Outward Sensitive Allomorphy in Nez Perce?*

Both Distributed Morphology (Embick 2010, 2015; Arregi and Nevins 2012; Marantz 1995, 2013; Harley 2014) and Minimalist Morphology (Wunderlich and Fabri 1994; Wunderlich 1996) are morpheme-based, but the former is realizational/interpretive, while the latter is lexicalist/generative. This point of difference has many empirical and conceptual consequences, among them what constraints on morphological selection are predicted. In particular, Minimalist Morphology entails that allomorphy can be sensitive to an inward context but not to an outward context, a generalization proposed long ago on empirical grounds by Simpson and Withgott 1986: 155 and Carstairs 1987. Distributed Morphology does not make this prediction out of the box. So if the generalization is true, Distributed Morphology must add a supervenient constraint to restrict its spellout mechanism accordingly. On the other hand, if it is false, as argued on the basis of newly discovered evidence by Anderson 2013; Svenonius 2012; Vaysman 2009; Wolf 2013; Merchant 2015, and Deal and Wolf 2017, then Minimalist Morphology is just plain wrong, or at the very least its foundations need a complete overhaul. I argue here that one of the more persuasive cases of outward-sensitive allomorphy, the one brought to light by Deal and Wolf 2017, is actually not allomorphy but a phonological alternation, which duly obeys the applicable phonological locality principles.[1]

Minimalist Morphology is a LEXICAL INCREMENTAL theory (Stump 2001) broadly situated in the lexicalist tradition,[2] meaning that morphology merges stems and affixes incrementally and computes the morphosyntactic, phonological, and semantic properties of the resulting combinations from the properties of their parts. Recursive merge in the morphology derives fully interpreted words that are inputs to the syntax, where merge continues, but now subject to syntactic locality constraints. There is no enumeration and no spellout, hence no issue about early or late vocabulary insertion, and no need for imposing constraints on spellout operations. Incremental word-building and interpretation at each step of the word derivation builds the constituent structure of words, accounts for morphological locality effects, and determines the semantic scope of morphemes in words and the domains of cyclic phonological interpretation, which I implement in Stratal OT, rather than in rule-based Lexical Phonology.

Minimalist Morphology's intrinsic predictions about the locality of morpheme selection, allomorphy, and phonology/morphology interactions are very restrictive. Morphological derivations are necessarily bottom-up, simply because affixes select for the bases they attach to. Three core generalizations about word structure then follow: the cyclicity of word phonology, the Mirror Principle, and the inward sensitivity and locality of morphological selection. In fact, they turn out to be manifestations of the same architectural commitment.

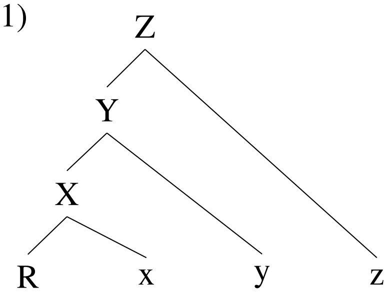
Specifically, the prediction is that the choice of a morpheme or allomorph can be sensitive to the identity of the adjacent stemward morpheme and to the accumulated morphosyntactic featural

*My thanks to XXX for their very useful comments on a draft, which both forced and enabled me to sharpen the argumentation.

[1]For the remaining putative cases of morphological outward dependency, I refer to Ch. 2 of XXX, where a detailed comparison of the other aspects of the two theories will also be found.

[2]Halle 1973, Aronoff 1976, Lieber 1982, Aronoff 1994, Carstairs 1987, Chomsky 1995, Hankamer and Mikkelsen 2002, 2005, Williams 2007, Ackema and Neeleman 2007: 330-341.

content of the base, not to affixes further away in the word structure. For example, in a morphological structure of the form (1),

(1)


inward dependencies are constrained by locality as in (2),

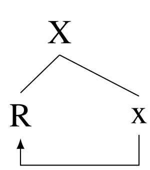
(2) a. z can depend on y and on Y, and y can depend on x and on X
b. z can't depend on x or on R, and y can't depend on R

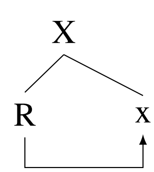
and outward morphological dependencies, even local ones, are entirely ruled out:

(3) a. y can't depend on z,
b. x can't depend on y or on z,
c. R can't depend on y or on z

The argument in brief is this. Word formation is either affixation to a base, or compounding of bases. A base can be a root, a stem, or a word, but it cannot be an affix. Word formation begins with an underived base, and proceeds recursively outward. Outwardly sensitive affix selection is excluded because upcoming material is not yet visible at the point when an affix is selected, and the affix cannot be replaced once the outward context comes into view. The Mirror Principle and phonological cyclicity follow because the output of each merge operation is interpreted morphosyntactically and phonologically. The order of merge determines the constituency of the word, and the semantic scope relations among the morphological elements within it. Locality of inward selection is guaranteed by bracket erasure (a process assumed by DM also), which in any lexicalist framework is independently motivated by the inaccessibility of word-internal structure to syntactic operations (as well as by phonology).

A further prediction can be derived from this setup: since roots are not cyclic domains (as phonology independently tells us), then, when the base is a root, the first cycle will consist of the root and an affix, which therefore *can* morphologically depend on each other.

(4) (a)


(b)


Morphosyntactic features are inherited upwards through successive cycles, ending up as properties of the words that the morphological derivation outputs. This is a necessary consequence of the architecture, since words must have morphosyntactic features in order to combine with each other properly in the syntax. The inheritance mechanism can give rise to seeming long-distance effects that masquerade as exceptions to (3). For example, supposing that a passive affix modifies the argument structure by existentially binding the subject, the modified argument structure is inherited through successive cycles and can then determine the choice of inflectional and derivational morphology across intervening affixes in the word, and of agreement and case assignment in the syntax.

These restrictions hold only for *morphological* dependencies, of course. Phonological alternations are contextual accommodations implemented after morphemes are in place, by processes that obey the altogether different locality conditions that govern phonology.

In a realizational/interpretive morphology such as DM, the morphology spells out a syntactic representation whose terminals are abstract morphemes that bear morphosyntactic features. Imposing locality in this framework requires extrinsic constraints of at least two types. First, in order to ensure that dependencies on specific morphemes and their properties are restricted to an inward context, spellout of the syntactic terminals must begin with the innermost node and proceeds successively outward (Embick 2010: 42), rather than, say, first to the outermost node and from there inward until it reaches the most deeply embedded node, or simultaneously everywhere, or left to right, or in random order. Secondly, depending on the size of the spellout domain (a phase, as usually assumed) there will be a string of abstract morphemes on either side of a site of Vocabulary Insertion, to which unfettered global access must be prevented by further constraints.

Deal and Wolf 2017 present two cases of outward-sensitive allomorphy in Nez Perce. One involves a straightforward root-suffix dependency of the type (4) which is unproblematic for MM. The other is a morpheme with phonologically conditioned outward-sensitive allomorphy of type (3), potentially lethal for MM. While DM's architecture does not intrinsically preclude it, it is still unwelcome in that approach, because it would force revision or abandonment of the empirically motivated constraint that spellout starts from the innermost constituent.

The morpheme of interest is what Aoki 1965, 1994 calls the benefactive suffix, which D&W dub μ, and identify as the head of a functional projection that hosts raised possessors. It is realized as *-eẏ* before -CV, elsewhere as *-eṅi-*, which is pronounced *-eṅy-* before -V. All forms of μ undergo regular *e* ∼ *a* vowel harmony. After the so-called C-class of stems, they receive an initial *-n-*, and otherwise their initial *-e/a* is deleted after a vowel. All told that adds up to at least 15 pronunciations of μ by my count. The alternation of greatest concern is between *-eṅi-* and *-eẏ* (and their respective harmonic and nasalized variants), which is phonologically conditioned to be sure, but does not at first blush look like a phonological alternation, and which would, if allomorphic, violate the inward conditioning constraint. It is illustrated by the examples in (5) (from Deal and Wolf 2017), where μ occurs in a context that requires *e* → *a* harmony and nasal augmentation.

(5) a. 'aẇ-yáx̂-naṅi-∅ '3OBJ.find.μ.IMPERATIVE.SG.
b. 'aẇ-yáx̂-naṅi-tc '3OBJ.find.μ.IMPERATIVE.PL.
c. 'aẇ-yáx̂-naṅy-u' '3OBJ.find.μ.PROSPECTIVE
d. 'aẇ-yáx̂-naẏ-sa-∅ '3OBJ.find.μ.IMPERFECTIVE.SINGULAR-PRESENT
e. 'aẇ-yáx̂-naẏ-tato-∅ '3OBJ.find.μ.IMPERFECTIVE.SINGULAR-PRESENT

Since *e* → *a* reflects Nez Perce's across-the-board vowel harmony, and *-(n)eṅy-* is just the prevocalic pronunciation of *-(n)eṅi-*, D&W rightly do not reckon these alternations as allomorphy. They posit four allomorphs of μ: *-neṅi-*, *-neẏ-*, *-eṅi-*, and *-eẏ-*. They consider the first two allomorphs to be conditioned by a class feature of the stem on their immediate left that causes a nasal augment to be added to an immediately following suffix, and the reduced *-(n)eẏ-* to be conditioned by the syllable structure created by the immediately following suffix. On their analysis, for instance, μ would be morphologically spelled out as *-naṅi-* just in case there is C-class stem on its immediate left and there is not a -CV syllable on its immediate right. I will argue that both of these alternations are likewise (morpho)phonologically conditioned.

First, the *n* appended to the beginning of μ after C-class stems appears to be a floating nasal originating on the stem that docks on a following suffix. Several facts make this likely. An initial *n* appears on many other morphemes immediately after C-class stems, provided of course that they are phonologically capable of hosting it (Deal and Wolf 2017). A search through Aoki 1994 turns up at least 15 other vocalic suffixes and bound roots which acquire an initial *n* immediately after C-class stems,[3] and none which do *not*. Since all these suffixes undergo the identical change in the identical set of environments, and the change is phonologically characterizable as the docking of a stem-final *-n* onto a suffix-initial vowel, it would be otiose to list them all with two allomorphs, one with *n*, the other without. The floating *n* analysis captures the generality and regularity of this distribution, and shrinks the number of μ's suppletive allomorphs to two, *-(n)ey̓-* and *-(n)en̓i-*. I assume it here in what follows. That said, if it *were* allomorphy, contrary to all appearances, it would be entirely unproblematic for what follows, since it would be of the inwardly sensitive type that is as compatible with Minimalist Morphology as with DM and with every other theory. In any case, the treatment of this alternation does not impinge in any way on the last alternation, the critical one, to which I now turn.

Assuming then that vowel harmony, nasal augmentation, and the vowel/glide alternation *-(n)en̓y-* ∼ *-(n)en̓i-* are phonologically conditioned, we are left with just one a suppletive allomorph, namely *-(n)ey̓-*. Since it is conditioned by a following -CV context, it would be outwardly sensitive allomorphy.

The phonological nature of the outward conditioning environment "-CV" is a first clue that the variant *-(n)ey̓-* might be derived via some syllable-sensitive phonological process. Of course it does not prove that, because allomorphy can be phonologically conditioned. To make the case we must identify and justify the phonological derivation. And it turns out that it is decomposable into phonological processes driven by phonotactic constraints that are manifested throughout the language.

A priori the underlying form of the suffix could be /-en̓i-/ or /en̓y-/. Suppose first that the underlying form is /-en̓i-/. Then its unstressed *i* would be subject to a well-attested syncope process of Nez Perce, by which medial *i* is deleted provided no complex codas or complex onsets result: in the context VC___CV to produce VC.CV, and moreover in those VCC___CV and VC___CCV contexts where the syncope results in VCCCV sequences which are phonologically reducible to VC.CV in the language. The same syllabicity restriction also naturally entails that only one of two successive syllables undergoes syncope. This *i*-syncope process is illustrated in (6) and (7), where the alternating morphemes are boldfaced.

(6)	a1.	**hekí**-ce	'I see'	b1.	**cíl̓ii**	'proud'
	a2.	**héki**-n	'I have seen'	b2.	**cil̓íi**-ce	'I am proud'
	a3.	**héx**-ne	'I saw'	b3.	hi-**cl̓íi**-ce	'he is proud'

(6a) illustrates the retention of stressed *í*, and (7a.iii) illustrates inhibition by *Complex. Further examples are given in (7).[4]

(7) a. i. **mic̓íi**-sa 'I hear'
ii. 'a-**mc̓íi**-sa 'I hear (someone else's)'
iii. 'anaas-**mic̓íi**-sa 'I hear them'
b. i. **ni**-wíhnaca 'I am leaving (mine) behind'
ii. hi-**n**-wíhnaca 'he is leaving (me, his) behind'
c. i. **liklí**-y̓u 'all around'
ii. **liklíi**-c-e 'I am going around'

[3]*-(n)áapii* 'to deprive', 'away from', *-(n)a(a)t* 'as the object moves by', *-(n)ax̣* 'conditional', *-(n)éet* 'agentive', *-(n)e(e)twik* 'after', *-(n)e'i* 'agentive', *-(n)eyi(k)* 'move around in order to', *-(n)in̓* 'passive participial', *-(n)u* 'to, for', *-(n)úukini* 'as something approaches', *-(n)u'* 'future', *-n̓es* ∼ *e's* 'an object for . . . ing', *-(n)o's* 'an object for . . . ing', *-n̓ipec* ∼ *'ipec* 'desirous of', *-néey̓* ∼ *-ey̓éey̓* 'not'. In addition, some suffixes beginning with consonants get *na-* after C-class stems.

[4]Examples cited from Aoki 1994 are converted here to the accepted tribal orthography used by D&W, except that I retain Aoki's rendering of glottalized consonants as n̓, y̓, etc.

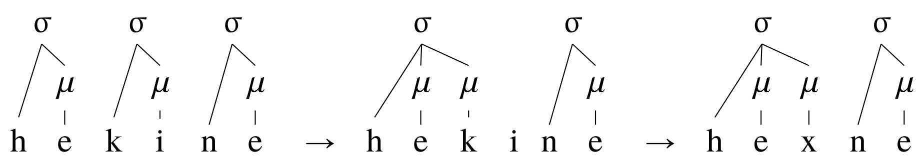
iii. hi-**lkil**-kíi-c-e ‘he is going around’
iv. hi-stée-**lkilii**-x-kik-e ‘he looked around’

The data in (8) confirm that the condition on deletion is checked in the cyclic output, as expected under Stratal OT assumptions. In (8d), deletion takes place in the VCC___CV context /. . . éw’ine. . . / because the two consonants /w’/ merge into *ẁ*.

(8) a. /’inéhne-ce/ *’inéhnece* ‘I am carrying (mine)’
b. /’inéhne-ce/ *’inéhnece* ‘I am carrying (mine)’
c. /pée-’inéhne-ce/ *pée’néhnece* ‘he is carrying (his)’
d. /’éw-’inéhne-ce/ *’éẁnéhnece* ‘I am carrying it’

Such a combination of deletion and merger can also account for the alternation in the µ morpheme in purely phonological terms.

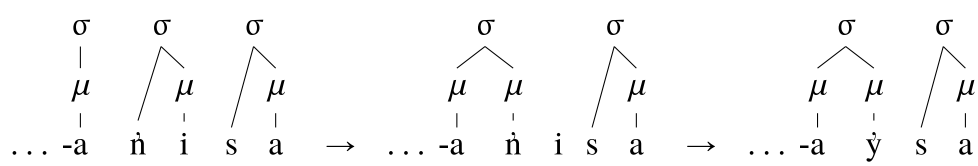
I take syncope and glide formation of *i* to be deletion of a syllable node. In an ordinary case of syncope such as (6.a3), *i* deletes and its stranded onset is adjoined to the previous syllable; /k/ then becomes a fricative since Nez Perce prohibits [+back] stops in codas.

(9)


Assuming underlying /eǹi/ (here with e → a harmony and the floating nasal), we have the derivation:

(10) /’aw-’yax̂-naǹi-sa/ → *’aw’yax̂naỳsa*
/’aw-’yax̂-naǹi-ta/ → *’aw’yax̂naỳta*

As in (9), simple deletion of *i* would produce consonant combinations which do not occur in the language, in this case *-ǹs-* and *-ǹt-* (Aoki 1970: 17 ff). Unlike *m̀, ẁ*, and *ỳ*, the glottalized nasal *ǹ* patterns with glottalized stops in being extremely rare in codas; *ǹ* never occurs word-finally.[5] As in (9), the output is modified into a licit cluster. Unlike an oral stop such as *k* in (9), nasal stops cannot become continuants. The *ǹ* coda accommodates to the phonotactic prohibition on glottalized stops in codas by fusing with desyllabified *i* into the admissible continuant coda *ỳ*, keeping its glottal feature, but, since Nez Perce also prohibits glottalized nasalized *y*, losing its nasality. The phonological derivation is shown in (11), sequentially for perspicuity.

(11)


It is obtained by the constraints in (12).

(12) a. *i*-deletion: Max-V́ > *i > Max-V
b. *Complex: Assign a violation mark to a syllable onset coda or a syllable coda consisting of more than one consonant.

[5]I am following D&W’s (2017: 31) phonemic rendering of µ with *ǹ* instead of Aoki’s ’*n*. In Aoki’s transcription, the missing outputs of syncope would have three-consonant clusters */’nt/, */’ns/. These three-consonant clusters also do not occur in Nez Perce, whereas /’ny/ (/ǹy/ for D&W) does (Aoki 1965: 27-33). These issues of phonological representation are therefore neutral with regard to my argument.

c. CodaCond: *[C,+back,–cont][C,+anterior]
Assign a violation mark to a sequence consisting of a velar, glottal, or glottalized stop and a labial or coronal consonant (conservative formulation, can probaby be generalized).

d. Max-V: An input vowel must correspond to an output segment.

e. Ident(lar), Ident(nas): Preserve glottalization and nasality.

(13)

	*i	*Complex	CodaCond	Max-V	Ident(lar)	Ident(nas)
Input: /-an̓i-sa/						
a. -an̓isa	*					
b. -an̓ysa		*	*			
c. -an̓sa			*	*		
d. -ansa				*	*	
e. -aysa					*	*
f. ☞ -ay̓sa						*

We now see that the apparent arbitrariness of the alternation is a consequence of Nez Perce's combination of *i*-syncope and its tight phonotactic restrictions on what consonants are admissible in coda position. The alternation is the minimum phonological accommodation that jointly satisfies these constraints, under the constraint ranking (12).

An alternative to *i*-syncope espoused in the literature on Nez Perce phonology (Crook 1999, Hargus et al. 2015) takes *i* to be epenthesized into complex clusters, rather than syncopated in the complementary context. The argument for the epenthesis analysis is that some *i*-vowels do not delete. In the alternative analysis the non-deleting *i*-vowels are represented as underlying /i/, whereas fleeting *i*-vowels are epenthetic:

(14) a. i. qilúu-se 'smoke bothers my eyes'
ii. hi-qilúu-se 'smoke hurts the eyes'
b. i. qiséeq-ce 'I open my mouth'
ii. hi-qséex̣-ne 'he opened his mouth'

The respective roots would be /qiluu/ and /qseeq/, with *i*-epenthesis /qseeq/ → *qiseeq*.[6]

While I do not want to dismiss this alternative analysis out of hand, I note that there are good arguments in favor of the deletion analysis. On the epenthesis analysis we would need underlying initial geminates in cases like (15).

(15) a. i. **wiwí**-c-e 'I'm (if [sic] a tree) falling'
ii. hi-**wwí**-c-e '(a tree) is falling'
b. i. **titwatíi**-s-a 'I tell a story'
ii. hi-**ttiwatíi**-s-a 'I tell a story'

If *wiwí-* and *titwatíi, -ttiwatíi* are derived by epenthesis into underlying /wwi/, /ttwatíi/, the question arises how the underlying geminates should be represented. On standard assumptions geminates are moraic (see most recently Ryan 2018), so we would have /w$_\mu$i$_\mu$/, /t$_\mu$i$_\mu$watií$_{\mu\mu}$/. But then how do we ensure that /w$_\mu$i$_\mu$/ is realized as *wiwi* and *wwi*, and not as **uwi* or **uyi*? The deletion analysis posits underlying disyllabic /wiwi/, i.e. /ui$_\mu$ui$_\mu$/, which removes this difficulty.

Nez Perce distinguishes unaccented stems from stems that bear an underlying unpredictable lexical stress on some syllable. It has morphologically conditioned stress mobility in complex words (Crook

[6]I would have expected **hix̣séex̣ne*. Although the syncope is fairly regular after person markers, it is not triggered by the question morpheme *mi-* (Aoki 1994: 441). Possibly the question morpheme belongs to an outer stratum where syncope is no longer active.

1999, Bjorkman 2010). Stress is attracted to prefixes and suffixes, and deleted in non-initial members of compounds. So, if the alternating cases in (7c) were epenthetic, the stem in ***liklí**-y'u* ∼ ***liklíi**-c-e* ∼ *hi-**lkil**-kíi-c-e* ∼ *hi-stée-**lkilii**-x-kik-e* would have to be from underlying /lkl/, with nowhere to put the lexical stress, which seems to be on the final syllable. The deletion analysis' lexically stressed underlying form /likilí/, with the vowels present, resolves the problem.

It gets worse. Stress shift may both feed and bleed deletion. Underlying stressed *i* may be destressed and then becomes subject to syncope:

(16) a. qimímii-c-e 'I get numb'
b. tulée-qmimii-ks-e 'my foot goes to sleep' (tulée 'foot')
c. wix̣su'ú-qimmii-ks 'my foot went to sleep from sitting' (wix̣su' 'sit')

The epenthesis analysis would posit /qmmii/, again with the problem of representing the geminate, and specifying the underlying accent on a syllable that is not present in the underlying form (*-mí-*). Besides, stress on an epenthetic vowel runs counter to the descriptive generalization that epenthetic vowels are not stressed, for which the OT literature posits a Head-Dep constraint. An example of stress shift bleeding deletion is (17c), where the underlying stress shifts off the final syllable and keeps the *i* intact.

(17) a. /hinimí/ *hinmíi* 'cry!'
b. /hinimí-m/ *hinmíim* 'animal cry, thunder' (nom.-poss.)
c. /hinimí-t/ *hinímit* 'animal cry, thunder' (abs.)

If the underlying form were /hinmí/, there would be no motivation for epenthesis in (17c) anyway.

The upshot is that the Nez Perce *i* ∼ ∅ alternations in (6)-(8) and (15)-(17) are (morpho)phonological though not automatic, and that a deletion analysis of them has to specify certain vowels as undeletable, but an epenthesis analysis faces several more daunting technical difficulties. While I believe that the deletion analysis is therefore superior to the epenthesis analysis, it is possible that a mixed deletion-cum-epenthesis analysis might work even better. Leaving this issue for Sahaptianists to resolve, I emphasize that the phonological treatment of the μ suffix works just as well if we adopt the epenthesis analysis or a mixed analysis of *i* ∼ ∅ alternations. Suppose that μ is underlying /aṅy/. Its /y/ would then be vocalized before -C and word-finally, and fused with the glottalized nasal before -CV. The treatment of the complex cluster would be driven by the same phonotactic constraints as above, except that Max-V is generalized to prohibit deletion of all [–consonantal] segments, vowels and glides.

(18)

	*i	*Complex	CodaCond	Max-V	Ident(lar)	Ident(nas)
Input: /-aṅy-sa/						
a. aṅisa	*					
b. aṅysa		*	*			
c. aṅsa			*	*		
d. ansa				*	*	
e. aysa					*	*
f. ☞ aẏsa						*

The proposed phonological analysis of the *-eṅy-V, -eṅi-C* ∼ *-eẏ-CV* alternation is robust enough to be be compatible with virtually any reasonable treatment of the *i* ∼ ∅ alternation.

If the Nez Perce μ-alternation is phonological, then, since phonology *can* be both inward and outward sensitive – subject to phonological locality – the alternation does not threaten the generalization (3) that morphology cannot be outward sensitive, nor theories such as Minimalist Morphology, from which that generalization follows in a principled way.

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