Narrow syntactic movement after Spell-out

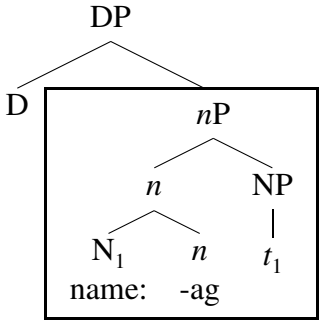
1 Introduction

This paper discusses the properties and implications of head movement across a phase boundary. We provide evidence which shows that syntactic phase boundaries correspond to phonological boundaries at the word level. This claim necessitates certain assumptions. First, a non-lexicalist model such as Distributed Morphology (Halle and Marantz 1993) must be the engine behind word-formation. Morphologically complex words are formed in the narrow syntactic and post-syntactic modules of computation. Second, phonological form is mapped to syntactic elements only on the PF branch. Vocabulary insertion must occur post-syntactically. Third, head movement across a phase boundary can occur only if Spell-out to the PF and LF components occurs in cycles, or phases (Chomsky 2001, Nissenbaum 2000, Svenonius 2001, and many others). Finally, we base our analysis within a system where all syntactic transformations are driven by a need to check uninterpretable features, following a strict version of the Minimalist Program (Chomsky 1993). These underlying assumptions allow for a principled investigation of head movement both before and after Spell-out. We argue that a phase head may move out of its phase after it has been assigned phonology–i.e., after Spell-out–, and that this phonological form is preserved during subsequent phonological operations. We will also argue for the possibility of extracting a phase head before Spell-out of its phase and address the theoretical implications of this state of affairs.

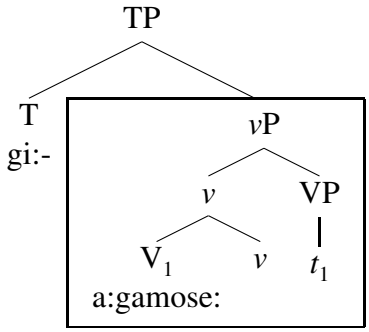
2 Word-internal phases without movement: the baseline

Piggott and Newell (2008) argue that syntactic phase boundaries play an important role in phonological processes at the word-level. They propose that vowel hiatus in Ojibwa (Algonquian) is resolved via *deletion* only when the offending morphemes are spelled out on the same phase cycle (1a) and that hiatus is unresolved if a phase boundary intervenes between two vowels in hiatus (1b) (boxed elements indicate a phase):

(1) a. name:-ag [name:g] V-deletion
sturgeon-PL
'sturgeons'



b. gi:-a:gamose: [gi:a:gamose:] no hiatus resolution
PAST-walk.in.snowshoes
's/he walked in snowshoes'



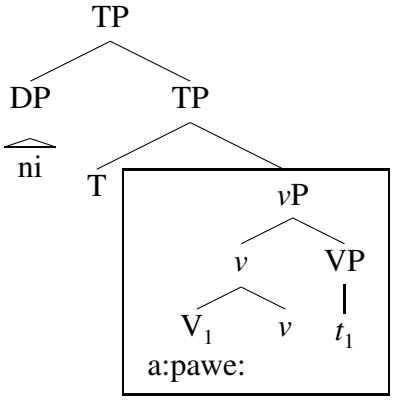
These patterns are attributed to the following condition:

(2) *Phase Integrity* (Piggott and Newell 2008)
Conditions on the well-formedness of prosodic categories are imposed on all elements that emerge within a phase α, if the elements are solely within α.

Thus, hiatus only needs to be resolved *within* a phonological phase, not across a phase boundary.

There is one condition where vowel hiatus appears to be resolved across a phase boundary. According to Piggott and Newell, this resolution occurs when elements in the higher phase do not meet a phonological phase minimality condition: they are too small to project a Pwd. This resolution is achieved via epenthesis rather than deletion.

(3) ni-a:pawe: [ni**d**a:pawe:] C-epenthesis
1S-have.nightmares
'I have nightmares'



Note that the person marker *ni* and the verb are separated by the *v*P phase boundary. Because the morpheme *ni* is a light syllable, and thus cannot stand on its own as a prosodic element, it must merge *phonologically* to the adjacent phonological phase (via a process of string-vacuous Local Dislocation, or morpho-phonological merger).

Because *ni* adjoins to the adjacent phonological phase, Phase Integrity now requires that vowel hiatus be resolved. However, it is crucial that this hiatus is resolved via epenthesis, not deletion. This analysis, in addition to other research (e.g Michaels 2009, Dobler 2009), supports a generalization on phonological phases, which we summarize as follows:

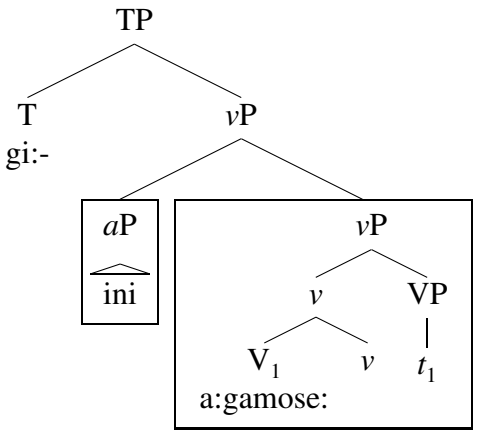
(4) *Phonological Persistence*
In the computation of phonology, there is a tendency to retain the phonological form that has been previously mapped to each individual phase constituent during later computation; i.e., the phonology assigned to a phase will be maintained as much as possible during subsequent computation.

The result of (4) is that phonological operations occurring between tautophasal morphemes will be more"destructive" than operations occurring across a phase boundary.

Before continuing it is important to establish that this case is indeed the baseline—where head movement across phase boundaries has not occurred. Ojibwa is a polysynthetic language, therefore evidence for non-movement (or movement) of heads is difficult to come by, but there is an indication that the verb does not raise to Tense in constructions like that in (3). An adjunct may intervene between the morpheme in T and the verb, which strongly suggests that the verb does not raise to T:

(5) a. gi:-ini-a:gamose:
PAST-there-walk.in.snowshoes
's/he walked there in snowshoes'

b.



Note also that the adjunct constitutes its own *a*P phase, and so hiatus is not resolved across its boundaries. See Piggott and Newell (2008) for more on adjuncts in Ojibwa.

Now, consider ex. (1a) again. Both *name:* and *-ag* are assigned phonology on the same Spell-out cycle. We can assume that V-deletion occurs during this Spell-out cycle, as well. Note that Vocabulary Insertion (VI) occurs from the bottom-up (we call each iteration of VI a 'stage'):

(6) Spell-out of *n*P
VI Stage 1: [name:]
VI Stage 2: [name: $^\wedge$ ag] → [name:g] (V-deletion)
End of *n*P Spell-out cycle; resulting phonological form: **[name:g]**

However, in the case of (3), there are two syntactic phases —and thus two phonological phases—, giving the following order of operations:

(7) Spell-out of *v*P
VI Stage 1: [a:pawe:]
End of *v*P Spell-out cycle; resulting phonological form: **[a:pawe:]**

Spell-out of CP
VI Stage 1: [ni]
End of CP Spell-out cycle; resulting phonological form: **[ni]**

Local Dislocation of **[ni]** to **[a:pawe:]** due to minimality violation:[1]
[**[ni]** $^\wedge$ **[a:pawe:]**] → [**ni+a:pawe:**]

Phase Integrity applies ([ni] has moved into the phonological phase of [a:pawe:]);
Epenthesis preferred to deletion as a result of Phonological Persistence:
[**ni+a:pawe:**] → [**nida:pawe:**]

In the final stage in (7), the features of the already spelled-out phonological phase **[ni]** are retained during the later process of hiatus resolution (i.e. deletion of phonological features does not occur). This adherence to Phonological Persistence will occur in all instances where vocabulary insertion occurs at separate stages of the derivation.

This analysis entails that the phonological boundary between string-adjacent morphemes that are contained in different phases is somehow *stronger* than the phonological boundary between tautophasal morphemes; in fact, there appears to be no phonological boundary between tautophasal morphemes. Also, phonological processes occurring between non-tautophasal morphemes will alter the phonological form of those morphemes *relatively less* than similar processes occurring between tautophasal morphemes (or oftentimes not at all).

3 Word-internal phases: post-Spell-out movement

In the last section we discussed the behaviour of word-internal phases in constructions where heads did not move out of the phase in which they were originally merged. This static syntactico-phonological mirroring will not always be the case. This section investigates the question of what occurs when head-movement crosses a phase boundary. Two possibilities present themselves. One option is that movement does not affect Spell-out domains, indicating that Spell-out may occur before movement operations. The other is that movement does affect Spell-out domains, indicating that movement out of a phase causes a head to be spelled-out in the phase into which it is remerged. Evidence from Phonological Persistence indicates, in the languages below, that the former is the case.

3.1 Malayalam

Evidence from Malayalam (Dravidian; South India) causatives suggests that movement out of a phase does not negate the phonological effects of a phase boundary.[2] Malayalam has two forms of

[1] A condition on phonological phase minimality can only be evaluated after VI on the entire phase is complete.

[2] See Michaels (2009) for a similar account of Malayalam causatives.

causatives: direct (8b) and indirect (8c) (data from Mohanan 2005:71).[3]

(8) a. booṭṭə muŋŋ-i
boat sink-PAST
'The boat sank.'

b. kuṭṭi booṭṭə mu-kk-i
child boat sink-CAUS-PAST
'The child sank the boat.'

UR of direct causative: /muŋŋ-kk-i/ (nasal deletion on stem)

c. kuṭṭi booṭṭə muŋŋ-icc-u
child boat sink-CAUS-PAST
'The child caused the boat to sink.'

UR of indirect causative: /muŋŋ-kk-i/ (epenthesis of *-i-* between stem and affix)

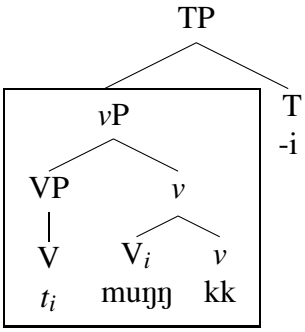
Each is formed using the same affix, *-ikk*. The underlying representations of the morphemes of both the direct and indirect causative verbs are identical, but their overt surface forms differ in that fusion of stem and affix only occurs in direct causatives. This distinction can be attributed to the fact that the indirect and direct causative morphemes are merged in a separate phase from the root, or in the same phase, respectively. This is the analysis we saw above with Ojibwa, but here there is one crucial difference. In Malayalam the verb always raises to T. This entails that the final syntactic position of the verb and the causative morpheme is the same in both constructions, yet their phonological forms are distinct. We argue that pre-movement Spell-out accounts for this difference.[4]

The direct causative morpheme is merged within the same phase as the stem. As a result, both morphemes are assigned phonology on the same Spell-out cycle. This allows them to be subject to destructive phonological processes such as fusion, based on the principle of Phonological Persistence.

[3]We avoid using the terms "lexical" vs. "syntactic", as we assume that all causatives are syntactic under DM. However, we do adopt the l-syntax vs. s-syntax distinction of Hale and Keyser (1993).

[4]Note that the apparent vowel disharmony of the past tense morpheme and palatalization on the causative in (8c) are not crucial to the current analysis.

(9) *Direct causative*

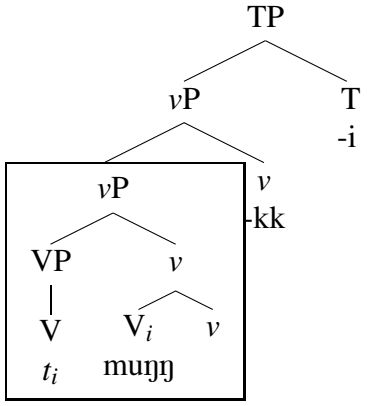


Stem and affix are spelled out on the same cycle, allowing for destructive phonology—i.e. nasal deletion—on the stem, forming *mukki*.

The indirect causative morpheme, on the other hand, is merged in a different phase from the stem and raises the stem after Spell-out of the stem's phase. Phonological Persistence therefore prohibits the indirect causative morpheme from bringing about phonologically destructive processes on the stem (relative to the processes available in the language).

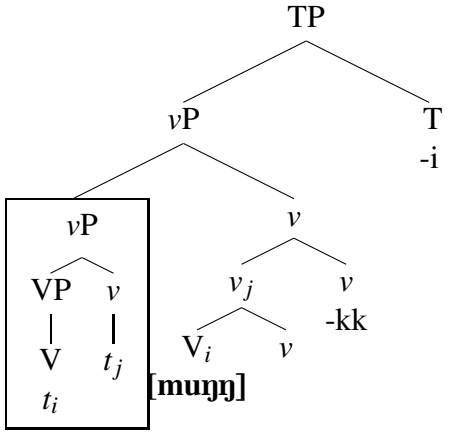
(10) *Indirect causative*

a.



Stem is spelled out on lower phase.

b.



Stem moves to affix only after it has already been assigned phonology on an earlier Spell-out cycle. Thus, its phonological form is maintained on subsequent Spell-out cycles—i.e., nasal deletion does not occur on the stem, forming *muŋŋiccu* after epenthesis.

3.2 Malagasy

Malagasy (Austronesian; Madagascar) shows a similar causative pattern to Malayalam. The causative morpheme *an-* displays a more destructive phonology in direct causatives than in indirect causatives (data from Lisa Travis):

(11) $\sqrt{}$*fatra*: measure
mifatra *m+i+fatra* x is measured
mamatra *m+an+fatra* y measures x N.B. *an+f* → *am* (direct causative)

In the direct causative in (11), the causative morpheme *an-* undergoes a process of fusion/coalescence with the stem. The final features of the affix fuse with the initial features of the stem to form a single, simplex nasal segment.

However, in an indirect causative, the same morpheme produces prenasalization:

(12) *mampifatra* *m+an+fa+i+fatra* z makes x be measured N.B. *an+f* → $a^m p$
(indirect causative)

In (12), the underlying nasal segment, rather than undergoing fusion to the obstruent to create a simplex segment, becomes a nasal coarticulation with the following oral obstruent, creating a complex segment.

We hold that the first (fusion) is more phonologically destructive than the second (prenasalization) because prenasalization is essentially structure-preserving, whereas fusion deletes existing segments.

The following verb in Malagasy contains both a direct and an indirect causative, and displays both types of phonological process:

(13) *mampamatra* *m+an_{indir}+fa+an_{dir}+fatra* z makes y measure x N.B. *an+f* → $a^m p$
an+f → *am*

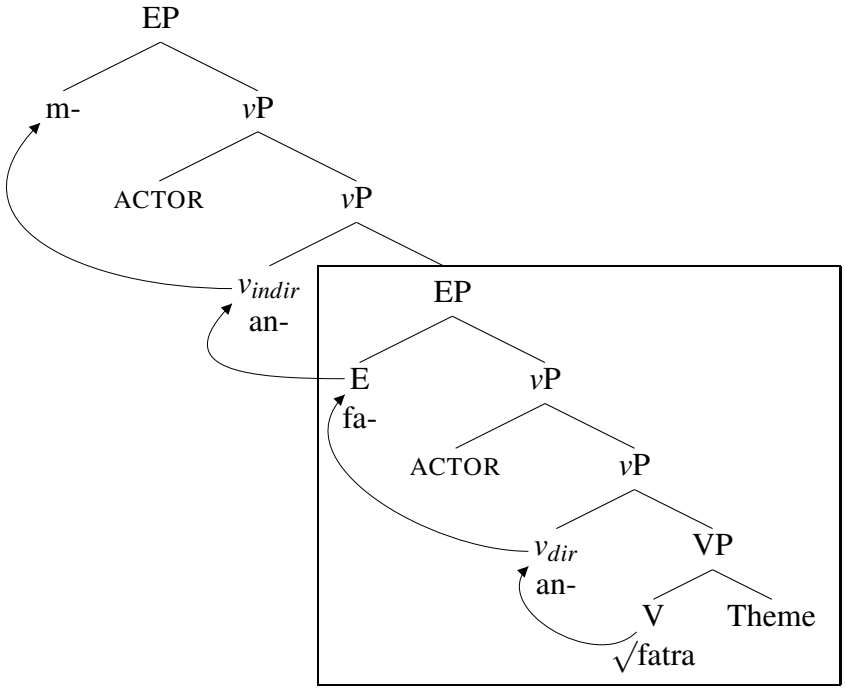
We might wish to say that the stem [*fa+an_{dir}+fatra*] remains in a separate syntactic –and thus phonological– phase from the affixes [*m+an_{indir}*]. However, Malagasy is a V-initial language, and thus the verb must raise higher than the arguments and, correspondingly, the base-generated positions of the heads that project them:

(14) nampamarana ny mpampianatra ny ankizy ny varavarambe.
PAST.CT.make.measure DET teacher DET child DET door
'The teacher made the child measure the door.'

The difference in the phonological processes involved in the PF interpretation of the causative morphemes is accounted for if the direct causative+stem constituent undergoes a cycle of Spell-out *before* raising higher in the structure. In the structure below, EP is an Event Phrase; all EPs are

phases (Travis 2000a). What is important to note is that there is a syntactic phase boundary between the indirect causative morpheme and its stem, whereas no such boundary exists between the direct causative morpheme and its stem.

(15)



In (15), the morphemes *[fa-an-fatra]* will undergo Spell-out before raising higher to the indirect causative (and subsequently raising even higher in the structure). Thus, "destructive" phonology (e.g. fusion) may apply between the direct causative and its stem, but not between the indirect causative and its stem (which undergo prenasalization due to Phonological Persistence of the stem).

3.3 Taking stock

The evidence from Ojibwa, Malayalam, and Malagasy supports the idea that syntactic Spell-out cycles have clear effects on phonological processes. Furthermore, these data seem to suggest that movement out of a phase does not negate these effects. In other words, even if a head moves out of its phase after Spell-out, the phonological effects of the phase boundary persist.

The above analyses have some important implications for syntactic derivation and Spell-out. First, looking closely at the derivations above, it is clear that a phase head is included in the Spell-out domain of the phase, contra previous models under which only the complement of the phase head undergoes Spell-out (e.g. Chomsky 2001, Nissenbaum 2000). Second, movement after Spell-out occurs. This post-Spell-out movement does not destroy the operations performed on the PF branch at an earlier phase.

The question to ask now is whether it always the case that different phonological behaviours of identical morphemes correspond to a difference in the presence or absence of a phase boundary. We argue below, as above, that this is the case, but question whether head movement can mask the effects of a syntactic phase boundary. First let us expand upon the correlation between phonological differences and syntactic complexity. Then we will reconsider the interaction of

movement and phase boundaries.

3.4 Timugon Murut

The data in (16) from Timugon Murut (Austronesian: Malaysia) seem to support the analysis that syntactic complexity (and phases in particular) affect the Spell-out of identical morphemes. The Topic/Subject marker in the language, */maN-/*, can either undergo nasal assimilation to the root it combines with or trigger nasal substitution. Crucially, the internal argument is optional in (16b), but not (16a) (data from Prentice 1971):

(16) a. Nasal substitution

/maN - buli/ → [ma**m**uli] '*Topic/Subject* will keep *Referent*'

/maN - tutu/ → [ma**n**utu] '*Topic/Subject* will pound *Object*'

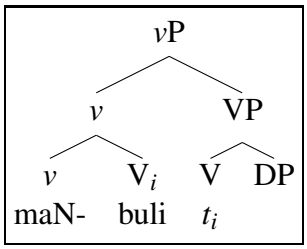
b. Nasal assimilation

/maN - buli/ → [ma**mb**uli] '*Topic/Subject* will keep *[Referent]*'

/maN - tutu/ → [ma**nt**utu] '*Topic/Subject* will pound *[Object]*'

As Timugon Murut is a verb-raising language, the verb root V necessarily always raises to *v* during the derivation (see Gref 2008). Following our current analysis, this suggests that the syntactic structure for (16a), in which both arguments are obligatory, is roughly the following, where both the root and Topic-Subject morphemes are merged in the same phase:

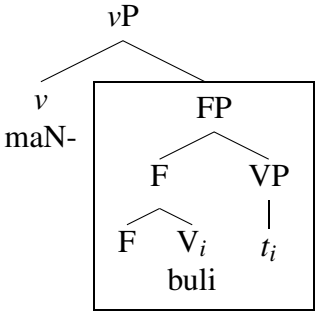
(17) *Nasal substitution* (16a)



Here, since the prefix and stem are tautophasal, we correctly allow for destructive phonology.

However, the current model suggests that the prefix and stem in (17b) are not tautophasal, since the stem is subject to Phonological Persistence. Indeed, we propose that there is an additional functional projection FP in (16b) that saturates the internal argument. In keeping with the above model, we represent this as follows, where the null head F creates a syntactic phase boundary between the root and affix:

(18) *Nasal assimilation* (16b)



The FP projection has two effects. It saturates the internal argument, thus allowing for omission of the argument in the overt representation, and it introduces a phase boundary between the overt affix and stem. As a result, the stem is spelled out on a separate cycle from the affix. The stem is thus subject to Phonological Persistence.

3.5 Alienable vs. inalienable possession

Crosslinguistic data from alienable and inalienable possession further support the correspondence between the amount of syntactic structure and differing phonological processes.

In languages that make the distinction, the phonological boundary between the possessive morpheme and the possessed noun is stronger in alienable possession than in inalienable possession. The following data from Acholi (Luo; Uganda) illustrate this distinction (Bavin 1996):[5]

(19) V-final stem: inalienable or alienable

obo-ni → [oboni]
lung-your
'your lung' (part of your body *or* an animal's organ that belongs to you)

(20) C-final stem: Inalienable (destructive phonology)

a. dog-na → [doga]
mouth-my
'my mouth' (part of my body)

b. tik-na → [tika] or [tixa]
chin-my
'my chin'

(21) C-final stem: Alienable (non-destructive phonology)

a. ot-na → [otna] or [odda]
house-my
'my house'

[5]For similar patterns in other languages, see Dobler (2008).

b. buk-na → [bukna] or [bukka], *[buxa]
book-my
'my book'

We suggest here that inalienably possessed noun roots are spelled out on the same cycle as their possessors, whereas alienably possessed nouns are not. We argue that this is due to the presence of an additional functional projection in alienable possession that disallows the possessive morpheme and the root from being spelled out on the same cycle. Evidence from Ojibwa possession supports this claim. In this language, an additional overt possessive marker can only appear in alienably possessed nouns:

(22) *Alienable possession: Ojibwa*

a. ni-wa:bigon-**im**
1P-flower-POSS
'my flower'

b. ni-wa:bigon-∅
1P-flower-∅
'my flower'

(23) *Inlienable possession: Ojibwa*

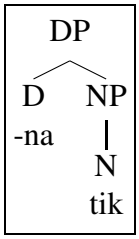
a. *ni-da:nis-**im**
1P-daughter-POSS
'my daughter'

b. ni-da:nis-∅
1P-daughter-∅
'my daughter'

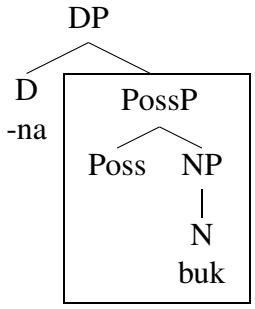
We represent this generally as follows (but note that we will revise this slightly in §4).

(24) Acholi

a. *Inalienable: [tixa]* (destructive phonology)



b. *Alienable: [bukna]* (non-destructive phonology)

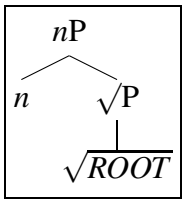


The availability of destructive phonological processes between morphemes corresponds with the absence of additional syntactic structure between those morphemes. Conversely, the presence of additional syntactic structure between morphemes corresponds with the unavailability of destructive phonological processes, i.e. Phonological Persistence.

4 A problem with multiple phases

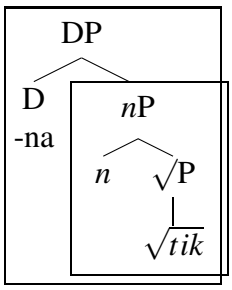
In the previous discussion, we have argued that a root+affix constituent may consist of two phases, with each morpheme being generated in a separate phase, or it may consist of one phase, with each morpheme being merged in the same phase. However, it has been argued by Newell (2008), following the work of Marantz (2007) and others, that the structures we are dealing with contain more phases than have been proposed here. For example, a categoriless root will be defined as a noun only by virtue of merging with an *n* phase head, as follows:

(25)



In the case of inalienably possessed nouns, there must therefore be two phases, where *n*P defines the root as a noun, and DP introduces the possessor. Given this, we might never expect destructive phonology to occur between a determiner and a noun root, contrary to our claim in the previous section. The following would be the structure of an inalienably possessed noun under this view (this tree does not reflect movement).

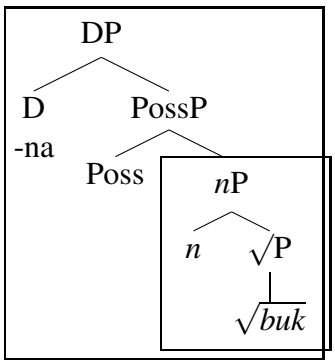
(26) [*tixa*] 'my chin' (inalienable)



The presence of a phase boundary in (26) predicts that destructive phonology between the root and affix is impossible, contrary to fact. This problem is resolved if D, rather than *n*, is the category-defining head in cases of inalienable possession–as there would again be only one phase, but here we will explore the possibility that the structure in (26) is the correct one. We must therefore allow for some mechanism by which the root and the affix are spelled out on the same cycle.

Given the structure in (26), the only possible way to derive this is if the root can escape Spell-out of the *n*P phase. Recall that we have argued for more syntactic structure in those cases that display less destructive phonology. Maintaining this view, we propose the structure in (27) for an alienably possessed noun, following the model currently under consideration (again, no movement is represented):

(27) [*bukna*] 'my book' (alienable)



The problem here is that, in both (26) and (27), the possessive morpheme in D is contained in a separate phase from the root.[6] Under our analysis there should be no difference in the phonological interaction of the root and D in these two structures.

4.1 Triggered Spell-out

In this section we will propose a solution to the above problem. If pre-Spell-out head movement is permitted, a morpheme could escape Spell-out within the phase in which it is merged. Also, we would need to offer a principled distinction between those derivations in which post- and pre-Spell-out movement occurs.

Note that D takes the *n*P phase as its complement in inalienable (26), but not in the alienable (27) constructions. Let us assume that D consistently targets the noun for movement in both (26) and (27). If D were to target its nominal complement for movement before *n*P underwent Spell-out, but had restrictions on locality, we would see a difference in the phase Spell-out patterns between alienable and inalienable constructions. In this vein, we posit the following model of Spell-out:[7]

[6]It is now unimportant whether PossP itself constitutes a phase in (27) (for the examples under consideration here), since this would simply create a second phase boundary between the overt morphemes [*buk*] and [*-na*].

[7]Note that Svenonius (2004) also proposes a triggering model of Spell-out. While the model proposed here differs somewhat from his, it is possible that the two can be made compatible.

(28) *Triggered Spell-out*
A phase *n* only begins the process of Spell-out once a head from phase *n+1* is merged or the end of derivation is reached. No other head is merged until Spell-out of phase *n* is complete.

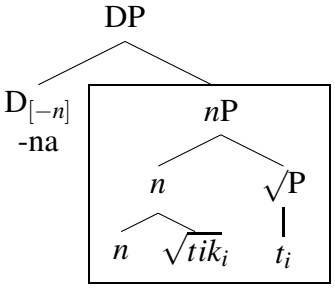
A head that merges directly with a phase—what we term a "Spell-out trigger"—may extract a head from that phase in a feature-checking operation before the phase undergoes Transfer to the PF branch.

4.2 Alienable vs. inalienable possession revisited

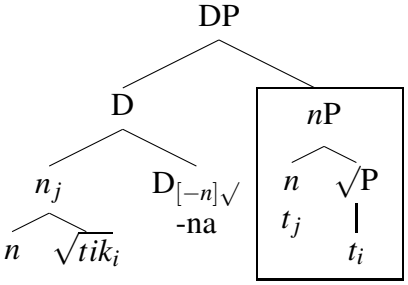
In the case of inalienable possession, the possessive morpheme in D merges directly with the *n*P phase as follows (we here represent standard root-to-*n* movement):

(29) [*tixa*] 'my chin' (inalienable) → *movement before Spell-out*

a. D merges with *n*P, triggering *n*P for Spell-out



b. D raises *n* for feature-checking before *n*P is transferred to PF



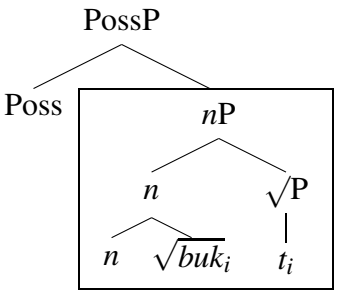
PF representation of *n*P after Spell-out: ∅

In (29), the root [*tik*] escapes the Spell-out cycle of *n*P, and so will be assigned phonology on the same Spell-out cycle as the affix, thus allowing for destructive phonology. In this way, movement before Spell-out can negate the phonological effects of a syntactic phase boundary.

In the case of alienable possession, the features do not change, but it is the additional Poss head that is the Spell-out trigger for *n*P, as follows:

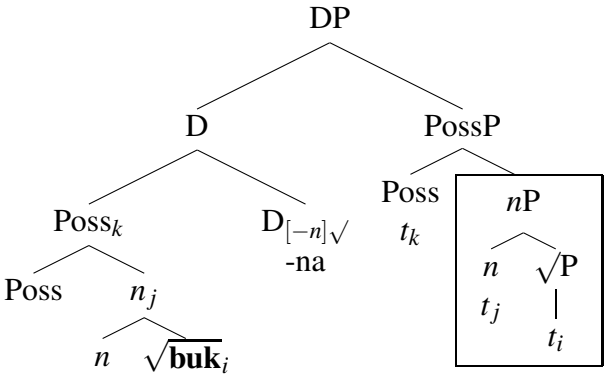
(30) [*bukna*] 'my book' (alienable) → *movement after Spell-out*

a. Poss merges with *n*P, triggering *n*P for Spell-out; Poss has no features to check, and so *n* remains *in situ* during Spell-out of *n*P



PF representation of *n*P after Spell-out: [**buk**]

b. Spelled-out head later moves to D once it is merged; Phonological Persistence applies to stem



The scenario in (30) illustrates movement after Spell-out. As D is not the Spell-out trigger, the Spell-out cycle of *n*P is complete before D merges and raises the noun. Therefore, though D may target the phase head *n* for movement in (30), it may only do so after phonological features have already been mapped to the morpheme(s) in *n*.

To summarize, only a head that triggers Spell-out may raise a phase head before that phase head is assigned phonological features. In this case, Phonological Persistence does not apply to the phase head, and so destructive phonological processes may apply to that head. A non-triggering head may raise a phase head after Spell-out, but Phonological Persistence applies to the morphemes in the phase head that has already undergone Spell-out.

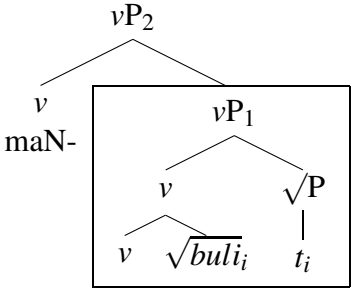
4.3 Timugon Murut revisited

Gref (2008) argues that the *maN-* prefix is always merged outside of the *v*P phase of the root, given, in part, that its semantics are consistent. This semantic consistency implies that it is always interpreted in the same syntactic position. It always marks a Topic or Subject. Importantly though, the prefix *maN-* always attracts the verb as soon as it is merged.

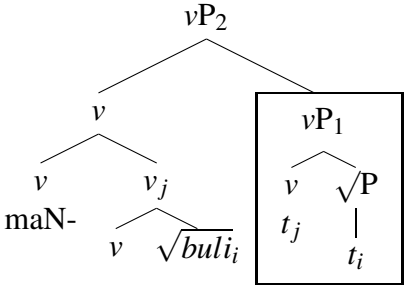
In the following derivation, where both arguments are obligatory (see discussion of (16a)), *maN-* merges directly with the *v*P, triggering Spell-out, but moving the verb out of the phase before Transfer:

(31) Movement before Spell-out

a. *maN-* triggers Spell-out of $v\mathrm{P}_1$:



b. *maN-* raises verb before Transfer of $v\mathrm{P}_1$ to PF branch:

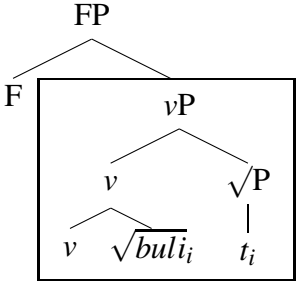


PF representation of *v*P after Spell-out: ∅

Due to movement before Spell-out in (31), no phonological boundary is established between the prefix and its stem, allowing for destructive phonology.

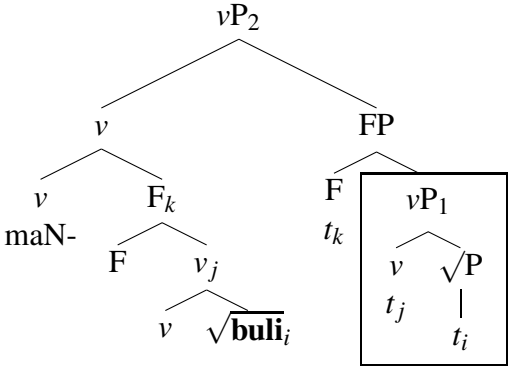
When the derivation contains the argument-saturating functional projection, the prefix *maN-* is not the Spell-out trigger. In the proposed structure below, the root in these constructions is defined as a verb before any of its arguments are saturated via merger of F:

(32) a. F is the Spell-out trigger; raising does not occur, and so the verb is transferred to PF where it is given phonological form:



PF representation of *v*P after Spell-out: [**buli**]

b. *maN-* merges and targets the spelled-out verb for raising; Phonological Persistence applies to verb stem:



The distinction in phonological output between the above structures follows if *maN-* attracts the verb before Spell-out only when it merges directly with the *v*P phase in which the verb root was generated. In these situations it is the Spell-out trigger of that phase. Otherwise, it will raise the verb after the verb has already undergone Spell-out, thus requiring Phonological Persistence to apply to the verb root.

5 Conclusion

The above discussion and analysis raises interesting questions for the syntax-phonology interface at the word level, as syntactic phase cycles have a direct effect on word-internal phonology. We argue that phonological distinctions reflect neither a tendency for phonology to be unprincipled with regard to syntactic structure, nor a lexical/syntactic divide. Phonological effects like those seen here can help us to better refine the architecture of syntactic derivation and Spell-out. Knowing the structure and featural makeup of the morphemes in a derivation allows us to predict phonological phenomena. Equally, once it is clear that phonology and syntax mirror each other in this way, we can use phonological output as a window into syntactic structure.

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