(Transcript of talk)

Directionless Syllabification and Ghosts in Yawelmani

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I. Introduction

In optimality theory, the grammar evaluates candidate outputs in parallel against a hierarchy of ranked, violable constraints. One of the main advantages of this framework is its ability to capture non-local dependencies straightforwardly, obviating the need to build the ill-formed intermediate structures that are sometimes inevitable in bottom-up approaches. A major challenge for parallel evaluation then is to account for directionality effects, in particular with regard to syllabification where directionality has been intimately bound up with the painstaking insertion of prosodic structure one piece at a time either from right to left or left to right. One approach to this problem, building on an observation of Kirchner's, has been to specify an edge of the word toward which the prosodic structure aspires, thereby encoding directionality in a way consistent wit the principles of optimality. Examples of this include McCarthy & Prince (1993a) and Padgett & Mester (1993). A different approach to the directionality problem, and the one I will take in this paper, is to seize the opportunity to see if the illusion of directionality might in fact be the result of more interesting properties of a language. It is in this light that I want to look at Yawelmani today. Noske (1985) and Archangeli (1991), building on the work of Kisseberth, Kuroda and Newman, have argued that the placement of epenthetic vowels in Yawelmani follows from right to left syllabification. I'll show however that directional syllable building is not a necessary component of the Yawelmani grammar, and that the pattern of syllabification and epenthesis, as well as the behavior of the notorious ghost segments, follows simply from align constraints which act to preserve the shapes of the Yawelmani templates on the surface while minimizing violation of higher ranked constraints such as PARSE, FILL, and *STRUC.[1]

[1] a. ALIGNMENT and template preservation obviate need for directional syllabification
(McCarthy & Prince (1993b))

b. *STRUC(σ) accounts for ghostly C/V asymmetry
(mentioned in PS)

II. Yawelmani Templatic Morphology[2]

First some background. Each verb in Yawelmani has either two or three consonants and a vowel and is associated with one of the default templates in [2]. The biconsonantal root *lag* in [2a] for example surfaces as the CVCVV iamb *lagaa,* in [2d] the root *dul* surfaces with an initial heavy syllable, and in [2f] the monomoraic syllable template yields a short open initial syllable. In some words the form of the template is obscured, so for example, in [2e] the initial monomoraic template syllable *du* is buried within a bimoraic syllable with a coda.

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1 I understand that Ellen Broselow has reached similar conclusions in her own work on Yawelmani.

2 All data is drawn originally from Newman (1944) . In this handout I cite the secondary literature from which examples were drawn where appropriate.

[2] Templatic morphology: (McCarthy & Prince (1986), Archangeli (1991))

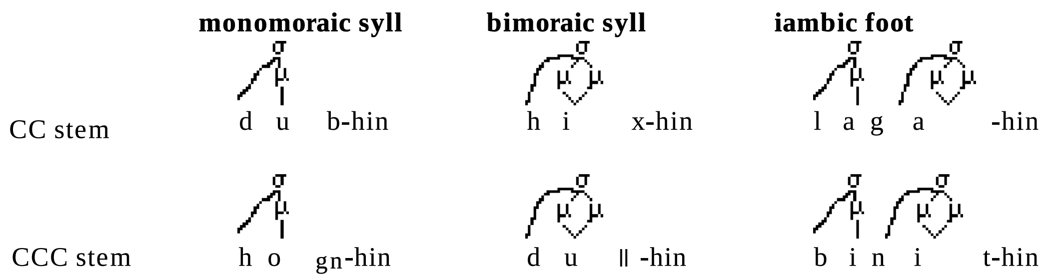
Verb stems are biconsonantal or triconsonantal
Each has a default template

(Data here from Noske (1985:336-8) unless otherwise indicated)

		default template	AORIST /-hin/	*gloss*	
a.	lag	$[\sigma_\mu\sigma_{\mu\mu}]$	la. gaa. -hin	*spend night*	
b.	bint	$[\sigma_\mu\sigma_{\mu\mu}]$	bi. net. -hin	*ask*	
c.	hix	$\sigma_{\mu\mu}$	hex. -hin	*be fat*	
d.	dull	$\sigma_{\mu\mu}$	doo. lul-hun	*climb*	SN
e.	dub	σ_μ[3]	dub. -hun	*lead by hand*	
f.	hogn	σ_μ	ho. gin. -hin	*float*	DA

Archangeli (1991) argued, illustrated in [3], that template association is independent of syllabification and that the verb melody with the associated template acts as a kind of underlying form . [3] shows the forms in [2] stripped of everything but their templates.

[3] Template shape serves as sort of underlying form: (Archangeli (1991))
NB: Template moras dominate only vowels



Notice that the CV and CVV syllables which make up the templates form a subset of the possible well-formed Yawelmani syllables, shown in [4]. A peculiarity of the template moras, noted by Archangeli, is that they only dominate vowels, despite the fact that moraic codas are common in non template syllables.

[4] Yawelmani syllable inventory (Newman, Kisseberth, Archangeli, Noske)
Yawelmani has closed syllables, but template itself limited to vocalic morae

CV CVV CVC

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[3]cf Prince (1990)

We know that the template morae are vocalic because of a Yawelmani constraint, sketched in [5] , first brought to light by Kuroda, which causes long high vowels to lower. Since this is the only source of the mid-front vowel, whenever we see an [e] we know that it must have been derived from a long vowel.

[5] Evidence that template association of bimoraic syllables yields long vowels rather than CVC syllables:

Long high vowels lower to mid (Kuroda)

	Error!-	**Error!**
ii	-	ee
uu	-	oo

An example of this is in [6a]. Here the underlying vowel in the root is /i/, as you can see in the first syllable, but it lowers to [e] in the second (bimoraic) syllable of the template. Even when the vowel is forced to shorten under pressure of syllabification as in [6b] it is still subject to lowering. This lowering reflects the underlying bimoraic association of the template, even when the vowel shortens to accommodate a consonant in a closed template syllable.

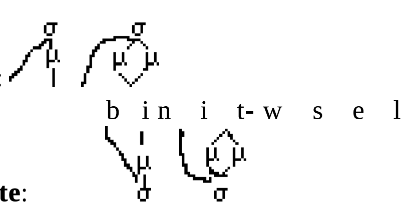
I represent this with the template associated below the melody and the surface syllabification on top. This is not meant to suggest that there are actually multiple tiers , but only to illustrate clearly the containment of the open syllables of the template in the output form.

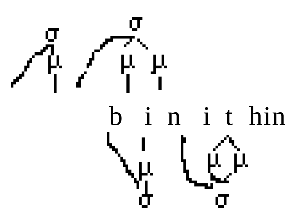
[6] Vowel length imposed by template is <u>contained</u> in the output form. (containment in the sense of PS (1993))

Since lowering is only source of the mid-front vowel, bimoraic template syllable must contain long vowel, even when the vowel has been shortened on the surface to accommodate a consonant in a closed surface syllable (Archangeli (1991)).

a. /bineet-wsiil/ b. /bineet- hin/

output:





template:

surface form: **bi. nee.** ti̠w. sel **bi. net.** hin

Unlike regular syllables then template moras associate only to vowels. This can be accomplished with something like the constraint in [7], undominated, which is essentially a no-coda constraint on the template.

[7] Special no-coda for templates (see McCarthy & Prince (1993a:19))

a. ALIGN-V Align (Template, R, Vowel, R)
[Forces templatic moras to dominate only vowels]

The template alone can license only part of the melodic string. The extra-templatic melody must also be prosodically licensed, and in doing so optimal parsing often impinges on the sanctity of the template shape. Leftover consonants which cannot simply slide into well-formed CVX syllables are licensed either as in [9a], by closing off the preceding open template syllable, thus obscuring the form of the template, or as in [9b] by insertion of an epenthetic high vowel. Notice that the position of the epenthetic vowel in [9b] serves to draw the consonant adjacent to the template away from the initial template syllable, thereby preserving the template's shape in the surface form.

[9] Strategies for syllabifying extratemplatic melody:

a. Close Template Syllable

template	templatic form	surface form
CV	du . b-hin	du b. -hin
CVV	hi :. x-hin	hi x. -hin
CVCVV	bine : t-hin	bi. ne t. -hin

b. Epenthesize

template	templatic form	surface form
CV	ho. gn-hin	ho. g[i] n-hin
CVV	du :. ll-hin	du:. l[u] l-hin

I'll argue that the choice as to whether or not to epenthesize and if so, where the vowel should be placed, is determined by the constraints in [10], ranked as in [11].

[10] Choice of strategy is predictable from interaction of four constraints

a. **PARSE**: Avoid deletion of root nodes (segments) (PS (1993))

b. **FILL**: Avoid epenthesis (PS (1993))

c. **ALIGN-TEMPLATE** Align (Template,R, σ, right) (MP (1993b))
'Match the right edge of the template with the end of a syllable'

d. **ALIGN-MORPHEME** Align (Morpheme,R, σ, right) (MP (1993b))
'Match the right edge of the morpheme with the end of a syllable'

[11] Ranking: PARSE » FILL » ALIGN -T» ALIGN-M

As has been well established elsewhere the fact that extra consonants, such as the N in *hoginhin* , are saved by epenthesis rather than obliterated, supports the ranking of PARSE over FILL, as shown in [12].

[12] PARSE » FILL
Reason: Potentially unparsable consonants are rescued by vowel epenthesis

hogn-hin —> **hoginhin**

/ hogn-hin /		PARSE »	FILL
a.	hog. < n>-hin	*!	
b. p	ho. g□ n. hin		*

The placement of PARSE over FILL in the hierarchy guarantees that epenthesis will save stray consonants from deletion, but it tells us nothing about where the epenthetic vowel should go. In fact, in Yawelmani, the position of an epenthetic vowel can always be predicted from the alignment constraints in [10]. The example in [13] illustrates the workings of the ALIGN-MORPHEME constraint which says that the right edge of a morpheme should correspond to the end of a syllable. In [13b], where the *-atn-* suffix is followed by a vowel initial suffix, no epenthesis is necessary. But in [13a] there is a triconsonantal sequence that must be broken somewhere, and as the tableau in [14] shows, the vowel appears suffix internally, between the T and the N, preserving morpheme alignment.

[13] Epenthesis tries to maintain morpheme alignment at right edge.
In 13 (a) the vowel is inserted morpheme internally thereby preserving alignment.

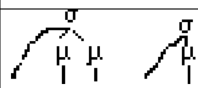
a. linÇ-**atn-**mi lin. Ç**a. t**□ **n**-mi having tried to speak
(*lin. Ç**at. n** □ -mi)
b. hall**-atn-**iin hal. l**at. n**en will try to raise (it)

[14]

/ lin Ç-**at. n**-mi /		ALIGN-M
a. p	lin. Ç-**a. t**□ **n.** -mi	
b.	lin. Ç-**at. n**□ **.** -mi	*!

The most important boundary in a word though is the edge of the template. The ALIGN-TEMPLATE constraint in [10] helps preserve the underlying template shape on the surface by keeping codas out of the open template syllables. This is illustrated by the tableau in [15]. The optimal candidate, in [15a] has an epenthetic vowel between the *g* and the *n* , thus preserving template alignment. As it's pictured here, you can tell if there is alignment by comparing the end of the syllable above the melody with the template below. So in [15a] the initial syllable *ho* , shown above the melody, matches the form of the template below. In [15b], on the other hand, the CV template is misaligned because its boundary falls within the surface CVC syllable.

[15] Template also tries to maintain alignment at right edge
Epenthetic vowel draws potential coda C away from open template syllable

		ALIGN-T
a. p **output** **template**	 h o. g ☐ n. hin 	
b. **output** **template**	 h o g. n ☐ . hin 	*!

[16] **-** [18] show that template alignment and morpheme alignment are in fact separate constraints and that template alignment is prominent. To see this we need a suffix which will give us an extra stray consonant, such as the reflexive/reciprocal suffix *wsel*, shown in [17]. This suffix imposes an iambic template on all roots, overriding their default shape. In [17b] the triconsonantal sequence **N W S** is broken up by an epenthetic vowel between the **N** and the **W** on the surface.

[16] ALIGN-T » ALIGN-M
Reason: When they conflict the template wins

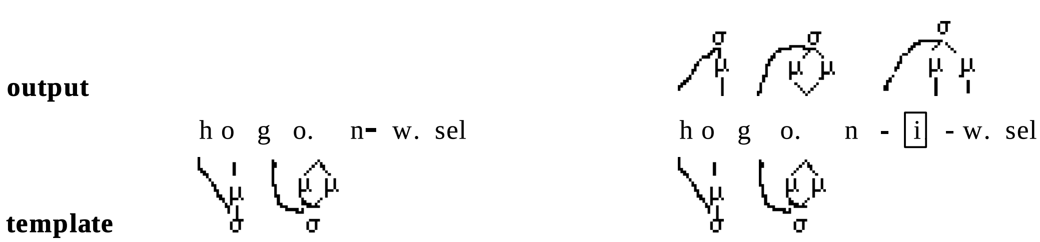
[17] -wsel 'refl/recip' imposes iambic template on root

a. /lagaa-wsel/ la. gaw. sel 'spend the night-REFL/RECIP'

b. /hogoo**n-ws**el/ ho.goo. nI. wsel 'float-REFL/RECIP'

[18] illustrates that by putting the epenthetic vowel in this position, the template's vocalic iamb is preserved. Notice however that morpheme alignment is violated here because the epenthetic [i] forces the root final *n* to be the onset of the following syllable.

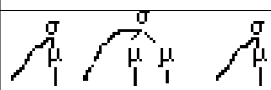
[18] Surface syllables align with the template, not with the end of the verb root
a. template only b. output syllabification



If, as illustrated by the tableau in [19], alignment referred to just the morpheme boundary then we would expect the second candidate to win, since here there is a clean boundary between the root and the suffix. So template alignment and morpheme alignment must be separate constraints and template alignment must be dominant.

[19] The surface form preserves the template shape at the expense of misaligning the edge of the verb root

/hogoo**n-**wsiil/ surface form: **ho. goo. niw.sel**

		ALIGN-T »	ALIGN-M
a. p **output** **template**	 h o g o. n-□ -w. sel 		*
b. **output** **template**	 h o g o n- w □ . sel 	*!	

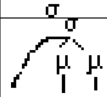
Other aspects of Yawelmani underscore the importance of template preservation in conditioning epenthesis. In nouns, where the phonology is based more on underlying word shape rather than templates clusters are broken up by protective vowels which are part of the underlying representation . Epenthesis plays no role there.

[20] Summary so far:
Epenthesis conditioned by morpheme & template alignment considerations

I will show in a couple of minutes that alignment will always put the epenthetic vowels in the right place, but first we need to know how ALIGN conspires with FILL. In the cases we just looked at we saw that when we had to epenthesize somewhere, we did it in such a way so as to preserve alignment of the template or morpheme with the end of the syllable. But what happens when we have a choice between alignment and epenthesis? I f FILL » ALIGN then alignment will be sacrificed, if , by doing so, we can avoid a FILL violation. As shown in [21] this is exactly what happens. The X in the middle of hiix-hin is parsed as the coda of the preceding template syllable, destroying alignment but avoiding a potential FILL violation. The lowered vowel testifies to the long high template vowel contained within the output form.

[21] a. FILL » ALIGN-T
Reason: Alignment will be sacrificed to avoid epenthesis altogether

b. /hii. x-hin/ —> hex.hin (*hee. x□ . hin)

/hii x-hin/		FILL »	ALIGN-T
a. **output** **template**	 h i . x□ . hin 	***!**	
b. p **output** **template**	 h i x. hin 		*****

If it were the other way around then we would expect the epenthetic form to win. So now by transitivity we have the ranking in [22].

[22] By transitivity:
PARSE » FILL » ALIGN-T » ALIGN-M

The next question is whether or not this this hierarchy will derive **all** of the cases which conform to the RL syllabification pattern. If so then we will be able to conclude that directional syllabification is not a necessary ingredient in Yawelmani syllabification.

Argument for RL syllabification

Archangeli (1991), following Noske (1985) and Ito (1989), argues that syllabification in Yawelmani proceeds from right to left on the basis of the pattern of epenthesis into an odd number sequence of stray consonants. As shown in [23a], when there is a single stray consonant an epenthetic vowel will be inserted to its left, resulting in a closed syllable. Where there are three consonants or more, as shown in [23b], epenthesis will pair off the consonants, starting from the right.

[23] Diagnostic for right-to-left syllabification (Ito (1989))

a. Epenthetic vowel inserted to the left of a single stray consonant

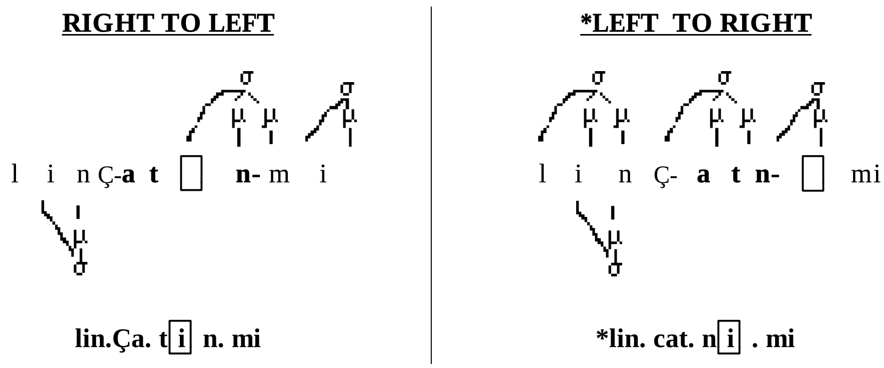
...vC. <u>C</u> .Cv —> v. C [i] <u>C</u>. Cv ..

b. Epenthesis pairs off odd # of strays starting from right

... <u>CC C</u> .Cv —> ...<u>C. C</u> [i] <u>C</u>. Cv ..

An example is shown in [24], where by doing syllabification from right to left we get *lincatIn*, with the epenthetic vowel in a closed syllable.

[24] Right to left syllabification (Noske (1985), Archangeli (1991) following Ito (1989))



ALIGN-M and FILL get the same result:

To compare the alignment account we have to look at three cases: first, treatment of stray consonants following the template, next of a stray consonant following a suffix morpheme, and finally that of a stray consonant which is morpheme initial. [25] shows words with a sequence of three stray consonants following the template. The leftmost consonant becomes the coda of the template's open syllable, leaving the remaining two consonants to pair off around an epenthetic vowel. This pattern, which conforms to the pattern in [23b] predicted by right-to-left syllabification, follows directly from the interaction of FILL and ALIGN-TEMPLATE.

[25] Stray Cs following a template (open syllable) (data from Archangeli (1991))

a.	/de:. **y-lt**/	dey.l[i] t	'is being guarded'
	1 2 3	1 2 v 3	
b.	/na. **p-tm**/	nap. t[i] m	'sisters' husbands

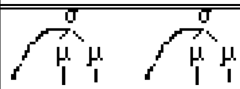
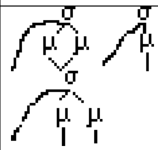
Illustrated in [26], 2n+1 stray consonants would require n+1 epenthetic vowels. For example, for three stray consonants you need to epenthesize twice. Therefore, as shown by the tableau in [28], it will always be optimal to parse the leftmost stray consonant by adding it to the preceding open syllable, since this will reduce the number of FILL violations by one. Since this is how the LEFTMOST consonant is taken care of, we get the feeling that syllabification goes from right to left. But this is just a consequence of the relationship between the extra consonants and the template.

[26] In an odd numbered sequence of unsyllabified Cs (2n+1) you need n+1 epenthetic vowels.
e.g., for three stray consonants you need two epenthetic vowels

CCC —>...□ C. C□ C

[27] In this case it is optimal to parse one of the consonants by adding it to previous open syllable since this reduces the number of FILL violations by one. Since this will always be the LEFTMOST consonant the remaining Cs will pair off from the right, giving the impression of right to left syllabification.

[28]

dee. yl-t		FILL »	ALIGN-T
a. p **output** **template**	 d e y. l □ t 	*	*
b. **output** **template**	 d e . y □ . l □ t 	**!	

Now what happens to a stray consonant at the end, that is the right edge, of a morpheme? As we saw earlier, and I have repeated in [29] a morpheme final consonant will be rescued by epenthesis to its left, just as if syllabification were right to left because in this way the morpheme's right edge alignment is preserved.

[29] Stray C at end of morpheme: Alignment yields internal epenthesis

VCC-CV linÇ-**at. n**-m i lin. Ç-**a. t**[i] **n**-m i *lin. Ç-**at. n-**[i] _. -m i

The final case, illustrated in [30], is a stray consonant morpheme initially, that is at the morpheme's left edge. Here we predict epenthesis to the right of the stray consonant. In Newman's corpus, however, there is no case of this which is not influenced by the higher ranking template alignment. We saw an example of this earlier in [19] for the suffix *wsel.*. In fact there is an interesting asymmetry in the inventory of Yawelmani suffixes. Except for wsel, the suffixes which might have been expected to yield the configuration in [30] , shown in [31], instead contain what has been called a ghost consonant, here represented in parentheses.

[30] Stray C at beginning of morpheme:

Prediction: vC-**C**Cv —> vC - **C**[i] _. Cv

[31] Not attested- relevant suffixes interact with the template (as in -wsel above)

Many of the CCV... suffixes which might yield this configuration contain ghosts

(h)nel	*passive adjunctive*
÷(h)iy	*consequent adjunctive*
(l)saa	*causative repetitive*

As shown in [32], stray morpheme initial ghost consonants delete , as in the form *hogonnel*, instead of triggering epenthesis as we expect for regular segments. So the prediction made about this third type cannot be tested against either the directional syllabification hypothesis or the alignment hypothesis.

[32] These consonants delete rather than trigger epenthesis
The *hogn* form would require epenthesis to fit the ghosts in.

| • = unparsed ghost | (Data from Archangeli (1991))

-(h)nel   maxa-|h| . nel   ho. gon. -•nel

[33] Summary:

a. PARSE » FILL » ALIGN-TEMPLATE » ALIGN-MORPHEME
b. Directional syllabification unnecessary to account for data

CAN THIS ACCOUNT BE EXTENDED TO THE GHOST SEGMENTS??

IV. GHOSTS in Gashowu and Choynimni Yokuts

While the asymmetric suffix inventory will remain a puzzle, we can extend the analysis to account for the behavior of the ghost segments themselves. Defined in [34], ghost segments are exceptional consonants and vowels which surface only in certain contexts. Although there is a robust inventory of ghost consonants in Yawelmani, I have drawn the data in this section from two other dialects of Yokuts described by Newman where in addition the ghost **vowel** phenomenon is a little more clear cut.

[34] **Ghost segments**:
Cs and Vs which surface only in certain contexts

(Hyman(1985),Kenstowicz&Rubach(1987),Archangeli (1988,1991),Szpyra(1992),Zoll(1993))

Another example of a suffix with a ghost consonant is given in [35]. Previous researchers have demonstrated that ghost consonants surface only when there is room for them in existing syllables. In [35a] the suffix-initial glottal stop surfaces as the coda of the preceding syllable, leaving the onset position of the final syllable open for the ghost H. In [35b] , on the other hand, due to an additional root consonant the glottal stop takes that onset position, and the ghost H fails to surface. This contrasts with the behavior of regular segments which would have triggered vowel epenthesis in this context in order to save themselves.

[35] ÷(h)iy *consequent adjunctive* imposes iambic foot template (Newman, p.164)

a. Ghost H surfaces when room can be made for it in existing syllable.
(Kisseberth, Archangeli, Noske)

/ çesee-÷(h)iy/ | çe. se-÷. **H**iy |

b. Unlike full segments it won't trigger epenthesis to save itself

/çexeel-÷(h)iy/ | çe. xel. ÷•iy | *çe. xee. l☐ ÷. **H**iy

An example of a ghost vowel is in [36]. Ghost vowels, like the ghost consonants, sometimes fail to surface. Unlike the consonants however these vowels are parsed only when necessary. So in [36a] the final vowel is required to facilitate syllabification of the suffixal **m** . In [36b], on the other hand, this **m** becomes the coda of the preceding open syllable. The vowel could show up, preserving alignment in the bargain, but as it is not necessary for any other reason it does not materialize.

[36] Vowel / ø alternation
Ghosts surface as vowels only when they are necessary

-m(I) *precative* (Data from Newman (1944): 135-6)

a.	/meeð-mI/	með-mI		*having swallowed*
b.	/panaa-mI/	panam•	*panaa-mI	*having arrived*

This is **not** simply a vowel deletion rule, since it is not the case that all expendable final vowels are deleted. As shown in [37], for example, the future suffix *in'i*, never loses its final vowel in these dialects.

[37] **Not Final Vowel Deletion**: (cf Kisseberth (1970), Archangeli (1988))

In these dialects there is not a general rule of final vowel deletion since not all final vowels delete. Alternating vowels must be distinguished from non-alternating vowels.

Compare [in'i] *future* (Newman, p.129)

Gashowu

a.	/Êul-in'i/	Êulun'u	*Êulun' •	*will burn*
b.	/ipÆ-in'i/	ipÆin'i	*ipÆin' •	*will leave (it)*

Since ghost segments fail to surface in contexts where full segments are always parsed they must be governed by their own parsing constraint, an informal version of which is given in [38].

[38] Ghost segments delete when regular segments don't so they must be governed by a separate PARSE constraint

PARSE-GHOST: Don't skip over ghost (Zoll (1993))

The hallmark property of ghost segments is the fact that they are defective in some way related to syllabification. Since in general it is root nodes which project morae and syllables, the most straightforward account of the ghosts' exceptional behavior is that their root features, including consonantal, are unspecified. [39] shows two possible instantiations of this. If either representation is correct, it seems odd that the ghost Cs and Vs have such different behavior, because it looks like we might need two separate parsing constraints referring to different values of consonantal.

[39] **Ghost Segment**: Segment defective with regard to parsing

Most straightforward representation is a segment with some sort of defective root node

a.	Lacks root features	[αconsonantal]	Szpyra(1992)
b.	Lacks root node		Zoll (1993)

However, rather than having to stipulate that ghost consonants and vowels have different underlying representations with distinct parsing constraints that refer to those representations, we can capture the asymmetry by looking at their surface functions. The *STRUC constraint in [40], which militates against superfluous syllable building, does just this. This constraint will have no impact on ghosts that surface as consonants, because they surface by simply slipping in to existing syllable structure. It will limit the realization of ghosts as vowels, on the other hand, because a vowel always heads its own syllable in this language.

[40] Ghost Consonants surface whenever they fit into existing syllable structure
Ghost Vowels surface only when necessary

QUESTION: If ghost lacks root feature consonantal, what distinguishes behavior of ghosts that surface as Cs and Vs??

*STRUC(σ): (first mentioned in print in PS:25, fn13)

Minimize number of syllables in a word
'Don't add unnecessary syllables'

(see Selkirk's (1981) Syllable Minimization Principle, also see Noske (1985) for very different implementation of a similar insight)

The ranking in [41] will guarantee that a ghost vowel appear only under compulsion from a higher ranked constraint such as PARSE.

[41] Ranking:
*STRUC(σ) » PARSE-GHOST

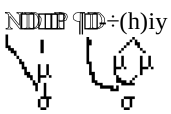
Let's fit these last constraints into the hierarchy. First of all, , where does PARSE-GHOST fall with respect to the **ALIGN** constraint? As illustrated in [42], alignment will be sacrificed to spare a ghost. Here this glottal stop ruins alignment by closing the last syllable of the iambic template, but by doing so allows the ghost to surface as the onset of the last syllable.

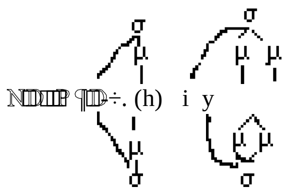
[42] Alignment will be sacrificed to spare a ghost

/kam'aa-÷(h)iy/

a. Template

b. Syllabified form

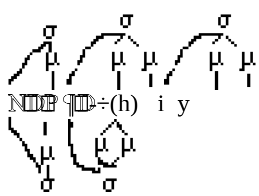
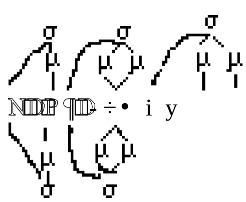




ka. m'a÷. Hiy

This means, shown in [43], that ALIGN -T must rank below the PARSE-GHOST constraint. The ghost surfaces at the expense of a clean morpheme boundary.

[43] PARSE-GHOST» ALIGN-T
REASON: Template alignment will be sacrificed to parse the ghost segment

/kam'aa-÷(h)iy/		PARSE -GHOST »	ALIGN-T
a. p **output** **template**			*
b. **output** **template**		*!	

The tableau in [44] shows that *STRUC must dominate parse ghost, since it is this constraint which keeps ghosts from surfacing as vowels unless they are necessary. The winner, in [44b], succeeds in parsing all the full segments into only two syllables so violates *STRUC only twice, while parsing the ghost in the non-optimal [44a] requires three syllables.

[44] *STRUC(σ) » PARSE-GHOST

Reason: Ghosts not parsed in absence of higher parse constraints

/panaa-mI/		*STRUC (σ) »	PARSE -GHOST
a.	pa. naa.mI	***!	
b.p	pa. nam•	**	*

Note again that the winner in [44] has messed up alignment which is what we expect based on the ranking we now have in [45].

[45] Therefore:

*STRUC(σ) » PARSE-GHOST » ALIGN-T » ALIGN-M

[46-47] establish the position of PARSE and FILL in the hierarchy yielding the ultimate ranking in [48].

[46] FILL / *STRUC unranked with respect to each other

/çexeel-÷(h)iy/		FILL	*STRUC »	PARSE - GHOST
a. p	çe. xel. ÷•iy			*
b.	çe. xee.l□ ÷. Hiy	*!	*!	
c.	çe. xel. ÷□ . Hiy	*!	*!	

[47] *STRUC(σ), FILL » PARSE-GHOST » ALIGN-T » ALIGN-M

[48] PARSE must dominate *STRUC(σ) otherwise no words at all!

PARSE »*STRUC(σ), FILL » PARSE-GHOST » ALIGN-T » ALIGN-M

IV. CONCLUSION

This hierarchy accounts for both regular syllable building and the syllabification of the exceptional ghost segments using extremely general constraints. Therefore directionality is not a necessary ingredient in Yawelmani syllabification. Using the tools of optimality theory we were able to see the force of template preservation in syllabification, even though as a low ranked constraint ALIGN-TEMPLATE is often violated. This is something which has eluded us in serial directional analyses / While template alignment will clearly not solve every apparent case of directional syllabification, the concept of parallel evaluation against a hierarchy of ranked but violable constraints in OT should help us uncover other properties of languages which have been hidden under the cover term of directionality.

[49] a. Yawelmani templates associate to melody to form open syllables
b. Pattern of epenthesis follows from interaction of ALIGN & FILL
c. Ghost Cs and Vs behavior governed by *STRUC (σ)

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References:

Archangeli, D. (1988). Underspecification in Yawelmani Phonology and Morphology. New York & London: Garland Publishing Inc.

Archangeli, D. (1991). Syllabification and Prosodic Templates in Yawelmani. Natural Language and Linguistic Theory, 9, 231-284.

Hyman, L. (1985). A Theory of Phonological Weight. Dordrecht: Foris Publications.

Ito, J. (1989). A Prosodic Theory of Epenthesis. Natural Language and Linguistic Theory, 7, 217-260.

Kenstowicz, M. & Rubach, J. (1987). The Phonology of Syllabic Nuclei in Slovak. Language. 63.463-497.

Kisseberth, C. W. (1970). Review Article: S.-Y. Kuroda, Yawelmani Phonology. Linguistic Inquiry, 1(3), 337-346.

Kisseberth, C. W. (1970). On the Functional Unity of Phonological Rules. Linguistic Inquiry, 1(3), 291-306.

McCarthy, J. & Prince, A. (1986) Prosodic Morphology. ms, UMass & Brandeis.

McCarthy, J. & Prince, A. (1993a) Generalized Alignment. ms, UMass and Rutgers.

McCarthy, J. & Prince, A. (1993b) Prosodic Morphology I: Constraint Interaction and Satisfaction. ms, UMass & Rutgers.

Newman, S. (1944). Yokuts Language of California. New York: Viking Fund.

Noske, R. (1985). Syllabification and Syllable Changing Processes in Yawelmani. In van der Hulst & Smith (Eds.), Advances in Nonlinear Phonology Dordrecht: Foris.

Prince, A. (1990). Quantitative Consequences of Rhythmic Organization. In CLS, 26 .

Prince, A. &Smolensky, P. (1993) Optimality Theory: Constraint Interaction in Generative Grammar. ms.

Szypra, J. (1992). Ghost Segments in Nonlinear Phonology: Polish Yers. Language. 68.277-312.

Zoll, C. (1993). Ghost Segments and Optimality. In WCCFL, 12.