

Towards Eradicating Class Driven Allomorphy: Nominal Suffixes in Afar

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I propose that much of the ‘allomorphy’ associated with the three noun classes of Afar can be derived phonologically. In fact, it is not (properly speaking) allomorphy at all - in the sense that there is no selection between different morphs. This forms part of a program that attempts to remove class features from generative grammar. Eradicating noun class features, as is done for this data, allows for a more elegant and minimalist analysis with a clear demarcation between the features of semantic interpretation (i.e. [+fem]) and the features of phonological form (i.e. [+high]). In this way it upholds the architecture of grammar made popular by distributed morphology. In this problematic case study, we see that Afar nominal paradigms are characterized by both the introduction of features/melody and paradigm-specific stress shifts. The proposed re-analysis relies heavily on the notion of catalexis. Using a Strict CV representational model, I propose that nouns in Afar are always trochaic. The tripartite difference in the shape of nominal roots is reduced to what part of the trochee’s dependent CV is filled by melody: both C and V (V-Masc) [‘bara] ‘night’, only C (C-Masc) [ma’tuk] ‘butter’ or neither (Fem) [ha’dɔ] ‘meat’. The shape of these roots juxtaposed with the shape of the Afar affixes regularly predicts the ‘allomorphy’. The underlying form of the proposed affixes have an unusual structural condition, though one that is predicted by foundational autosegmental principles. These come with both features and skeletal structure *unassociated* to each other. Consequently, following my proposal, affixation can simultaneously introduce features and induce stress shift in a DM-compatible item-and-arrangement analysis, all the while without recourse to class features.

1 Introduction - architecture, allomorphy and class features

Before the Afar data is introduced, it is important to situate the debate in its theoretical background. This article will start to demonstrate that the morphology of nouns in Afar does

not offer selection of competing morphs based on a noun class feature, therefore it is crucial to explain what the problems would be with this rather standard proposal.

1.1 The architecture of grammar

The matter here is an architectural one. This paper seeks to defend a strictly modular grammar consistent with the current movement in linguistics that could be loosely called *phonomorphosyntax*.¹ It is a loose confederacy of individuals and projects – the most unified group in this spirit is Distributed Morphology (Halle and Marantz 1993, 1994). *Grosso modo* it is a theory of the interaction of the components of the grammar (Bobaljik 2015).

The purpose of this theory is to supply an architecture to the core contribution of generative grammar, namely that grammars are described in terms of a derivational model where lexical information (in the shape of features) is shipped or mapped from component to component in an attempt to pair sound with meaning. The modern statement to this effect is the SMT (Chomsky 2005), shown in (1).

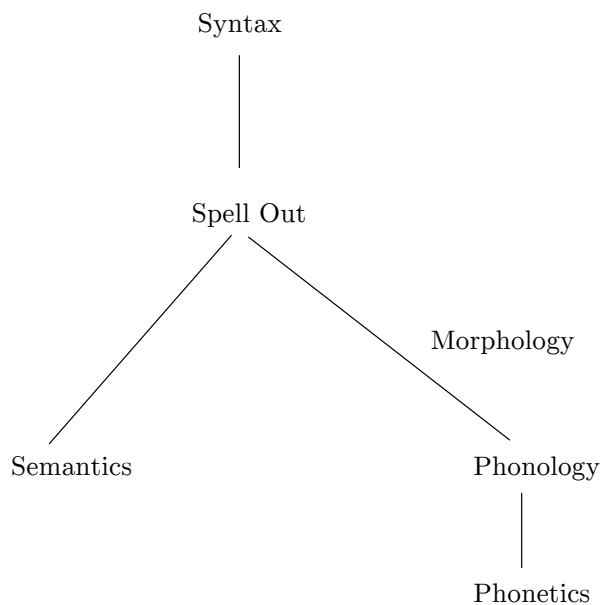
(1) Strong Minimalist Thesis

Merge + Interfaces (SM and CI)

The direction of the shipping of the information is universal and the autonomy of the modules is sacrosanct (no *look ahead* or *looking back*, *tampering* (going back)) (Strict cycle condition (Chomsky 1973), Strict cyclicity (Kiparsky 1985, Kenstowicz (1994), a variant of which is used in Kaye (1995), and its relative the Phase Impenetrability Condition (Chomsky 1999 and 2001), Scheer 2012, D'Alessandro and Scheer 2015).

Each module has its own vocabulary of features (Scheer 2015), therefore, it follows that for any relevant chunk ‘all the syntax will be done before all of the phonology’. Therefore, the modules must be strictly ordered.² In (2), is the order of the modules proposed by Distributed Morphology and its natural consequences for the interaction of the module of phonology and phonetics.

(2) Architecture



The first major assumption of Distributed Morphology is that the syntax is the sole driver of composition in the grammar (cf. *Merge* in the SMT in (1)).

- (3) **Syntax-all-the-way-down:** *The primary mode of meaningful composition in the grammar, both above and below the word-level are the syntax. Syntax operates on sub-word units and thus (some) word-formation is syntactic.* (Bobaljik 2015)

The second major assumption is consistent with the observation that the features in grammars belong to different modules. Evidently [+fem] belongs to the syntax, while [+high] belongs to

the phonology, therefore, the most economic proposition³ is to say that the features of the modules **stay** in their own module. Therefore, there is no phonological content in the syntax, no words or affixes. This assumption is stated in (4).

- (4) **Late Realisation:** *The pieces manipulated by the syntax (functional morphemes) are abstract lacking in phonological content. The pairing of phonological features with the terminals of the syntax (vocabulary items, exponence) happens post-syntactically, in the mapping from the syntax to the phonological form. (Bobaljik 2015).*

This assumption is harmonious with a model where all words are built from lexical roots, merged with categorial features and other heads/syntactic features (Borer 2003).

1.2 Defending the architecture

Researchers interested in defending this architecture of the grammar have chiefly given themselves to three tasks.

Firstly, a great deal of recent work is concerned with establishing the unique character of representations at different modules. For instance, it has been shown that in the syntax locality is established exclusively through a structural computation over a hierarchically nested structure (c-command etc...) (Chomsky 1986, principle A, B). Or that the computation of the grammar acts only in accordance with information encoded in hierarchical (not linear) structure. Meanwhile, in the phonology everything appears to be a 2D flatland where almost all relations appear to be local and linear (Neeleman and van der Koot 2006, Samuels 2011, Idsardi and Raimy 2013, Scheer 2013).

Secondly, there has been a focus on showing the independence of each level (blindness to next layer) and/or proving the order of the modules where the (Scheer 2012). Indeed, early

on, Kiparsky's (1982) division of phonological rules into lexical and post-lexical was a step in this direction.

Thirdly, there have been concerted efforts to provide a reanalysis for proposals which appear to mix the levels/modules (Scheer 2015). The Parisian school especially has begun focusing on eliminating class features and reanalysing allomorphy in phonological terms (Banjaballah et al. forth., Faust et al. in prep.).

1.3 Class features and allomorphy

1.3.1 Class features

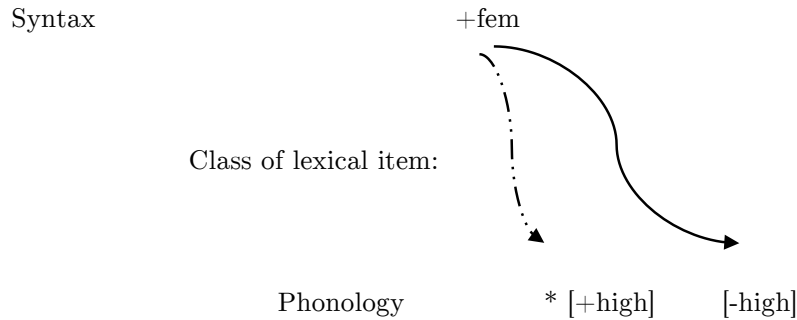
Class features triggering allomorphy do not fit neatly within the architecture that has been laid out in previous sections.

Allomorphy is always a one-to-many relationship between syntactic and phonological features (Babaljik 2015) and the mapping between syntactic and phonological features is arbitrary (cf. Saussure), nonetheless there is such a thing as a 'pure' mapping: real features of interpretation being paired with real features of phonological interpretation.

Class driven allomorphy is not like this, it is a mapping that is 'artificial' in the sense that it seems to serve neither the CI interface nor the SM interface. The whole DM model is centered around relating meaning to form (CI to SM, LF to PF) through syntax. Class features do not serve either meaning or form, they do not belong to either domain. Class features do not belong to the CI interface because they do not contribute to semantic interpretation, but, also, they do not contribute to the SM interface because they are not features *of* form. At least not in the same way as a [+high] feature (they are not directly interpretable).

Class features appear to be of a wholly different nature, they are like indexes or constraints guiding the mapping between syntax and form for their own dead-end sake. They are like features which govern the derivation itself: x may not be paired with/merge y, x must be paired with/merge z, when either would be suitable either to the semantics or the phonology. They unfairly mediate between the levels – unpleasantly reminding us rules that guide the derivation as a whole.

(5) Class features and the hierarchy



Perhaps class features will turn out to be a scourge that we all have to live with, but (where possible) analyses based on class features should be reanalyzed in purely phonological terms. As a start (of an uphill battle), this paper will show that there are probably no class features in the nominal system of Afar.

1.3.2 Allomorphy

Allomorphy is standardly defined as the condition where there is more than one variant in the pronunciation of a given morpheme. However, being stricter (Noam Faust 2015 pers. comm.), allomorphy can be defined as the *selection* of two or more morphemes to stand for the exponent of a given feature or set of features. The conditions can be morphological or phonological.⁴ An

example of morphologically conditioned allomorphy could be the alternation of -sume ~ sumpt. The choice of these two morphemes cannot be established on phonological grounds: resume vs. resumption cf. *resumptible. While an example of phonologically conditioned allomorphy could be the English alternation of [ði] vs. [ðə] ‘the’.

(6) Phonologically conditioned allomorphy

	V-initial stems	C-initial stems
[ði]	apple, eider, architect, ulna, EU, OPEC	
[ðə]		pepper, pheasant, narc, leopard, rat, humber, plum, scotch, USA, UCL

It is not obviously that the selection of the the-allomorphs is phonologically optimizing. It is uncontroversial to say that, of the two lexically stored versions of ‘the’, the correct form is selected at vocabulary insertion in response to the phonological feature of the first sound of the stem. This requires what Nevins (2011) refers to as phonological subcategorization.

(7) Phonologically driven allomorphy

DEF ↔ [ði] in the context of #__
DEF ↔ [ðə]

If, however, the variation in the pronunciation of a morpheme is derived from ordinary phonological processes acting on a single underlying form (depending on a phonological trait of the stem), this is not truly allomorphy. On this strict view, if there is not a *selection* of one form over another, there is no allomorphy. To take a famous example, the variations in pronunciation of the possessive suffix in Turkish ([im, um, ɯm, ym] (Nevins 2010)) would not

constitute allomorphy because at no point is there a selection of one lexical form over another, there is the insertion of [-Vm] and spreading of features to derive the variations in pronunciation.^{5 6}

1.3.3 Allomorphy and class features

Morphologically and phonologically conditioned allomorphy are very different in architectural terms to the ‘allomorphy’ that is simply produced by the phonological processing of an underlying form.

It follows from this definition of allomorphy, as well as from our discussion of class features, that if a language was demonstrating allomorphy based on class features every attempt should be made to reanalyze it. Where possible, this should be done by motivating the variation from the general phonology acting on a single underlying form, thereby relocating the explanation for the variation purely in the phonological component. This would significantly clean up the architecture of grammar. It would mean that syntactic features important to the semantic interpretation would be located in the syntax, while the phonology would handle only issues of form, such as phonological variation of affixes. All this without resorting to phonologically conditioned selection of forms, rather everything being done in a neat derivational account.

This is the specific ambition of this paper, with the syntactic features staying in the syntax and the phonological features staying in the phonology - each to his own.

5

6

1.4 What can affixes be composed of?

The following view of what affixes are composed of is consistent with Hockett's (1958) definition of Item-and-Arrangement morphology and the general tenets of autosegmental phonology.

Affixes are vocabulary items, therefore they must be made of 'stuff'. That stuff can be any (set of) phonological object(s). Since the late 70s (Leben 1973; Goldsmith 1976), phonological theory, the realm of form, has been concerned with two basic layers of representation: the skeletal/structural tier (time and prosody/grouping) and the melody (the features).

Compelling evidence for the distinctness of these two layers comes from observing each layer independently. While the canonical phonological form is of features attached to structure through association lines (8a), both structure and melody are independently attested (8b) and (8c).

(8) Forms of affixes

(a) [ba]			(b) Templates/structure			(c) Floating tones/features		
C	V	or	C	V	/	μ	or	
b	a							H

The case of affixes that come with structure associated to melody are straightforward, beneath I discuss some of the detail behind the types of representations in (8b) and (8c), before introducing the remaining logically predicted type.

1.4.1 Structure not associated to melody

In (8b) there is 'structure without melody'. These are affixes made up of empty slots/positions; syllable structure which is not associated to any feature. In main words, this kind of structure

drives compensatory lengthening (Clements 1986 etc...), certain sandhi phenomena like RS (Passino 2013, Scheer and D'Alessandro 2015). Ultimately this is the structure that lies behind the description of catalexis (Kiparsky 1991) and its analogue in Government Phonology literature the final empty nucleus or empty CV (Kaye 1990; Harris and Gussmann 2002; Scheer 2012).

Indeed, though empty nuclei or empty CVs might appear ‘exotic’, ‘european’, or ‘dangerously abstract’, they share their ontology with Marantzian templates in reduplication. According to Marantz (1982) reduplication is handled by the morphology inserting strings of skeletal structure which are then filled by spreading from the base. For instance in Lakhota there is a CVC pattern of reduplication: xapa > xap-xapa ‘to rustle’ (Shaw 1980), though there is no underlying constituent of Lakhota being selected for reduplication.

This view of reduplication has been criticized for being overly productive, the shape of the reduplicative template is essentially arbitrary (Trommer 2008). However, the alternative to Marantzian templates is to reduplicate using prosodic constituents (ibid.) and it is clear that not all reduplication comes in shape of constituents.

(9) Non-constituent reduplication or truncation (Andrew Nevins pers. comm.)

- | | | | |
|-----|---------|-----------|------------|
| (a) | Aranda | | |
| | ul.keɬ | ulk-ulket | ‘parentie’ |
| (b) | English | | |
| | an.drew | and-y | |
| | ban.ter | bant-s | |

The example given in (9b) is particularly striking. In Andrew > Andy, the reduplicant not only selects something larger than a viable constituent -an.d- (crossing over the syllable boundary), but it furthermore fails to reduplicate the entirety of the second constituent, it

ignores the second part of the branching onset and only reduplicates the first half. Therefore, while it is clear that reduplication and truncation often come in shapes that correspond to valid phonological constituents – but they do not have to. It seems to demonstrate that reduplication and truncation can be formed by the insertion of arbitrary templates composed of nothing but skeletal structure.

In a deeper sense, even if the templates were not arbitrary and always corresponded to a phonological object or constituent of the prosodic hierarchy, this would still be an empty prosodic object (Trommer 2008), empty mora, empty syllable ‘etc...’, it would still be ‘structure without melody’.

Take for instance, augmentative affixation in Alabama (Muskogean): PERF hofna > IMPERF hoofna ‘smell’ and PERF hocoba > IMPERF hoc.coba (Hardy and Montler 1988). In these patterns, the morphological pattern seems to be described solely as the insertion of a piece of syllable structure (call it an empty mora, or an empty CV unit). The important point is that the morphology is introducing structure which is unassociated to melody. See Haugen and Harley (2010) for item-and-arrangement, distributed morphology approach to reduplication.⁷

1.4.2 Melody not associated to structure

Meanwhile in (c) there is ‘melody without structure’. This obtains when a feature (or a bundle of features) dangles without attachment to a structure. These have been called ‘featural affixation’ (Trommer 2014). These are affixes made up exclusively of features. Tonal morphemes being among the first such objects to be discovered (Welmers 1959). Metaphorically

these can be thought of as ‘floating’, entering the representation without attachment to skeletal structure. Floating features introduced by the morphology become associated with structure and given interpretation. I will very briefly show how affixes containing floating melody can be used to resolve cases of phonologically conditioned allomorphy.

(10) British English indefinite determiner

	V-initial stems	C-initial stems
[ən]	apple, eider, architect, ulna, EU, OPEC	
[ə]		pepper, pheasant, narc, leopard, rat, humer, plum, scotch, USA, UCL

(11) British English indefinite

INDEF

↔

[ən]

if it removes violation to ONSET

INDEF

↔

[ə]

Instead of modelling this data with phonologically conditioned suppletive allomorphs, where the phonology is selecting between two morphs, it can be understood in the following way.

(12) Underlying form of indefinite determiner

(a) Consonant-initial stem ‘batter’

C

V

+

C

V

C

V

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b

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(b) Vowel-initial stem ‘otter’

C

V

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V

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1.4.3 Unassociated melody and structure

The affix types (a-c) might seem to be a comprehensive, but they are in fact non-exhaustive because autosegmental foundations predict affixes made up of a fourth arrangement of ‘stuff’. These would be affixes where both melody and structure are introduced, but they melody is not associated to the structure.⁸

(13) Unassociated

C	V
b	a

The melody in these structures is aligned to the structure, but it is not associated. It is assumed, in a manner similar to the association convention (though with a different directionality) (Marantz 1982), that the melody associates to the nearest viable host right-to-left (or it is possible that the association is driven by the skeletal structure according to some sort of search operation (cf. Nevins 2010)).

To give a brief example of how this might work, I refer to phonologically conditioned allomorphy in Moroccan Arabic. The alternation of the 3P object clitic is referred to by Nevins (2011) as being derived from phonologically conditioned selection of two underlying forms which are underivable from each other. After consonant-final stems the allomorph is [u] and after vowel-final stems the allomorph is [h] (e.g. ktab-u ‘his book’ vs. xt^aa-h ‘his error’).

Following Mascaró (2007) he notes that the historical form of this object clitic was [hu], but that synchronically one cannot derive one from the other. Indeed it is impossible to derive

a [h] from an [u] or *vice versa*, however, this may not be the parade case for phonologically conditioned suppletive allomorphs.

It seems clear that a child learner would have ample opportunity to reconstruct both [h] and [u] as belonging to the same underlying form. Therefore, one could propose that in fact the underlying form of the 3P clitic is still synchronically ‘hu’. The only difficulty is how to obtain the correct surface form which is purely a problem of how to get the correct association.

I propose that it would be possible if the underlying form of the 3P object clitic were to introduce unassociated melody and structure.⁹


(14) [ktab] > [ktab-u] ‘his book’

(a) Underlying form

C	V	C	V	C	V1	+	C	V
k		t	a	b			h	u


(c) V1 is filled, blocking ‘h’s attachment

C	V	C	V	C	V1	+	C	V
k		t	a	b			h	u



(d) ‘h’ and the final empty structure are deleted or stray erased

C	V	C	V	C	V1	+	C	V
k		t	a	b			h	u



In (14) the reader will note that the clitic affix introduces both some structure and some melody though they are underlyingly unassociated to each other. The Arabic consonant-final stem actually ends in an empty vocalic skeletal position (V1). This is the leftmost piece of structure

that requires interpretation. ‘h’ cannot occupy this slot, but ‘u’ can. This results in the stray erasure or deletion of ‘h’ and the skeletal structure above it.

Conversely, as shown beneath (15), in vowel final stems the empty slot to fill is the C1 of the affix. The floating ‘h’ associates to it. The final V position is licensed to remain empty and does not seek association with melody (this will be explained in the theoretical background (section 1.5)).

(15) [xtʰa] > [xtʰa-h] ‘his error’

(a) Underlying form

C	V	C	V	+	C1	V
x		tʰ	a		h	u

(b) ‘h’ links to C1

C	V	C	V	+	C1	V
x		tʰ	a		h	u

The precise details of the Moroccan example do not concern us, but they hopefully show the potential for introducing both skeletal structure and melody aligned with each other, but unassociated to each other.

1.5 Background in Strict CV machinery

Before the discussion turns to Afar and its noun classes, I take some space to introduce the representational model used in this paper.

The previous section shows the representational division between structure and melody. Strict CV is based on precisely this principle. The CVs are the skeletal structure and the

melody is the features that can associate to it. Strict CV is an ordinary autosegmental framework in this regard.

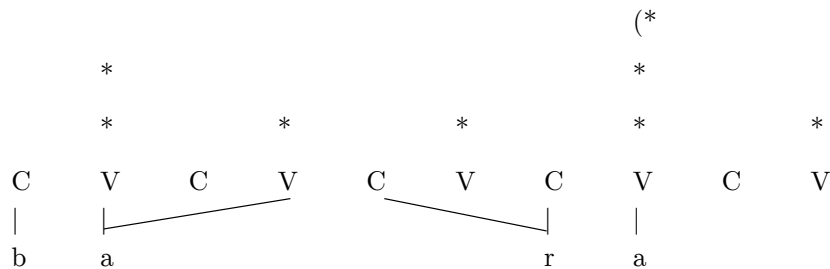
1.5.1 CV units

Where Strict CV strays from general assumptions is its notion that the fundamental unit or building block of syllable structure is the CV (Lowenstamm 1996). It is like Clements and Keyser's (1983) CV phonology in that regard, except with an obligation that could be expressed in precedence terms as: V prec %, C prec V, # prec C. This means that all word-final consonants end in empty nuclei and all vowel-initial words begin in empty onsets.¹⁰

1.5.2 Geminates, Long Vowels and Consonant Clusters

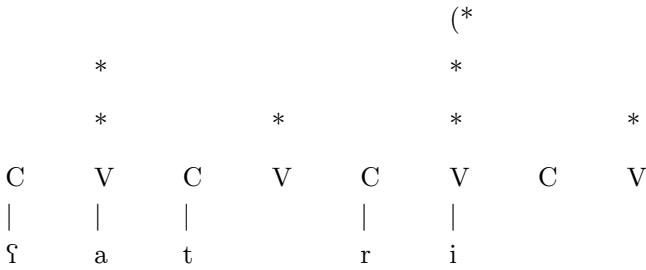
In this framework of representation, long vowels and geminate consonants have a straightforward autosegmental definition (Kenstowicz 1994), they are described as a one-to-many relationship between a (bundle of) feature(s) and syllable structure. In (16), I show an Afar word with a long vowel and a geminate.

(16) [baar¹ra] ‘woman’



Heterosyllabic consonant clusters have a very similar structure to geminates, they are composed of two C positions - each filled with their own melody. Just as with the geminate shown above there is an empty nucleus interpolating the two filled Cs, but this V is empty.

(17) [ʕat.'ri] ‘perfume’



1.5.3 Empty positions

Just like Marantzian templates, empty positions are pieces of syllable structure without segmental content. In terms of nomenclature, an empty V position is frequently termed an ‘empty nucleus’, while empty C positions are called ‘empty onsets’. The distribution of empty nuclei in words is largely unpredictable and determined lexically, but their empty status or phonetic interpretation is governed by universal principles (Kaye 1990; Charette 1991). There is by now a whole literature on the distribution of empty nuclei for a comprehensive recent discussion see Scheer (2004). Basically empty nuclei are allowed to remain empty and without phonetic interpretation iff they meet the following conditions:¹¹

(18) (Phonological) **Empty Category Principle**

P-licensed empty Vs have no phonetic interpretation

(19) **P-Licensing**

An empty nucleus (V) may be p-licensed iff

It is domain-final (Subject to Parameter <yes, no>)

It is governed

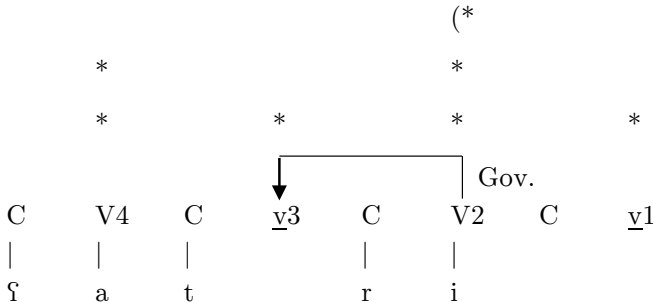
¹¹

Government

An empty nucleus may be governed if it is local to by a non-p-licensed nucleus to its right.

I will demonstrate these principles on the following structure. When an empty V slot is p-licensed (permitted to be empty and un-interpreted) it will be shown in small caps and underlined (to mark its silencing).

(21) [ʔat.'ri] 'perfume'

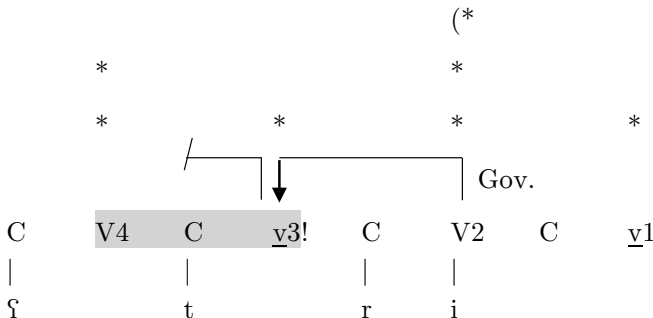


In (21) there are two empty nuclei: V1 and V3. V1 is domain final and it is parametrically permitted to be p-licensed.¹² V3 is not in a domain-final position so it cannot be p-licensed by virtue of this parameter. However, as indicate above, V3 is local to V2 on its right. V2 is not itself p-licensed (it is a filled nucleus) and therefore it may govern V3. V3 is therefore in a valid environment to be p-licensed and it remains empty and uninterpreted.

Counterfactually, if V4 were also an empty nucleus it would not be able to be p-licensed.

I show the structure beneath:

(22) *[\u026a t' ri]

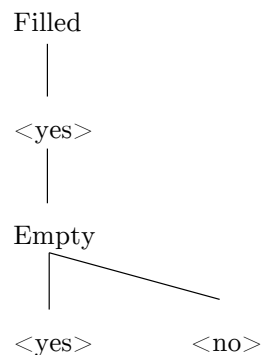


In (22) V4 is not in a position to be p-licensed because its only source of government (V3) is itself p-licensed. As is indicated above, it constitutes an ECP violation (marked by highlighting in grey and marking the violation with an exclamation mark).

1.5.4 Metrical model

The metrical model followed here is a Strict CV grid theory based on Scheer and Szigetvari (2005) and developed in Ulfsbjorninn (2014). It is a unification of syllable structure and metrical structure where the grid is built directly on the CV tier. It is virtually identical to the models presented in Halle and Vergnaud (1987) and Idsardi (1992). The only object of metrical significance in this model is the nucleus, filled or empty.

(23) The projection parameters



Filled nuclei project to line 2

Empty nuclei project to line 1 (subject to availability)

Feet are established by identifying a head and its dependent(s). The dependents may be identified at either line 2 or line 1.

2 Afar and its noun classes

Afar is a Cushitic language spoken by approximately 4.5 million people across Djibouti, Eritrea and Ethiopia. In the following description of the facts, all the data comes from the impressive generative grammar of Afar by Bliese (1981). The sound system of Afar is made up of the following sounds. All vowels can be long or short.

(24) Afar consonants

L ^{AB}	D ^{ENT}	A ^{LV}	R ^{FLX}	P ^{AL}	D ^{ORS}	P ^{HAR}	G ^{LOT}
	t				k		
b	d		ɖ		g		
m	n						
f		s			h	h	
					ʕ		
	l,	r					
w				j			

(25) Afar vowels

i, i:	u, u:
e, e:	o, o:
a / a:	

IPA will be used throughout, though it should be noted that geminate consonants will be shown as doubled (for visibility of accent mark), therefore [dum'mu] ‘vixen’ not: [dum':u].

There is also [a] ~ [o] vowel harmony effects. These are straightforwardly phonological (though highly complex) therefore they will not be part of the discussion we offer as it would essentially be a major tangent into vowel harmony. A good explanation of these patterns is necessary, as so far only descriptions exist and reader is welcome to consult Bliese’s (1981) for the facts.

Afar nouns are subdivided into three classes. The masculine nouns come in two shapes: those ending in unstressed vowels and those ending in consonants; feminine nouns end in stressed vowels.

(26) Noun classes of Afar

V-Masc		C-Masc		Fem	
(a)	['bara] 'night'	(d)	['af] 'mouth'	(g)	[ba:'ra] 'woman'
(b)	['gita] 'road'	(e)	[mu'luk] 'butter'	(h)	[ħa'do] 'meat'
(c)	['na:fi] 'dew'	(f)	[a'lil] 'heart'	(i)	[ʕa't.ri] 'perfume'

2.1 The forms of the noun classes

The three noun classes of Afar can each be given a unique phonological definition. In the Strict CV model I adopt, the difference in the noun classes lies exclusively in how its final CV is filled. I propose that fundamentally, the noun classes of Afar are built around the need to establish a trochaic foot at the right edge of the word. The noun classes of Afar are the three licit ways of constructing such a foot.¹³

The difference between V-Masc and C-Masc is catalexis (Kaye 1990, Kiparsky 1991, Harris and Gussmann 2002). As shown in (27) and (28), both forms have a trochaic foot (defined as two nuclei one which is marked as the head and the other as its edge).

(27) V-Masc shape

['bara] 'night'			
(*			
*		*	
*		*	
C	V	C	V
b	a	r	a

(28) C-Masc shape

[a'lil] 'heart'					
(*					
*		*		*	
*		*		*	
C	V	C	V	C	V
a	l	i	l		

13

The difference between V-Masc and C-Masc roots is therefore exclusively stated in terms of whether the final V position of the word is filled (associated to features/melody or not).

The Fem class is like the C-Masc class, but in addition an empty final-V slot, it also has an empty final-C slot. Both parts of the foot's dependent CV are empty.

(29) Fem shapes¹⁴

[ʕa'le] 'mountain'					
			(*		
	*		*		
	*		*		*
C	V	C	V	C	V
ʕ	a	l	e		

As shown above, the Fem class phonetically ends in a word-final stressed vowel. However, phonologically, this vowel is actually the head of a final CV.

2.1.1 Evidence for final empty structure and feet in Afar

A compelling reason to think of the penultimate V position as the metrical head of a right-aligned foot comes from a melodic restriction on mid-vowels in Afar: mid-vowels are banned in the final position of V-Masc roots: *['bare], *['mato].

One may start by observing that the stressed position can host any of Afar's five vowels: high [i, u], low [a], and mid [e, o]. However, the restriction on the distribution of mid vowels in V-Masc roots cannot be stated purely in terms of being 'unstressed'. This is because pretonic unstressed positions, such as the pretonic, can contain mid-vowels: [maʕo'lim] 'teacher', [kabel'la] 'shoe'. Also, in standard terms, this restriction cannot be stated as a general word-

final restriction, because word-final stressed nuclei *can* contain mid vowels (cf. the Fem roots: [ħa'do] ‘meat’ or [ʃa'le] ‘mountain’).

The restriction on mid-vowels could, therefore, either be stated con-junctively: mid-vowels are banned in word-final unstressed positions: {[stress] & _#}, or the restriction can be stated more simply in foot terms. The dependent position of a foot can only contain simplex (corner) vowels: ([a, i, u]). We show the difference between V-Masc and Fem roots in these terms beneath.

(30) Final vowel of V-Masc is dependent

(31) Final vowel of Fem is head

[gita] ‘road’				[ħa'do] ‘meat’					
(*)				(*)					
*		*		*		*		*	
*		*		*		*		*	
C	V	C	V	C	V	C	V	C	V
g	i	t	a	ħ	a	d	o		
	Head		Dep.				Head		Dep.
	Free		No Mid				Free		No Mid

3 Allophonic variation by class

Nouns are affixed according to the following schema: Noun – Particular – Plural – Fem (stress shift) – Case.

3.1 Nominative

Afar has a case system where subjects are marked for nominative and non-subjects are unmarked for case. Of the three verb classes only the V-Masc roots are marked with the nominative suffix. Nominative case is expounded by an [-i] suffix, it is also accompanied with stress shift. The accent moves to the final vowel of the stem (the nominative affix itself).

(32) Nominative marking by noun class

	Root	Nominative	Gloss
V-Masc	['bara]	[ba'ri]	‘night’
C-Masc	[mu'tuk]	...	‘butter’
Fem	[ha'do]	...	‘meat’

The most elegant and parsimonious account should do the following simultaneously:

- (33) (a) Account for the insertion of the affix
 (b) Account for the stress shift
 (c) Explain why only V-Masc shows (a) and (b)

Naturally, one could propose a rule based on morphological allomorphy:

- (34) Nom ↔ [-i] V-Masc
 ↔ [Ø] Elsewhere

However, as I have explained in the previous sections, this creates the kind of analysis that I am trying to avoid (if realistically possible). Moreover, because this morphologically conditioned allomorphy contains sets which are phonologically unique in their description, if they were to also contain a class information this information would be needlessly duplicated. Said that, because the phonological shape of the noun classes one could set up a system of phonological allomorphy:

- (35) Nom ↔ [-i] If ends in unstressed vowel
 ↔ [Ø]

This account would handle both (33a) and (33b), that is, it would explain the simultaneous presence of [-i] and the stress shift. It can do so by listing the nominative affix as underlyingly/inherently stressed. In order to work, this account would also have to introduce a stress clash rule which promotes the accent of the nominative to main stress (a rule specific to this level of the morphology). What this account cannot do, however, is explain (33c).

Phonological allomorphy cannot simultaneously explain why the nominative is marked only on V-Masc roots. Indeed, it would be just as phonologically optimizing to overwrite the final vowel position of the Fem roots: $\text{ħa'do} > *[\text{ħa'di}]$ ‘meat’, or introduce itself after the final position of the C-Masc: $\text{ma'tuk} > *[\text{matu'ki}]$ ‘butter’.

3.1.2 Proposal for the nominative

In section (2.1) I gave a definition to the noun classes of Afar in terms of their phonological shape. I will now show how to explain (a-c) using only this information.

The nominative affix is of the type shown in (36). It has both structure and melody but these are not associated to each other.

(36) Nominative Exponent

C	V
	i

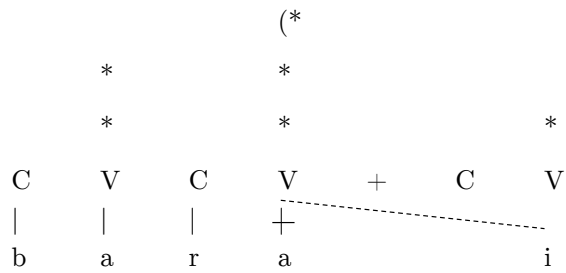
The effect is that (where possible) the structure introduced by the morpheme forms part of the whole, establishing (where licit) a trochaic foot at the right edge of the word. While the floating melody attaches left to right anchoring to the first valid host.

(37) V-Masc underlying forms

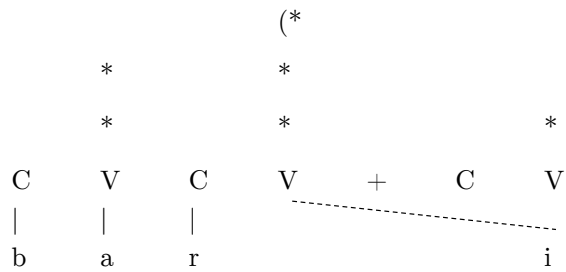
(a) 'bara + i ‘night’

(*)					
	*		*		
	*		*		
C	V	C	V	+	C V
b	a	r	a		i

(b) Derivation¹⁵



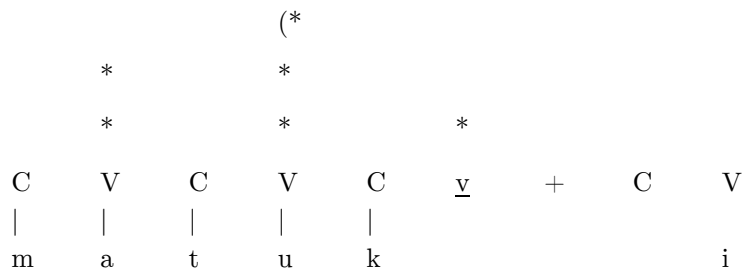
(c) Outcome [ba'ri]



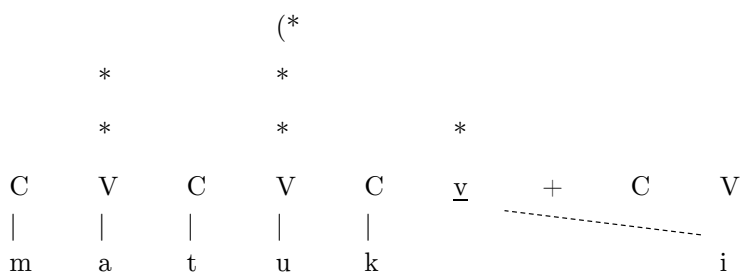
Meanwhile, C-Masc and Fem roots cannot host the melody of the nominative because their final nucleus is a p-licensed foot dependent. The structure cannot remain (with the 'i' attached to it or not) because it violates the phonological ECP condition, the general ban on two empty objects of the same category in the same representation (defined in 18 (38c). However, even if the final nucleus is filled, it would not form a licit foot and so the structure cannot be licensed (38c).

(38) C-Masc underlying forms

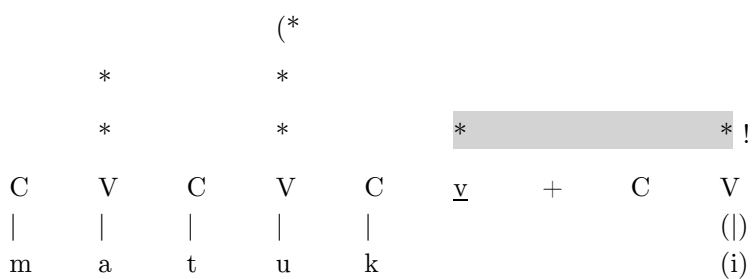
(a) ma'tuk + i 'butter'



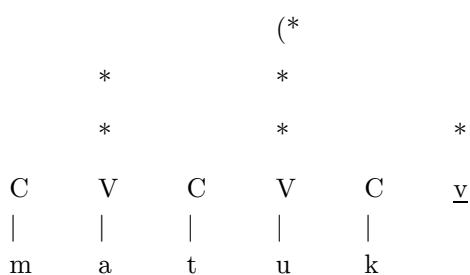
(b) Derivation



(c) Potential illicit outcome *[ma'tuki]



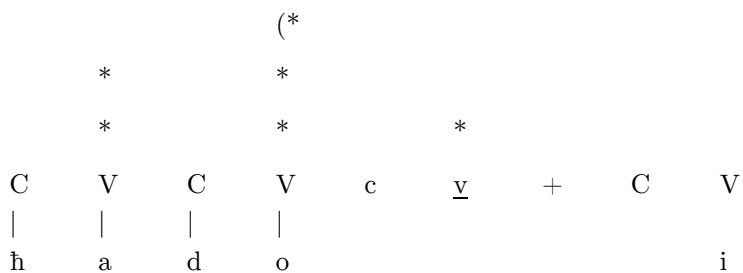
(d) Actual outcome [ma'tuk]



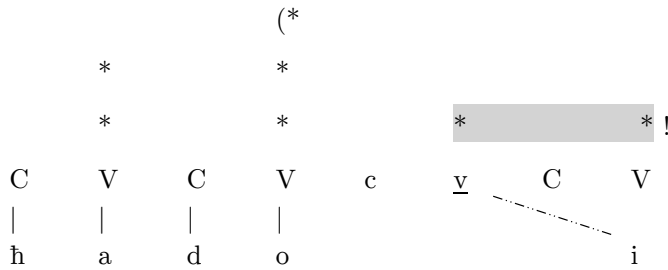
Meanwhile, the Fem roots cannot host the melody for the same reason as the C-Masc roots, they end in a p-licensed empty nucleus. Moreover, stress shift cannot occur because the output would violate either the ECP or the condition on the trochaic foot.

(39) Fem underlying forms

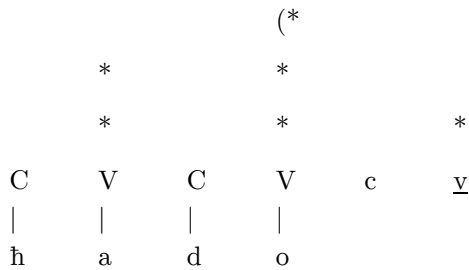
(a) ħa'do + i 'meat'



(b) Derivation ('i' cannot dock and CV cannot be made to form a trochee)



(c) Outcome [ha'do]



The proposed analysis explains (33a-c) simultaneously. The structure that triggers stress shift is introduced alongside the melody of the affix, which, being floating, attaches to the left-most suitable host, the left-most non-p-licensed nucleus.¹⁶

Concurrently, there is an entirely phonological explanation for why C-Masc and Fem roots do not show nominative exponence. What the C-Masc and Fem roots have in common is a word-final empty nucleus, which is p-licensed and marked as the dependent of a trochaic foot. This means that there is no host for the nominative's melody in the root. Moreover, the structure of the nominative cannot be incorporated into a word-final trochaic foot therefore it cannot be hosted.

3.2 Genitive

The Genitive alternations show us concrete evidence for the underlying empty structure of the Fem roots (it makes the proposed empty structure somewhat more concrete).

The exponence for the genitive is complicated. There appear to be four regular strategies, decided by the class of the root.

(40) Genitive

Root	Genitive	Gloss	
(a) V-Masc			
[ʼawka]	[awʼk-i kiʼta:ba]	‘boy’	‘boy’s book’
(b) C-Masc			
[ʼnum]	[ʼnum kiʼta:ba]	‘man’	‘man’s book’
(c) Fem			
Preceding a vowel-initial word			
[saʼga]	[saʼga-h-ʼiba]	‘cow’	‘cow’s foot’
Preceding a consonant-initial word			
[buʼda]	[buʼda-m-ʼmara]	‘village’	‘village’s people’

For V-Masc roots the genitive is marked by [i] and stress shift (like the nominative) (40a). While, the genitive remains unmarked for C-Masc roots (40b). Fem roots have the genitive expounded by external sandhi. If the ensuing word begins with a vowel, an [h] is inserted between the root and the following word (40c), while if the following word begins with a consonant, the genitive is marked by doubling that initial consonant (40d).

To account for this complex pattern it would again seem that class features are required – each class feature being associated with its own morphologically conditioned allomorph.

Though in fact, the alternation in (40c-d) already hints that a phonological solution would be preferable. This is because the outcome unambiguously depends on the phonological condition of the *following* word. Still this might be handled as a mixed case of morphologically and phonologically conditioned allomorphy. In fact, neither allomorphy solution is necessary; the whole of the variation can be accounted for phonologically (without morphs competing for selection).¹⁷

3.2.1 Proposal for genitive

I will assume that the genitive marker is the same as for the nominative:

(41) Genitive underlying form

C V

i

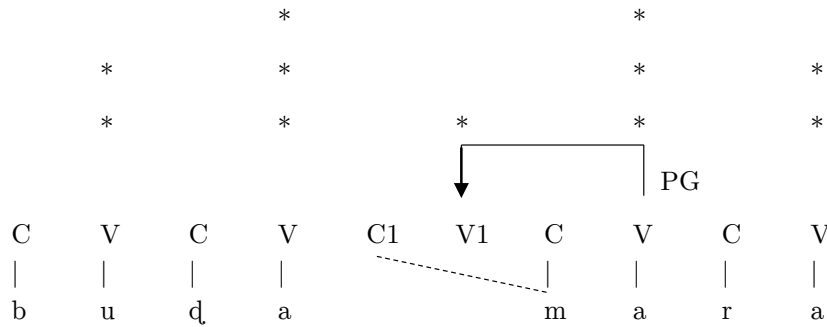
The attachment to V-Masc is the same as described for nominative. The non-attachment to C-Masc and Fem roots is explained for the same reason as shown for the nominative.

What is novel about the genitive in Afar is that the possessor belongs phonologically within the same phase/domain as the possessee: $[[A \ B] \ C] > [AB, C]$.

Under these conditions, the root-final empty CV of the Fem roots triggers consonant doubling in precisely the same way as phonological Raddoppiamento Sintattico in Corsican or Tuscan Italian (Scheer 2009, Passino 2013).

(42) Fem genitive + consonant-initial word

[bu'dam-'mara] 'village's people'

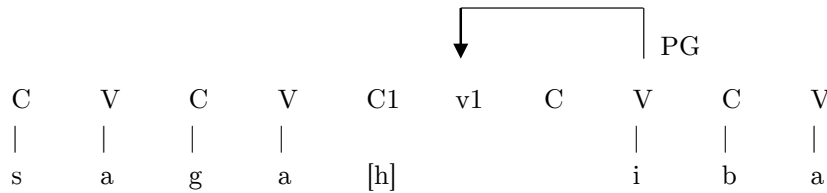


As shown in (43), the empty structure of the Fem root, which is licensed parametrically in final position, is now thrust domain-medially. The empty V slot (V1) can be licensed by PG, this leaves the C slot (C1) unlicensed. C1 therefore would violate the ECP but spreading fills the position.

If the following word had of begun with a vowel, however, C1 could not be filled by spreading and it would have to be realized by epenthesis of [h] (as shown beneath in (43)).

(43) Fem genitive + vowel-initial word

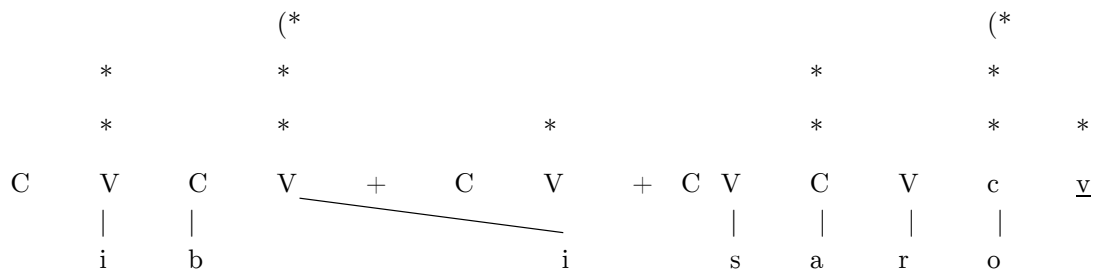
[saga-h-iba] 'cow's foot'



The V-Masc and C-Masc roots do not undergo this h-epenthesis or consonant doubling for their own phonological reasons. In the case of the V-Masc, the derived floating 'i' of the genitive blocks gemination in the case of V-Masc.¹⁸ This is shown beneath in (44). While in the C-Masc, there simply is not any ECP violation to trigger doubling or h-epenthesis (shown in 43).

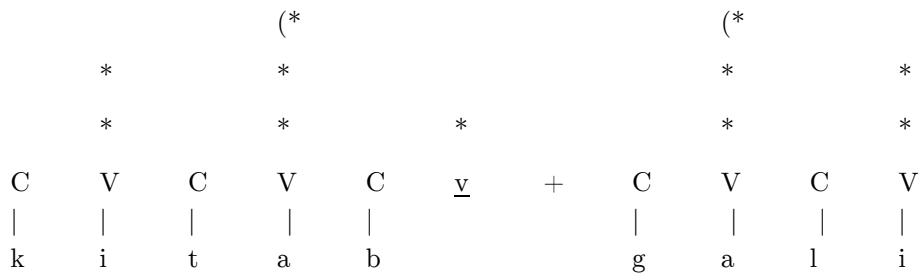
(44) V-Masc (floating 'i' blocks gemination)

[i'b-i-sa'ro] 'foot's cloth/sock' ('iba foot)



(45) V-Masc (no trigger for gemination or h-epenthesis)

[ki'tab 'gali] 'pages of a book'



To summarise, the explanation proposed for the stress shift and lack of affixation and in genitive Fem and C-Masc roots is the same as for the nominative. The additional complication of the genitive is that the possessee and possessor form part of the same domain. This triggers RS-like external sandhi for the Fem roots before consonant-initial words and h-epenthesis of the Fem roots before vowel-initial words. Meanwhile V-Masc roots and C-Masc roots do not contain word-endings that could trigger either gemination or h-epenthesis.

3.3 Particular noun suffix

The phonological shapes that are proposed to explain the genders and the variation of form of the nominative and genitive will now be shown to explain yet another pattern of suffix variation. Afar has a suffix to expone something akin to definiteness called the particular.

(46) Particular affix

(a) Fem root

(i)	[gaʕam'bo]	[gaʕambo-y'ta]	‘particular bread’
(ii)	[ʕa'le]	[ʕale-y'ta]	‘particular mountain’
(iii)	[dum'mu]	[dummu-y'ta]	‘particular vixen’

(b) V-Masc root

(i)	['dummu]	[dum'mu-yta]	‘particular tomcat’
(ii)	['wakali]	[waka'li-yta]	‘particular companion’

(c) C-Masc root

(i)	[ħu'tuk]	[ħu'tuk-ta]	‘particular star’
-----	----------	-------------	-------------------

In Fem stems it surfaces as [yta] and triggers stress shift so that the primary stress falls on the affix itself (46a). Meanwhile, in V-Masc roots the affix also surfaces as [yta] and there is stress shift, however the stress does not shift to the suffix, but to the final vowel of the root (46b). Lastly, in C-final stems the initial glide of the suffix deletes and there is no stress shift (46c).

The two parts of the analysis that must be perspicaciously accounted for are listed beneath:

(47) Problems to solve

- (a) The loss of consonantal ‘y’ after C-Masc roots.
- (b) Stress shift to the suffix after Fem roots. Stress shift to penultimate in V-Masc. No stress shift in the C-Masc.

Clearly the shift in stress cannot be accounted for by proposing inherent/underlying stress to the affix, because the suffix is only stressed if it is concatenated with Fem roots.

3.3.1 Proposal for the particular

Our account can simultaneously solve the (47a) and (47b) problematic parts of the analysis.

As is explained for the nominative, the way it works is by having the structure of the particular suffix unassociated to its melody.

(48) Underlying form of particular suffix

C	v	C	V
y		t	a

As I showed for the nominative, the floating melody attaches to the leftmost piece of structure that can host it. In this case the ‘y’ of the nominative is floating beneath a C, it is consonantal.¹⁹

Crucially, according to our proposed representations, the word-final stressed vowel of the feminine is not the last piece of structure in the Fem roots. These end with a further empty CV, the dependent part of the word-final trochee.

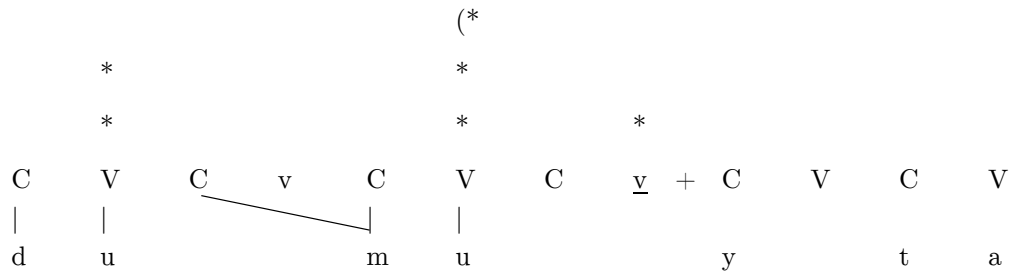
(49) [dum'mu] ‘vixen’

							(*
	*				*		*
	*				*		*
C	V	C	v	C	V	C	<u>v</u>
d	u			m	u		

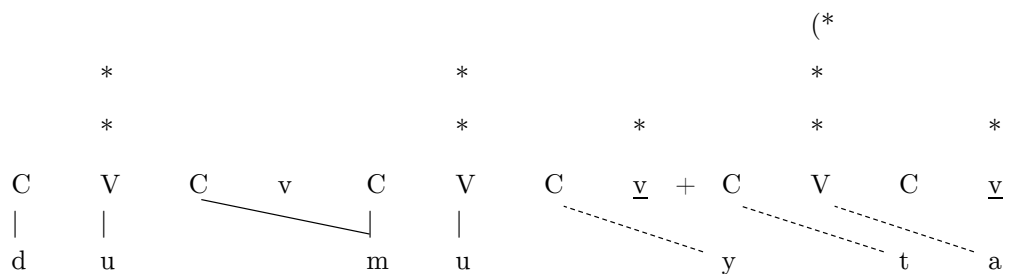
As well as the p-licensed v-slot, the empty CV of the trochee contains an empty consonantal position. This acts as the host for the initial melody of the particular suffix, the glide ‘y’.

(50) Fem + particular derivation [dum'mu > dummu-y'ta] 'particular vixen'

(a) Underlying form



(b) Suffix' melody spreading and forming final trochee

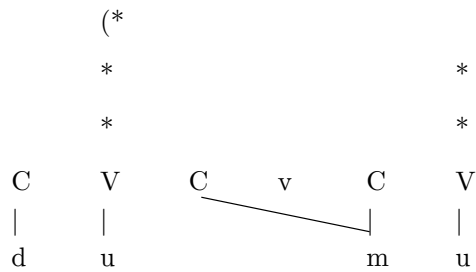


As is shown above, the glide of the particular suffix takes up its position in the final C of the Fem root. Following that, all the other parts of the particular suffix slide into place.

This accounts for the melodic component of the particular suffix in Afar, but it also accounts for the stress shift. This is because at the end of the derivation once all the melody has slid into place, there is still a domain-final empty CV. This is structurally identical to the dependent of the trochaic foot in Fem roots and it allows the formation of a trochaic foot in rightmost position, hence dragging the stress to the penultimate V slot hosting the 'a' of the particular suffix.

The same underlying form of the suffix combined with the phonological ending that is proposed for the V-Masc roots also accounts for the stress shift. I illustrate this with the minimal pair of Fem [dum'mu > dummu-y'ta] 'vixen': the V-Masc root: ['dummu > dum'muyta] 'tomcat'.

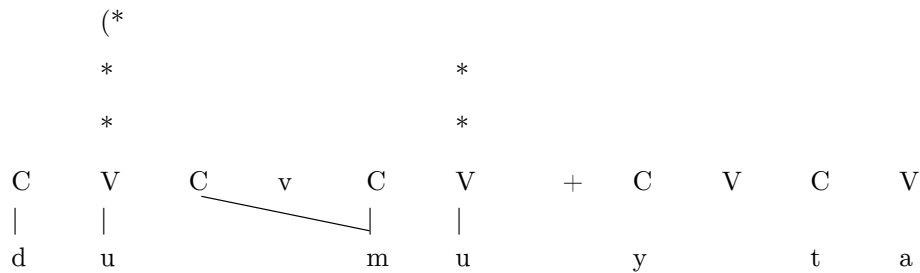
(51) ['dummu] 'tomcat' (cf. 47)



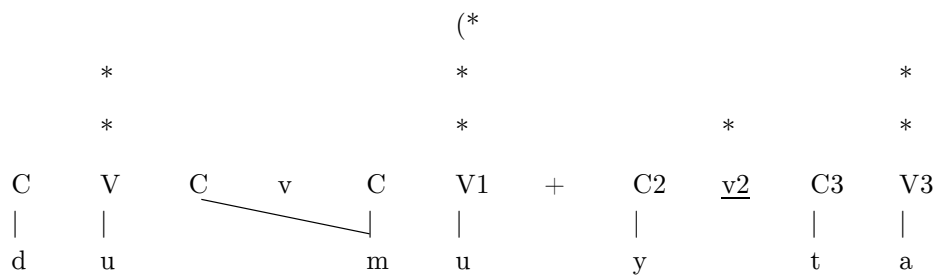
In the UR of a V-Masc root (51) there is no final empty C position for the 'y' of the suffix to move into. Therefore when the V-Masc root is concatenated with the suffix the 'y' attaches to the first C of the suffix.

(52) V-Masc + particular derivation ['dummu > dum'mu-yta] 'particular tomcat'

(a) Underlying form



(b) Outcome



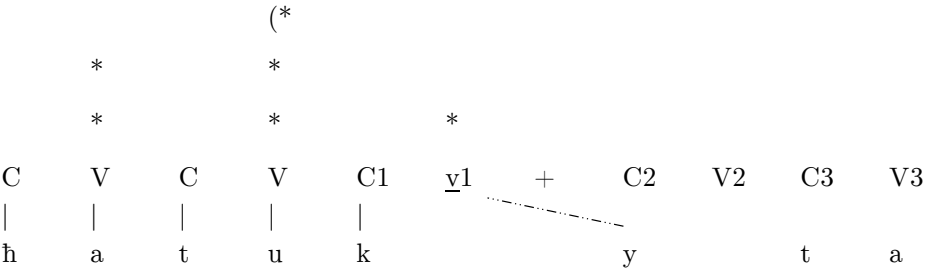
In (52b) just above, the 'y' of the suffix links to C2 and the rest of the suffix' melody attaches to C3 and V3. V2 remains empty and therefore cannot act as the metrical head of the domain²⁰,

this makes V1 the penultimate nucleus. Stress is therefore shifted to the final vowel of the root allowing a trochaic foot to be formed at the right edge of the word.

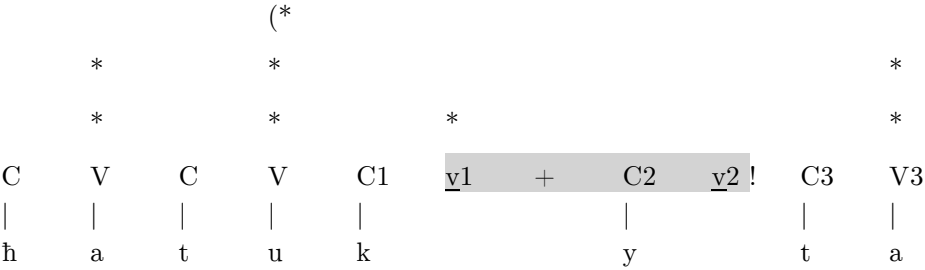
This is also why the C-Masc do not undergo stress shift. As is shown in (53), the root final nucleus in C-Masc root + particular complexes is always the penultimate nucleus. Concurrently, the phonological shape of the C-Masc can also explain is the loss of ‘y’ from the melody of the particular suffix.

(53) C-Masc + particular derivation [ħa'tuk > ħa'tuk-yta] ‘particular star’

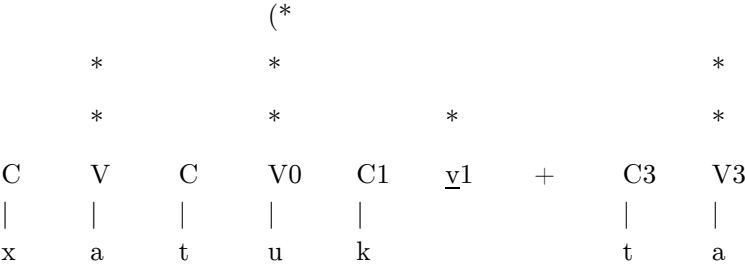
(a) Underlying form (y cannot link to C1)



(b) Derived form, ECP violation triggered by CV2



(c) Outcome (deletion of CV2)



To summarize the derivation shown in (53a, c), it is shown that the filled final C position of the C-Masc root (C1) blocks the association of the floating ‘y’ of the suffix. The ‘y’ therefore attaches to C2 and the rest of the affix’ melody slots into C3 and V3.

However, this move of the derivation creates an ECP violation between two adjacent p-licensed empty nuclei. This leads to deletion of the offending CV2 (the source of the ECP violation) which also deletes the ‘y’ of the affix. The outcome of the deletion is a well-formed trochaic foot and main stress stays on the penultimate filled nucleus (V0).

4 Conclusion

This paper hopes to highlight the problematic nature of class feature driven allomorphy from a generative perspective. I discussed the language Afar and demonstrated that what might be seen as morphologically conditioned allomorphy (responding to three noun classes) could be reanalyzed without allomorphy. I showed that the variation in form of the Nominative, Genitive and Particular suffixes could be derived entirely phonologically. The analysis centered on the combination of (a) the phonological shape of the three noun classes and (b) the shape of the affixes. These unusually introduce both structure and melody, but with melody unassociated to structure. From these entirely phonological factors, it was possible to explain the segmental content of the suffixes and, simultaneously, the various kinds of stress shift that affect them. Because everything concerning form is handled by the phonology, this leaves the syntax free to deal exclusively with the kinds of features that belong to its domain. Syntactic agreement shows only two categories, masculine and feminine. From our reanalysis it is possible to say that the noun classes of Afar are simply irrelevant in the syntax (stages of grammar preceding vocabulary insertion). This is because the noun classes are shown to be identified entirely by their phonological shape. The form of the three noun classes is what

determines the shape of the affixes. This means that the structures and features required to account for the variation are entirely kept within the domain of phonology, where they belong. How the noun classes became the shape they are and why they are paired with the syntactic gender feature they are is a complicated historical matter, it could be the subject of much future work, but it remains essentially a question of diachrony. From the point of view of synchrony, what is shown in this paper is that there is a particular elegance to a model of grammar which attempts to keep features within their own modules. Indeed, Afar is more elegantly explained by this phonological approach than by morphologically or phonologically conditioned allomorphy. It is hoped that the kinds of analyses presented here will stimulate further work of this type, reanalyzing class feature driven allomorphy in entirely phonological terms, or understanding the differences between the phenomena of Afar discussed here and the ‘real’ class features of bantu noun classes (which show class-based syntactic agreement).

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Content of footnotes

- 1 - What follows here is not a historiographical summary, rather it is an explanation in support of the approach.
- 2 - In fact, the truth for a single derivation is more complex with many, if not most researchers, agreeing that the spell out applies cyclically in the course of the syntactic derivation, see Embik (2010) for a discussion of this. What is crucial, however, is that even if it is in cycles, the general architecture in (2) is maintained.
- 3 - And perhaps the only sensible statement...
- 4 - I put aside any discussion of lexical allomorphy here.
- 5 - This distinction does presuppose a derivational approach.
- 6 - Realistically this a better definition of allomorphy because there are small phonetic differences in form in all affixes depending on their phonological context. Though these are 'small' or 'insignificant' they do exist, so the point at which it can be said that 'there is variation in pronunciation' is rather arbitrary (unless one was to use a criterion such as structure preservation (Kiparsky 1985), though this is probably too restrictive). The definition of allomorphy presented here makes a non-arbitrary distinction – if there is selection between forms it is allomorphy, if the variation in form originates from a phonological derivation applied to the same underlying form it is not allomorphy.
- 7 - There is a competing approach to Reduplication based on readjustment rules (Raimy 2000), however, these however have a dubious future (cf. Haugen (2011) and Haugen (2016) cf. Bonet (2008) for a criticism of Item-and-process morphology).
- 8 - This is formally akin to the derivation of semitic roots McCarthy (1981).
- 9 - I could enter into detail here, but it is only included to be a 'demonstration of how it works in principle'/'proof of concept'. The Afar will provide a detailed case study.
- 10 - This is a formal condition inherited from Government Phonology (Kaye 1990, Kaye et al. 1990; Charette 1991).
- 11 - The wording of the principles and conditions is based on (slightly updated) from Kaye (1990), Kaye et al. (1990), and Charette (1991).
- 12 - If the language were not to allow this condition, any final empty nuclei would be phonetically realized as schwa or filled by epenthesis (the language could not have word-final consonants).
- 13 - Perhaps this foot is only penultimate stress (where the head must be filled), but forms such as 'baarra 'woman' suggest that a foot (whose head can 'branch' is required). Also see the mid-vowel argument in (section 2.1.1).
- 14 - There is a de-linking of the nucleus which bears its new floating melody – a form of 'overwrite'.
- 15 - There are in fact a number of suppletive genitive forms which are not derivable phonologically, these involve the historical Cushitic genitive – t –. These irregular forms are things like weekdays: gumcat-'t-i ay' *ro the day of Friday* 'Friday', and a number of monosyllabic roots: bar-'t-i 'wax 'the cold of the night', xan-'t-i 'bisu 'milk's colour'. The 't' is also found in some lexicalized compounds: daro-t-ala [daro'tala] *grain-animal* 'weevil' and baḍo-t-ala

[baɖo'tala] *land-animal* 'snake'. Further evidence for these compound forms are underived is the presence of only one stress though there are two roots (all other genitive constructions in Afar have more than one stress).

16 - It seems that alignment is preserved, post-association.

17 - Introducing some melody as consonantal and some as vocalic is perhaps unfortunate because it requires stipulating the C or V nature of certain pieces of melody without attachment to the skeleton. However, this is generally known to be required in templatic morphology (cf. McCarthy 1981).

18 - If indeed it is metrically projected at all, perhaps only the word-final empty nuclei are projected.

19 - I include a second representation of a Fem root because it demonstrates to readers less familiar with Strict CV the representation of long vowels and geminate consonants.

20 - The fact that the melody of the suffix can overwrite the vowel means either that underlyingly all V-Masc final nuclei have unattached floating melody beneath them (which then attaches as part of the derivation). Or potentially that floating vowels are always allowed to overwrite onto V positions. This is not preferred however, as floating Cs cannot overwrite lexically linked Cs (cf. 53).