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Phase domains at PF

Root suppletion and its implications*

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This chapter investigates some implications of Spell-Out in a phase-based, realizational derivational system. It is argued that all operations on the PF branch within a phase, specifically Vocabulary Insertion and phonological rule application, are predicted to have isomorphic domains of application. This has implications for the proposals on how to extend suppletion domains found in Embick (2010) and Bobaljik & Wurmbrand (2013). Apparent mismatches in suppletive vs. phonological domains are examined in a number of languages, including English, Yiddish, Turkish, Ojibwe, Malagasy, and German. The data are argued to support modifications to both (i) certain theoretical proposals held in the literature, and (ii) the syntactic location of triggers for suppletion generally assumed.

1. Introduction

There has recently been much debate within Distributed Morphology (DM) about how cyclic syntactic domains, or phases, relate to morphological realization, specifically allomorph selection (e.g. Bobaljik 2012, Bobaljik and Wurmbrand 2013, Embick 2010, Harley 2014, Merchant 2015). In this chapter we will focus on a particular class of allomorph selection, i.e. root suppletion, and some of its implications for phonological interpretation and syntactic structure.

In DM, Vocabulary Insertion (VI), and therefore suppletion, is effected at Morphological Structure (MS), a sub-domain along the PF branch of the derivation.

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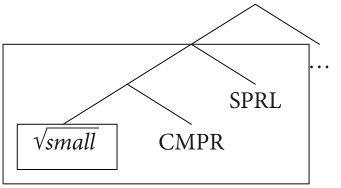
Given that VI is part of PF, we expect the following two things to be true about the structure and interpretation of grammatical cycles, or phases, on the PF branch. First, considering that once VI is triggered, phonological interpretation will be effected, phonological domains and the domains for suppletion should be wholly isomorphic. Such isomorphism would predict that there will never be evidence for a phonological boundary (ex. PWd) between a suppletive morpheme and the morpheme that conditions its suppletion. Secondly, we expect that both the morpheme that conditions suppletion and the morpheme that undergoes suppletion will be present in the same phase at MS and PF. Taking all proposed readjustment rules to be, in reality, instantiations of suppletion, any instance of VI will depend only on the heads within a particular phase (see Haugen and Siddiqi (this volume) and Haugen (this volume) for a more detailed discussion of Readjustment Rules). Spell-Out will lead to PF interpretation, and the output of PF interpretation will be subject to the cyclic freezing effects that have been proposed throughout the phonological literature (Strict-Cycle Condition (Kean 1974), Prosodic Persistence (Newell and Piggott 2014)). Interestingly, both of these entailments have apparent counter-examples. We will focus on two of these – (i) suppletive and phonological domains in English comparative and superlative derivations, and (ii) verbal suppletion in certain Yiddish cleft structures. Here we give brief introductions to these two problems, leaving a longer discussion to the body of the paper.

Comparative and superlative paradigms cross-linguistically evidence a restricted set of suppletive patterns (Bobaljik 2012). Notably, a superlative morpheme may only condition suppletion of a root if the comparative morpheme does. Focusing on the exponent of the root, this entails that AAA, ABB, and ABC patterns are possible, while an *AAB pattern will never be attested.

(1) a. small-smaller-smallest AAA
b. good-better-best ABB
c. bonus-melior-optimus ABC
d. *bonus-bonior-optimus *AAB

This pattern has led to the proposal that regular comparative and superlative derivations as in (1) are interpreted in at least two cycles (Bobaljik, 2012).

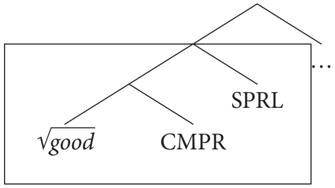
(2)



In (2) the comparative morpheme is a phase head and sends its complement to MS and PF. No suppletion is conditioned and phonological interpretation is effected for the VI *small*. In a second phase the comparative and superlative heads are interpreted and are realised as a suppletive portmanteau *-est*.

In a derivation where the comparative head does condition suppletion, it is proposed that the phase domain is extended (Bobaljik and Wurmbrand 2013). Skipping some details that will be elaborated in Section 3.3, this gives us the derivation in (3) for *best*.

(3)



As the exponent of *good* is conditioned by the comparative head, and subsequently the comparative exponent is conditioned by the superlative, PF interpretation will be delayed until all relevant morphemes are present. Of interest here is that these derivations entail that a regular root as in (2) should display the effect of having been interpreted at PF in 2 cycles [[small]est] while the suppletive root should emerge in the same PF domain as its suffixes [best].

The phonology of comparatives in English, however, tells a different story. Voiced velar deletion in NC clusters in English is subject to cyclic effects. In monomorphemic words, [g] is syllabified as the onset of an available following vowel, while in a multi-cyclic derivation [g] will be deleted before affixation.

(4) a. [fiŋgɚ] 'finger'
b. [siŋɚ] 'sing-er'

Bobaljik and Wurmbrand's domain extension proposal predicts that the comparative *-er* should have the same phonological output effects as the nominalizing *-er* in (4b), contrary to the facts. Comparative *-er* behaves as though it is interpreted at PF in the same domain as the root, as in the monomorphemic (4a).

(5) [loŋgɚ] 'long-er'

This is a problem for our first entailment above, i.e. that phonological domains and the domains for suppletion will be completely isomorphic.

In this chapter we will offer an alternate analysis for the cyclic interpretation of comparative and superlative derivations that will have implications for the manner in which suppletion is effected in derivations where the phase must be extended. This analysis, however, causes problems for Bobaljik's (2012) restriction on AAB suppletive patterns, which we will resolve. We will conclude that, with a different method of domain extension, isomorphism does indeed hold.

The second problematic case we will analyze is that of the following cleft construction in Yiddish.[1]

(6) a. ikh red mame-loshn
1.SG speak.1.SG mama-language
'I speak Yiddish.'

b. **red-n/*red** red ikh mame-loshn
speak-INF/speak.1.SG speak.1.SG 1.SG mama-language
'As for speaking, I speak Yiddish.'

Predicate clefting in Yiddish (see Davis and Prince 1986) places a copy of the verb in sentence initial position where it appears in its infinitival form.[2] What is interesting for our purposes is that when the verb form is suppletive, a *pseudo-infinitive* (see Cable 2004) is formed by (i) stripping off the Tense/Agreement suffix (*veyst* → *veys*) and (ii) adding the infinitive ending to the suppletive root (*veys* + *n*).

(7) **Veys-n** hos-tu mir gezogt az er veyst a sak
know.3.SG-INF have.2.SG-2.SG 1.SG told that 3.SG know.3.SG a lot
'As for knowing, you told me that he knows a lot. INFINITIVE: *visn*

It is argued below in Section 4.1 that the clefted constituent does not include the (T/Agr) head that is normally proposed to provide the appropriate environment for verbal suppletion. Given the second entailment above – that suppletion must be conditioned within a phase – it is concluded that T/Agr cannot be conditioning verbal suppletion in Yiddish. It is proposed that the clefts in (6b) and (7) are copies of a phrase below TP, and therefore the head that conditions the suppletion of the verb root in Yiddish must be found within that phrase and not in T.

This proposal then leads to a discussion of root suppletion in another environment where the triggering head appears to be absent from the required domain, namely English compounds.

(8) a. mice-catcher
b. *rats-catcher cf. rat-catcher

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[1] ABBREVIATIONS: 1 – 1st person; 3 – 3rd person; ACC – accusative; AN – animate; CMPR – comparative; COND – conditional; COP – copula; DIM – diminutive; DUB – dubitative; E – event; FIN – final; INAN – inanimate; IND – indicative; INF – infinitive; OBJ – object; PL-plural; PRF – perfective; SG – singular; SPRL – superlative; SUBJ – subject; TS – theme sign.

[2] Note that this material at the front of the sentence triggers V2, i.e. the finite verb moves to the second position, and this material must therefore be phrasal.

It has been noted in the literature that, while irregular plurals may emerge as the first member of a compound, regular plurals may not (Berent and Pinker 2007). We discuss Siddiqi's (2009) analysis of these facts and conclude that the Yiddish cleft structure points toward a different solution. A lower head, distinct from the regular plural, must be present in (8a), conditioning suppletion. Evidence for the complexity of projections relating to number are called upon to support this analysis (Borer 2005, Mathieu 2012, Steriopolo 2013, Travis 1992).

Both of the above issues, the non-isomorphy of phonological and suppletive domains and the absence of the conditioning head in a domain where suppletion emerges, are argued herein to be only apparent. The discussion of why this is so will begin with an overview of phonological and suppletive domains in Section 2. This will be followed by a discussion of apparent mismatches between phonological domains and suppletive domains in Section 3.1, and then the particular problem of English comparative structures in Section 3.2. Bobaljik and Wurmbrand's (2013) domain suspension proposal will be evaluated in Section 3.3, and then a reanalysis of the cyclic domains in comparative and superlative derivations will be proposed in Section 3.4.

We turn to the problem raised by the Yiddish cleft constructions in Section 4.1. We lay out an analysis of these derivations in line with the syntactic reduplication operations proposed in Travis (2003) that lead to the conclusion that verbal suppletion in the language is triggered by a low, phonologically null head. This in turn leads to a similar analysis of English compounds in Section 4.2. Section 5 concludes with a summary of the implications of the two analyses presented in the chapter. The main conclusion is that cyclic domains on the PF branch (MS and in the phonology proper) are isomorphic, and that this has consequences for the analyses of the morpho-syntactic structures in which suppletion emerges.

2. Domains

As outlined above, we expect the domains that are relevant for phonological realization and suppletion to be isomorphic. Here we first explore ways that they appear to meet this expectation, followed by some apparent mismatches, ending with a system of feature transmission, Feature Portage, which accounts for these data.

2.1 Phonological domains

The domains for the application of phonological rules mirror the domains for suppletion in interesting ways. While phonological processes can cross a word boundary, here we constrain the discussion to syntactically conditioned phonological domains at or below the word level. We restrict the discussion to word-level phenomena so as to facilitate the comparison of phonological domains and suppletion domains.[3]

2.1.1 *Causatives and inner domains*

Studies on the derivation of the phonological word have shown that a word may contain more than one phonological cycle (e.g. Booij and Rubach (1987), Chomsky and Halle (1968), Dubinsky and Simango (1996), Ito and Mester (1986), Kiparsky (1982), Marantz (2007), Marvin (2002), Mohanan (1986), Newell (2008), Peperkamp (1997), Samuels (2010)). Marantz (2007) formulates the generalization that has emerged in the literature: there is an inner domain in word formation that permits phonological and semantic irregularity, and an outer domain where the phonology and semantics are both regular. He, along with others (e.g. Svenonius (2005) and Travis (2000, 2010)), propose that (one of) the boundary/ies between the inner and outer domains falls between an inner mono-eventive domain (E(vent)P(hrase)/vP) and the outer heads which select this inner domain, which may include tense and outer aspect or an additional eventive layer in the case of syntactic causative constructions.[4] This division is exemplified by the following data from Malayalam (data adapted from Michaels (2009), for more Malayalam data, see Mohanan (2005)).[5]

(9) a. Lexical causative (attached to unaccusative)
/aaʈ+ikk/ [aa**ʈʈ**] ‘Y shakes X
$\sqrt{\text{SHAKE}}$ + CAUSE
/nana+ikk/ [nana**kk**] ‘Y waters X’
$\sqrt{\text{WATER}}$ + CAUSE

b. Syntactic causative (attached to unergative)
/paaʈ+ikk/ [paaʈ**ikk**] ‘Y makes X sing’
$\sqrt{\text{SING}}$ + CAUSE
/kaɹa+ikk/ [kaɹaj**ikk**] ‘Y makes X cry’
$\sqrt{\text{CRY}}$ + CAUSE

---

[3] It is of note that though there are various levels of phrasal phonology (Selkirk 2011), the phenomenon of ‘phrasal suppletion’ (where a phrase is replaced en masse in a specific syntactic environment) does not exist.

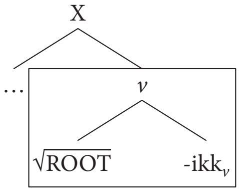
[4] Marantz notes that these inner and outer domains appear to correlate with Ramchand’s (2008) first-phase syntax and Hale and Keyser’s l-syntax (2002).

[5] The traditional terms of lexical causatives and syntactic causatives are used here, see (9), though they are not meant to be related to their method of derivation. We are assuming that both are syntactically derived.

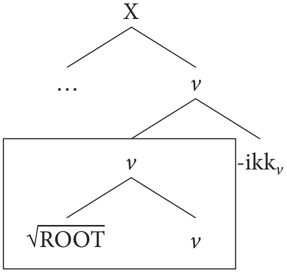
The examples in (9a) are single-event lexical causatives. The phonological interpretation of the root+causative suffix triggers either coalescence of the final consonant of the suffix with a root-final consonant or vowel deletion to resolve hiatus. In bi-eventive syntactic causatives as in (9b), affixation of the causative morpheme does not trigger coalescence and hiatus is resolved by the epenthesis of a glide.

The syntax of the constructions in (9), along with the proposal that syntactic interpretation proceeds in phases, gives us the fact that in (9a) the causative suffix is interpreted with the root (10), while in (9b) the causative and root are interpreted in separate cycles (11).

(10) Lexical causative



(11) Syntactic causative



The above distinction in causative domains is paralleled in Malagasy. Consider the following example.

(12) a. ma$\boxed{\text{mp}}$a$\boxed{\text{m}}$atra

b.	m-	**an**-	[$_{EP}$ **f**-	**an**-	**f**atra	]
	T.E-	CAUSE-	E-	CAUSE-	measure	

‘to make measure’

We can see in (12) that the illicit nasal-labial sequence is resolved in two ways. The /n/ in the causative morpheme *-an* coalesces with a following /f/ in the lower, lexical domain (within EP). Prenasalization, rather than coalescence, occurs when the causative is interpreted as part of a separate event/phase (outside of EP).[6]

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[6] See Travis (2000, 2010) for more details. See Newell (2014) for a discussion of why and how the phonology restricts the types of repair strategies available in the inner and outer domains cross-linguistically.

Given that the phonological domains in Malayalam and Malagasy parallel the syntactic phases in the above derivations, we might therefore expect domains for the application of certain phonological rules to coincide generally with syntactic phases.[7]

2.1.2 *Beyond causatives*

Other languages and other constructions also exhibit the phonological effects of inner and outer domains. Consider the following data from Ojibwe.

(13) a. gig$\boxed{\text{i:i}}$kid$\boxed{\text{o}}$na:wa:dige:nag

b.	gi-	**gi:**	-**i**kid**o**	-**i**n	-a:	-wa:	-dige:n	-ag
	2-	PAST-	be.ashamed	-FIN	-TS	-2.PL	-DUB	-3.PL

'you (pl.) must have been ashamed of them'

Ojibwe both allows and disallows vowels in hiatus (Newell and Piggott 2006, 2014). In (13b) hiatus is not resolved between the tense prefix and the verbal domain, but vowel hiatus is systematically resolved within the lower l-syntactic domain. The distinction in (13b) is categorical in the verbal domain in the language. Within each phase, CP and EP, hiatus is resolved, but it remains unresolved interphasally. Newell and Piggott propose that the exponents of the syntactic heads interpreted within each cycle project a Prosodic Word (PWd). Hence the structure of (13b) in (14a) is interpreted as in (14b). We propose that the Ojibwe data shows that the lower domain comprises the lower single event/argument structure domain, yet crucially excludes inflectional functional information such as T.[8]

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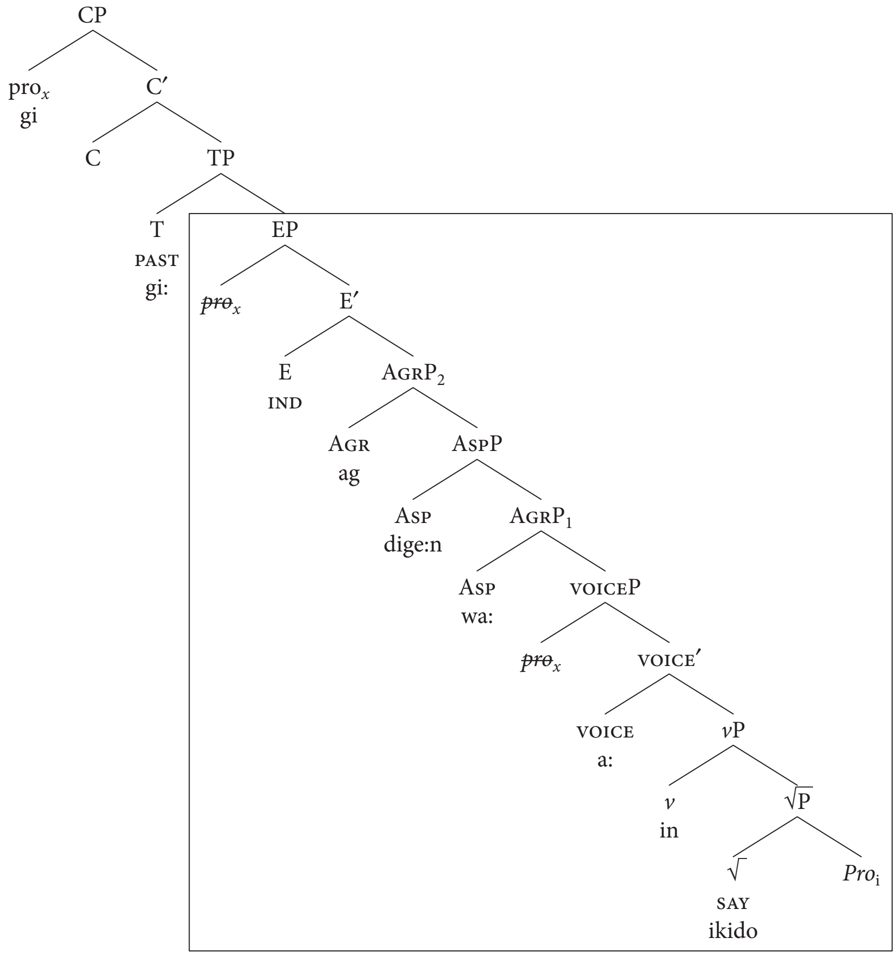
[7] It is of note that the domains in the syntactic literature proposed to be cyclic domains, or phases, are constantly evolving and therefore some proposed phases are more established than others. Here we restrict ourselves to the (relatively) uncontroversial CP/vP division, modulo the modification that vP is a cover term for the highest phrase in the lowest event domain (EP in Travis 2000). We also are aware that morpho-phonological requirements may blur the isomorphism between syntactic and phonological phases (Bobaljik and Wurmbrand 2013, Newell 2005, Newell and Piggot 2014), to be discussed in Section 3.3. Smaller, more controversial phases will be discussed below.

[8] We assume that Ojibwe shows the full extent of the lower phase more clearly than other languages with less overt morphology. We leave open the possibility here that phases are determined along the lines presented in Grohmann (2003, 2006). There it is proposed that each thematic, agreement, and discourse domain constitutes a Spell-Out domain. If phases are determined based on domains, the highest thematic, or verbal, projection would delineate a Spell-Out domain regardless of its particular features.

(14) a.


CP
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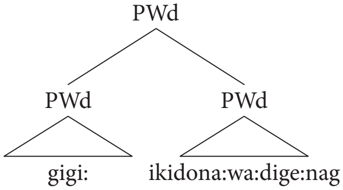
PWd
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gigi:
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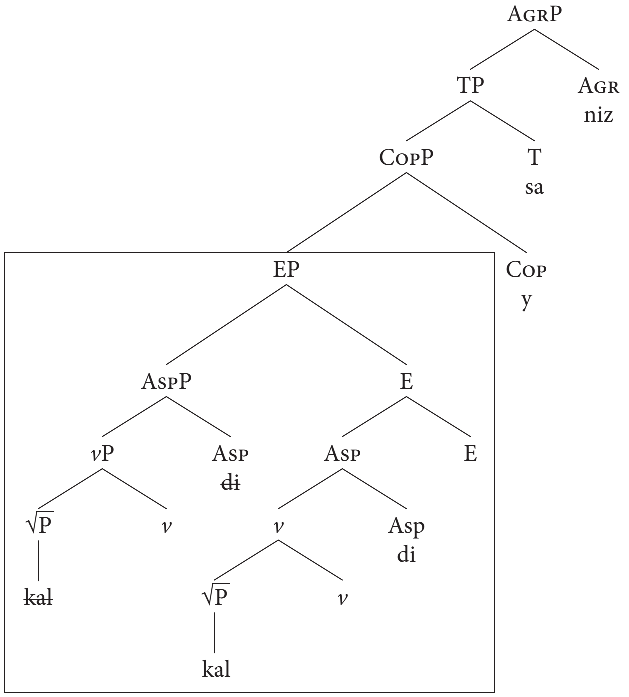
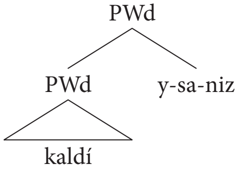
Another language that displays a hard phonological boundary between the inner verbal domain and a higher inflectional domain is Turkish. Newell (2008), following Kornfilt (1996), argues that irregular stress in the verbal domain arises due to syntactic differences between verbal constructions. Regular stress in Turkish is final. Verbs whose derivations contain a copula, however, will spell out in two phases (15a). In this type of construction, the copula raises to host Tense and Agreement morphology in TP. Stress will be assigned in the first phase (EP), and therefore will be non-final. Verbs with regular, final stress, in contrast, contain only one (main) verbal root that raises into the CP domain to check T and Agreement features (16a). Head movement of the verb to T in non-copular constructions allows it to escape interpretation in the EP domain.[9]

(15) a. kal-dí-y-sa-niz
stay-past-cop-cond(high)-2pl
'If you have stayed'

b.



c.



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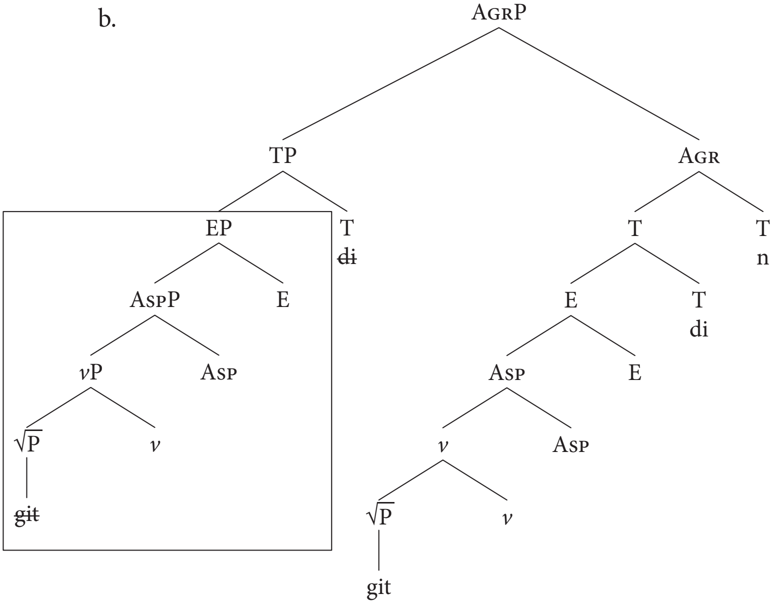
[9] We do not go into some of the necessary details here to explain the lack of head movement out of the lower domain in (15a). One solution is that there are two separate head chains created – one in the lower domain and one in the higher domain and that the two undergo morphological merger later (see Newell (2006) for more on this). Another solution is that there is pre-Spell-Out head movement in (16a) and post-Spell-Out head movement in (15a). Pre-Spell-Out head movement would be triggered by a feature in T and T is visible to the lower domain in (16a) but not in (15a). See Skinner (2009) on locality of features and Dobler et al. (2009) on pre- vs. post-Spell-Out movement.

(16) a. git-tí-n
go-past-2.sg
'you went'

b.



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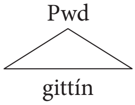

In this section we have given cross-linguistic evidence that the domain split in the syntax is mirrored in the phonology. While the exact definition of the edge of the domain might be underdetermined at this point, there are some elements that are clearly within the lower domain (root, lexical causative) and some elements that are clearly outside of the this lower domain (T, syntactic causative). Armed with this knowledge, we turn to the problem of matching the domains needed for phonology and the domains needed for root suppletion.

2.2 Domains for suppletion

Suppletion is another PF process that requires a notion of domain or locality. Here we present two restrictions on the relation between the suppletive morpheme and the suppletion trigger. We will see that neither an XP boundary nor a phasal boundary can intervene.

We begin, however, by establishing our basic assumption about root suppletion. We follow others such as Bobaljik (2012), Bobaljik and Harley (2013), Harley (2014), Haugen and Siddiqi (2013), and Siddiqi (2009) in assuming that roots as well as functional heads are filled by competing exponents and therefore that there is true root suppletion. Bobaljik and Harley (to appear), Harley et al. (to appear) provide some support for this assumption with data from Hiaki. We see below that Hiaki roots may be suppletive depending on the Number feature of their internal arguments (with transitive and unaccusative verbs).

(17) a. Aapo/Vempo uka koowi-ta **mea**-k
3.SG/3.PL the.SG pig-ACC.SG kill.SG-PRF
He/They killed the pig.

b. Aapo/Vempo ume kowi-m **sua**-k
3.SG/3.PL the.PL pig-PL kill.PL-PRF
'He/They killed the pigs.'

The Hiaki data provide two arguments in support of root suppletion. First, there need not be any phonological similarity between the potential vocabulary items (unlike *sing/sang/sung*, *foot/feet*, etc.) therefore arguing against a readjustment analysis for these forms. Second, given the widespread use of suppletion and the range of verbs, including unaccusative and transitive verbs, that undergo suppletion, it is difficult to argue that these are all light verbs (some examples are: *weama/rehte* 'walk around, wander', *kecha/ha'abwa* 'stand (something) up', *yecha/hoa* 'put down, place').[10] We continue our discussion, then, assuming that roots can undergo suppletion, i.e. roots can compete for Vocabulary Insertion.

There are both syntactic and phonological locality restrictions on the environment for suppletion, but our interest is in syntactic locality.[11] In his study of suppletion in comparatives and superlatives, Bobaljik (2012) notes that root suppletion in a comparative is never triggered in the analytic form, only in the synthetic form. In other words, to take an English example, while we find suppletive forms such as *bett-er*, we never find suppletive forms of the type *more bett*. Bobaljik describes this observation in his Root Suppletion Generalization (Bobaljik 2012: 3).

(18) The Root Suppletion Generalization (RSG)
Root suppletion is limited to synthetic (i.e., morphological) comparatives.

The RSG is captured by the following structural restriction (Bobaljik 2012: 13) where β can trigger the suppletion of α.

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[10] It is interesting that these are all directional verbs. Butt (2010) suggests that these directionals could be light verbs themselves but we leave this proposal aside here and assume that these verbs are not solely the exponents of functional heads.

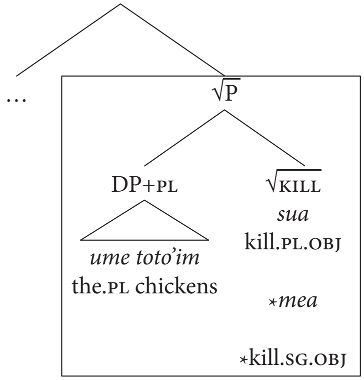
[11] See Embick (2010: Section 3.1) for a discussion concerning the need for a phonological adjacency requirement, and Merchant (2015) for arguments that this adjacency condition must be loosened in particular situations.

(19) a. $\alpha \ldots\ldots]_{X^0} \ldots \beta$ (e.g. *bett-er*)
b. $^*\alpha \ldots\ldots]_{XP} \ldots \beta$ (e.g. **more bett*)

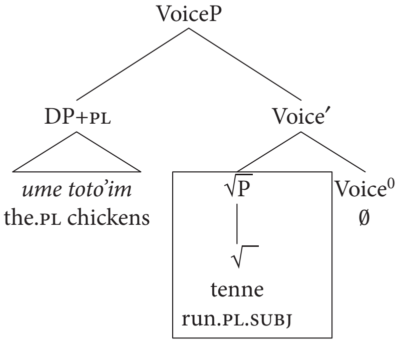
Given the possible and impossible configurations for suppletion, one could posit that suppletion can only occur within a complex head and not between a head and an XP. While this accurately describes the case of *bett-er* vs. **more bett*, a different characterization of the environment is needed to include the data set from Hiaki.

We saw in (17) above that Hiaki root suppletion can be conditioned by the number of the internal argument. An obvious analysis would have the agreement morphology appear in an AGR head that through head movement of the verb forms a complex head configuration with the root. Bobaljik and Harley (2013), however, provide arguments against the AGR head analysis and propose that the relevant environment is provided by the DP argument itself in-situ. We can see in the following structure that there is no XP boundary between the root and the triggering environment when the argument is the complement of the root (20a). Further, we can see why the number of an external argument may not condition root allomorphy since there is an intervening XP when the argument is external to the √P (20b). The restriction in (19) thus accurately captures the facts of Hiaki (trees adapted from Bobaljik and Harley (2013:(13) and (14)).

(20) a. Suppletion



b. No suppletion



We expect, then, to find no cases of root suppletion unless the triggering environment is within the same complex head as the root (as in the *bett-er* case) or the triggering environment is a sister of the root (as in the Hiaki case).

Now we turn to the role of phases in determining domain edges for suppletion. We have seen phonological evidence that suggests that when a second categorial head is added to a syntactic structure, it is added in the outer domain.[12] In the domain of allomorphy, there are parallel locality restrictions on which heads may be the trigger or target of suppletion. Embick (2010) discusses the patterns of nominal formation in English as evidence for this.

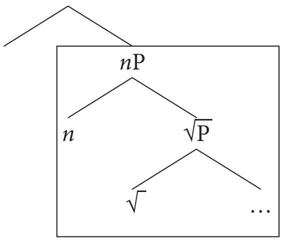
(21) Nominals and Allomorphy (Embick 2010)

derived/simple	*gerund*
refus-al	refus-ing
marri-age	marry-ing
destruct-ion	destroy-ing
break-0	break-ing

Like in the vP/CP domains, phonological (and semantic) evidence suggests that cyclic domains, or phases, are also triggered by derivational affixes. It appears that the first category-defining head merged to a root will fall within the PF domain of the root, but when a second category-defining head is added to a syntactic structure, it is added in the outer domain. In the simple nominals in (21), the category-defining head *n* is realized by different exponents, such as *-al, -ity, -iage, -(t)ion*, 0, depending on the identity of the root it attaches to. In this configuration *n* may also condition allomorphy of the root, as seen in *destruct*ion. In gerundive nominals, the only possible exponent of *n* is *-ing*, and there is no suppletion of the root (see *destruction* vs. *destroying*). Assuming that the gerund contains a *v* between the root and higher nominalizing head, a cyclic theory of Spell-Out explains why there can be no allomorphy of *n* conditioned by the root: *n* is spelled out in a later cycle than the root, so they are not visible to each other at the time VI occurs.

(22) Structure of simple and gerundive nominals

a. *n* root attached (derived/simple nominals)



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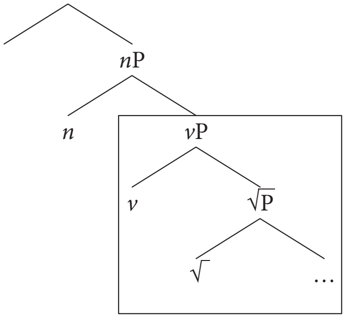
[12] In the cases of the syntactic causatives in Section 2.1.1, a second *v* is being added.

b. *n* NOT root attached (gerundive nominals)



These facts indicate that even though head movement could in principle create a structure that does not violate the restriction we have seen in (19), the existence of the phase boundary will nevertheless block the triggering of suppletion.

So far we have seen that both phonological domains and suppletive domains reflect phasal domains. We will see now, however, that suppletive domains appear to be suspended in certain situations, jeopardizing the isomorphy between the two processes.

3. Domain mismatches

In this section we start by exploring some cross-linguistic mismatches in phonological and suppletion domains. We entertain the possibility that domain suspension might be parameterized, but we eventually are left with the problem that English appears to extend the *v*P suppletion domain but not the *v*P phonological domain. First we will take a closer look at verbal suppletion in the domain of Tense and will argue that the phonological evidence argues against Embick's (2010) account of Spell-Out domains. We will then will discuss comparatives and will argue that the cyclic domains in these derivations are different than those proposed by Bobaljik and Wurmbrand (2013). We will offer a solution that introduces a process of feature transmission at PF, Feature Portage.

3.1 Tense domain mismatches

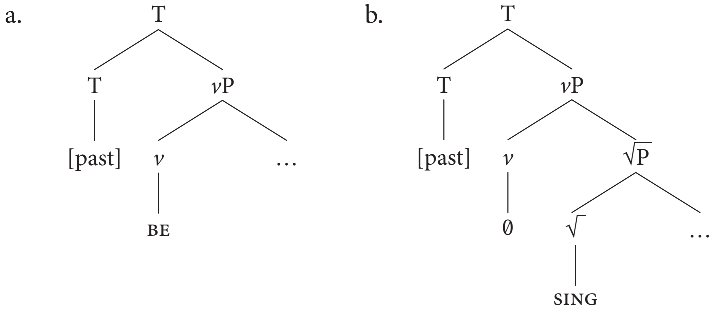
Ideally the domains needed in the PF module reflect the domains that have independently been proposed for syntax. But even setting that issue aside, we would expect that the domains for morphophonological (PF) operations, such as Vocabulary Insertion and phonological rule application, to be isomorphic. We will see below, however, that there is an apparent mismatch between the domain needed for root suppletion and that needed for phonological Spell-Out. We propose that this discrepancy is only apparent.

One of these apparent mismatches emerges when we compare the phonological facts that reflect a phase-by-phase Spell-Out with the facts of suppletion conditioned by T in English. The phonology in the languages discussed above tells us that *v* and its complement count as a Spell-Out domain to the exclusion of T (see e.g. the Ojibwe example (13b)). However, in a number of languages T can condition allomorphy and suppletion on verbs. If *v* and its complement comprise a Spell-Out domain which undergoes vocabulary insertion and phonology, then it is not clear how a head outside of this domain can condition suppletion. This is illustrated below for the English verb *go*.

(23) *go – went*
   a. $[_v [\sqrt{\text{GO}}\ ]] \rightarrow$ Spell-Out and VI → *go*
   b. $[_T \text{T} \ldots \boxed{[_v [\boxed{\sqrt{\text{GO}}\ ]]}}]$ → the root is frozen, and we expect *go-ed*

In order to accommodate the fact that T can condition the form of the verb, what is needed appears to be a suspension of the Spell-Out domain. In what follows we review two of such endeavours in the literature, Embick (2010), and the more recent Bobaljik and Wurmbrand (2013).[13]

Embick (2010) argues that Spell-Out of the first phase is suspended until the next higher phase head is merged.

(24)


Regardless of the different status of the verbs in (24) where *be* is a light verb and *sing* is a root, Embick proposes that the verb/root and T are in the same phonological cycle. Therefore T can affect the verb or root, and either of these can condition allomorphy of T, as long as linear adjacency holds. This formulation of how suppletion is constrained allows for the syntactic relation between the allomorph and its trigger to be relatively loose. In a structure such as (25) below, y and x being cyclic heads, allomorphy of the root can be conditioned as far away as Z, as long as the heads X, Y, and x are phonologically null (see Embick (2010: 17)).

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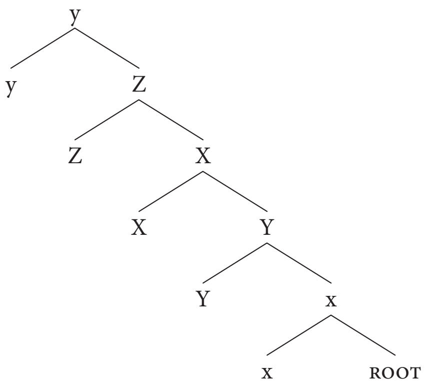
[13] Various other solutions in terms of domain suspensions have been entertained (den Dikken 2007, Moskal 2013, Svenonious 2004, Skinner 2009, Merchant 2015, among others) that could potentially deal with this, however we explore those of Bobaljik and Wurmbrand and Embick, as they deal specifically with root allomorphy.

(25)



We would like to point out two issues with the above formulation of cyclic domains. First, it has been proposed in Bobaljik (2012, 2014) and Bobaljik and Wurmbrand (2013) that allomorphic conditioning must be syntactically local, in a way that Embick's proposal does not adhere to. Second, it is not clear whether for any language T is in the same *phonological* domain as the root, given the data discussed in Section 2.1.2. What the phonological data suggest is that any approach to domain suspension cannot be absolute, contra Embick (2010).

One possibility would be that domain suspension of certain cyclic heads is parameterized.[14] This would mean that in English, but not in Ojibwe, the first Spell-Out domain is extended to include T. Note that an approach in terms of parameterization of domain suspension makes a certain prediction, creating a falsifiable theory. For example, in a language like Ojibwe, where the phonology tells us that there is a domain edge between *v* and T, we would not expect to find verb suppletion conditioned by T. In turn, we would not expect to find a phonological domain edge between *v* and T in a language like English, which has T conditioned root suppletion.

Suppletion does indeed not cross the EP domain in Ojibwe. Ojibwe roots may be subject to suppletion but, like in Hiaki, this suppletion can only be conditioned by features of the object in the verbal domain. In (26) the form of the verb root meaning 'eat' depends on the presence of, and if present the gender of, the object; /wiishini/ in intransitives, /amw/ in the domain of an animate object,[15] and /miidjin/ in the domain of an inanimate object.[16]

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[14] D'Alessandro and Scheer (2015) propose that phases are universal but that the Phase Impenetrability Condition (PIC) may be suspended in certain constructions. This is quite different from what we are proposing here.

(26) a.

Nin-	dago	-in	-a:	-n	zhi:wita:gan	wi:sini	-ya:n
1P-	add.in	-FIN	-TS	-3.INAN	salt	**eat**	-1.SG

‘I add salt when I eat.’

b.

In-	gi:-	amw	-a:	wi:shko:bi	-bakwezhigan	gi:-
1P-	PAST-	**eat**	-TS	sweet–	bread	PAST-

tibishkaa	-ya:n
have.birthday	-1.SG

‘I ate cake when I had my birthday.’

c.

Ni-	mi:ji	-n	-an	zi:nziba:kwad	-o:ns	-an
1P-	**eat**	-3.INAN	-PL	sugary.thing	-DIM	-PL

‘I’m eating candies.’

Another case in point is Turkish, which we have shown to also have a phonological domain edge between v and T and which is therefore predicted not to have verbal root suppletion. This appears to be the case. Veselinova (2013), citing Lewis (1967), notes that Turkish does have T-conditioned suppletion. This suppletion is, however, proposed to only occur with the verb BE, which is a prime candidate for copula status. If this is the case then BE would move into the higher domain like the copula in (15a).[17]

In conclusion, the facts from Ojibwe and Turkish are compatible with the prediction that in these languages T does not condition root allomorphy. This is in line with the proposal in (Newell and Piggott 2014) that EP in Ojibwe is sent to PF interpretation separately from the T which c-comands EP.

As for English, a language that does have T-conditioned root suppletion, we predict there to be no evidence of a phonological domain edge between *v* and T. Interestingly, T in English only appears to be within the same phonological domain as its root in cases of suppletion (Goad and White, 2006). Restrictions on English syllable structure are flouted by the addition of regular inflection, indicating that the regular tense suffix is adjoined to an inner PWd (27a), while irregular [t] is merged inside the same phonological domain as its root (27b).

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[15] Interestingly, *wi:sko:bi-bakwezhigan* ‘cake’ is an animate noun in Ojibwe, while *bakwezhigan* ‘bread’ is inanimate. This calls into question whether the locus of animacy features is the root, or rather a nominalizing head (Glyne Piggott, p.c.). *Wi:sko:bi* ‘sweet’ is a modifier and therefore is not predicted to affect the projection of features of the nominal root.

[16] Data come from the Ojibwe People’s Dictionary (2015).

[17] Contrary to her entry on the WALS site, Veselinova (2006:123) states that Turkish has no suppletion at all “However, if we look at languages where there is no Tense–Aspect suppletion, such as Turkish […]”. In any case, copular verbs in Turkish do not pose a problem for the prediction that we have described. Verbs conjugated in the past or conditional, without a copula, are predicted to be able to undergo suppletion. Their lack of suppletion is also, clearly, not a problem. See Section 4.

(27) a. [hɛlp]$_{PWd}$ t]$_{PWd}$
b. [kɛpt]$_{PWd}$

In (27a) the verb contains a final sequence [ɛlpt] which is never found PWd-internally, while in (27b) the [t] triggers V-shortening due to its PWd-internal position. This pattern does not support Embick's proposal that T is always within the same phase as the verb in English. Moreover, it falsifies a relativised version of the phase whereby domain extension is parameterized cross-linguistically. At first sight, it supports a proposal where domain extension is linked to suppletion, such as that of Bobaljik & Wurmbrand, to be discussed in Section 3.3. We will see, however, that even B&W's solution is problematic here, and we will briefly return to a solution to the non-isomorphy of the suppletive and phonological domains in English below in Section 4.

3.2 Phonological domains in comparatives

While the facts about English T are problematic for the proposal that phonological and suppletion domains are isomorphic, the facts of English comparatives do appear to support it. As English allows for suppletion in comparatives (*good-better*), we predict the absence of a phonological domain edge in non-suppleting forms. This appears to be borne out: The pronunciation of words such as *longer* and *younger*, [laŋgɚ] and [jʌŋgɚ] parallels that of monomorphemic words such as *finger* [fɪŋgɚ], in which the velar nasal necessarily spells out together with the velar stop.[18]

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[18] Bermudez-Otero (2011) offers evidence that the comparative morpheme in Belfast English (B.E.) is not in the same phonological domain as the root to which it attaches, except when the root is suppletive. To consolidate the analyses of B.E. and Standard English (S.E.), he proposes (p.c.) that in S.E. the [g] in *long* is not saved by the syllabification in the onset of the comparative '-er' within the first (stem) cycle, but rather that the appearance of [g] in the output is an exception, essentially an allomorph. This analysis would force us to conclude that there are two ways in which the [g] can emerge in S.E., either by regular syllabification in the onset of a level 1 affix such as in *elongate, longevity* or *longitude* (as compared to its deletion before a level 2 affix such as *ish* as in *longish*), or by allomorphic selection. But, the evidence for the comparative not being level 1 comes either from a different dialect, namely B.E, or the behaviour of words like *solemner* [sɔləmɚ] vs. *solemnity* [sɔlɛmnɪti], where '*solemner than*' has less than 500 hits on Google. A cross-linguistic analysis of the phonology of comparatives should give us more insight. For the present paper we will maintain the proposal that [g] retention in comparatives is purely phonological, rather than allomorphic, in S.E.

(28) *finger – longer*
  a. [*n* [√FINGER]] → Spell-Out and VI → [fɪŋgɚ]
  b. [CMPR *-er* [√LONG]] → Spell-Out and VI → [laŋgɚ]

This contrasts with derived nominals such as *singer* [sɪŋɚ]. The latter is derived from the verb *sing* (v+ √SING) that undergoes Spell-Out and phonology before the agentive suffix *-er* is attached.

(29) *singer* – (also *longer* (one who longs))
  a. [*v* [√SING]] → Spell-Out and VI and phonology → [sɪŋ]
  b. [*n -er* [*v* [√SING]]] → Spell-Out and VI → [sɪŋ] + er → [sɪŋɚ]

Given this converging evidence from velar deletion and root suppletion that the root and comparative morpheme undergo Spell-Out in the same phase, it appears that the comparative offers evidence for the isomorphism of domains for phonology and suppletion. However, based on a careful consideration of the cross-linguistic suppletion patterns exposed in Bobaljik (2012), namely that AAB patterns (e.g.*good-gooder-best) in adjective-comparative-superlative triplets are unattested, the parameterized approach to domain suspension is once again to be rejected. In the next section we propose a revision to Bobaljik and Wurmbrand's (2013) theory of domain suspension in a way that is compatible with the facts presented above without opening the door to unattested patterns of suppletion.

3.3 Domain suspension à la Bobaljik and Wurmbrand

Bobaljik and Wurmbrand (2013) (henceforth B&W) propose that the cyclic domain in a construction such as (30) can be extended under the two conditions in (31) (See B&W, p. 186).

(30) $[\ X\ [_{Y^n}\ Y\ ]]$

(31) a. Morphology: if X is a cyclic head, then Y^n is a Spell-Out domain, unless Y depends on X for its interpretation.
  b. Syntax: if Y^n is the highest projection of a (potential) cyclic domain, then Y^n constitutes a phase, unless Y depends on X for its interpretation.

The wording in (31a) suggests that (30) allows for Domain Suspension in the case where a phase head triggers allomorphy of its complement. This is exemplified by the existence of ABC patterns of suppletion, as found in the Latin comparative/superlative paradigm.

(32) bonus-melior-optimus

B&W's argument includes the proposal that the comparative head (CMPR) is cyclic. Under this assumption, in derivations where CMPR does not condition root allomorphy, it spells out its complement domain. The root undergoes VI and is consequently frozen due to the Phase Impenetrability Condition (Chomsky 2000). When the (higher) superlative (sprl) head is merged it is therefore impossible for it to trigger suppletion on the root. This way, the non-existent pattern of suppletion AAB is successfully prevented from being generated.

If, on the other hand, cmpr conditions suppletion of the root then Spell-Out will wait until the merger of a further cyclic head to induce Spell-Out. If this cyclic, superlative head also conditions suppletion of the root/cmpr then it will cause another iteration of domain suspension and will be in the Spell-Out domain of the root, as in (32). In this configuration sprl can therefore condition the suppletive form of the root.

We would like to call attention here to some problems with this account. As detailed in the previous section, if in non-suppletive comparative derivations the root spells out separately from the comparative suffix, we predict a pronunciation akin to [sɪŋɚ] for roots ending in a nasal-velar stop, where the vowel in the agentive morpheme is not visible in the Spell-Out domain of the root, and not akin to a monomorphemic word such as [fɪŋgɚ], where the /g/ can be syllabified as an onset. We do, however, find the latter pronunciation, e.g. [laŋgɚ], which suggests that the root and the comparative are spelled out in the same domain even when no allomorphy is conditioned (the vowel of the comparative suffix is visible).[19]

The other issue with domain suspension is a meta-theoretical problem with (31a) that applies to morphological suspension, though not to the syntactic suspension in (31b). Consider the following. Under (31b), if a cyclic head has unchecked features, this ‘uncheckedness’ can be ‘seen’ by the syntax, and can trigger suspension. Nothing will be sent to the interfaces. Under (31a), however, the suspension cannot be triggered in the syntax. Under the realizational assumptions of B&W there is no morphophonological information in the syntax. It is only on the PF branch, when VI is attempted, that it can become evident that a root’s morphological exponent is dependent on, say, a comparative head for VI. So, if the comparative head sends its complement to PF (and LF) the following statement of allomorphy will be accessed at the PF interface.[20]

(33) VI of root+cmpr
root^{4786} → xxxx/_______ cmpr
→ yyyy elsewhere

At this point we can see that there is a potential conditioner for allomorphy. The big problem here, however, is that the cmpr morpheme, under B&Ws proposal, is not present. Therefore, VI should occur, and we should see the elsewhere allomorph inserted. In any statement of allomorphy containing an elsewhere case, allomorphy/suppletion should never suspend VI as there is no motivation for it to do so.[21]

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[19] Note the exception that is *wronger*, pronounced as [ɹaŋɚ]. We don’t have anything to say about this, except to observe that for most speakers *wronger* is not a great comparative form to begin with. Also, see Footnote 18.

[20] We use the notion of root indexation as proposed in Harley (2014) citing Acquaviva (2008), Pfau (2000, 2009).

The issue this section seeks to raise is that there is a mismatch between the Spell-Out domains proposed in B&W (2013) to account for suppletion, and the phonological domains that are needed to account for the pronunciation of non-suppletive comparatives. We suggest that these two sets of data can only be reconciled if the exclusion of the AAB pattern has a different source than that proposed by B&W. This problem is detailed in the following section.

3.4 Domain suspension revised: Feature Portage

We propose here a solution to the problem that B&W have with respect to non-suppleting adjectives, namely that they appear to be interpreted phonologically in the same domain as the comparative.[22]

Given the pronunciation of [laŋgɚ] and [jʌŋgɚ], let us bite the bullet and assume that the phase head CMPR spells out together with its complement.[23] If this is true, then there is there is no rationale for domain suspension at this point in the derivation; VI of the adjective/root always occurs in the domain of CMPR.

(34) [[√LONG] CMPR] → Spell-Out and VI → [laŋgɚ]

Since both the root and CMPR are in the same domain, the velar stop fails to delete and we derive the pronunciation [laŋgɚ]. In case of a suppletive root, such as *worse*, there will be no need for domain suspension, since the triggering environment, CMPR, is present when VI of the root occurs. The ABB pattern (*bad-worse-worst*) is predicted: by the time the next phase is spelled out (SPRL), the root has already been inserted and is frozen.

What about the ABC pattern now? If root suppletion triggered by CMPR no longer requires domain suspension, we must ask how the ABC pattern could ever be possible. Note that Bobaljik (2012: 217) points out that the ABC pattern depends on the portmanteau exponence of ROOT+CMPR in the superlative. In Bobaljik (2014), this generalisation is termed The Inner Portmanteau Generalization (IPG).

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[21] There is another correlation above that we just want to mention here. Under (31b) syntactic and semantic cycles are always parallel. Under (31a), if there is no trigger for suspension in the syntax, interpretation at LF should continue as normal. We should therefore predict that allosemic domains will never be mismatched with syntactic cyclic domains, only with allomorphic domains.

[22] This subsection benefited greatly from personal communication with Jonathan Bobaljik. All errors remain ours.

[23] Arguments supporting that some phase heads are indeed interpreted with their complements can be found in Newell and Piggott (2014) and Dobler et al. (2009). See also example (10).

(35) The Inner Portmanteau Generalization (IPG)
In the ABC pattern, the superlative stem must be a portmanteau, including $\sqrt{\text{ROOT}}$ +CMPR. (Bobaljik 2014: p. 6)

This suggests that domain suspension occurs only when the phase head CMPR is dependent on SPRL. We propose the following revision of B&W's morphological domain suspension, wherein we follow Newell & Piggott (2014) in assuming that phases heads can spell out with their complement.

(36) [Z … $[_{X'}$ X [Y]]]

(37) Morphology: if X is a cyclic head, then X′ is a Spell-Out domain, unless X depends on Z for its interpretation.[24]

The comparative morpheme shows allomorphy in the context of SPRL, and therefore, in line with (37), can condition domain suspension even when it does not condition allomorphy on the root, a pattern attested in Latin:

(38) beat-us beat-**ior** beat-**iss**-imus Bobaljik (2014)[25]
'happy' 'happier' 'happiest'

This also allows for the emergence of the ABC pattern seen in (32). (39) and (40) give us the statements of allomorphy for BON and CMPR, respectively, that would lead to *bonus-melior-optimus*.

(39) a. BON+CMPR → opt/SPRL
b. BON → mel/CMPR
c. BON → bon/elsewhere

(40) a. BON+CMPR → opt/SPRL[26]
b. CMPR → iss/SPRL
c. CMPR → ior/elsewhere

---

[24] Note that in the narrow syntax, there is no morphological domain suspension (syntax being blind to issues relating to VI). Thus, X and its complement are sent to PF at Spell Out. (This is also how morphological phase domain suspension was intended by B&W (Bobaljik p.c.).) Suspension occurs for VI, at PF, due to the features of SPRL in the allomorphy statement for CMPR.

[25] The *-iss* morpheme is historically the same as *-ior*, but not synchronically (Bobaljik p.c.).

[26] We will have more to say about the appearance of this conditioning environment in both lexical entries in a revision to these statements below in (49).

Bobaljik (p.c.) points out that this revision to domain suspension re-opens the door for the emergence of the unattested AAB pattern. For example, this revised proposal allows for a hypothetical vocabulary statement for the root which lacks a suppletive form conditioned by CMPR but contains a suppletive form conditioned by SPRL. The statements of allomorphy in (41) and (42) predict the surface forms *bonus-bonior-optimus*, an unattested pattern.

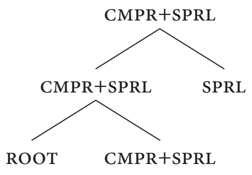
(41) a. BON+CMPR → opt/SPRL
b. BON → bon/elsewhere

(42) a. BON+CMPR → opt/SPRL
b. CMPR → iss/SPRL
c. CMPR → ior/elsewhere

To solve this problem let us consider in detail what must occur at Vocabulary Insertion. First we will demonstrate how our system can derive the pattern in (38) as well as an ABC pattern such as *bonus-melior-optimus*. Then we turn to how the AAB pattern is excluded.

A statement of allomorphy indicates not just the insertion of a vocabulary item/allomorph, but also a search for the relevant conditioning features by a lexical item. So, for instance, the lexical item CMPR, represented in (41), will search its domain for the feature SPRL. If it does not find SPRL the elsewhere allomorph is inserted. If the search does encounter SPRL, considering for the moment statement (42), we propose this results in a matching operation, akin to feature matching that occurs in the narrow syntax. We propose that this operation will bundle the matched features under the head that initiates the search (here CMPR), and that these features percolate to the node that dominates CMPR and its conditioner.

(43)



Let us call this operation *Feature Portaging*[27]

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[27] The term is inspired by the nautical term of 'portaging' (pronounced with stress on the second syllable), and also links our discussion to Bobaljik's *Inner PORTmanteau Generalization* (2014: 6) Feature Portaging has a similar function to Fusion (Halle and Marantz 1993), and to the Vocabulary Insertion Principle (VIP) (Radkevich 2010: 8), but it is motivated by the independently necessary checking operation called for by any statement of allomorphy that has a conditioned environment. It shares with Radkevich (2010) the concept of spelling out non-terminal nodes, but it makes different predictions to the VIP as well as to the Fusion

(44) Feature Portaging:
A morphological matching operation that results in the matched features being bundled in the head that initiates the search. These features will then percolate, or *portage*, to the node dominating both heads.

The structure in (43) necessitates that CMPR+SPRL enter into an allomorphic/suppletive relationship. This entails that either (i) the CMPR vocabulary item has superlative-conditioned allomorphy and that the SPRL head is spelled out as a separate VI (45a), or (ii) that CMPR+SPRL are realized as a single portmanteau Vocabulary Item (45b).[28] In other words, the CMPR and SPRL features may be realized separately at the terminal nodes, or may together realize the portaged node.

(45) a. beat-**iss**-**imus**
b. pretti-**est**

Given the above, let us demonstrate how we derive the ABC pattern while excluding the AAB pattern. Consider again the Latin comparative and superlative derivations using the statements of allomorphy in (46).

(46) a. BON+CMPR → opt/SPRL
BON → mel/CMPR
BON → bon/elsewhere
b. BON+CMPR → opt/SPRL
CMPR → iss/SPRL
CMPR → ior/elsewhere
c. SPRL → imus

In a derivation (after head movement) where no SPRL head is merged, the output will be a structure as in (47). At Spell-Out the first step of VI will be initiating a search for features based on the statement of allomorphy of the most deeply embedded lexical item, the root. When the search returns with the CMPR feature, matching and portaging will occur, giving the feature bundles indicated on the nodes in (47). The next step will be to initiate a feature search triggered by the CMPR lexical item. The existence of the SPRL feature in the statement of allomorphy for the CMPR in (46b) will trigger domain suspension, as predicted by the revised version of it given above in (37). As

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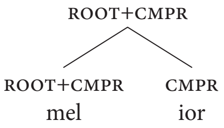
approach to portmanteaus. While it gives the impression of allowing portmanteaus to spell out non-constituents (e.g. -st in best) similarly to spanning (Caha (2009), Svenonius (2012), Merchant (2015)), it formally does not actually do this. There are important distinctions in the predictions made by these theories that we do not have space to fully expand upon here. (See Newell and Noonan (in prep)).

[28] It could also be the case there that either the CMPR or the SPRL is realized as a null head. See Haugen & Siddiqi (this volume) for a discussion of the null vs portmanteau options.

the sprl head is never merged in this derivation, no matching/portage will occur at the cmpr node. Upon completion of the phase, VI will then occur from the inside-out. The root node will be realized as *mel*, and the cmpr as *ior*.

(47)



Notably, the second option raised in (45), where the portaged head spells out as a portmanteau is attested in the Welsh *gwell* 'better'.

Let us now consider the derivation of the superlative *optimus*. What is crucial here is that all allomorphy within a phase must be determined before VI occurs, or we could never realize an ABC pattern. First, the root will portage features with cmpr. As in the previous derivation, the statement of allomorphy of the cmpr lexical item will cause domain suspension. But note now that the statement of allomorphy of the portaged root+cmpr node will also initiate a search for sprl. Crucially, we adopt the following additional condition on suppletion, akin to that proposed in Bobaljik (2014) and Bobaljik & Harley (to appear).

(48) Sisterhood condition:
Allomorphy/suppletion may only be conditioned on a sister node.[29]

This novel proposal entails that root+cmpr is an independently stored morpheme, with its own statement of allomorphy, given in (49c). root+cmpr is the sister node whose allomorphy is conditioned by sprl. We can therefore remove the root+cmpr conditioning environments from the statements of allomorphy in (39) and (40), eliminating the duplication problem raised above.[30] This then gives us the new statements of allomorphy in (49).

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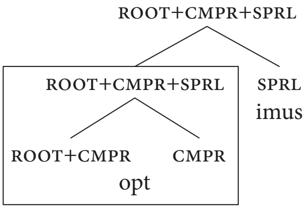
[29] Bobaljik (2012) allows for suppletion between any two nodes within the same Spell-Out domain. Bobaljik and Harley (to appear) refine this to the domain of any two nodes not separated by an XP projection, keeping the option open that non-sister heads in a complex X^0 may enter into a suppletive relationship. We propose that the modifications proposed for the cmpr/sprl derivations herein allow for this even stricter restriction on suppletion.

[30] In statements of allomorphy like those in (39) and (40) it was noted that the conditioning environment for the portmanteau needed to be stated in each. It is only if a non-terminal node may also be a morpheme, and can therefore have its own statement of allomorphy that this doubling is eliminated. This type of non-terminal morpheme will only emerge during the checking phase of an independent morpheme (the root in (47)). This leads to the fact that the statement of allomorphy of a non-terminal morpheme (a portmanteau) will never include an elsewhere case.

(49) a. BON → mel/CMPR
BON → bon/elsewhere
b. CMPR → iss/SPRL
CMPR → ior/elsewhere
c. BON+CMPR→ opt/SPRL

The search algorithm then continues with the merger of the SPRL head, allowing for a second feature matching and portage operation to occur, giving (50).[31]

(50)



At the point of vocabulary insertion we know that it must be the case that the ROOT+CMPR node enters into an allomorphic relation with SPRL, as (i) domain suspension has occurred, and (ii) SPRL may only condition the allomorphy of its sister. The sister node of SPRL must contain the features of both the root and the comparative morphemes, as they have previously entered into a matching relationship. The only possible realizations of this structure are (i) one where the portaged ROOT+CMPR node is realized as a portmanteau, and the SPRL is realized as an affix, or (ii) one where the ROOT+CMPR+SPRL node is realized as a single portmanteau. Option (i) is what we find in Latin. Option (ii) is found in the Old Irish *maith* 'good' *ferr* 'better' *dech* 'best'.

In essence, the combination of Feature Portage and the Sisterhood Condition derive Bobaljik's Inner Portmanteau Generalization (see (35)). In a language where allomorphy of the root is never conditioned by CMPR, Feature Portage will never derive the ROOT+CMPR node. Therefore, a language simultaneously containing the three morphemes in (51) is predicted to be impossible, excluding an output like the unattested **bonus-bonior-optimus*.

---

[31] Remember that CMPR *can* be conditioned by SPRL – in a case where there is no checking between the ROOT and CMPR (as in *beat-iss-imus*, cf. **beat-ior-imus*). This indicates that the CMPR head can undergo a checking relation with the SPRL head. But, in cases where there is a statement of allomorphy that refers to both the ROOT and the SPRL, this statement of allomorphy will always necessarily also include reference to the CMPR. Therefore, agreement between SPRL and its sister node will always occur in the configuration in (50). It is therefore unclear if the CMPR head also checks features with SPRL. (50) represents a derivation where it does not.

(51) a. BON → bon
b. CMPR → iss/SPRL
CMPR → ior/elsewhere
c. BON+CMPR → opt/SPRL

In such a system the sister of SPRL will never contain the features of the root. The cross-linguistic exclusion of the AAB pattern, contra B&W, is therefore not contingent on the CMPR and the root spelling out together iff the CMPR conditions allomorphy on the root.

To summarize, we have shown that the B&W account of CMPR/SPRL suppletion makes the wrong prediction regarding the pronunciation of regular comparatives: phonologically it looks like the root and the comparative suffix are always spelled out inside the same phase, and domain suspension is therefore never needed to account for CMPR triggered root suppletion. Our solution appeared to predict the emergence of the unattested AAB pattern but, as we have just demonstrated, the combination of Feature Portage and the Sisterhood Condition gives all and only the attested patterns. The domains for allomorphy and phonology in comparative constructions are therefore isomorphic.

Notably, Feature Portaging and the Sisterhood Condition will not solve the question of English T-conditioned allomorphy, since T, contrary to CMPR, is not a sister to the root (little *v*, and other heads, such as Asp and E, intervene). Given that there is evidence of a phonological edge between T and *v* even in a language like English that does exhibit T-conditioned allomorphy on the verb, we must propose a different solution. This solution will be dependent on the analysis of Yiddish predicate clefts in the following section.

4. Lower Heads

In this section we return to the problem of predicate clefts in Yiddish. We propose that a lower, phonetically unrealised, head is needed to explain root suppletion in the predicate clefts. This then entails that the generally assumed analysis where a higher, phonetically realised, trigger in T and/or Agr conditions verbal suppletion in Yiddish must be revised. Once proposed for the problem of Yiddish predicate clefts, we extend this to account for suppletive plurals appearing in English compounds.

4.1 Yiddish predicate clefts

Yiddish predicate clefts pose a problem that cannot be solved by domain suspension. The cleft containing the reduplicated root will always be separated from the

Tense and Agreement morphology taken to condition verbal allomorphy by an XP, and therefore we must find an alternate solution to the locality problem posed by this data.

The relevant construction is given in (52) (repeated from (6), see Cable 2004, Davis and Prince 1986, Waletzky 1969 for more data).

(52)	a.	ikh	red	mame-loshn	
		1.SG	speak.1.SG	mama-language	
		'I speak Yiddish.'			

	b.	red-n/*red	red	ikh	mame-loshn
		speak.1.SG-INF/speak.1.SG	speak.1.SG	1.SG	mama-language
		'As for speaking, I speak Yiddish.'			

A form of the verb is found in sentence initial position, and, as Yiddish is a V2 language, the finite verb moves to second position. What is noteworthy for our purposes is that in this example (i) the fronted verb, *redn*, is 'resumed' by the finite verb *red*,[32] and (ii) the form that the fronted verb appears to take is that of the infinitive.[33] However, as pointed out in Waletzky (1969) and Davis and Prince (1986), with verbs that show root suppletion, a form other than the infinitive is used. Below we see that the fronted form in (53), repeated from (7), is *veysn* while the infinitive is *visn*, and in (54b) is *binen* while the infinitive is *zayn* (examples from Davis and Prince 1986).

(53)	Veys-n	hos-tu	mir	gezogt	az	er	veys-t	a	sak
	know.3.SG-INF	have-2.SG	1.SG	told	that	3.SG	know-3.SG	a	lot
	'As for knowing, you told me that he knows a lot.'						infinitive: *visn*		

(54)	a.	ikh	bin	in	amerike
		1.SG	be.1.SG	in	America

---

[32] While Cable (2003) argues for a copying account of predicate clefting in Yiddish, Cable (2004) argues that the clefted element is base-generated in a higher position (for him, Spec,TP). He does this to account for constructions where the higher and lower material do not match. We leave these constructions aside for two reasons. We have not found speakers who accept these constructions, and the constructions that are given do not contain pseudo-infinitives. This is part of our ongoing research.

[33] Much work has been done on predicate clefting in other languages, e.g. see Koopman (1984) on Vata, a Kru language, Harbour (2008), Larson and Lefebvre (1991), Lefebvre (1992) on Haitian Creole, Lefebvre (1992) on Fongbe, Cable (2004) on Brazilian Portuguese. While many of the characteristics of predicate clefting in these languages are similar to the facts of Yiddish, to our knowledge none of these languages shows the same root suppletion facts.

b.	bin-en	bin	ikh	in	amerike
	be.1.sg-inf	be.1.sg	1.sg	in	America

‘As for being, I am in America.’ infinitive: *zayn*

Davis and Prince give several suppletive paradigms (*visn* ‘to know’, *gebn* ‘to give’, *hobn* ‘to have’) but the most complex one is that for the verb *zayn*, ‘to be’, given below.

(55) Inflected vs. fronted forms for *zayn*, ‘to be’

Agr	Inflected	Fronted	Agr	Inflected	Fronted
1.sg	bin	binen	1.pl	zaynen/zenen	zaynen/zenen
2.sg	bist	bizn	2.pl	zent	zenen
3.sg	iz	izn	3.pl	zaynen/zenen	zaynen/zenen

In their terms, what moves “is neither the infinitival form of the verb nor the entire tensed verb itself. What moves is simply the verb stem ‘stripped’ of its inflectional ending.”

The intriguing aspect of this construction, for questions regarding root suppletion, is that the suppletive form of the root appears, but in the apparent absence of its conditioning environment, namely Tense and person/number agreement. The case of (53) is particularly interesting as the overt agreement suffix of 3rd person singular, *-t*, is missing. Given that the constituent which fronts must be an infinitive, we conclude that the constituent does not include T and AGR.[34] The question thus is: how is the suppletive form of the root inserted at the point of VI? We first briefly outline the essential points of an approach in terms of reduplication proposed in Travis (2003). We then return to the issue of root suppletion.

Travis (2003) argues in favour of treating reduplication as a syntactic process and postulates a reduplicative head Q, whose function is to copy a (subpart of a) phonological or a syntactic constituent into a given structure. Below we give two of her structures – one where the copy is head adjoined to Q (56a) and one where the copy appears in Spec,Q (56b).[35] Below we see that in each case, material from the sister constituent is copied either from a head into a head position (56a), or from a complement into a Spec position (56b).

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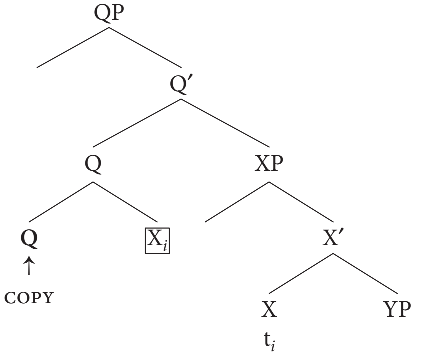
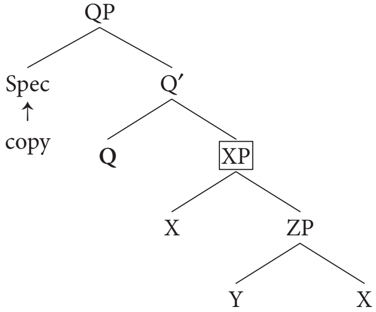
[34] Cable (2004) gives examples where the non-finite verb is clefted. For the purposes of this paper, we only examine cases where the finite verb form is clefted.

[35] There is a third possible structure to account for *She found a JOB job* type of reduplication. This structure also involves head adjunction but where it is the Q itself that is the adjunct. See Travis (2003) for more detail.

(56) a. Phonological (Tagalog: nagLA lakad, nagLAKAD lakad)



b. Iterative (CUP after cup of coffee ; CUP OF COFFEE after cup of coffee



A reduplicated *phrasal* constituent is necessarily copied into Spec,Q, and from there, like many other specifiers, it is free to move. This approach appears to us to be well-suited to account for the Yiddish predicate cleft: (i) the copied constituent is moved to pre-V2 position and triggers V2 inversion, and (ii) it displays island sensitivity characteristic of XP-movement (see Cable 2004, Davis and Prince 1986). In Travis (2003) it is assumed that Q merges with VP and copies the head of its sister into its specifier (thus, the case of figure (56b)). Q furthermore adds the infinitival morphology resulting in forms such as *veys-n*.[36] The verb from which the copy is created then undergoes head-movement all the way to the V2 position, picking up the relevant inflectional morphology.[37]

---

[36] Reduplication is known to add a fixed component to the copy. Often it is phonological material that is fixed as in Hindi *mez-vez* 'tables and the like'. In Yiddish predicate clefts, where the copy is more complex, the infinitival morpheme is fixed. This could be a nominalizing head, as the predicate cleft is often analysed as a nominalized constituent (for discussion of this see, for example, Manfredi (1993), Stewart (2001)).

Let us now return to the intriguing question of why the suppletive form appears. If, as we have been assuming, roots undergo late insertion and are subject to competition, we are faced with the following conundrum: How can we get the suppletive form of the root to be inserted at the point of Vocabulary Insertion when the immediate context that would condition this suppletive form is not present? If, as Travis argues, reduplication shows all the signs of being a syntactic process and therefore occurs in the syntactic component, then at the point where the constituent is reduplicated, all we have are abstract features of the root. At VI, this root, which is part of the XP that has moved to Spec,CP (or whatever constitutes the pre-V2 topic position) lacks the environment of T and AGR, and is only in the immediate environment of the infinitival suffix. We therefore expect the default infinitival root to surface, contrary to fact.

Note that domain suspension solution that allowed us to reconcile the crosslinguistic facts from comparative suppletion patterns with the evidence from phonological domains cannot work here for Yiddish. The reduplicated verb in Spec,QP must be interpreted at PF separately from the spine of the tree containing the tense morpheme. We therefore have a structure where Spec,QP cannot contain T, and T is not local to the reduplicated root, but nonetheless suppletion is triggered at VI.

We propose that, contrary to appearance and traditional belief, the conditioning environment for root suppletion is in fact not T, the head that hosts the actual affix (after VI), but a lower head in the structure. This lower head remains abstract, but it has matching features with T. It furthermore bears the phi features of the subject (i.e. the external argument, or a derived subject that moves through its specifier). What is copied to Spec,QP is thus not just the verb, but the verb plus this head containing those features. Since what is clefted plausibly corresponds to an event, we propose that this head is E(vent) (see Travis 2000). E therefore contains T features that must match with those of T of the clause, as well as phi features of the argument that passes through its specifier. We assume that the root undergoes head-movement to E, and it is thus part of a complex head for the purpose of VI after Spell-Out.

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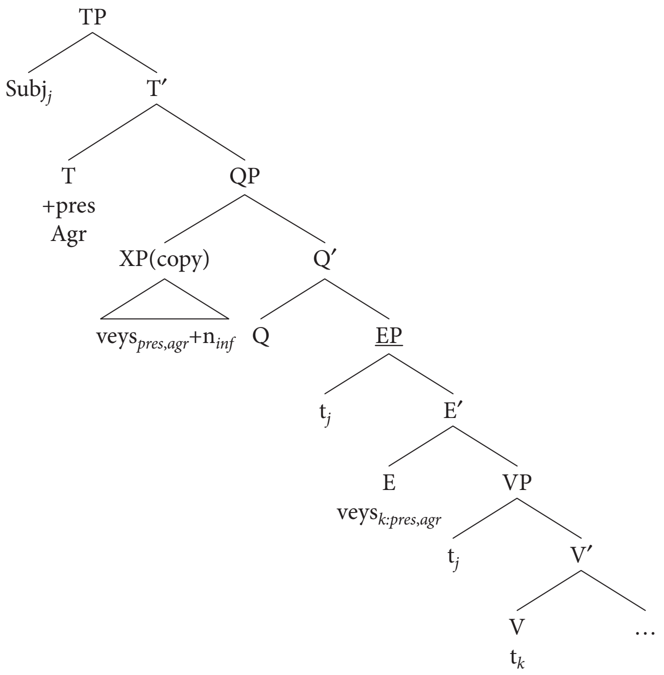
[37] Here we remain agnostic as to precise details of the reduplicative mechanism, in particular whether a head or a (remnant) XP containing only a complex head is copied into Spec, QP. Cable (2004: 7, his example (11d): gloss by the authors) presents data that suggest the latter might be true, as the predicate cleft can contain the verb as well as its internal arguments:

(i)	Gibn	di	kinder	tsukerkes	gib	ikh
	give	the	children	sweets	give	I

Note that infinitive is normally *gebn*, while here it is *gib+n*. Thus, also here we observe the same type of suppletion without its triggering context as we find in examples (53) and (54).

(57)



When the structure is interpreted at PF and VI occurs, the root in an example such as (54) will be inserted as *bin-*, since it will be in the environment of the features [-past], 1st person singular. As for the infinitival ending, as in Travis (2003), we take this to be part of the instruction of Q, an invariable part of Spec, QP.

As we will see in the next section, what makes this albeit speculative solution attractive is that a similar account may be exploited to explain the well-known, puzzling restriction in compounding that allows irregular but disallows regular inflection inside compounds.

Before turning to compounds in the next section, let us return briefly to the question of T-conditioned allomorphy on English verbs. At the end of Section 3.1 we pointed out that domain extension would not solve the English case, since T and the suppleted root are not sufficiently local to one another (there are a number of intervening heads, such as Asp and E). Note that if our proposal about a lower head being responsible for triggering root suppletion, rather than T, turns out to be on the right track for Yiddish, we might invoke the same solution for English T-conditioned suppletion, namely that "T conditioned" suppletion here is also conditioned by a lower head, say E, having matching features with T and containing the phi features of the subject.[38]

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[38] Regarding Ojibwe and Turkish, the lack of suppletion conditioned by Tense would now no longer fall out from its lack of domain suspension parallel to English, but would be accidental.

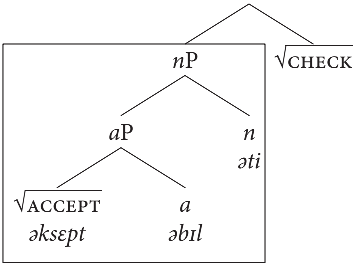
4.2 Compounds

In this final section, we discuss a long-standing puzzle regarding plurals in synthetic compounds. In English, nouns with the regular plural *-s* cannot be the complement of a compound (**rats-catcher*), but irregular plural nouns are permitted (*mice-catcher*). If the suppletion of nouns like *mouse* is conditioned by Num, as is generally assumed, but Num is not permitted to be part of a compound, then this appears to be another case of a suppletive form appearing in the absence of its conditioning environment.

Canonical synthetic compounds in English are headed by a deverbal adjective or noun which itself selects a noun, which we will refer to as the *head* and *non-head*, respectively. The non-head complement noun may be morphologically complex, as in *acceptability checker*, but may not contain inflectional morphology, as in **rats-catcher*.

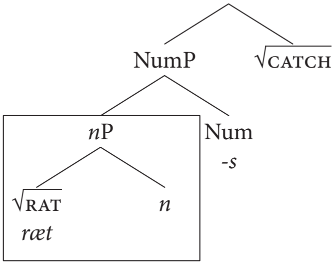
Harley (2008) accounts for this distinction by assuming that non-head modifiers are restricted to *n*P. In the case of *acceptability*, *-ity* is the exponent of a category-defining *n*, so the whole word constitutes an *n*P, as shown in (58). This structure is an appropriate complement for the head of the compound.

(58)



On the other hand, a noun with the regular plural, like *rats*, must include structure above the *n*P since it includes the morpheme *-s*, the regular exponent of Num, as shown in (59).

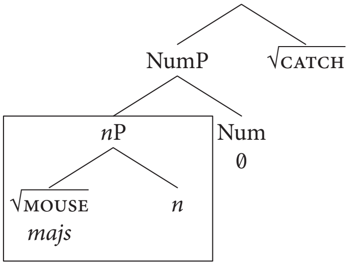
(59)



Hence, *rats* is not of the right category to be a compound non-head. Only the *n*P subtree in (59) is a potential candidate, as in *rat-catcher*.

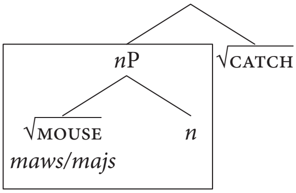
As for irregular plurals, the simplest assumption would be that they have the same structure as (59), with insertion of the suppletive allomorph [majs] conditioned by Num (whose exponent is null in this case).

(60)



This structure should also be impossible as a non-head compound member. Only the *n*P subtree should be allowed, which could only have [maws] as the exponent of the root √MOUSE. However, irregular plurals *are* are possible non-heads, as in *mice-catcher*. Experimental studies have shown that speakers have a strong aversion to compounds that include regular plural inflection, while compounds that include irregular plurals are accepted (Berent and Pinker 2007).[39] Parallel to the Yiddish case discussed above, it seems that the suppletive allomorph appears without its conditioning environment, in this case Num.

(61)



A solution proposed by Siddiqi (2009) is that the plural feature that conditions suppletion is in fact present in the non-head of compounds such as *mice-catcher*. He proposes that the derivation of the word *mice* involves Fusion of the complex head containing √MOUSE, [n] and the [plural] feature on Num into a single node. At that point, this node with no internal structure can be merged with the root √CATCH to create a compound because the [n] feature is structurally adjacent and hence licenses compounding.[40]

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[39] There are well-known exceptions to the observation that regular plurals are not allowed within compounds (e.g. Parks Commissioner, salesperson, Admissions Committee). See Berent & Pinker (2007:164) for a discussion of the counterexamples.

[40] Haugen and Siddiqi (2013) discuss the possibility of vocabulary items being inserted at non-terminal nodes, so that features in lower nodes are visible for suppletion without the need to collapse syntactic structure. However, this would exacerbate the problem of differentiating between regular and irregular plurals for compounding, since they would have the same structure and differ only at VI. This account would also be problematic for our Yiddish puzzle since we need a form of the suppletive root that is separate from the morpheme that conditions it.

In the case of a word with regular plural inflection, such as *rats*, the root √RAT does not Fuse with the Num head, as evidenced by the fact that Num is realized by its own exponent *-s*. Hence, Num intervenes structurally between the node containing √RAT [n] and the root √CATCH. Since compounding must combine a root and a node containing [n], the compounding of structurally complex *rats* with √CATCH is illicit.

Siddiqi's analysis maintains the assumptions that (i) licit non-heads must have the label [n] at the highest point in their structure, and (ii) that Num is the trigger of root suppletion in irregular plurals. We suggest these two assumptions are not necessary to capture the distinction between regular/irregular plurals in compounds, and present an alternative solution in the spirit of that laid out above for Yiddish.

Proposals have been put forth in favour of postulating inner and outer heads that determine Number; see for example Travis (1992) for English, Steriopolo (2013, citing Stump (2001)) for Breton, Borer (2005), Mathieu (2012), and Steriopolo (2013).[41] If these two separate number-related heads are universal across all languages, then it follows that English plurals are more structurally complex than is suggested by the morphological exponents. We propose that the regular plural inflection *-s* is an exponent of the outer Number head when it is valued as plural, but this is not the head that conditions the *mouse* – *mice* allomorphy. Rather, the inner number head (which in English always remains abstract) is the trigger of suppletion.

This would require a revision of Harley's assumption that only *n*Ps are permitted as compound non-heads. The type of structure that is a licit non-head must include inner Number, which triggers suppletion of √MOUSE, but excludes the outer Number head whose exponent is *-s*. This would still exclude regular plural *-s* from appearing in non-heads, but allows for some functional structure above the *n*P level to be present.

Interestingly, there is some converging evidence coming from German compounds. German compounds are known to display plural nouns in the non-head position, as shown below:

(62) a. kind-er-arzt
child-PL-doctor
'paediatrician'

b. Blume-n-vase
flower-PL-vase
'flower vase'

c. Städt-e-tour
city-PL-tour
'city tour' (of several cities)

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[41] Note that the data Steriopolo (2013) cites for Breton are not analysed in terms of two Number heads in Newell (2005, 2008) but rather resulting from late adjunction of the diminutive.

The plurals above represent a number of different plural allomorphs. However, it has been claimed that the default plural *-s* form is consistently absent internal to German compounds (Clahsen et al. 1992, Fuhrhop 1996).

(63) a. *Auto-s-friedhof
car-PL-cemetery
'scrapyard'

b. *Kino-s-besucher
cinema-PL-visitor
'moviegoer'

These facts suggest strongly that (i) the constituent targeted for compounding is larger than *n*P (contra Harley), and (ii) that the regular plural *-s* realises a higher number head than the irregular plurals in German also.

In this section we solved the problem of the Yiddish pseudo-infinitive by positing a lower abstract head related to T/Agr that is the actual trigger of the root suppletion on a verb. We followed up by suggesting that cases of root suppletion in nouns could also be triggered by a lower abstract head related to Number, explaining the appearance of suppletive plurals within English compounds. Some converging evidence for this proposal was presented from a set of plural markers that appear within German compounds.

5. Conclusion

The two main goals of our chapter were to present data of apparent mismatches between root suppletion domains and phonological Spell-Out domains as well as to introduce Yiddish predicate clefting data as a puzzle for structural constraints on root suppletion. In the process of presenting this material, we examined two accounts of domain suspension (Embick (2010) and Bobaljik and Wurmbrand (2013)) in light of these apparent mismatches and suggested that a version of Bobaljik and Wurmbrand's proposal, using a system of Feature Portage, could provide the necessary flexibility to account for the data. However, in tackling the Yiddish problem, we were led to propose the existence of lower abstract heads and to claim that these heads are the true triggers of suppletion. If these speculative thoughts pan out, then the necessity of a parameterised theory of domain suspension as entertained in Section 3.3 is no longer necessary. The phonological evidence from Ojibwe and the other languages cited that points to [E+*v*+root] being part of separate Spell-Out domain from T would not create a problem for the apparent ability of Tense (and other higher heads) to trigger allomorphy/suppletion, since the conditioning head would be a lower one, part of the smaller Spell-Out domain (for example, as we suggest, the head E). Domain suspension appears to remain a necessary concept to invoke in order to account for the ABC patterns discussed in Bobaljik (2012) and Bobaljik and Wurmbrand (2013), albeit under the revised version found herein.

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