Candidate chains, unfaithful spell-out, and outwards-looking phonologically-conditioned allomorphy*

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1. Introduction

Most serial theories of morphology, drawing on the idea of the transformational cycle first proposed by Chomsky, Halle & Lukoff (1956), assume that either the introduction of affixes (in a lexical theory) or the spell-out of abstract morphological structure (in a realizational/late insertion theory) proceeds from the inside out. That is, more deeply embedded morphemes are phonologically instantiated before less deeply embedded ones. Additionally, most generative theories which posit ordered rules (in whatever domain of grammar) assume that these rules are Markovian—informally, that the only thing that a rule 'sees' is the output of the previous rule (or the original input, in the case of the first rule). Rules are usually assumed not to have access to information about earlier or later stages of the derivation.[1]

To see the consequences of putting these two assumptions together, suppose we have a word with the abstract morphological structure [[[*A*]*B*]*C*]. Suppose that *A* has a single phonological realization *α*, *C* has a single realizaton γ, and that *B* has two alternative allomorphic realizations β_1 and β_2. If morphology proceeds cyclically, the following sequence of events will take place. First *A* receives phonological realization, giving us [[[α]*B*]*C*]. Next *B* receives phonological realization. Crucially, at this point the phonological realization of *A* (namely α) is present, but *C*'s phonological realization γ is not yet present. Therefore the decision about whether to realize *B* as β_1 or β_2 can be influenced by phonological properties of *α* but cannot be influenced by phonological properties of γ. Let's say that β_1 is chosen as the realization of *B* when *α* precedes, giving [[[α]β_1]*C*]. Finally, C is phonologically realized, giving the output [[[α]β_1]γ]. No matter how many phonological criteria might prefer that we use β_2 rather than β_1 before γ, it is too late for these criteria to have any effect: the decision to use β_1 rather than β_2 has already been made before γ comes along. This prediction, that phonologically-conditioned allomorphy (Carstairs[-McCarthy] 1987, 1988, 1990, 1998) cannot 'look outwards', is thus shared by any theory in which the instantiation of affixes proceeds serially, one at a time, from the inside out. This prediction has been noted, and argued

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[1] Lakoff (1970) proposed that linguistic theory should include so-called GLOBAL RULES, which can see other stages of the derivation. See Kiparsky (1973a) for an influential critique of proposals for global rules.

to be correct, in a number of such theories, including rule-based Lexical Phonology (Kiparsky 1996; Paster 2006: 115, 149-150, 213, 2009), stratal or cyclic versions (Dolbey 1997; Caballero 2010) of Optimality Theory (Prince & Smolensky 2004 [1993]), rule-based Distributed Morphology (Halle & Marantz [1993]; on predictions about allomorphy see among others Bobaljik [2000] and Embick [2010]), Lexeme-Morpheme Base Morphology (Beard 1995: 60), and Harmonic-Serialist OT (Prince & Smolensky 2004 [1993]: 19-26, 94-97) which includes morpheme realization as a derivational step (McCarthy to appear b). While these theories differ in many respects, they exclude outwards phonological sensitivity for the same reason: all involve allomorphic decisions being made one at a time and from the inside out.[2]

A different prediction is made if a fully-parallel version of OT (is used to model phonologically-conditioned allomorphy.[3] In a serial theory like the ones just mentioned, outwards-sensitivity is ruled out because the choice between β_1 and β_2 cannot be put off; a strictly serial theory does not allow us to leave our options open until after the subsequent insertion of γ. Parallel OT is different because all decisions are made at once, so, in a sense, every decision is 'put off' to await the resolution of every other. More formally, if we compute the realization of the whole word [[[*A*]*B*]*C*] in parallel, the candidate set will include at least the forms [[[α]β_1]γ] and [[[α]β_2]γ]. Choosing between β_1 or β_2 really means choosing between these candidates, and so any phonological constraints which penalize either of the sequences β_1γ or β_2γ will be able to affect this decision. That is, the choice of whether to use β_1 or β_2 is able to 'look outwards'.

This article has two goals. The empirical goal concerns establishing the existence of outwards-looking phonologically-conditioned suppletive allomorphy (or "PCSA" following the usage of Paster [2005, 2006, 2009, to appear]). While outwards-looking PCSA is indeed not as broadly and freely attested as parallel OT would predict, neither is it completely unattested, as a purely serial theory would predict. The second, theoretical goal is to argue that Optimal Interleaving (or OI: Wolf 2008), a theory of phonology-morphology interaction cast within Optimality Theory with Candidate Chains (OT-CC: McCarthy 2007), is able to achieve a compromise between pure serialism and pure parallelism which predicts outwards-looking PCSA to be possible only under particular conditions where we do in fact observe it. OT-CC is a theory in which

[2] In the case of Stratal OT (e.g. Kiparsky 2000), this would not be entirely true if the allomorphy of two or more affixes were decided within the same stratum, since work in Stratal OT almost always assumes full parallelism with in a stratum (Embick 2010: 171-172). Complete elimination of outwards sensitivity would require a totally cyclic version of Stratal OT, where every addition of a new affix automatically triggered a new round of optimization. Rule-based Lexical Phonology (Pesetsky 1979; Kiparsky 1982; Mohanan 1982) is more strict insofar as all of the morphological rules would be Markovian, and so even if multiple affixes were added on the same stratum, the form chosen for the first-added affix could not look ahead in the derivation to see the phonological form of the second-added one.

[3] For OT treatments of allomorph selection, see McCarthy & Prince (1993), Burzio (1994), Mester (1994), Hargus (1995), Tranel (1995, 1996, 1998), Kager (1996), Mascaró (1996a,b), Dolbey (1997), Anttila (1997a,b), Hargus & Tuttle (1997), Perlmutter (1998), Anttila & Revithiadou (2000), Rubach & Booij (2001). It should be noted that a number of these works advocate OT architectures (e.g Stratal OT) which are not fully parallel.

potential derivational paths are constructed, and then the completed derivations compete as candidates. The reason it results in this intermediate prediction is that some kinds of choices—those which involve being unfaithful in the same type of way—are made locally, in the course of constructing the derivations, while other choices are 'put off until later', only being resolved when the completed derivations compete as candidates. Section 2 lays out the assumptions of OT-CC and of OI, the essential one of which is the notion of LOCAL OPTIMALITY. Section 3 presents analyses of two examples of outwards-sensitive PCSA in which one of the competing allomorphs is unfaithful in a way that the other is not. Section 4 explores how the proposal could be extended to PCSA of roots, which would by definition be outwards-looking. Section 5 offers a concluding summary and discusses a few topics for further investigation.

2. The structure of OT-CC and of OI

In parallel OT, each candidate is a direct mapping from the input to a potential output. In OT-CC, each candidate is a gradual, multi-step mapping from the input to a potential output.[4] Three inviolable conditions define what is a valid candidate derivation. The first is that the chain must be harmonically-improving: each form in the chain must be more harmonic than the previous one, given the constraint ranking of the language in question. The second is that the chain must be gradual: each step must be obtained from the previous one via the application of just one of some hypothesized set of basic operations. In the original OT-CC proposal (McCarthy 2007), the basic operations are: delete one segment; epenthesize one segment; change one feature-value of one segment; metathesize two adjacent segments. Other research in OT-CC and the related theory of Harmonic Serialism (Prince & Smolensky 2004 [1993]: 19-26, 94-97) has looked at additional types of operations including mora-linking (Shaw 2009), autosegmental spreading (McCarthy to appear a), reduplicative copying (McCarthy, Kimper & Mullin 2010), syllabification (Prince & Smolensky 2004 [1993]: 19-26; Elfner 2010; Pater to appear), footing (McCarthy 2008a; Pruitt 2010; Kimper 2011; Wolf to appear), phonological phrasing (Kimper 2011), and, most relevant to this paper, morphological spell-out (Wolf 2008, to appear; McCarthy to appear b).[5]

The gradualness and harmonic-improvement assumptions together invite a recursive model of candidate construction (computationally implemented by Becker [2006]). Starting from the input (by itself a chain of length one), the candidate-generating function GEN tries all possible ways of performing each of its basic operations. Any resulting forms which are harmonically-improving become the second links of chains of length two. GEN then seeks all harmonically-improving changes that could be made to any of these forms, and so forth, until it is not possible to make any further harmonically-improving basic changes to the final link of any chain

[4] This characterization sets aside the device of the merger of chains which are convergent (i.e., end in the same surface form). The device of merger is of great importance to the analysis of phonological opacity in OT-CC, but is not relevant to anything under discussion here.

[5] See also McCarthy (2008b) for a proposal that segmental deletion cannot occur in one step, but instead must proceed via gradual attrition of features.

constructed so far.[6] Candidate construction in OT-CC can thus be conceived as a branching search for all possible harmonically-improving derivational paths.

The third assumption of OT-CC, and the one of central importance to this article, is called LOCAL OPTIMALITY. As implemented by McCarthy (2007), operations are organized into types according to which basic faithfulness constraint they violate—indeed operations are referred to as LOCALIZED UNFAITHFUL MAPPINGS or *LUMs*. The 'basic' faithfulness constraints are all of the general, non-positional constraints of the MAX, DEP, IDENT, and LINEARITY families. Now suppose *A*, *B*, *C* is a valid chain in some language. Suppose further that there are three different ways we could perform some LUM λ to *C*, all of which would be harmonically improving. (There might, e.g., be three different sites at which epenthesis of a schwa would improve harmony.) Call the potential resulting forms D_1, D_2, D_3. Do all of the following three chains then get to be in the candidate set (and to serve as subchains of potential further chain-building)?

(1) A, B, C, D_1
A, B, C, D_2
A, B, C, D_3

The local optimality requirement says no: only the chain ending in the most harmonic member of the set $\{D_1, D_2, D_3\}$ gets to be in the candidate set. More generally, starting from any given subchain, only the one most harmonic way of performing any given LUM can be pursued as a derivational path. This means that operations which qualify as instances of the same type of LUM act something like Markovian rules: the choice between them must be made locally, before proceeding to any further derivational steps. On the other hand, the choice between LUMs of different types—which violate different basic faithfulness constraints—can be sensitive to later developments, since these alternatives do not compete locally. Suppose that to form *C* above there would be one harmonically-improving way to perform some other operation δ (deletion, say), yielding a new link *E*. Then the chain *A, B, C, E*, along with its harmonically-improving continuations, would get to be in the candidate set, along with *A, B, C,* D_2 and *its* harmonically-improving continuations. The choice between a chain beginning *A, B, C, E...* and one beginning *A, B, C,* D_2*, ...* could then be made based on developments later in each chain. Thus, in OT-CC, the potential for derivational lookahead exists only in choices between two operations which violate different basic faithfulness constraints, and which therefore do not compete for Local Optimality.

Let us now turn to the assumptions that OI theory adds to the basic OT-CC architecture. OI assumes that morphology is realizational, much like Distributed Morphology (Halle & Marantz 1993). This means morphology begins with the creation of an abstract morphosyntactic structure, the pieces of which are at a later stage endowed with phonological content or 'spelled out'. OI proposes that the spell-out of abstract morphosyntactic structure occurs in the same module of grammar as the

[6] That each chain must eventually converge, as opposed to continuing infinitely, is guaranteed by Moreton's (1999) proof that OT grammars of markedness and faithfulness constraints are 'eventually idempotent'; see McCarthy (2007: §3.2.2) for discussion of this point in relation to OT-CC.

phonology. This means that the input to the phonology is not a set of underlying forms, but instead an abstract structure into which morphosyntactic features are arranged. The phonology is then responsible both for selection of which underlying forms to associate with which morphological features, as well as which surface structure to associate with those underlying forms. (Comparable assumptions can be found in Zuraw [2000], as well as in work in the Bidirectional Phonology and Phonetics program which makes use of what are called LEXICAL CONSTRAINTS; references include Boersma [2001, 2006], Apoussidou [2007], Jesney [2009], Jesney, Pater & Staubs [2010], and Hamann, Apoussidou & Boersma [to appear].)

Since sound/meaning pairings are arbitrary, there must be constraints which tell the phonology which underlying forms ought to be paired up to which collections of morphosyntactic structure. In OI, these constraints are faithfulness constraints on a Correspondence relation (McCarthy & Prince 1995) between two levels of morphological structure. The first of these levels, the one given to the phonology as an input, is the MORPHEME level. As is done in Distributed Morphology, I use 'morpheme' to mean the terminal nodes of the morphosyntactic tree structure, each of which consists solely of a bundle of morphosyntactic features. The other level of representation I call the MORPH level. A morph is an ordered pair consisting of (a) a bundle of morphosyntactic features, and (b) a phonological underlying form, either of which could in principle be empty. For example, the regular form of the plural suffix in English will be something like <PLURAL, /-z/>.[7] Following the usage in Trommer (2001), I will use the term FEATURE STRUCTURE, or FS, to mean the bundles of features which are the sole content of a morpheme, or one half of the content of a morph. The FSes of morphemes and morphs potentially stand in Correspondence with one another, as do the individual morphosyntactic features of those FSes. Let us call the dimension of correspondence between morpheme-level structures and morph-level ones the MM CORRESPONDENCE RELATION.

It is reasonable to assume that the general families of constraints on phonological input-output (IO) correspondence have analogues in the MM correspondence relation. Consider first MAX constraints. In phonology, MAX-IO constraints militate against deletion: they demand that structures in the input have correspondents in the output. In MM correspondence, the MAX-MM constraints serve two basic functions. First, a constraint MAX-MM(FS) will give a violation-mark for every morpheme-level FS which does not correspond to some morph-level FS. This provides an incentive for inserting morphs: adding a morph provides one or more morphemes' FSes with a correspondent, and thus reduces the number of violations of MAX-MM(FS). In OI, it is crucial that inserting morphs should yield such a benefit. Because adding a

[7] While this will suffice for the examples dealt with in this paper, a more sophisticated conception of morphs will be required in order to deal with process morphology such as truncation. As sketched in Wolf (2008: §6.2), one way to do this is to conceive of morphs not as ordered pairs of things, which can be inserted by an operation in GEN, but rather to think of each morph itself as a basic operation in GEN which bundles together two changes that get done simultaneously: a morph-level FS is inserted, and some phonological change is performed. The phonological change might be insertion of material, as in familiar piece-based affixation, or it might be deletion of segments or of an accent, metathesis of two segments, etc. See Kimper (2009) for discussion of morphological truncation in similar terms.

morph in general means adding additional phonological structure, adding a morph will in general mean more violations of phonological markedness constraints. Therefore, inserting morphs at all would never improve harmony unless there were some countervailing pressure in favor of the morphs being there.

The second function is performed by the MAX-MM(feature) constraints. These constraints require that individual morphosyntactic features on the morpheme level have correspondents at the morph level. They thus collectively favor the use of morphs which 'realize' as many of their corresponding morphemes' features as possible.

In addition to MAX-MM, there will also be DEP constraints on the MM correspondence relation. In phonological IO correspondence, DEP constraints discourage epenthesis: they are violated when structures in the output lack correspondents in the input. In MM correspondence, DEP-MM(FS) will discourage the presence of morphs which do not correspond to any morpheme. This constraint is violated by various reported 'dummy' affixes which appear when needed to fulfill some phonological requirement, but which do not correspond to any identifiable meaning (Wolf 2008: §2.5.2). DEP-MM(feature) constraints discourage inserting morphs which are overspecified—which contain features that the morphemes to which they correspond do not. As we'll see, there is good evidence that these constraints are violable as well.

The objects referred to as morphs in OI are more or less equivalent to the entities called VOCABULARY ITEMS (VIs) in Distributed Morphology. In DM it is generally assumed that vocabulary items are paired up with abstract morphemes in accordance with the Subset Principle (Halle 1997):

(2) *Subset Principle*
The phonological exponent of a Vocabulary item is inserted into a morpheme in the terminal string if the item matches all or a subset of the grammatical features specified in the terminal morpheme. Insertion does not take place if the vocabulary item contains features not present in the morpheme. Where several Vocabulary items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

The Subset Principle is a case of the Elsewhere Condition (Pāṇini, by way of Anderson [1969], Kiparsky [1973b], and others): it says that when choosing which VI to use to realize the features of a morpheme, the most specific one has priority. Crucially, the Subset Principle excludes the use of a VI which is specified for features not present in the morpheme it realizes; this is regarded as an impossibility.[8] In OI, however, because

[8] The same is explicitly assumed in Trommer's (2001) Distributed Optimality (see esp. §§3.2.4, 3.4.1, 4.1). On the other hand, Caha (2009) argues for a reversal of the Subset Principle, called the Superset Principle, whereby insertion only occurs if the morpheme's features are a subset of the features of the VI. (This idea is attributed to class lectures by Michal Starke; see Caha [2009: 55, fn. 7] for references to other work on the Superset Principle.) As discussed in Wolf (2008: §2.2.3), the Subset Principle would correspond in OI to a situation where all DEP-MM(feature) constraints dominate all MAX-MM(feature) constraints, while

DEP-MM(feature) constraints are violable, the possibility arises that a language could insert morphs containing features that are 'epenthetic' with respect to the corresponding morpheme.

We now have the necessary background in place to consider how Local Optimality works with respect to morph insertion. A natural assumption in OI is that in one step we can insert a single morph from the language's lexicon, and place the FS and the indiviudual morphosyntactic features of that morph in correspondence with FSes and features at the morpheme level. Now suppose that from some valid subchain, there is more than one harmonically-improving way to insert a single morph. Under what conditions will those alternative ways of inserting one morph have to compete for Local Optimality? In Wolf (2008: §3.4.2), I proposed that insertion of morph *A* and insertion of another morph *B* must compete for Local Optimality if they are inserted into correspondence with the same morpheme. Put somewhat differently, the alternative possible spellouts of the same abstract morpheme must compete for Local Optimality, but to spell out morpheme *X* versus to spell out morpheme *Y* need not compete for Local Optimality. This has the consequence that the choice of whether to spell out *X* at all versus to skip over it and spell out some more peripheral morpheme *Y* can display outwards sensitivity, since these alternatives do not compete locally. In Wolf (2008: §3.4.3), I argume that this sort of 'something vs. nothing' lookahead is indeed found in real languages.

This article argues for an amendment to the definition of Local Optimality for morph insertion which brings it more into line with how Local Optimality works for phonological operations. Specifically, I am proposing that two different morph-insertions must compete for Local Optimality iff both of the following hold:

(3) (a) The two morph-insertions involve giving a correspondent to the same morpheme.
(b) The two morph-insertions violate the same (possibly null) set of basic MM faithfulness constraints.

As mentioned, phonological operations must compete for Local Optimality when they violate the same basic faithfulness constraint, so for conceptual, theory-internal reasons it would be desirable if the sets of morphological operations which must compete for Local Optimality were also defined by being unfaithful in the same way. In the next section, I will argue that adopting (3) is empirically desirable as well. We will look at two attested cases of outwards-looking PCSA in which we have reason to think that one of the competing morphs has in its FS a feature which is not present in the morpheme-level input in those situations where lookahead arises. This means that one morph will violate a DEP-MM constraint and the other will not, which per (3) means that they will not compete for Local Optimality.

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the Superset Principle corresponds to the opposite ranking. If morph/VI selection is mediated by freely re-rankable OT faithfulness constraints, then it would come as no surprise if both Subset-Principle-type and Superset-Principle-type patterning should be found among the world's languages.

3. Outwards sensitivity with DEP-MM violation

3.1 Number marking on possessed nouns in Western Armenian

Our first example of outwards phonological sensitivity comes from the morpho-phonology of possessed nouns in Western Armenian. All of the data and empirical generalizations, unless noted otherwise, come from Vaux (2003); these facts are also discussed by Burzio (2007). Possessed nouns with singular possessors consist of the root, followed by a plural suffix (if the possessed noun is plural), followed by an enclitic marking the person of the possessor (Vaux 2003: 113)[9]:

(4) *Paradigms of Western Armenian nouns with singular possessors*

	'cow'	*'cows'*	*'cat'*	*'cats'*
'X'	gov	gov-ər	gadu	gadu-nər
'my X'	gov-əs	gov-ər-əs	gadu-s	gadu-nər-əs
'your (sg.) X'	gov-ət^h	gov-ər-ət^h	gadu-t^h	gadu-nər-ət^h
'his/her/its X'	gov-ə	gov-ər-ə	gadu-n	gadu-nər-ə

As can be seen, the plural suffix is /-ər/ when it attaches to a monosyllabic base and /-nər/ when it attaches to a polysyllabic base; this general pattern is subject to some additional complications which are discussed by Vaux (2003: §4).

The outwards-looking allomorphy arises in possessed nouns with *plural* possessors. There are two ways to form such possessed nouns. One is to place the appropriate possessive pronoun indicating the person of the possessor before the head noun; in this case the (default) third person enclitic is always used at the end of the possessed noun, no matter what the person of the possessor:

(5) *Western Armenian paradigms using possessive pronoun to show plurality of possessor*

	'cow'	*'cows'*	*'cat'*	*'cats'*
'our X'	mer gov-ə	mer gov-ər-ə	mer gadu-n	mer gadu-nər-ə
'your (pl.) X'	ts^{h}er gov-ə	ts^{h}er gov-ər-ə	ts^{h}er gadu-n	ts^{h}er gadu-nər-ə
'their X'	anor gov-ə	anor gov-ər-ə	anor gadu-n	anor gadu-nər-ə

The other way to form a noun with a plural possessor is to use an affix /-ni/, which appears immediately to the left of the person-of-possessor enclitic. The affix /-ni/ requires a minimally disyllabic base. When /-ni/ attaches to a singular noun with a monosyllabic root, the plural marker /-ər/ shows up between the root and /-ni/, thus adding another syllable, despite the fact that the possessed noun is semantically singular. Thus, 'our cow' and 'our cows', etc., are homophonous when /-ni/ is used to mark plurality of the possessor:

[9] Vaux's (2003: 114) analysis of these is that the 1st, 2nd, and 3rd person possessive enclitics are underlyingly /-s/, /-t^h/, and /-n/, respectively; these trigger schwa epenthesis under "appropriate syllabic conditions", and epenthesis in turn "typically" results in deletion of /n/.

(6) *Western Armenian paradigms using /-ni/ to mark plurality of possessor*

	'cow'	*'cows'*	*'cat'*	*'cats'*
'X'	gov	gov-əɾ	gɑdu	gɑdu-nəɾ
'our X'	**gov-əɾ-ni-s**	**gov-əɾ-ni-s**	gɑdu-ni-s	gɑdu-nəɾ-ni-s
'your (pl.) X'	**gov-əɾ-ni-tʰ**	**gov-əɾ-ni-tʰ**	gɑdu-ni-tʰ	gɑdu-nəɾ-ni-tʰ
'their X'	**gov-əɾ-ni-n**	**gov-əɾ-ni-n**	gɑdu-ni-n	gɑdu-nəɾ-ni-n

That the anomalous /-əɾ/ really is the plural suffix is vouched for by the fact that monosyllabic noun roots which take irregular plural inflection show that irregular form when the noun is singular and has a plural possessor[10] (Vaux 2003: 115):

(7) *Western Armenian: /-ni/ with irregular plural morphology on singulars*

	'finger'	*'hand'*	*'eye'*
'X'	mɑd	tsʰer-kʰ	ɑtʃʰ-kʰ
'Xes'	mɑd-və-nəɾ	tsʰer-və-nəɾ	ɑtʃʰ-və-nəɾ
'our X'	mɑd-və-ni-s	tsʰer-və-nis	ɑtʃʰ-və-ni-s
'our Xes'	mɑd-və-(nəɾ)-ni-s	tsʰer-və-(nəɾ)-ni-s	ɑtʃʰ-və-(nəɾ)-ni-s

Notice that the unpossessed plurals in (7) involve a double plural, taking /-və/[11] in addition to the regular plural /-nəɾ/ expected with a disyllabic base; in the possessed plurals the double plural marking is optional. What is important for our purposes is what happens in the possessed singulars: since the roots depicted are monosyllabic, an extra syllable is required in order to guarantee that /-ni/ has a disyllabic base. As we can see, these words recruit /-və/ rather than /-əɾ/ for this purpose. If the anomalous /-əɾ/ seen in data like (6) were some epenthetic sequence rather than the plural suffix, the fact that the possessed singulars in (7) used /-və/ instead would be unexplained.

These data suggest the following OI analysis. All nouns, whether singular or plural, carry a number morpheme. When this morpheme contains the feature [SINGULAR], it is normally spelled out by a morph <SINGULAR, Ø> with an empty phonological UR. (We will consider below why we need to posit a phonologically null singular affix, as opposed to saying that singulars carry no number morph at all.) However, when necessary for the sake of giving plural-of-possessor /-ni/ a disyllabic base, the [SINGULAR] number morpheme will instead be spelled out with the regular plural morph <PLURAL, əɾ> (except in the nouns which take irregular plurals).

Let us now illustrate how this analysis will play out. First, I will assume, as seems reasonable on both semantic and affix-ordering grounds, that the number-of-the-root morpheme is structurally closer to the root than the plural-of-possessor morpheme[12].

[10] Or at least they did at one time in the language's history. Vaux (2003: 115) states that these examples are drawn from grammars published in 1866 and 1924, and that modern speakers generally do not use these irregular forms.

[11] "The /-və-/ suffix is the descendant of a Medieval Armenian plural /-vi/, which is still used in many varieties of Modern Armenian as a dual marker for paired body parts" (Vaux 2003: 115).

[12] See also Anderson (1992: 95) on the morphosyntactic structure of possessed nouns.

That means that, for 'our cow', the morphosyntactic input will be √-SG-PL.POSS-1P.[13] Assuming morph-insertion to necessarily proceed root-outwards, the first thing that will happen is for the root morph /gov/ to be inserted. The following tableau indicates how this is harmonically improving:

(8) *First step of derivation: Insertion of root morph harmonically improving*

	$\sqrt_1$-SG_2-PL.$POSS_3$-$1P_4$	MAX-MM (FS)	*[velar]
Fully-faithful candidate	*a.* $\sqrt_1$-SG_2-PL.$POSS_3$-$1P_4$	4	
Insert root morph	*b.* $\sqrt_1$-SG_2-PL.$POSS_3$-$1P_4$ <$\sqrt_1$, gov> gov	3	1

Candidate (8a) is the fully-faithful candidate, the form identical to the input which serves as our baseline against which to check the harmonically-improving status of operations. Candidate (8b) is the result of inserting the root morph /gov/. Since (8b) introduces a morph, it includes three levels of structure: the morphemes (which are on top in small caps); below this, the inserted morphs, with the MM correspondence between the morphemes' and morphs' FSes indicated by subscripts; and on the bottom, the surface phonological string. (Technically the surface phonology stands in IO-correspondence with the phonological side of the morphs, but this is not depicted so as to avoid the visual clutter of a second set of subscripts.) While candidate (8a) violates MAX-MM(FS) four times because none of the four morphemes has a corresponding morph, candidate (8b) has only three violations because the insertion of /gov/ means that the root morpheme now has a correspondent. So long as MAX-MM(FS) outranks any phonological constraints violated by the string /gov/, of which *[velar] is depicted as a representative example, the derivational step in (8b) will improve harmony.

Because (8b) is harmonically-improving, we can now feed it back into GEN to see what it could be harmonically-improving to do next. The singular morpheme, whose allomorphy is at the center of our interest in this paper, is now up for insertion, so this is the crucial step. Because plural-of-possessor /-ni/ will not be inserted until a subsequent step, the requirement that /-ni/ have a disyllabic base cannot affect our decision at the current step. Two things must therefore hold. First, it has to be harmonically-improving to insert <PLURAL, əɾ> as the correspondent of the singular morpheme, even if /-ni/'s phonological demands are not yet in the picture. This will be the case provided that MAX-MM(FS), which demands that the number morpheme have some correspondent morph, dominates DEP-MM([PLURAL]), a violation of which is created by placing <PLURAL, əɾ> in correspondence with morpheme-level [SINGULAR]. The following tableau illustrates how this desideratum is met:

[13] I show at both the morpheme and morph levels only a generic root (rather than specifically √COW) consistent with the account of root allomorphy put forth below in section 4.

(9) *Second step of derivation: Inserting either singular or plural morph improves harmony*[14]

	$\sqrt{}_1$-SG_2-PL.$POSS_3$-$1P_4$ <$\sqrt{}_1$, gov> gov	MAX-MM (FS)	DEP-MM ([PLURAL])
Fully-faithful candidate	*a.* $\sqrt{}_1$-SG_2-PL.$POSS_3$-$1P_4$ <$\sqrt{}_1$, gov> gov	3	
Insert plural morph	*b.* $\sqrt{}_1$-SG_2-PL.$POSS_3$-$1P_4$ <$\sqrt{}_1$, gov>, <PL_2, ər> go.vər	2	1
Insert singular morph	*c.* $\sqrt{}_1$-SG_2-PL.$POSS_3$-$1P_4$ <$\sqrt{}_1$, gov>, <SG_2, Ø> go.v	2	

Now, in principle other affix morphs of the language besides <PLURAL, ər> could be used to supply a correspondent to [SINGULAR]. In fact, it is only <PLURAL, ər> (or <PLURAL, və>, for the irregular words in (7)) which can anomalously appear here. A reasonable explanation for why is that <PLURAL, ər>, while not a flawlessly faithful spellout of [SINGULAR], is at least a partial match, for example if [SINGULAR] and [PLURAL] are understood as shorthand for complexes of number features which include at least some parts in common.[15] As a result, use of <PLURAL, ər> is more harmonic than the use of any non-number affix, as use of other affix morphs would be more severe in their violation of MM faithfulness constraints.

The second thing which needs to hold is that insertion of <PLURAL, ər> and insertion of <SINGULAR, Ø> do not compete for Local Optimality. If options (9b) and (9c) had to compete for Local Optimality, then only the most harmonic of them (namely (9c)) would be available to use as the basis for further chain construction, most relevantly by the insertion at the next step of the plural-of-possessor morph /-ni/. Obviously, this will not do, since it is (9b) which inserts the anomalous plural affix which is attested to occur in 'our cow'. Now, even if (9b) and (9bc) did have to compete for Local Optimality, (9b) would obviously be available for further chain-building if it and not (9c) were somehow the more harmonic option. But that can't be true either, since otherwise we'd observe <PLURAL, ər> to *always* be used as the spellout of [SINGULAR], regardless of whether /–ni/ later showed up.[16] Instead, we have to countenance

[14] Numerals indicate tallies of violation-marks. Because this tableau is for the purpose of checking for harmonic improvement, as opposed to choosing the winner, the Ws and Ls of the comparative tableau format (Prince 2002, 2003) are not included. (See fn. 18 below for an explanation of this.)

[15] This might be true, for example, under a theory where morphsyntactic features are arranged in a feature geometry (Harley & Ritter 2002).

[16] It is at this point that we can explain why we need to assume that there is a phonologically null singular morph. If insertion of <PLURAL, ər> as the correspondent of [SINGULAR] is harmonically improving, then by definition (9b) is more harmonic than fully-faithful (9a), where the [SINGULAR] morpheme has no correspondent. But then, if <SINGULAR, Ø> did not exist as an alternative, <PLURAL, ər> would always be used as the spellout of [SINGULAR], since having it there would be more harmonic than having nothing there.

derivational lookahead: the alternative spell-outs of [SINGULAR] do not compete for Local Optimality. Formally, that means that each of (9b) and (9c) is separately re-submitted to GEN in order to see what further harmonically-improving steps could be taken.[17] In both cases, high-ranked MAX-MM(FS) means that it will be harmonically-improving to insert the plural-of-possessor marker /-ni/ and then the person-of-possessor marker /-s/.

So, ultimately, the fact that (9b) and (9c) do not compete for Local Optimality means that the derivation branches, yielding two separate chains which terminate in the two forms seen in tableau (10) below. After these chains are completed, they compete against each other as candidates. Because OT-CC's PRECEDENCE constraints, which evaluate the order of derivational steps, do not play a role in this analysis, we can save space by depicting below only the final step of each chain, since that is what the markedness and faithfulness constraints evaluate when the completed chains compete with each other. As we can see, the chain which inserts the anomalous plural marker will win if the constraint that requires /-ni/ to have a disyllabic base outranks DEP-MM(plural):

(10) *Final competition of constructed chains*[18]

	*[σ.ni	DEP-MM([PLURAL])
a. ☞ $\sqrt{}_1$-SG_2-PL.$POSS_3$-$1P_4$ <$\sqrt{}_1$, gov>, <PL_2, ər>, < PL.$POSS_3$, ni> <$1P_4$, s> go.vər.nis		1
b. $\sqrt{}_1$-SG_2-PL.$POSS_3$-$1P_4$ <$\sqrt{}_1$, gov>, <SG_2, Ø>, < PL.$POSS_3$, ni> <$1P_4$, s> gov.nis	W1	L

The lack of competition for Local Optimality between <PLURAL, ər> and <SINGULAR, Ø> is crucial to achieving the attested outcome: if these two options had to compete for Local Optimality at step (9), then (10a-b) would not both get to be candidates: only (9c) would have been able to serve as the basis for further chain-construction, and the desired winner (10a) would not even have been produced.

There are several possibilities about what exactly is the constraint (informally expressed above as *[σ.ni] which says that /-ni/ requires a polysyllabic base. One possibility is that it wants to be aligned with the right edge of a foot (McCarthy & Prince 1993); another is that it wants to not immediately follow a stressed syllable,

[17] This highlights the key difference between OT-CC and Harmonic Serialism: in HS, only a single winner is chosen at each step: even if there are multiple different changes which it would be harmonically-improving to make, only the most harmonic way of doing *any* change gets kept and used as the input for further possible changes. If we place morph-insertion in an HS grammar rather than in an OT-CC grammar, lookahead is strictly excluded, because (just as in rule-based frameworks) we never get to keep more than one option alive to see what would be most compatible with further affixes added at a later step. See McCarthy (to appear b) for an analysis of Arabic pausal phenomena which relies on this property of HS-based allomorph selection.

[18] This tableau uses the combination format advocated by Prince (2003). Numerals indicate counts of violation marks. In rows for losing candidates, 'W' indicates that a constraint prefers the winner over that loser, and 'L' indicates that a constraint prefers that loser over the winner.

since most modern Armenian dialects have word-initial secondary stress (Vaux 1998: 148). It could conceivably be objected that this entire example is not really a case of 'phonologically conditioned' suppletion because the constraint involved might actually be an arbitrary morphoprosodic alignment requirement (effectively, a sort of phonological subcategorization frame) on the suffix /-ni/. Even if this is so, it will remain the case that there is *outwards sensitivity* here insofar as the requirement "/-ni/ must have a disyllabic base" is a requirement that holds of the plural-of-possessor *morph* /-ni/, not one which holds of the abstract plural-of-possessor *morpheme* which /-ni/ realizes. If the number-of-the-possessum morpheme is morphologically internal to the plural-of-possessor morpheme, there is lookahead here because the realization of number-of-possessum as Ø vs. as /-əɾ/ responds to a requirement which cannot enter into our calculations until the later derivational step at which /-ni/ is inserted. (If, for instance, the disyllabicity requirement is stated as an alignment constraint which says 'the left edge of the morph /-ni/ must be aligned with the right edge of a foot', this constraint will be vacuously satisified if /-ni/ is not yet present.) What matters here is not so much the phonological 'naturalness' of the criteria involved, but rather at what point in the derivation the criteria are potentially violated.

To sum up the discussion so far, one way that morphs can differ in their faithfulness status is if one contains a feature *Z* that isn't present on the morpheme whose realization is in question, and the other morph doesn't contain *Z*. If so, then inserting the first morph will create a violation of DEP-MM(Z), while inserting the second morph will not. The proposal being made in this paper predicts that in cases where this occurs, outwards-looking phonologically-conditioned choice between the two morphs is possible, because, per (3), they do not compete for Local Optimaility. Western Armenian possessive forms confirm this prediction.

In the Western Armenian example, the faithfulness-violation-creating feature *Z* is [PLURAL], and assuming one of the competing morphs to have it and the other not to have it is independently motivated by the morphological functions which the two morphs are observed to serve in the language overall. However, it is possible to imagine a situation where placing some *Z* in the FS of one of the competing morphs was not so transparently motivated. Imagine, for instance, a language just like Western Armenian where [SINGULAR] was normally realized by Ø, except that on monosyllabic roots before /-ni/, [SINGULAR] was realized by some monosyllabic suffix /-ta/. Suppose that this /-ta/ was only found on singular nouns, giving us no reason to call it anything other than a singular affix. The choice between Ø and /-ta/ would have to be outwards-looking for the same reasons as the choice between Ø and /-əɾ/ in real Western Armenian. So under the present proposal, they would have to differ in their MM-faithfulness status when inserted as the correspondent of [SINGULAR]. One way to do this would be to posit the following FSes for these morphs:

(11) <SINGULAR, Ø>
<{SINGULAR, Z}, ta>

In this analysis, Z could simply be a diacritic feature, or could be any contentful morphosyntactic feature not otherwise in use in the language. Placing Z in /ta/'s FS would have no motivation other than to place /ta/ in a different MM faithfulness class from Ø, thus allowing outwards-looking competition between them. Particularly if diacritic features are available to serve as such Z's, then the danger is that my proposal would in fact fail to place *any* limits on outwards-looking PCSA, since for any two morphs, we could assume a diacritic feature in the FS of one of them, instantly exempting them from competition for Local Optimality.

Thus, to in fact place typological limits on when outwards-looking PCSA can arise, the proposal here has to come with some sort of limitation on the abstractness of morphological analyses which will prevent the cheat just sketched. I do not yet have a specific proposal about this, except to note that in this as in any area of linguistics, non-stipulative limitations on the degree of abstractness that can be found in real languages most plausibly result from something about how language learning works: the algorithm used by actual learners explores a hypothesis space which does not include the undesired sort of abstract analysis. Some of the recent work on 'lexical constraints' cited above has argued that learners can arrive at appropriately restrictive grammars even if only observed surface allomorphs are considered as URs (see e.g. Jesney, Pater & Staubs [2010]). Something similar may go for the morphosyntactic part of morphs.

The abstractness worry just discussed is related to a prediction which looks tentatively like a virtue of the present proposal. A standard assumption is that morphemes which are realized by irregular morphology (and thus, also the morphs which will realize them) are overspecified with some diacritic feature which is absent in the regular morphemes (and morphs). For example, the morphs for the regular plural /-z/ of English, and *–en*, one of the irregular plural markers (as in *oxen*), can be represented as follows:

(12) (a) <PLURAL, -z>
(b) <{PLURAL, +X}, -ən>

Suppose we are choosing which morph to insert as the correspondent of the plural morpheme of a regular word. Then using the irregular morph is unfaithful: there is no irregular-class diacritic [+X] on the morpheme level. Therefore, regular and irregular morphs differ in faithfulness status: using <{PLURAL, +X}, -ən> results in a violation of Dep-MM(X), but using <PLURAL, -z> does not. In this case, the rival morphs don't compete for Local Optimality, and lookahead is possible. But when we're choosing a correspondent morph for the plural morpheme of a [+X] irregular word (e.g. *ox*), both the regular and irregular forms are faithful, so they compete for Local Optimality and there can be no lookahead in the choice between them. However, inserting the plural morph for a different irregular class, e.g. <{PL, +Y}, ɪm> (as in *cherubim*) will still be unfaithful, so it doesn't have to compete for Local Optimality with the others, and lookahead may arise. This means that:

(13) (a) Normally regular words can switch to having irregular morphology under outwards-looking phonological conditions.

(b) Irregular words can switch into another irregular class under outwards-looking phonological conditions.

(c) Irregular words *can't* switch to using regular morphology under outwards-looking phonological conditions.

I am not aware of any counter-examples to prediction (13c). Whether cases of (13a) or (13b) exist is not entirely clear. The Catalan gender allomorphy facts discussed by Bonet, Lloret & Mascaró (2007) may be an example of an outwards-looking regular-to-irregular switch. Briefly, while the regular realization of masculine gender is Ø, certain masculine nouns will switch to using the irregular masculine suffix /-u/ before plural /-s/, presumably to break up the consonant cluster which would otherwise result. I do not know of any examples of (13b). In any case, the predictions made under the present proposal about possible outwards-looking inflection-class switches (particularly the interesting asymmetry between (13a) and (13c)[19]) offer a straightforward means by which the present proposal could be falsified.

3.2 Outwards-sensitive allomorphy in Kayardild

Our second example of allomorphic lookahead comes from Kayardild, an Australian Aboriginal language of the Tangkic family whose morphology is the subject of a detailed study by Round (2009). His analysis is couched within a multi-level realizational theory of morphology. In addition to a level of morphosyntactic features (analogous to OI's morpheme level) and a level of underlying phonological structure (morphs), Round makes use of an intermediate level of units of pure morphological form: the MORPHOMOIC level of representation proposed by Aronoff (1994). Morphosyntactic features are first mapped onto (realized by) morphomes, and then morphomes are mapped onto (realized by) morphs.

The basic motivation (Round 2009: §1.5.2) for using a morphomic level in the analysis of Kayardild is that the language has numerous morphs (and sets of related allomorphs) which are associated with extremely heterogeneous collections of morphosyntactic functions. This is illustrated by the two suffixes whose phonology will be of interest to us in this section. One is what Round (2009) calls the 'formal proprietive'; this has two allomorphs [-kuɻu] and [-kuu] which Round refers to as 'strong' and 'weak', respectively. The formal proprietive realizes proprietive case as well as the potential and athematic future values of tense/aspect/mood. In addition to these inflectional uses, the formal proprietive (as well as two other morphomes, the formal privative and formal associative) can be used derivationally with bases

[19] If the predictions in (13) are correct, they make an interesting counterpoint to the generalization argued for by Noyer (2005) that syncretism across inflection classes is always in the direction of either (a) a default allomorph, or (b) the allomorph used in the default class. See also Burzio (2007: 8, 14-16) for related discussion of phonological constraints compelling extension of the more marked/less general category (including of the Armenian example).

consisting of nominal$_1$+nominal$_2$ to create words with the meaning '(not) having nominal$_2$ at nominal$_1$' (Round 2009: 199):[20]

(14) (a) /waɻa-wuɻan-kuɻu/ 'having food in its mouth'
mouth-food-formal.proprietive

(b) /kuɳtuŋ-kunakuna-kuɻu/ 'having a child on her chest'
chest-child-formal.proprietive

The other suffix of interest is the formal ablative (strong [-napa], weak [-naa]), which realizes ablative case and the 'prior' value of athematic tense/aspect/mood, in addition to being used derivationally in place-names (Round 2009: 200):

(15) (a) /ʈucu-ki-napa/
fish species-formal.locative[21]-formal.ablative

(b) /ŋaːrk-ki-napa/
pandanus nut-formal.locative-formal.ablative

The choice between the strong and weak allomorphs of the formal proprietive is decided as follows (Round 2009: 215-218):

(16) (a) When realizing a derivational affix, /-kuɻu/ must be used.
(b) When realizing proprietive case:
(i) If any affixes other than the termination follow, /-kuɻu/ must be used.
(ii) If the preceding morph ends in /u/, /-kuɻu/ must be used.
(ii) Otherwise there is variation, with /-kuɻu/ being more frequent.
(c) When realizing tense/aspect/mood:
(i) If the preceding morph ends in /u/, /-kuɻu/ must be used.
(ii) If the following morph is the formal locative /-ki/, /-kuɻu/ must be used.
(iii) Otherwise, there is variation, with /-kuu/ being more frequent.

The not dissimilar generalizations about the formal ablative are as follows (Round 2009: 218-219):

[20] The examples in (14)-(15) are cited in their underlying phonological form.
[21] The formal locative is another morphome posited in Round's (2009) analysis. See Round (2009: 232) for a list of its morphosyntactic functions.

(17) (a) When realizing a derivational affix, /-napa/ must be used.
(b) When realizing ablative case:
(i) If any affixes other than the termination follow, /-napa/ must be used.
(ii) Otherwise /-naa/ is used.
(c) When realizing prior tense/aspect/mood:
(i) If the formal locative /-ki/ follows, /-napa/ must be used.
(ii) Otherwise /-naa/ is used.
(d) When realizing precondition tense/aspect/mood, /-napa/ is used.

Assuming that morphs are inserted one at a time from the inside out, then there are several tightly interconnected cases of derivational lookahead here. (Because the conditions on the formal proprietive and formal ablative are so similar, I will restrict the following discussion to the former, in order to keep things easier to follow.) First, /-kuu/ is impermissible as a realization of proprietive case if any affix other than the termination vowel follows; the realization of inner material is thus sensitive to what other material, if any, is destined to be added further out.

Second, /-kuu/ cannot be used if the preceding morph ends in /u/. Round (2009: 217, 225-227, 296-297) connects this with the fact that initial /k/ of both formal proprietive allomorphs will delete post-vocalically. Selecting underlying /...u+kuu.../ will result in surface [...u+uu...], which is phonotactically impermissible in the language: sequences of three vowels in which the first two are the same do not occur. If we follow Round (2009) in attributing the ban on /-kuu/ after /u/-final bases to this effect, there is lookahead in that the operative phonological constraint refers not to conditions at the point that /-kuu/ is inserted, but rather to conditions at a later derivational step after /k/-deletion has occurred.

Third, the preceding two arguments come together with respect to the exception to the first one, involving the termination vowel. The termination, in Round's (2009: §3.7) analysis, is a meaningless morphome which occurs at the end of every syntactic word. Following a vowel-final base, the termination is /-a/ (p. 154), except in three phonological environments, where it has zero surface realization. One of these is after /uu/, which reflects the same generalization behind the second argument: the tri-vocalic sequence [uua], with the first two vowels the same, is not allowed in the language (pp. 162, 226-227, 296-297). The weak allomorph /-kuu/ of the formal proprietive normally cannot be used if any other suffixes follow in the word, but the termination vowel does not count for purposes of this restriction because its allomorphic realization after /uu/ is zero. (Round [2009: 296-297] treats the zero realization of the termination vowel as competition between listed allomorphs /-a/ and Ø, rather than as phonological deletion.) Thus, the permissibility of using the weak allomorph /-kuu/ depends not simply on the presence or absence of outer layers of morphology, but on the presence or absence of outer layers of morphology which get a phonologically overt realization.

Fourth, the weak allomorph /-kuu/ is impermissible when followed by the formal locative /-ki/. Here we again see both kinds of lookahead at work: from an inner to an outer affix, and also from realization of an affix to the outcome of a phonological process that the affix conditions (Round 2009: 225-227, 298). The initial consonant of /-ki/ also deletes post-vocalically, and so using /...kuu+ki.../ will result in intermediate /...uu+i.../, which violates the same phonological constraint against tri-vocalic sequences with the first two vowels the same. The language's phonology leads us to expect that the now-postvocalic /i/ would then devocalize to /j/, but Round (2009: 226-227, 291) argues that the resultant [uuj] sequence is also phonologically disfavored.

In OI terms, all of this means that, when /-kuɻu/ and /-kuu/ are competing to be used inflectionally, they must not compete for Local Optimality, since the choice between them may depend on things that happen later in the derivation. In terms of the present proposal, I would like to suggest that the lack of competition for Local Optimality is connected with the asymmetry in the morphosyntactic functions which the two affixes are able to discharge: as mentioned in (16a), the strong allomorph /-kuɻu/ can be used derivationally, but the weak allomorph /-kuu/ cannot.[22]

Let us suppose that we do not make use of a morphomic level of representation in between the morpheme (morphosyntactic) and morph levels. If we have a morph which can discharge either of two unrelated morphosyntactic features *A* or *B*, we can analyze it by assuming, first of all, that the representation of the morph is <{A, B}, /phon/>.[23] That is, the morphosyntactic side of the morph contains both *A* and *B*. In order for it to be harmonically improving to insert this morph when the input contains only *A*, we require the ranking MAX-MM(A) >> DEP-MM(B): giving a correspondent to morphosyntactic feature *A* is a higher priority than avoiding morphs which 'epenthesize' the feature *B*, as the following tableau illustrates.

(18)

	A	MAX-MM(A)	DEP-MM(B)
Fully-faithful candidate	*a.* A	W1	L
Insert morph	*b.* ☞ A_1 <{A_1, B_2}, /phon/>		1

Likewise, *mutatis mutandis*, we require the ranking MAX-MM(B) >> DEP-MM(A) in order for it to be harmonically improving to insert this morph when the morpheme level contains only *B*.[24]

[22] Another asymmetry between the strong and weak forms is that in Kayardild song, only the strong allomorphs are used [Round 2009: 229].

[23] See Jones (2009: 38-41) for discussion of essentially the same idea in a Distributed Morphology context, with respect to an unnatural-class syncretism in Kinande, and Jones (2010) on the possibility of analyzing the same facts in morphomic terms.

[24] This is an illustration of the point mentioned earlier in fn. 8: we obtain Superset Principle-style spellout (give correspondents to as many input features as you can, while tolerating 'epenthetic' features) by ranking the relevant MAX-MM constraints above the relevant DEP-MM constraints.

Applying this mode of analysis to the Kayardild formal proprietive, we would posit morphs that look something like the following. (The features in each morph's FS are notated in an entirely naïve manner for ease of exposition; these labels should of course be understood as a shorthand for a more articulated theory of the morphosyntactic feature content of the morphemes involved.)

(19) (a) <{DERIV, PROP, FUT, POT}, /-kuɻu/>
(b) <{PROP, FUT, POT}, /-kuu/>

Notice that only the /-kuɻu/ morph includes [DERIV], our shorthand for the feature(s) involved in the derivational function expressed by the formal proprietive. Therefore, if MAX-MM([DERIV]) outranks all countervailing constraints, we expect that only /-kuɻu/ and never /-kuu/ will be used for spelling out this particular derivational morphology, as we do indeed observe.

Now consider what will happen when we are trying out these two morphs as correspondents of, say, the features comprising proprietive case, which we abbreviate as [prop]:

(20)

	PROP	MAX-MM([PROP])	DEP-MM([FUT])	DEP-MM([POT])	DEP-MM([DERIV])
Fully-faithful candidate	*a.* PROP_1	1			
Insert strong morph	*b.* PROP_1 <{PROP_1, FUT_3, POT_4}, /-kuu/> kuu		1	1	
Insert weak morph	*c.* prop_1 <{DERIV_2, PROP_1, FUT_3, POT_4}, /-kuɻu/> kuɻu		1	1	1

Using either morph will improve harmony by virtue of supplying a correspondent to [PROP], thus eliminating the violation of MAX-MM([PROP]) seen in the fully-faithful candidate. However, each morph will also bring with it a violation of DEP-MM(F) for each one of the other features *F* which is present in the morph's FS. Both /-kuu/ and /-kuɻu/ have [FUTURE] and [POTENTIAL] in their FS, so both will introduce DEP-MM violations for those features. However, because /-kuɻu/ has the additional 'feature' [DERIV] in its FS and /-kuu/ does not, the former but not the latter introduces a violation of DEP-MM([DERIV]). This unshared MM faithfulness violation (resulting from the wholly motivated difference in the contents of the two morph's FSes) places the two morphs in different LUM-classes and, under proposal (3), causes /kuɻu/-insertion and /kuu/-insertion not to compete for Local Optimality.

This harkens back to our discussion of regular-irregular switches at the end of subsection 3.1: competition for Local Optimality does not occur when one of the competing morphs is overspecified (and thus unfaithful) in a way that the other morph is not. In that earlier discussion, we noted that competition for Local Optimality will occur (and thus that phonological outwards-sensitivity will not occur) when the overspecified feature is present in the input. For Kayardild, this arises when it is [DERIV] that we are trying to spell out. Inserting <{DERIV, PROP, FUT, POT}, /-kuɻu/> will produce violations of DEP-MM([PROP]), DEP-MM([FUT]) and DEP-MM([POT]), but no violation of DEP-MM([DERIV]), since [DERIV] *is* now in the input. Inserting /-kuu/ (even if we did assume that it was harmonically-improving to do so) will introduce the same violations of DEP-MM([PROP]), DEP-MM([FUT]) and DEP-MM([POT]), so now the competing morphs are in the same LUM-class and are must compete for Local Optimality. Thus, when it is [DERIV] we are trying to spell out, there cannot be any lookahead—which is compatible with the reported generalizations insofar as it is only ever /-kuɻu/ that is used derivationally, no matter what the surrounding phonological or morphological context looks like. Indeed, under my proposal there could not exist a language which was just like real Kayardild, including all of the various forms of allomorphic lookahead, but in which both /-kuɻu/ and /-kuu/ could be used derivationally. In such a language, the two morphs would have identical FSes and would always compete for Local Optimality, making lookahead impossible.

4. Outward-sensitive root allomorphy

So far in this paper we have confined our attention to outwards-sensitive PCSA of affixes. In this section, we turn to the question of PCSA of root morphemes. A root is by definition the most-embedded unit of a word (setting aside compounds, where there are multiple roots), so if roots can show PCSA at all, it would have to be outwards-looking. Examples of root PCSA are well-known, perhaps most so from the Romance languages. In French, for example, a number of adjectives and determiners have two distinct forms in the masculine: a vowel-final citation form, and a consonant-final form (homophonous with the feminine form) which is used in *liaison* environments when the following word begins with a vowel (see e.g. Tranel [1995, 1996]; Perlmutter [1998]; Steriade [1999, 2000]; Burzio [2007] for theoretical discussion):

(21) *Masculine* liaison *form homophonous with feminine form*:

	Citation masc.	Citation fem.	Masc. liaison form	
'new'	[nuvo]	[nuvɛl]	[nuvelã]	
	nouveau	*nouvelle*	*nouvel an*	'new year'
'beautiful'	[bo]	[bɛl]	[bɛ.lɔm]	
	beau	*belle*	*bel homme*	'handsome man'

There are other adjectives where the masculine *liaison* form contains the final consonant of the feminine form, but has the same vowel as the masculine citation form, rather than the vowel quality of the feminine:

(22) *Masculine* liaison *form with V of masc. citation form, final C of feminine form:*

	Citation masc.	Citation fem.	Masc. liaison form	
'silly'	[so]	[sɔt]	[so.ta.mi]	
	sot	*sotte*	*sot ami*	'silly friend'
'last'	[dɛʁnje]	[dɛʁnjɛʁ]	[dɛʁnjeʁɔm]	
	dernier	*dernière*	*dernier homme*	'last man'

It seems clear that the masculine forms of these adjectives display suppletion which is sensitive to the phonological shape of the following word.[25] This counts as a form of derivational lookahead if we assume, as is rather standard, that words are morphologically assembled at an earlier stage of the derivation, and enter into phrasal juncture only at a later stage. This is expressed, for example, in Lexical Phonology (Pesetsky 1979; Kiparsky 1982; Mohanan 1982) by the ordering of morphology and lexical phonology prior to syntax and postlexical phonology. Likewise, in a phase-based Distributed Morphology model (e.g. Marvin 2002, Embick 2010) where cyclic spell-out occurs post-syntactically, the earliest cycles, where the allomorphy of roots would have to be decided, would include only word-internal material, and only on later cycles, corresponding to larger syntactic constituents, would multiple words in juncture be included within a single cycle.

A somewhat different form of root suppletion in Romance is found in cases where verbs have two suppletive forms, one of which is used when the root gets main stress, and the other of which is used when the inflectional ending gets main stress. This is the case with several verbs of Italian, most famously *andare* 'to go' (Carstairs 1990; Hurch 1996; Kiparsky 1996; Juge 1999; Burzio 2003):

(23)

1sg.	ˈvado	1pl.	andiˈamo
2sg.	ˈvai	2pl.	andˈate
3sg.	ˈva	3pl.	ˈvanno

This is a case of lookahead because we cannot know whether the root or the ending will recieve stress until after both have been inserted. Assuming root-outwards spellout, the sequence of events would have to be *insert root*, *insert ending*, *assign stress*, so for root allomorphy to be stress-conditioned, the decision of which root allomorph to use must be put off until the whole process is over. (That is, for e.g. the 1st person singular, we must be able to construct both ['vado] and *['ando] as candidates.) One plausible phonological account of this would be to say that the allomorph /and-/ is preferred in general, but that when the root bears stress, /va-/ is preferred because its

[25] Because of the apparent gender mismatch in the masculine *liaison* forms (Plank 1984; Tranel 1995; Perlmutter 1998), it is tempting to consider the possibility that 'lookahead' is possible in these forms for the same reason as we have proposed for Western Armenian and Kayardild. I do not pursue this option here primarily because of the existence of other cases of root PCSA, discussed below, which lack any apparent mismatch. Additionally, the claim that the French data do in fact show a gender mismatch has been questioned (Posner 1985; Lamarche 1996; Lapointe & Sells 1996; Janda 1998; Tranel 1998).

syllable has an onset. (See Smith [2002: §3.2.2] on languages which require stressed syllables to have onsets.)

In Surmiran Rumantsch (Anderson 2008, to appear), this mode of stress-conditioned suppletion arguably occurs with *all* verbs. In addition to verbs which are more obviously suppletive in the manner of (24), Surmiran has other verbs in which the vowel on which stress falls when the stem is stressed alternates with a reduced vowel /ə/, /ɪ/, or /ʊ/ in the forms where the stem is not stressed.[26] The argument for suppletion is that, across the language as a whole, the relationship between the stressed and unstressed vowels is many-to-many. For instance, both [a] and [o] in the stressed form can alternate with any of /ə, ɪ, ʊ/ (Anderson 2008: (7)-(9)):

(24)

Infinitive (ending stressed)	*3.sg.pres.indic (root stressed)*	
l[ə]var	l['a]va	'wash'
tgil[ɪ]ttar	tgil['a]tta	'sit down (scornfully, as of a cat)'
v[ʊ]rdar	v['a]rda	'watch'
cl[ə]mar	cl['o]ma	'call'
dum[ɪ]gnar	dum['o]gna	'dominate'
cr[ʊ]dar	cr['o]da	'fall'

Because neither alternating vowel can be predicted from the other, Anderson argues that it is necessary to assume that both alternants are simply memorized for every verb, i.e. that the stem has two suppletive forms. This is an instance of a general line of possible arguments for PCSA of roots, namely from cases where roots undergo irregular or unproductive alternations. A number of authors (Hudson 1974; Hooper 1976: 127-131; Zuraw 2000; Green 2007; Guy 2007; Mascaró 2007; Kager 2009; Siddiqi 2009) have argued that the appropriate way to deal with such effects is to lexically list the alternants of the affected morph(eme)s, rather than generating them from a shared UR through morpheme-specific rules or constraints.[27]

If we accept, then, that roots as a class are capable of showing outwards-sensitive PCSA, how can that be fit in with the proposal here? One possibility is that neither my proposal nor any other proposal about the grammatical machinery involved in PCSA is responsible for dealing with roots, because the expression of roots is a matter of speaker free choice and is not resolved by the grammar *per se* (Marantz 1995; Harley & Noyer 2000; De Belder 2011). The reasons why we might think this go back to some of the earliest arguments given for late insertion of roots by Marantz (1995). Spell-out is post-syntactic in Distributed Morphology, and what Marantz argues is that the abstract morphosyntactic structure which gets spelled out should contain only those features which are syntactically relevant. For instance, in an English sentence like *The cat slept*, the syntax needs to know (for instance) that the root that

[26] Stress in Surmiran is final, except when the rime of the final syllable is [ə], [ər], [əl], [ən], or [əs], in which case stress is on the penult.

[27] Of course, the argument for allomorphic listing being the appropriate account of exceptions can be made (and by many of the authors cited is made) for affixes as well as for roots.

gets spelled out as *cat* is a noun, that it is countable as opposed to mass, and so on. By contrast, there is no reason to think that the syntax needs to know that *cat* refers to a furry, viviparous quadruped which purrs and catches mice (etc.). But if such features are not present in the abstract morphemes, then root morphemes which are destined to be spelled out as *cat* are indistinguishable from those which are destined to be spelled out as *dog* or *lizard* or *moose*, since these are all identical in their syntactically-relevant features, and differ only in their noncompositional semantic features. If the grammar cannot determine the choice among such morphs, some other mechanism—the speaker's conceptual knowledge of what they want to talk about—must therefore be responsible (see Pfau [2009] for discussion how this might look in terms of online processing).

As regards the allomorphy of roots, two arguments have been cited for the position that the realization of roots is not decided in the grammar. First, it has been argued that true roots do not undergo suppletive allomorphy, because root vocabulary items do not compete for insertion the way that affixal ones do (Marantz 1997, 2006; Harley & Noyer 2000). One consequence of this claim is that apparently *prima facie* cases of root suppletion like English *go ~ went* do not actually involve roots; instead, light verbs like *be*, *go*, *come*, *have*, etc., which in many languages display irregular paradigms suggestive of root suppletion, are proposed to actually functional morphemes and do not involve roots. Second, it predicts that roots will differ from functional morphemes in not showing inflectional syncretism. To use an example from Marantz (2006: 1), we don't see things like *cat*, *dog*, *giraffe*, *elephant*, etc. contrasting in the singular, but *elephants* across the board in the plural (in place of **cats*, **dogs*, **giraffes*, etc.).[28, 29]

More recently, the empirical claim that true roots, as opposed to functional morphemes, cannot be suppletive, has been challenged by a number of authors (Harley

[28] A more radical way of obtaining these results would be to go further than saying that the realization of roots is underdetermined with respect to the grammar: we could assume that roots morphemes have phonological content to begin with, and do not undergo realization/spell-out/vocabulary insertion at all, because they do not need to. This is assumed in Beard's (1995) Lexeme-Morpheme Base Morphology, and in certain work in Distributed Morphology (Embick & Halle 2005; Embick & Noyer 2007: 295; Embick 2010: 193, note 1). Such an approach would seem to require that apparent suppletion of roots (assuming that the root in question, like those in (25), is not plausibly re-analyzable as a functional morpheme) be handled as an actual morphological operation which completely over-writes the phonology of the root and replaces it with a different phonological string (e.g. Beard 1995: 62); see also Chung (2009) and De Belder (2011: 63-64) for related suggestions cast within versions of DM which do see roots as subject to insertion. For a critique of accounts of allomorphy based on literal replacement, see Kiparsky (1996). A major issue, related to the discussion in Kiparsky (1996: 22-24), is why such rules could not also over-write the phonological contents of affixes in such a way as to create the appearance of outwards-sensitive affix PCSA. Further, if root morphemes contain their phonology intrinsically, it follows that different roots are differentiated from one another in the morphology/syntax. Marantz's (1995) main point is that if the identity of roots is known to the morphology/syntax, individual roots can display exceptional or idiosyncratic morphosyntactic behavior, which he argues to be unattested.

[29] Syncretism is indeed found with light verbs, consistent with the view that they should be classed with the functional morphemes. For example, in Spanish, Portuguese, and Galician, 'to go' and 'to be' are identical in the preterite, imperfect, future subjunctive, and synthetic pluperfect (Juge 1999; Corbett 2007: 26). See also fn. 31 below.

2009 [cited in De Belder 2011: 62]; Siddiqi 2009: 43; Bonet & Harbour to appear: §3.2).[30] The following table presents the examples of reported root suppletion known to me for which it would be most difficult to maintain that the root involved is actually a functional morpheme:

(25) *Reported examples of not-plausibly-functional suppleting roots*

!Xóõ (Khoisan; Botswana & Namibia)	'knife': singular [!õo], plural [ǂnûn] (SSD; Traill 1994: 23)
Arapesh (Toricelli; Papua New Guinea)	'bread fruit tree': sg. [aloḭ], pl. [eheliḭ] (SSD; Fortune 1942: 39)
Archi (NE Caucasian; Dagestan)	'corner of a sack': sg. [bič'ni], pl. [boždo] (Kibrik et al. 1977: 46) 'pier of a bridge': sg. [biq'ˤni], pl. [boʁdo] (Kibrik et al. 1977: 46) 'shepherd': singular [uɬdu], plural [ɬɬʷat] (Corbett 2009: 32) (Examples also in SSD and in Chumakina *et al.* [2008].)
Niishnabemwin (Algonquian; Ontario)	'dog': unpossessed [nimoš], possessed [nday] (SSD; Valentine 2001: 202)
Burmeso (East Bird's Head-Sentani; Papua New Guinea)	'machete': sg. [samo], pl. [tugurararuro] 'sago tree': sg. [timo], pl. [fihir] (Donohue 2001: 113-115; Corbett 2007: 34, fn. 34)
Imonda (Waris; Papua New Guinea)	'make netbag': singular [hõnõ], plural [pueg] (Seiler 1985: 82; Veselinova 2006)

SSD = Surrey Suppletion Database (Brown, Chumakina, Corbett & Hippisley n.d.)

To be sure, the interpretation of such data is subject to a number of difficult questions, most notably (a) the question of where exactly to draw the line between lexical and functional vocabulary, and (b) the possibility that the features responsible for the apparent suppletive allomorphy in such examples are really fully-integrated parts of the lexical semantics of the root, meaning that we are actually dealing with extragrammatical semantic selection as opposed to competition between suppletive alternatives in the grammar (Barker 1964: 175-177; Mithun 1988: 213-215, 231-232; Hale, Jeanne & Pranka 1991; Corbett 2000: 258-260).[31] Nevertheless, the quantity of available evidence makes it not altogether unreasonable to conclude that at least some cases of true suppletive allomorphy of roots do exist. What that means is that grammatical constraints must play a crucial role in favoring one root morph over another, e.g. when a !Xóõ sentence concerning multiple knives is being spelled out, use of the plural morph /ǂnûn/ is favored over the singular morph /!õo/ because the former but not the

[30] Also, for recent typological surveys of root suppletion, see Veselinova (2006) on verbs, and Vafaeian (2010) on nouns and adjectives.

[31] Bearing these caveats in mind, there are examples of what at least superficially looks like number-based syncretism of verbs, e.g. the Koasati and Klamath examples discussed in Mithun (1988: 214-215).

latter supplies a correspondent for the morphosyntactic feature [PLURAL] in the input. The examples of root PCSA mentioned above suggest that phonological constraints can do the same thing, e.g. favoring *va-* over *and-* in Italian when the root bears stress.[32]

If we put this together with the arguments in Marantz (1995) that root morphemes are incompletely differentiated in the syntax, the following emerges as a possible account of root suppletion in OI. When a root morpheme is being spelled out, the grammar has to rely on the conceptual system to tell it which root morphs from the lexicon are semantically appropriate to use. In some cases, the conceptual system may return multiple such roots. For example in !Xóõ, if the syntax has produced a structure ROOT-PLURAL, and the speaker wishes to say something about knives, the conceptual system will return both {ROOT_1-PLURAL_2, <ROOT_1-PLURAL_2, /ǂnûn/>} and {ROOT_1-PLURAL, <ROOT_1, /!õo/>}[33] as options for the morphology to consider and to serve as the beginning of further chain-construction. Likwise, if an Italian speaker wishes to say something about going, the conceptual system will return both <ROOT_1, va> and <ROOT_1, and>. In such cases, where the conceptual system retrieves more than one viable root morph, constraints in the grammar will subsequently winnow down the choice between these alternatives. Crucially, though, because the various root morphs are 'inserted' by consulting the conceptual system rather than inserted within the grammar *per se*, grammatical constraints (whether morphological or phonological) cannot compel a choice between them *at the point of insertion*. In OI terms, there is no competition for local optimality. However, the chains initiated by the insertion of one root vs. of another can and do ultimately compete as candidates in the grammar. In Italian, for instance, chains that begin by inserting *va-* and those that begin by inserting *and-* both get to be in the candidate set and both get to serve as the basis for further chain construction. Ultimately, the chain leading to 1st person singular ['vado] then gets to compete with the one leading to *['ando], with the presence of stress on the root resulting in victory for the former.

This proposal, like any which exempts roots *as a class* from competing at the point of insertion (i.e., for local optimality)—make the prediction that root PCSA can never be opaque, since all possible harmonically improving root-morph insertions remain in the candidate set. If the set of alternative root allomorphs is never culled by competition for local optimality prior to the application of other processes, then the ultimate choice between root allomorphs cannot but be sensitive to phonological or morphological processes which occur later in the derivation.

[32] A related point: suppose that we follow Marantz (1997, 2006) in claiming that apparent roots which show suppletive allomorphy, such as Italian 'to go', as actually being a functional morpheme. We would still have to confront the question of why the PCSA of this functional morpheme can be outwards-looking, something normally not possible. The existence of outwards-sensitive root PCSA indicates that suppleting roots will persist in being special, behaving in a way affixes generally cannot, even if we reclassify such roots as functional morphemes. This suggests that collapsing suppletive roots together with functional morphemes may not be empirically viable.

[33] What I mean to represent between the curly brackets are the morpheme level structures (the first item inside the brackets) together with the inserted root morph (the second item).

A couple of related examples of opaque root PCSA have been discussed in the literature. Kiparsky (1996: 25, citing conference discussion by Wolfgang U. Dressler), mentions the Italian *va- ~ and-* allomorphy discussed earlier, noting that the unstressed allomorph *and-* is selected even when it ultimately gets assigned a rhythmic secondary stress. As an example he gives *ˌandiriviˈeni* 'going back and forth'. If main stress is assigned before secondary stress, this would mean that the *va- ~ and-* choice is made in parallel with assignment of main stress, but cannot look ahead far enough to be sensitive to the location of secondary stress. However, it would not be necessary to treat such examples as involving failure of lookahead if we simply incorporate the representational distinction between primary and secondary stress directly into the analysis. That is, we would just say that *va-* is used when the root would get *main* stress, and *and-* is used otherwise.

The similar system of stress-conditioned stem allomorphy in Surmiran Rumantsch also shows possible examples of cyclic selection of stem allomorphs in the derivational morphology. Anderson (2008: §2.7) states that '[t]ypically, when a verb has "stressed" and "unstressed" stems, derivationally related forms will be built on one or the other, depending on where stress falls in the derived form':

(26)

Verbal form with unstressed allomorph:	luˈd-ar 'to praise'
Verbal form with stressed allomorph:	ˈlod-a 'he/she/it praises'
Derivative with unstressed allomorph:	luˈdevel 'praiseworthy'
Derivative with stressed allomorph:	ˈlod 'praise' (noun)

However, there are also a 'significant' number of derived words which use the stressed stem allomorph even though the stem does not carry the main stress:

(27)

Verbal form with unstressed allomorph:	durˈm-eir 'to sleep'
Verbal form with stressed allomorph:	ˈdorm-a 'he/she/it sleeps'
Derivative with unexpected stressed allomorph:	dormuˈlent 'sleepy'

(28)

Verbal form with unstressed allomorph:	sfanˈd-agn	'we split'
Verbal form with stressed allomorph:	ˈsfend[ər]	'to split'
Derivative with unexpected stressed allomorph:	sfenˈdibel	'splitabble'

Anderson suggests that these forms may arise from cyclic application of stress and stem choice: before the derivational suffix is added, there is an inner cycle on which the stem gets main stress, and the stressed allomorph is accordingly chosen; on the second cycle the derivational suffix is added and stress is shifted off of the stem, but the 'stressed' allomorph of the stem has already been chosen. This is a potential counter-example which deserves serious consideration, though as Anderson (2008) notes, 'the principles involved [in cyclic secondary stress] have not yet been fully worked out' (§2.2) and '[f]urther exploration of the Lexical Phonology of the language is necessary before [the suggested cyclic analysis of forms like those in (27)-(28)] can be considered confirmed' (§2.7). Speculatively, it might be that the anomalous forms in Surmiran could be given a surface-oriented analysis under the reverse of the analysis

suggested for Italian: the stressed stem allomorph is used when it would carry the main stress *or* a cyclically-assigned secondary stress. (This would probably require that we be able to representationally differentiate cyclic secondary stresses—erstwhile main stresses assigned prior to the insertion of the derivational suffix—from the secondary stresses which Surmiran predictably assigns to word-initial syllables which are separated by at least one syllable from the main stress [Anderson 2008: §2.2].) Alternatively, it might be that the problematic forms like the ones in (27)-(28) are simply irregular and that the suffixes in question arbitrarily require to be attached to a particular stem allomorph—hardly an unprecedented state of affairs in derivational morphology. Whatever the best analysis turns out to be, however, the Surmiran and Italian examples indicate the sorts of data which we would need to look for in order to falsify the prediction that roots as a class will always display surface-oriented PCSA.

5. Conclusion

A completely serial theory of allomorph selection (assuming Markovian rules) predicts that allomorphy of inner, earlier-realized material can never be sensitive to the shape of outer, later-realized material. A completely parallel theory of allomorph selection, on the other hand, predicts that, in principle, the allomorphic realization of any morphological unit can be sensitive to the phonological form of anything else in the utterance (subject only to purely phonological locality conditions on how nearby two structures need to be in order to interact phonologically). In this paper I have argued that the empirical reality lies between these two extremes: outwards-sensitive PCSA is possible, but only under specific conditions. I have further argued that if allomorph selection is decided in an OT-CC grammar, a reasonable definition of local optimality as in (3) to a substantial extent correctly predicts these conditions. That is, lookahead is possible (a) when the alternatives are to spell out one morpheme vs. the next one out ('something vs. nothing PCSA', as discussed in Wolf 2008: §3.4.3), and (b) when the alternative morphs for the same morpheme differ in faithfulness status. I have argued here that scenario (b) is exemplified by data from Western Armenian and Kayardild. I have also discussed how PCSA of roots—by definition outwards-looking—is expected to be possible in this system, given that selection of *candidate* realizations of a root is extragrammatical and therefore cannot be subject to evaluation by grammatical constraints at the point of insertion; different root allmorphs can only compete globally, via the final competition of candidate derivations featuring different roots. To my knowledge, these mechanisms cover all plausible reported cases of surface-oriented PCSA—with just one set of possible exceptions.

The remaining cases which are potentially challenging for OI as well as for other serial theories of allomorph selection are cases in which the phonological conditions governing allomorph distribution appear to refer to the allomorphs' own prosodification (see discussion in Wolf [2008: 203-206]). For example, several affixes in Sámi (Dolbey 1997) have two allomorphs, one with an even number of syllables and the other with an odd number. The distributional generalization is that the even-parity allomorphs are used with even-parity bases and odd-parity allomorphs with odd-parity bases. As Dolbey notes, these distributions mean that the combination of base and affix

will have even parity overall, guaranteeing that it will be possible to exhaustively parse it into disyllabic feet. The problem for reproducing such an analysis in OT-CC is that there are a number of convincing arguments (McCarthy 2008a; Pruitt 2008, 2010; Elfner 2010; Kimper 2011; Moore-Cantwell 2011; Jesney to appear; McCarthy & Pruitt to appear; Staubs to appear; Wolf to appear) that foot-construction ought to be a step of its own in HS/OT-CC derivations. If these arguments are accepted, the parsing-driven account of syllable-counting allomorphy systems like the one in Sámi would not be replicable in OT-CC because they would require that allomorph choice look ahead to a subsequent step of the derivation. The next step for the research program presented in this article is to look more closely at cases of PCSA driven by constraints on footing and prosodic phrasing. Perhaps some cases will prove to involve differences in MM faithfulness, making lookahead expected; perhaps others will prove amenable to a different phonological analysis (e.g., is the footing of the affix itself really the best way to understand the patterns involved?); or perhaps we can develop a more nuanced theory of when prosodification is a step of its own. Whether the outcome is favorable or not for the theoretical orientation I have been arguing for, such investigation will undoubtedly illuminate much about the nature of allomorph selection, prosodification, and their relationship to one another and to other phonological processes.

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