even with independent tense interpretation of the infinitival complement, suggesting that the correlation between ‘restructuring’ and object shift breaks down when comparative data are included in the analysis.⁴⁰

Modal auxiliaries and raising predicates never have an extraposed embedded clause, making it impossible to test the scope properties of the shifted object (the two predicates have no distinguishable scope domains). But with propositional control predicates, the combination of object shift with wide scope and independent tense interpretation can be demonstrated:

- (43) *wide scope of shifted object with independent tense of the embedded predicate*
- | | | | | | | | | |
|-----|------|-----------|-----------|---------------|-----------|---------------|-----|---------|
| ... | dat | hij | elk-e | knop | beweert-t | in<ge>druk-t | te | heb-ben |
| | COMP | 3SG.M.NOM | every-ARG | button | claim-3SG | <GE>press-PRT | INF | AUX-INF |
| | | toen | de | foutmelding | kwam | | | |
| | | when | DEF | error.message | come:PST | | | |
- ‘... that he claims that he pressed every button when the error message appeared.’
(*every* > *claim*)

In (43), the object *elke knop* ‘every button’ takes scope over the matrix predicate *beweert* ‘claims’ (yielding the reading that it is true for every button that he claims to have pressed it, whereas it is not true that he claims that he pressed every button), and the embedded predicate shows again infinitival past tense, expressing cotemporaneity with the reference point given by the adjunct *toen de foutmelding kwam* ‘when the error message appeared’.

These facts, which can easily be multiplied, show that restructuring and independent tense interpretation of the embedded predicate are not mutually exclusive. Continuing to assume that tense interpretation is tied to the presence of an operator T, the cartographic analysis of restructuring in (23b) cannot be correct.

The following table summarizes the distribution of object shift, scope of the object, and infinitival tense interpretation in the relevant classes of predicates in Dutch (see also Ter

³⁹ Wurmbrand (2001:184f) briefly discusses the type where a past tense infinitive appears under a modal auxiliary, but she does not address the observation in connection with the position of T, deriving the interpretation instead from the relative ordering of the modal and the temporal auxiliaries. For raising verbs, Wurmbrand (2001:205-206) claims that these are essentially epistemic modal auxiliaries, occupying a high position which leaves room for the temporal auxiliary in one of the lower positions for modal auxiliaries.

⁴⁰ See Ter Beek (2008, chapter 5) for evidence that object placement in constructions like (42) is indeed of the A-movement variety.

Beek 2008).

VERB CLASS	EXAMPLE	IPP	OBJECT SHIFT	OBJECT SCOPE	EMB TENSE	CONSTRUCTION
modal (deontic)	moeten 'must'	+	+	single	locked	verb raising
modal (epistemic)	moeten 'probably'	+	+	single	free	verb raising
aspectual	staan 'stand'	+	+	single	locked	verb raising
ECM	zien 'see' laten 'cause'	+	+	single	locked	verb raising
raising	schijnen 'seem'	dna	+	single	free	verb raising
control	proberen 'try'	+/-	+/-	wide/narrow	dep	verb raisg/third constr/extrap
implicative	vergeten 'forget'	-	+/-	wide/narrow	dep	third constr/extraposition
irrealis	besluiten 'decide'	-	+/-	wide/narrow	dep	third constr/extraposition
propositional	beweren 'claim'	-	+/-	wide/narrow	free	third constr/extraposition

Recall that on Wurmbrand's (2001) analysis, the temporal interpretation of a past tense infinitive (as in (4) and (40)-(42)) is a function of the auxiliary occupying a functional head position (which may be T or, in 'functional restructuring', some other functional head position). But, as we have seen, the auxiliary is not an independent syntactic element, but part of a periphrastic member of the verbal paradigm. The combination of a temporal auxiliary and a past participle is what languages like Dutch and German have in their inventory of verbal forms to realize past tense on a nonfinite V. On this approach, the past tense interpretation is not a function of the presence of a temporal auxiliary in the structure, but it is the other way around: the presence of a feature tense with the value PAST in the structure is what produces the auxiliary in postsyntactic morphological realization. And since we assume that the feature tense is a clausal operator T, we cannot have an independent past tense interpretation of the embedded predicate without a separate element T somewhere in the structure.

If this is correct, the cartographic analysis of verb clusters, represented by Wurmbrand (2001), fails. In the cartographic analysis, we are forced to conclude from the absence of object licensing in the embedded clause, that the embedded clause also lacks T (see (23)). But now we conclude that T can be present even in the absence of object licensing. We therefore need to return to the drawing board and come up with an analysis of restructuring that does justice to these observations.

This will be the subject of section 10. Before that, we briefly discuss the realization of future tense in infinitives, instrumental in Wurmbrand's (2001) analysis of infinitives as lacking tense.

9. Future ‘tense’

Wurmbrand (2001) observes that infinitival complements referring to an unrealized event (irrealis complements) come in two types, one of which allows a future time adverbial like *tomorrow*:

- (44) a. John decided to mow the lawn (tomorrow)
b. John tried to mow the lawn (*tomorrow)

In German, the verbs of the *try*-class show restructuring properties, and the verbs of the *decide*-class do not. On Wurmbrand’s analysis, where infinitival complements of (lexical) restructuring verbs are VPs, lacking T, the distribution of future time adverbials like *tomorrow* is explained by the presence or absence of T. On the approach contemplated here, where restructuring and tense may go together, such an explanation is not available.

However, it is not clear that the contrast between (44a) and (44b) forces us to conclude that T is present in (44a) and absent in (44b). As always, we need to distinguish a feature (like tense) and its value (like PAST). The range of time adverbials allowed then may be a function of a more limited range of possible feature values for tense in a particular construction.

While I believe it is possible to make the case that such restrictions are at work in both (44a) and (44b), and that the restrictions are more severe in the case of (44b), and that these restrictions are a function of the lexical semantics of the matrix predicate, I also believe the discussion is beside the point. The reason is that there is no evidence that T in languages like German and Dutch (or English, for that matter) ever has a feature value FUTURE. The feature values PAST and PRESENT are motivated by a morphological marked/unmarked opposition (both in the finite and in the nonfinite paradigm). Adverbials are relevant in that they may force the expression of one or the other feature value. Inasmuch as the future time adverbial *tomorrow* does not occasion any morphological adjustment, its presence or absence has no bearing on the presence or absence of T.⁴¹

What the contrast in (44) does seem to reveal is that constructions of infinitival complementation may refer to more or less tightly organized event complexes. In (44a), reference is made to two clearly separated events, a deciding event and a mowing event. The two events are connected in the sense that one is the (unrealized) effect of the other, but nothing in the semantics of *decide* tells us that the two events necessarily coincide or even adjoin. In (44b), while there are two predicates, it is not clear that reference is made to two separate events. The event of trying and the event of mowing are inseparable, in the sense that we utter (44b) to refer to a state of affairs where John was in the (incomplete and not necessarily successful) act of mowing the lawn.⁴² If so, the property of restructuring must be connected, not to the presence or absence of T, but to the organization of the events

⁴¹ Unrealized events may be referred to by the use of modal or aspectual auxiliaries in Dutch and German (e.g. modal *zullen* ‘shall’ and aspectual *gaan* ‘go’ in Dutch). But the use of these auxiliaries is not forced by the presence of a time adverbial like *morgen* ‘tomorrow’. Hence there is reason to believe that ‘future’ in the languages under discussion is a modal/aspectual rather than a temporal category.

⁴² As Wurmbrand (2001:83) discusses, we can force a reading in which the two events are teased apart, so that *try* takes on the added meaning of *arrange*. In that case, including the adverb *tomorrow* becomes felicitous again (and the restructuring properties go away in German).

referred to by the predicates, as determined by the lexical semantics of the matrix predicate.⁴³

This leads us to the question of how clustering (restructuring) must be analyzed in the model of grammar contemplated here.

10. What is cluster formation?

The model of grammar I am assuming here is the basic model of grammar of the minimalist program (Chomsky 1993), where a central component Narrow Syntax merges elements into sets (actually, ordered pairs, if I am correct in Zwart 2005), creating syntactic structures to be interpreted by interface components dealing with meaning and sound. Call this interpretation process ‘externalization’.

We have seen that part of externalization is the replacement of feature bundles created in Narrow Syntax by forms from the paradigms in Morphology. As these forms may be complex, we assume separate derivations for the construction of these complex forms, feeding directly into Morphology. Morphology, then, is a point of contact between derivations, and a starting assumption is that each derivation has essentially the same properties (crucially involving a component Narrow Syntax in which elements are merged).

I take the elements to be merged in Narrow Syntax to be grouped together in a set (or an array), called Numeration. Every derivation, then, is a triple ⟨Numeration, Narrow Syntax, Externalization⟩. Just like separate derivations may feed into Externalization (i.e. into Morphology), we may (and in fact must, see Zwart 2015) allow for separate derivations to feed into the Numeration. This yields complex elements in the Numeration, such as compounds, coordinations, phrases, clauses etc. We typically expect these elements to be opaque, in the sense that their component parts are not available for manipulation in Narrow Syntax (Zwart 2009).

From this perspective, it is reasonable to ask whether the verb clusters discussed here could be derived in a separate derivation feeding into the Numeration. If so, what seems to be a complex syntactic entity is in fact a single syntactic element, arguably of category V (verb). There is a similarity here to the periphrastic past discussed earlier, which we assumed to be likewise derived in a separate derivation, feeding into the paradigms of Morphology.

Concretely, to derive a cluster like *probeert te vinden* ‘tries to find’ in the Dutch integrated construction in (15), we would need a derivation like (45).⁴⁴

(45) *deriving a verb cluster*

Numeration:	{ proberen, vinden }
Narrow Syntax:	Merge <i>proberen</i> and <i>vinden</i> yielding ⟨proberen, vinden⟩
Externalization:	proberen te vinden

⁴³ It follows that Wurmbrand (2001) was correct in taking the distribution of adverbs like *tomorrow* to be indicative of the presence or absence of restructuring, just not in connecting both with the presence or absence of tense.

⁴⁴ I abstract away from morphosyntactic features and their realization (including the infinitival marker *te*) in this toy derivation.

The Numeration underlying the derivation of (15), then, includes as one of its elements the output of the derivation in (45), i.e. *proberen te vinden*.⁴⁵ Crucially, *proberen te vinden* is now a single element V, whose subparts cannot be merged separately in the derivation of (15).

The restructuring properties now follow: any object associated with *vinden* must be generated as an internal argument of the cluster as a whole. This cluster, being a single V, must license the internal argument as an object in the designated object licensing position (which is in the ‘middle field’ position indicated in (15)), by definition to the left of the matrix predicate *proberen*. The object will take scope over the cluster from this position, hence also over the matrix predicate. This derives the two restructuring properties of verb clusters in Dutch (19a,b). For German long passives, the third restructuring property (19c), we can simply apply the standard passivization mechanism: object licensing is not available in passive, forcing the object to move to the subject position.

We argued above (section 8) that the absence of long passives in Dutch can be explained away, and therefore has no bearing on the presence or absence of restructuring. The explanation presupposes that part of the derivation of a long passive is the conversion of an active verb cluster into a passive verb cluster. Let us assume that PASSIVE is the marked value of a feature ‘voice’ which is structurally represented in the functional domain of a clause. If so, passivization is the marking of V by the feature ‘voice’ with the value PASSIVE, which leads to a particular externalization (selection of a passive form from the paradigms in Morphology for the realization of V).

In languages like Dutch and German, the passive verb forms are periphrastic, using the past participle (again) and a particular voice auxiliary, Dutch *worden* ‘become’ and German *werden* ‘become’. Hence Dutch *vinden* ‘find’ with the features 3SG, PASSIVE will be realized as *wordt gevonden* ‘is found’, for example. Notice that on this approach, the voice auxiliary is not an independent syntactic element, but emerges only as the morphological realization of a V with the feature PASSIVE. That is, the voice auxiliary and the temporal auxiliary are treated alike, as products of Morphology.⁴⁶

Long passive, then, involves the same process of externalization, taking as input a V which happens to be a cluster, and as output a string that involves the verbs of the original cluster and a voice auxiliary. The proposal made in section 8 is that this externalization process is constrained by the adjacency condition in (34), requiring the voice auxiliary to be left-adjacent to the head of the verb cluster.⁴⁷

The proposed analysis, then, entails the following:

- (46) a. a verb cluster is a single V (composed in a separate derivation)
- b. externalization processes apply to a verb cluster as a whole (since it is a single V)
- c. the paradigms in Morphology must contain complex forms for the realization of the V elements we call verb clusters

⁴⁵ Recall that we assumed that Narrow Syntax manipulates only (bundles of) features. If so, the output of (45) must be converted into a feature representation when it is included in the Numeration for the derivation of (15). I put aside the implications of this consequence of the layered derivation approach.

⁴⁶ The equation of voice and temporal auxiliaries is not entirely straightforward, however, as we know that different ordering restrictions apply to the two types of auxiliaries in the Continental West-Germanic languages (including Afrikaans).

⁴⁷ I use the term ‘head’ for the hierarchically highest element of the verb cluster.

If this is the right approach, we predict morphological idiosyncrasies associated with the realization of verb clusters. And clearly, these exist.

One morphological idiosyncrasy associated with the realization of verb clusters is the IPP-effect (18). This is the phenomenon that the periphrastic past of a verb cluster is formed with an infinitive instead of a participle (see section 6). Compare:

(47) *IPP-effect*

- a. ... dat Cook het heeft { ge-wil-d / *wil-len }
 COMP Cook 3SG.N AUX:3SG GE-want-PRT / want-INF
 ‘... that Cook wanted it.’
- b. ... dat Cook het heeft { *ge-wil-d / wil-len } doe-n
 COMP Cook 3SG.N AUX:3SG GE-want-PRT / want-INF do-INF
 ‘... that Cook wanted to do it.’

This can now simply be described as follows (Zwart 2017a):

(48) **ge-V* where V is a cluster

This is consistent with an old observation, namely that the IPP-effect is not found in dialects where the prefix *ge-* is not used in the formation of the past participle (Hoeksema 1980, Lange 1981).

On the dynamic approach to syntactic structure contemplated here (where each derivation is a network of derivations, with separate derivations feeding into the Numeration and into the paradigms of Morphology), it is easy to accommodate tense inside a verb cluster, yielding examples like *moet hebben geslapen* ‘must have slept’ in (13). All that is required is the inclusion of T in the Numeration underlying the derivation of the verb cluster:

(49) *deriving a verb cluster with tense*

- Numeration: { moeten, T, slapen }
 Narrow Syntax: Merge T and slapen yielding ⟨T, slapen⟩ = A
 Merge moeten and A yielding ⟨moeten, ⟨T, slapen⟩⟩
 Externalization: moet hebben geslapen

The output of (49) *moet hebben geslapen* is then included in the Numeration underlying the derivation of (13).⁴⁸

In the derivation of (13), then, the string *moet hebben geslapen* (or the corresponding features) returns as a single V defined by the features of its component parts.⁴⁹ This allows the construal of the past tense adverbial *toen ik binnen kwam* ‘when I came in’ with V

⁴⁸ Again, it is not clear to me if, and if so, how the string *moet hebben geslapen* is to be converted into a bundle of features for the inclusion in further syntactic derivations, a question I leave for further consideration.

⁴⁹ There is more to be said here, as the cluster must have an *internal* tense feature with the value PAST, and may in addition acquire an *external* tense feature from the tense operator (T) in the clause as a whole.

marked by the feature PAST associated with one of its components, *slapen* ‘sleep’.⁵⁰

Note that V, the cluster *moet hebben geslapen* ‘must have slept’, in addition to the feature PAST held over from the previous derivation (49), also acquires a tense feature from the operator T merged in the context of the derivation of (13). What we observe is that the values of the two tense features need not match. In Dutch, Externalization at the conclusion of the derivation of (13) yields a cluster *moet hebben geslapen* in which the two tense features can be clearly distinguished both morphologically and semantically.

Given the possibility of a derivation like (49), where T is part of the verb cluster, the most economical system perhaps would require that a verb is *always* construed with T before merging with another verb (the higher predicate). The value of T, then, may be restricted depending on the nature of the higher predicate, as we have seen with verbs like *try*.

On this approach, restructuring can simply be defined as the construction of a verb cluster in a separate derivation. It follows that absence of restructuring involves no such derivation layering, and that strings of verbs appearing in non-restructuring constructions must be merged individually in the context of the derivation of those constructions. I suspect that this goes a long way towards an account of the so-called Third Construction type in Dutch (Den Besten, Rutten, Veenstra and Veld 1988), where we find object shift but no IPP-effect:

(50) *third construction*

...	dat	Cook	het	Zuidland	ge-probeer-d	heeft	te	vind-en
	COMP	Cook	DEF.N	South Land	GE-try-PRT	AUX:3SG	INF	find-INF

‘... that Cook tried to find the South Land.’

Here *proberen* ‘try’ and *vinden* ‘find’ must be separate verbal elements in the derivation of the clause, and *proberen*, marked by the feature ANTERIOR, is realized as the periphrastic past. Since *proberen* and *vinden* do not form a cluster, (48) does not apply.⁵¹

11. Conclusion

In this article the following has been shown. Past tense can be morphologically realized on infinitives in Dutch, not via inflection but via periphrasis. This occurs in the infinitival complement of a range of verb classes (epistemic modals, raising verbs, propositional control verbs), which must therefore be analysed as containing an operator T. The value of the infinitival tense is independent of the value of the tense of the matrix predicate, at least

⁵⁰ To be a bit more precise, the construal takes place during Externalization, where the component parts of complex syntactic items must be readily available again (to account for morphosyntactic processes such as agreement and case-marking affecting subparts of these items, not to mention linearization processes such as verb second and spell-out processes such as deletion/ellipsis affecting individual items from verb clusters).

⁵¹ This presumably forces us to a base-generation analysis of object placement, and some mechanism that links the core grammatical functions with the argument positions in the lexical conceptual structures of the predicates. Note that such a mechanism is unavoidable anyway in the top-down mechanism proposed in Zwart (2009), and there are other reasons for assuming it, having to do with the fact that the V-little v combination must be the output of a separate derivation as well (making it impossible to generate the subject and object in the theta-positions associated with V and little v and manipulate them as individual syntactic elements in the derivation of the clause).

with these classes of predicates. With other predicates, the temporal interpretation of the embedded infinitive is determined by the temporal properties of the matrix predicate. A natural assumption to make at this point would be that T is present with all clausal infinitives, with its morphological realization determined by the existence or non-existence of temporal dependence between the matrix and embedded predicates.

The modal and raising predicates obligatorily appear in verb clusters, the propositional control predicates do so optionally (they have an alternative ‘extraposition’ realization). The modal/raising predicates and the propositional control predicates differ in a number of other respects, most importantly in that when the verbs cluster, and the matrix predicate has the feature ANTERIOR (relative past), the IPP-effect (replacing the expected participial morphology on the matrix predicate with infinitival morphology) obtains with the modal/raising verbs but not with the propositional control verbs. While this suggests a distinction between modal/raising verbs as restructuring verbs and propositional control verbs as non-restructuring verbs, as Wurmbrand (2001) proposes, a simple cartographic analysis of the two types of constructions, taking restructuring complements to be VP and non-restructuring complements to be TP or larger, fails.

The cartographic analysis predicts that (i) modal/raising verbs show no independent tense in the infinitival complement, while propositional control verbs do, and (ii) modal verbs show object shift of the object of the infinitival complement into the functional domain of the matrix predicate, while propositional control verbs do not. But as we have seen, both modal/raising verbs and propositional control verbs show both properties (independent tense and object shift) at the same time.

The conjunction of object shift and infinitival tense is incompatible with the cartographic analysis, since object shift indicates impossibility of object licensing in the embedded clause, hence absence of vP and by implication also absence of TP, hence no independent tense. Conversely, on the cartographic analysis independent tense interpretation indicates the presence of TP and by implication also presence of vP, hence embedded object licensing. The predicted conjunction of properties is not attested in infinitival complements in Dutch.

We have also argued that one of the diagnostic criteria for restructuring applied by Wurmbrand (2001), ‘long passive’ yields no results in Dutch for morphological reasons: the linear order of the elements in the verb cluster entails that the voice auxiliary and the passive suffix are not adjacent in Dutch, unlike in German. If the distribution of long passive is subject to such a constraint on morphological realization, its presence or absence can not be used as a telltale criterion for restructuring.

Finally, we have suggested that the properties of restructuring constructions in Dutch can be deduced straightforwardly on a dynamic approach to syntactic structure, where complex elements (including verb clusters) are generated in separate derivations feeding into the Numeration of the clause in which these complex elements appear. This ‘derivation layering’ is independently needed to describe the periphrastic past (finite or nonfinite) in a model of grammar in which morphology is the postsyntactic realization of the bundles of features created in Narrow Syntax. Temporal auxiliaries, on this approach, are not (in fact, cannot be) generated in functional heads, but are a by-product of morphological realization during postsyntactic externalization.

In this model of grammar, restructuring is what we get when verbs are merged in a separate derivation layer. Nothing excludes this separate derivation to involve a tense operator associated with the embedded verb. The most natural assumption, then, would be to assume that this tense operator can always be present, and receives dependent or

independent interpretation depending on the lexical semantics of the matrix predicate.

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