A Unified Treatment of Latent Segments and Floating Features[*]

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0 Introduction

Floating features and latent segments ("ghosts") are traditionally considered to be distinct entities whose differences correlate with the presence or absence of an underlying root node. The floating feature's lack of a root node (1) allows it to escape being parsed in contexts where full segments must surface (following Leben 1973, Goldsmith 1979). Latent segments, such as the Slavic yers or final consonants in French, likewise have a special immunity from regular parsing constraints. However they are thought to require root nodes primarily because of two other traits which distinguish them from floating features: (a) Floating features can move around to find a place to dock while latent segments are restricted to a single position (MOBILITY) and (b) Floating features attach to existing segments while latent segments surface independently (AUTARCHY). This distinction has necessitated the use of diacritics or the largely redundant X-tier[1] to capture the defective parsing properties of the latent segments, as illustrated by the representations in (2).

(1) SEGMENT / FLOATING FEATURE

SEGMENT	FLOATING FEATURE
Root | features	feature

(2) Proposed Representations for latent segments

a. **Lacking an X-slot** (Hyman 1985, Kenstowicz & Rubach 1987, Rubach 1993)

```
X     X
®  ®  ®
|  |  |
t  E  t
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b. **Marked lexically as non-syllabifying** (Archangeli 1991)

Representation: /t E t/ Condition: Don't syllabify E

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[1]For arguments for redundancy of the skeletal tier for other phenomena see Hyman (1985), McCarthy & Prince(1986), Hayes (1989), Ito (1989).

c. **Underlyingly extrametrical**
(Clements&Keyser1983)

```
    s
  / m
  ®® ®
  | |  |
  t e (T)
```

d. **Has a defective root node**
(Szpyra 1992) [αconsonantal]
(Bethin 1989) [-consonantal]

In this paper I demonstrate that the potential mobility and independence of a phonological entity do not correlate either with each other or with the presence or absence of a root node. Therefore these properties cannot be used to motivate a structural distinction between latent segments and floating features. I propose instead a unified underlying representation for both latent segments and floating features (3), thus allowing a unique characterization of their immunity from the demands of regular parsing, and show that their surface differences follow straightforwardly from a grammar utilizing constraints which are necessary independently of the subsegmental phenomena.

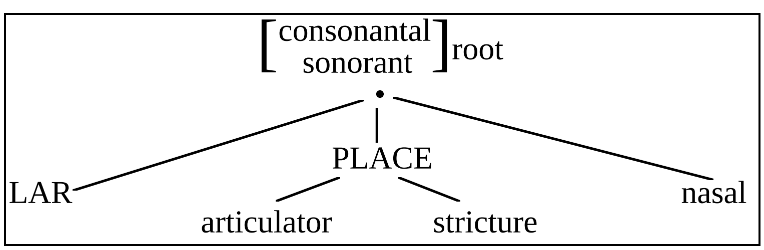
(3)

FULL SEGMENT	LATENT SEGMENTS AND FLOATING FEATURES
Root | features	features

1 Assumptions

Throughout this paper I assume a separation between consonantal place features and vocalic place features, following Clements 1991, Clements and Hume 1993, and N' Chiosáin and Padgett 1993. For the purposes of this paper it does not matter whether this separation is effected through independent place nodes or by using different names for the consonantal and vocalic features. Here for clarity of exposition I will use the traditional vowel features {high, low, back, round, ATR, RTR} for vowels and reserve place of articulation names {coronal, dorsal, labial, phar} for consonants. Otherwise the geometry I adopt is in (4). Note here that the close association between place and stricture is reified in the geometry.

(4) Geometry of features: (Clements 1985, Sagey 1986, McCarthy 1988, Selkirk 1988, Hume 1992, Padgett 1992)



I also wish to clarify the terminology I will be using. In the arena of ghost segments there is a lot of confusion since both latent segments which sometimes materialize, and the always invisible featureless consonant and vowel slots, such as those that have been proposed for French *h-aspiré*, have been called ghosts. I am now in danger of adding to this confusion by equating the featural ghosts with floating features. In an attempt to keep things clear I will refer to features which lack a root node, that is, the floating features and featural ghosts as "latent" features from now on, reserving the term *ghost* for the abstract consonants and vowels that never appear. The term "latent segment" should be considered to mean floating features which materialize as full segments in contexts determined by the grammar.

2 The Relationship between (Im)mobility and Autarchy

Two of the major reasons why latent segments have been considered to need a root node to distinguish them from floating features are repeated here in (5).

(5)

	Floating features	**Latent Segments**
MOBILITY	Floating features can move around to find a place to dock	Latent segments are restricted to a single position
AUTARCHY	Floating features attach to existing segments	Latent segments always surface as their own segment

These differences are illustrated by the prototypical cases of latent segments and floating features in (6-7). In Chaha (6), for example, the third-person singular object is indicated by labialization on the verb (McCarthy 1983, Rose 1994, Archangeli and Pulleyblank (forthcoming)). It associates to the rightmost labializable segment, either a labial or a dorsal consonant. If there is no such consonant the labialization fails to show up, and crucially it never heads a segment on its own.

(6) Chaha object labialization (McCarthy 1983: 179)

		no object	*with object*	
a.	final	dænæg	dænæg^{w}	*hit*
		nækæb	nækæb^{w}	*find*
b.	medial	mækær	mæk^{w}ær	*burn*
		s^{y}æfær	s^{y}æf^{w}ær	*cover*
c.	initial	qætær	q^{w}ætær	*kill*
		mæsær	m^{w}æsær	*seem*
d.	none	sædæd	sædæd	*chase*

This contrasts with cases such as the Yawelmani latent vowel in (7) (Noske 1984, Zoll 1993b). This vowel surfaces only as a full segment and only in one position. It is parsed just when it becomes necessary to rescue an otherwise unsyllabifiable consonant (Kisseberth 1970).

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

a.	/amic-mI/	amic-mI	*amic-m•	*having approached*
b.	/panaa-mI/	panam•	*panaa-mI	*having arrived*

The problem with accounting for the differences between these two types of cases with the representations in (1-2) is that the dividing line between the two classes of phenomena is not clear cut, and the properties listed in (5) do not always correlate with each other. First, it is not always the case that things restricted to a single position will also be able to head their own segments. For example, the imperative palatalization feature in Chaha is restricted to the right edge (8a-b). If the final consonant is not a palatalizable coronal or dorsal obstruent then palatalization will fail to surface (8c) (McCarthy 1983, Rose 1994, Archangeli and Pulleyblank (forthcoming)). The feature is restricted to the edge, but never materializes as its own segment.

(8) Chaha Imperative Palatalization (Archangeli and Pulleyblank (forthcoming: 278))

a.	n‘k‘s	n‘k‘s^y	*love*
b.	w‘tæq	w‘tæq^y *fall*	
c.	qætær	q^{w}ætær *kill*	

Likewise, some mobile floating features will under certain circumstances appear as independent segments. In Yawelmani, for example, suffix-induced glottalization floats into the stem and surfaces as the release of a post-vocalic sonorant (9a-b). If there is no such target in a triconsonantal root, glottalization will fail to surface (9c). Thus far the glottal looks simply like a well-behaved floating feature. But in a biconsonantal root which contains no glottalizable sonorants, glottalization will emerge as a suffix-initial glottal stop (9d), with subsequent shortening of the vowel in the now closed syllable which preceeds it (Archangeli 1983, 1984, Noske 1984, Newman 1944, Archangeli and Pulleyblank (forthcoming)). A feature's mobility then does not preclude manifestation as an autarchic segment.

(9) Glottalization in Yawelmani (Archangeli and Pulleyblank (forthcoming))

a.	caaw-(ʔ)aa-	caaw^{ʔ}aa-	*glottalizes R-most post-vocalic sonorant*
b.	ʔelk-(ʔ)aa-	ʔel^{ʔ}kaa-	
c.	hogn- (ʔ)aa	hognaa- *fails to surface*	
d.	max- (ʔ)aa	maxʔaa- *surfaces in biconsonantal root as stop*	

Finally, metathesis and infixation appear to involve the movement of undiminished consonants and vowels, so it is not the case that mobile segments necessarily lack root nodes. Infixation in Tagalog, for example, as analyzed by Prince & Smolensky 1993 and McCarthy & Prince 1993a, involves the movement of an entire affix (10). The *um-* is pronounced at the beginning of vowel initial verbs (10a) but appears after the entire onset in verbs which are consonant initial (10b-c).

(10) Tagalog *-um-* Infixation (McCarthy and Prince 1993a: 19)

	Root	-um-	
a.	aral	um-aral	*teach*
b.	sulat	s-um-ulat	*write*
c.	gradwet	gr-um-adwet	*graduate*

Likewise Iloko (also known as Ilokano) contains affixes whose position is not fixed (Vanoverbergh 1955). The past tense *in-* is pronounced word-initially before vowel initial verbs (11a) but follows the onset in consonant initial ones (11b). This affix has even greater flexibility than the Tagalog *um--*. In words which begin with sonorant coronal consonants metathesis of the affixal segments themselves may take place instead of infixation (11c), yielding *ni-* at the beginning of the word instead.

(11) Iloko *in-* Infixation and Metathesis (Vanoverbergh 1955)

	Root	-in-	PAST TENSE	
a.	aso	**in**-áso	*got*	147
b.	da–gaw	d-**in**-a–gaw	*devastated*	147
c.	lukatán	**ni**-lukatán ♠ l-**in**-ukatán	*opened*	40

Clearly then properties in (5) do not correlate either with each other or with the presence or absence of a root node. Cases such as Chaha and Yawelmani, where mobility and autarchy are independent of each other, require the grammar itself to determine the manner in which a floating feature manifests itself, including when it may surface as an independent segment. In the next sections I analyze such cases, extending the model for infixation of Prince & Smolensky 1993 and McCarthy & Prince 1993, and demonstrate that the grammar which is necessary to handle these also accounts for the protoypical cases of latent segments and floating features. The distinction reified in (1-2) between latent segments and floating features thus is neither necessary nor does it accurately characterize the variety of phenomena associated with defective parsing in phonology.

3 Affix (Im)mobility

As we saw above, mobility of phonological material is not restricted to floating features. (12) presents another example of a fully segmental infix in Iloko. Like Tagalog, Iloko's *um-* affix appears inside the word in verbs which are consonant initial (12b).

(12) Iloko *-um-* Infixation (Vanoverbergh 1955 : 137)

(same phenomenon as Tagalog in McCarthy and Prince 1993a: 19)

	Root	-um-	PRESENT TENSE
a.	isem	um-'sem	*(threatens to) smile*
b.	kagat	k-um-agát	*(threatens to) bite*

We can contrast this with another Iloko affix with the same shape shown in (13). Here the *ag-* prefix is found word initially no matter what form the verb takes. Whether the root is vowel-initial (13a) or consonant initial (13b), the affix always stays at the left edge of the word.

(13) Compare to Iloko prefix ag- (Vanoverbergh 1955)

	Root	**-ag-**	PRESENT	
a.	isem	ag-'sem	*(actually) smilea*	132
b.	kagat	ag-kagát	*(actually) bites*	137

Prince & Smolensky 1993 and McCarthy & Prince 1993 argue that infixes such as the Tagalog and Iloko *-um-* do not constitute a distinct third class of affixes, but rather that they differ from fixed affixes only in that prosodic constraints outweigh the infix's own imperative to align with the left (or right) edge of the stem. In this case they propose that the position of *-um-* is determined by the interaction of the familiar NO-CODA constraint (14a) with an alignment constraint that says that *-um-* wants to be at the left edge of the stem, in other words, that *-um-* is essentially a prefix (14b).

(14) Constraints (McCarthy and Prince 1993a: 20)

a.	NO-CODA	Syllables are open	
b.	ALIGN-*um*	Align Left (*um*, Stem)	i.e., *-um-* is a prefix

c. Ranking: NO-CODA » ALIGN-*um*
Rationale: Alignment will be violated to avoid additional coda violations

Infixation arises when ALIGN is subordinate to NO-CODA (15). In the optimal form the affix will turn up in the leftmost position at which it can avoid violating NO-CODA. Thus in any form which begins with one or more consonants *-um-* must follow the onset. The candidate in (15b) is optimal because there the infix avoids creating an additional coda violation. It is optimal despite the misalignment of the prefix, because ALIGN violations are less serious than those of the more highly esteemed NO-CODA.

Key:

* = violation	p= winner
*! = fatal violation	

(15) NO-CODA » ALIGN-*um* , from {*um, kagat*}$_{Stem}$

	Candidates	NO-CODA	ALIGN-*um*
a.	[-<u>um</u>.kagat	**!	
b. p	[k-<u>um</u>.-agat	*	k

For vowel initial verbs, such as the one in the tableau in (16) *-um-* does surface at the left edge (16b) since perfect alignment does not entail any additional **NO-CODA** violations.

(16) um-'sem from {*um, isem*}$_{Stem}$

	Candidates	NO-CODA	ALIGN-*um*
a.	[-<u>um</u>.isem	*	
b. p	[is-um-em	*	is!

Under this analysis the difference between infixing *-um-* and prefixing *-ag-* follows from the relative ranking of their alignment constraints with regard to NO-CODA. The constraint which governs the placement of *ag-* must dominate the NO-CODA constraint since additional coda violations will be tolerated in order to maintain perfect alignment (17).

(17) a. ALIGN-*ag* Align Left ([*ag*]$_{Af}$,Stem) i.e., *ag* is a prefix

b. Ranking: ALIGN-*ag* » NO-CODA
Rationale: Additional coda violations tolerated in order to maintain perfect alignment

The tableau in (18) illustrates the effect of this ranking. Even in the case of a consonant initial verb the optimal candidate (18a) places the affix at the beginning of the word. This results in an additional violation of NO-CODA, but since this is lower ranked it does not lead to infixation.

(18) ALIGN-*ag* » NO-CODA from {ag, kagat}$_{stem}$

	Candidates	ALIGN-*ag*	NO-CODA
a.p	ag-kagát		**
b.	k-ag-agát	k!	*

These two examples yield the mini-grammar for Iloko shown in (19). The varied behavior of the two different affixes follows directly from the ranking of their respective morphological alignment constraints vis-a-vis the purely phonological constraint NO-CODA.

(19) ALIGN-*ag* » NO-CODA » ALIGN-*um*

4 (Im)mobility of Floating Features: Chaha

In the cases discussed in Prince & Smolensky 1993 and McCarthy and Prince 1993a the crucial interaction leading to infixation is between alignment of segmental morphemes and the demands of syllable structure constraints, but their account easily extends to latent features[2]. In this section I show that the different behavior of Chaha immobile (suffixing) palatalization and mobile (infixing) labialization reflects a difference in the position of their particular ALIGN constraints with respect to phonological constraints on features in the Chaha hierarchy.

The data to be accounted for in Chaha are repeated here in (20-21). The third person masculine singular object morpheme is an infixing [round] feature. It shows up as labialization on the rightmost labializable consonant (McCarthy 1983), where labializable consonants include labials and velars (20a-c). If there is no such consonant the feature fails to emerge (20d).

(20) Chaha object labialization (McCarthy 1983: 179)

		no object	*with object*	
a.	final	dænæg	dænæg^{w}*hit*	
		nækæb	nækæb^{w}*find*	
b.	medial	mækær	mæk^{w}ær	*burn*
		s^{y}æfær	s^{y}æf^{w}ær	*cover*
c.	initial	qætær	q^{w}ætær *kill*	
		mæsær	m^{w}æsær*seem*	
d.	none	sædæd	sædæd	*chase*

This pattern contrasts with that of imperative palatalization, which has purely suffixal behavior (21). Palatalization turns up on the rightmost consonant if palatalizable, where palatalizable consonants include the coronal and velar obstruents (21a-b). Unlike labialization, however, palatalization is restricted to the right edge. If the final consonant is not palatalizable then the feature will fail to appear (21c).

(21) Chaha Imperative Palatalization (Archangeli and Pulleyblank (forthcoming: 278))

a.	n‘k‘s	n‘k‘s^{y}	*love*
b.	w‘tæq	w‘tæq^{y} *fall*	
c.	qætær	q^{w}ætær *kill*	

A complete analysis of this data must (i) specify licit targets for the floating features; (ii) account for the different behavior of the two affixes; and (iii) explain why these features can dock onto existing segments but never head their own. In the next sections, after providing the segment structure constraints to which delimit the range of potential targets, I will show that the difference between labialization and palatalization follows from the position of their respective alignment constraints with respect to a phonological constraint governing the parsing of features. I will then argue that their inability to project autarchic segments is the result of a constraint minimizing the number of syllables in a word.

4.1 Segment Structure Constraints and Potential Targets

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[2]The extension of alignment to features was first implemented by Kirchener 1993. For a broadly similar approach to the one taken here see Akinlabi 1994.

Every account of floating features must include segment structure constraints which govern possible feature combinations in a language. The term "Segment Structure Constraints" (22) will be used in this paper as a convenient cover term for the group of undominated constraints which render certain combinations of features impossible in a particular context.

(22) **Segment Structure Constraints**: Avoid undesirable feature combinations

In Chaha the segment structure constraints can be read directly from the inventory of underlying segments shown in (23) (McCarthy 1983: 177). Only labials and velars have labialized counterparts, and thus labialization targets only labials and velars. Likewise, the palatalized segments are limited to coronal and velar obstruents. As we saw targets for morphological palatalization are limited to just these segments.

(23) Chaha Consonants (McCarthy 1983: 177)

plain:	b p	d t		g k
		ṭ		q
	m	n r		
	f	z s		x
	w	y		
palatalized :		d^y t^y	g^y k^y	
		ṭ^y		
		z^y s^y	x^y	
				q^y
labialized :	b^w p^w			g^w k^w
	fw			x^w
	m^w			q^w

Therefore the effect of the segment structure constraints in Chaha is to prohibit the types of segments listed in (23).[3]

(23) effect of SSCs for Chaha: *Labialized coronals
*Palatalized Labials
*Palatalized sonorants

As unviolated constraints in Chaha, the Segment Structure Constraints sit at the top of the hierarchy. Since they must dominate the **PARSE-FEATURE** constraint (24) they may force the underparsing of floating features which would otherwise result in illicit segment types. This is illustrated by the tableau in (25) for *sædæd* in a labializing environment. The most harmonic candidate (25d) fails to parse [round], thus avoiding the more serious Segment Structure Constraint violations which would otherwise ensue as the result of labializing a coronal.

(24) a. PARSE-FEATURE: Features should be parsed

b. Ranking: Segment Structure Constraints » PARSE-FEATURE
Rationale: Features remain unparsed rather than resulting in ill-formed segments

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[3]For discussion of the nuances of constraints on segment structure in OT and the derivation of gross restrictions on segment structure from more basic constraints see Prince and Smolensky (1993) and Smolensky (1994). A more detailed dissection of segment structure constraints may be necessary for cases where some targets are better than others such as Japanese mimetic palatalization (Mester and Ito (1989)), palatalization in Gude (Hoskison (1974)), and Kurdish emphasis (Hoberman (1989)).

(25) sædæd from /sædæd, [round]/

	Candidates	SSC	PARSE-F
a.	sædæd^{w}-	*!	
b.	sæd^{w}æd-	*!	
c.	s^{w}ædæd-	*!	
d. p	sædæd <w>		*

4.2 The Relationship between ALIGN and PARSE

Once the set of potential targets has been determined, the next step is to account for the potential mobility or lack of mobility of a latent feature in its quest for a target. This is governed by the relative rankings of the **PARSE** and ALIGN constraints, following the infixation model of Prince and Smolensky 1993 and McCarthy and Prince 1993. Where PARSE-FEATURE dominates ALIGN the latent feature will move from the edge in order to find a suitable target if necessary (26a).[4] This is the ranking which governs the object labialization morpheme in Chaha. On the other hand, where ALIGN dominates PARSE-FEATURE the floating feature is restricted to a target at the edge specified by the alignment constraint (26b). This ranking regulates the pattern of Chaha imperative palatalization. These two rankings yield infixation and suffixation respectively, the difference being here that the affixes in question are floating features rather than full segments.

(26) Difference in mobility depends on relative alignment of PARSE-FEATURE and ALIGN

a. PARSE-FEATURE » ALIGN feature will move to be realized
b. ALIGN » PARSE-FEATURE feature will delete rather than move

The constraints governing Chaha object labialization specifically are shown in (27). Since the morpheme is a mobile feature, PARSE-FEATURE must dominate the morpheme-specific ALIGN constraint.

(27) Chaha Object Labialization
a. PARSE-FEATURE
b. ALIGN[*round*]$_{Af}$ Align-Right ([*round*]$_{Af}$, Stem)
i.e., the object marker is a suffix
c. Ranking:
PARSE-FEATURE » ALIGN[*round*]$_{Af}$
d. Rationale: Feature moves from edge to find target

The tableau in (28) illustrates the effect of the hierarchy. ALIGN[*round*]$_{Af}$ violations are calculated by counting the number of consonantal root nodes between the right edge and the feature's docking site (see McCarthy 1983). The highest ranked Segment Structure Constraints rule out candidate (28a) since coronals cannot host secondary labialization in Chaha. We know PARSE-FEATURE dominates the alignment constraint, since [*round*]$_{Af}$ moves from the edge to find an appropriate docking site (28d) rather than fail to surface (28b). The winning candidate (28d), where the middle consonant is labialized, is more harmonic than (28c) because (28d) violates ALIGN only minimally.

(28) mæk^{w}ær from /mkr, [*round*]$_{Af}$/

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[4]This ranking should allow movement only of underlyingly *floating* features. I assume that there is a highly ranked constraint of some sort that preserves underlying associations in these cases. See Myers 1994 for discussion.

	Candidates	SSCs	PARSE-F	ALIGN[*round*]$_{Af}$
a.	mækær^{w}	*!		
b.	mækær <w>		*!	
c.	m^{w}ækær			**!
d. p	mæk^{w}ær			*

Palatalization differs from labialization in that it only appears if it can do so on the rightmost consonant . This is achieved by domination of ALIGN-[*pal*]$_{Af}$ by the PARSE-FEATURE constraint (29).

(29) Chaha Palatalization

a. ALIGN-[*pal*]$_{Af}$ Align ([*pal*]$_{Af}$, R, Root, R)
i.e., the imperative marker is a suffix

b. <u>Ranking</u>:
ALIGN-[*pal*]$_{Af}$ » PARSE-FEATURE

c. <u>Rationale</u>:
Floating feature fails to surface rather than violate alignment

The tableau in (30) illustrates the implementation of this ranking. Candidate (26a) fails because it violates the highly ranked Segment Structure Constraints, which limit palatalization to coronal and dorsal *obstruents*. Because ALIGN-[*pal*]$_{Af}$ outranks PARSE-FEATURE in this case it is better not to parse the feature (26c) rather than to violate ALIGN-[*pal*]$_{Af}$ (26b).[5] Therefore in the absence of a suitable word-final target the feature fails to surface.

(30) q^{w}ætær from /q^{w}ætær ,[*pal*]$_{Af}$/

		SSCs	ALIGN-[*pal*]$_{aff}$	PARSE-F
a.	q^{w}ætær^{y}	*!		
b.	q^{w}æt^{y}ær[6]		*!	
c. p	q^{w}ætær <y>			*

Together these rankings yield the partial hierarchy in (31) for Chaha. Potential targets are limited by the highly ranked Segment Structure Constraints, while the different relationship of the alignment constraints to PARSE-FEATURE result in the distinctions with regard to potential mobility of the floating labialization and palatalization affixes.

(31) SSCs , ALIGN-[*pal*]$_{Af}$ » PARSE-FEATURE » ALIGN-[*round*]$_{Af}$

*4.3 *STRUC(σ):*

We saw that it does not follow automatically that a floating feature cannot head its own segment. In the Yawelmani example in Section 2, for example, the floating glottal could either dock to an existing segment or surface as a full glottal stop depending on the circumstances. Having delimited the range of possible docking sites and accounted for the different mobility of the two morphemes in Chaha, we still

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[5]See Pulleyblank 1994 for discussion of lack of alignment violations for unparsed features.

[6] Palatalization and labialization CAN co-occur in the same word. See for example *s^{y}äg^{w}är* ‘change’

must explain why these floating features never manifest themselves as independent segments, since as I have argued this does not follow directly from the absence of an underlying root node.

Zoll 1993b proposed that a constraint which functions to minimize the total number of syllables in a word,*STRUC(σ), plays an important role in limiting the ability of floating features to surface independently (32). This constraint must outrank PARSE-FEATURE in Chaha since the floating features delete rather than surface as independent vowels, yielding the hierarchy in (33).

(32) a. ***STRUC(σ)**:[7] Avoid syllables
i.e., 'Don't add unnecessary syllables'

b. Ranking: *STRUC(σ) » PARSE-FEATURE
Rationale: Feature deletes rather than surface as independent vowel

(33) SSCs, *STRUC(σ), ALIGN-[*pal*]$_{Af}$ » PARSE-FEATURE » ALIGN-[*round*]$_{Af}$

The effect of the final piece of the ranking is illustrated by the tableau in (34). Here, since all of the root consonants are coronals, labialization is impossible. In theory the [round] feature could project its own vowel (34a) but is kept from doing so by the highly ranked *STRUC(σ). The optimal candidate (34b), with no surface realization of the floating feature, contains only a lesser PARSE-FEATURE violation.

(34) *STRUC(σ) » PARSE-FEATURE , from {sdd, [round]}$_{Root}$

		*STRUC(σ)	PARSE-F
a.	sædæd**U**	***!	
b. p	sædæd <w>	**	*

The tableau in (35) demonstrates the exact same effect for palatalization. The addition of an extra vowel to host the otherwise unparseable palatalizing feature causes a fatal violation (35a). The optimal form (35b) simply leaves the feature unparsed.

(35b) *STRUC(σ) » PARSE-FEATURE , from {q^{w}tr, [pal]}$_{Root}$

		*STRUC(σ)	PARSE-F
a.	q^{w}ætætrI	***!	
b. p	q^{w}ætær <y>	**	*

There are of course a number of other possible ways to keep a floating feature from manifesting itself as a full segment. A FILL constraint could proscribe insertion of a new root node (Zoll 1993a), or we could count additional segments rather than syllables as extra structure violations. However only *STRUC(σ) correctly predicts an asymmetry that exists between the behavior of floating consonantal and vocalic features. Namely, since extra consonants can be an onset or coda to an already existing syllable and thus do not necessarily add to syllable count, they will not necessarily violate the constraint when they surface as independent segments. The varied behavior of the latent features in Yawelmani, discussed in the next section, support this use of *STRUC(σ) and demonstrate its consequences.

5 A Feature is a Segment: Yawelmani

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[7]This is an OT implementation of Selkirk (1981)'s *Syllable Minimization Principle*. See also Broselow (to appear, fn 19). Noske (1984) develops a very different implementation of a similar insight. (cf. Ito (1989) on minimality).

In Section 2 we saw that in Yawelmani a floating [constricted glottis] feature has the capacity to manifest itself as an independent segment under certain conditions. Yawelmani has in addition two other types of latent segments. In this section I will show how the behavior of all three types follows from an analysis parallel to the one developed for the Chaha floating features, and motivate the use of *STRUC(σ) by demonstrating its role in accounting for asymmetries in the behavior of Yawelmani's latent consonants and latent vowels.

5.1 *Three Kinds of Latent Segments*

The Yawelmani glottalization process is an example of a latent feature which will either move to find a suitable docking site or will project its own root node, depending on context. The data is repeated in (36). The glottalization surfaces on the rightmost post-vocalic sonorant if there is one. Otherwise, in a biconsonantal root it will manifest itself as a suffix initial glottal stop (36d). Note that in (36a) vowel shortening is unnecessary since [constricted glottis] can dock as a secondary feature on the preceding sonorant, whereas in (36d), a biconsonantal stem with no glottalizable sonorant, vowel length is sacrificed to the parsing of the full glottal. In the triconsonantal root in (36c) there is no way to parse the feature since there is no post-vocalic sonorant, nor is there space for a full glottal stop without epenthesizing a vowel, so the feature is not expressed.

(36) Yawelmani glottalization

a.	/caaw-(ʔ)aa-/	$caaw^{ʔ}aa$-	*shout*	
b.	/ʔiilk-(ʔ)aa-/	$ʔel^{ʔ}kaa$-	*sing*	
c.	/hogn- (ʔ)aa-/	hognaa-	*float*	(*hognVʔaa)
d.	/max- (ʔ)aa-/	maxʔaa-	*procure*	

The dual behavior of the glottal contrasts with that of other latent segments in Yawelmani. A list of the suffixes containing other latent consonants, shown in parentheses, is provided in (37).

(37) Yawelmani suffixes with latent features (Archangeli 1984)

(h)nel	*passive adjunctive*
(m)aam	*decedent*
(l)saa	*causative repetitive*
(n)iit	*decedent*

Like the floating glottal these latent segments are distinguished from regular consonants in that they delete rather than trigger epenthesis to avoid forming an illicit cluster. The data in (38) illustrate this constrast. The suffix-initial *h* in *hin* is a full segment. In (38a) suffixation results in a triconsonantal *gnh* cluster which must be resolved, since the maximal syllable in Yawelmani is CVX. Because all three are full segments they must all be parsed, and therefore a vowel is epenthesized.[8] In (38b) suffixation of *(h)nel* likewise has the potential to produce a triconsonantal cluster, but since here *h* is a latent segment, like the glottal above, it fails to appear, rather than force epenthesis. It is the hallmark property of these latent segments as well as the glottal stop that they never trigger epenthesis of a vowel to save themselves, although as we can see again in (38c) vowel length will be sacrificed to spare a latent segment. What distinguishes these latent consonants from the glottal, however, is that they never manifest themselves as release features on an existing segment.

(38) (Data from Archangeli 1991)

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[8]See Broselow (1993), Zoll (1993b), Noske (1984), and Archangeli (1991) for choice of epenthesis site in a cluster.

a. -hin /hogn-hin/ ho. g[i] n-hin

b. -(h)nel /hogon-(h)nel/ ho. gon. -•nel *ho. g^{h}on. -nel
c. cf /maxaa-(h)nel/ ma. xa-h. nel

Yet a third kind of behavior is exhibited by latent vowels, exemplified in (39). Latent vowels, like the latent consonants, sometimes fail to surface. Unlike the consonants however these vowels are parsed only when necessary. In (39a) the final vowel is required to facilitate syllabification of the suffixal ***m*** . In (39b), on the other hand, this ***m*** becomes the coda of the preceding open syllable. There is room for the vowel, but as it is not necessary for any other reason it does not materialize.

(39) Vowel/ø alternation: Latent vowels surface only when they are necessary
-m(I) *precative* (Data from Newman 1944: 135)

a.	/amic-mI/	amic-mI	*amic-m•	*having approached*
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 (Noske 1984). As shown in (40), for example, the indirect object suffix *ni* holds on to its final vowel even suffixed to a vowel final root.

(40) Not Final Vowel Deletion: (Noske 1984)
Compare *ni* ‘ indirect object ‘ (Newman, p.201)

a.	/talaap-ni/	talapni		*bow-IO*
b.	/xataa-ni/	xataani	*xatan•	*food-IO*

Superficially it appears then that there are three different kinds of latent segments in Yawelmani: (i) glottals which show up wherever they can either as full segments or secondary features (ii) other latent consonants which only come to light as full segments when there is room for them and (iii) latent vowels which turn up only when they are absolutely necessary, these latter two always as independent segments. All three of these contrast with full segments which are always parsed even if it requires epenthesis.

The absence of an underlying root node for all three types of irregularly parsed segments in Yawelmani would account for their immunity from normal parsing. Once we have made this distinction between full segments (which have a root node) and latent features (which lack a root node) the diversified behavior of the different latent features follows from the same families of constraints used to account for Chaha (41) ranked as in (41e). I will first motivate the ranking for the glottalization case and then show how the same hierarchy makes the right predictions for the other latent segments in Yawelmani.

(41) Yawelmani constraints and ranking
a. Segment Structure Constraints
b. *STRUC(σ): Avoid [unnecessary] syllables
c. PARSE-Feature Features should be parsed
d. ALIGN Establishes edge affinity for latent features

e. Ranking:
Segment Structure Constraints , *STRUC(σ) » PARSE-Feature » ALIGN

5.2 Glottalization:

5.2.1 Segment Structure Constraints:

First it is necessary to establish the set of appropriate targets for the floating glottal feature. The inventory of consonants in Yawelmani is shown in (42). Although there are many different kinds of glottalized segments, derived glottalization is restricted to a “post-vocalic sonorant”, either in the onset or coda (Archangeli and Pulleyblank (forthcoming: 305 on authority of Newman 1944:15). For now we can lay the burden of this on a rough Segment Structure Constraint prohibiting the linking of a free [constricted glottis] feature to any segments but those sonorants in in the appropriate position.[9]

(42) Yawelmani Inventory (Archangeli 1984: 60 from Newman 1944)

b p ∏	d t Ê		± Æ Æʔ	x g k
	Û c Ç	Û ç çʔ		
	s ‹			
m mʔ	n nʔ		l lʔ	
w wʔ	y yʔ			h ʔ

5.2.2 Mobility:

Since the glottal feature will move to find an appropriate target within a word, PARSE-FEATURE must outrank ALIGN. In this case the alignment constraint wants to line up the left edge of the suffix with the right edge of the root (43b). Any suffixal material which moves leftward away from the root’s edge into the root will constitute a violation.

(43) a. PARSE-Feature Features should be parsed

b. ALIGN-$[(ʔ)aa]_{Aff}$ Align $([^{(ʔ)}aa]_{Aff}$,L,root, R)

c. Ranking: PARSE-Feature » ALIGN-$[(ʔ)aa]_{Aff}$

d. Rationale: [c.g] moves to find well-formed docking site

This is illustrated by the tableau in (44). The number of ALIGN violations in the chart reflects the number of root nodes between the segment to which glottalization attaches and the right edge of the root. Note that here the glottal cannot surface as an onset to the suffix since this would create an ill-formed trisyllabic cluster. Alignment cannot be satisfied in this case by the floating feature because the root final consonant is not a licit docking site (44a). In the optimal candidate (44c) glottalization turns up two root nodes to the left, violating ALIGN twice. This is preferable to simply leaving the feature unparsed (44b) however, since PARSE-FEATURE outranks the alignment constraint.

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[9] This is a manifestation of the” emergence of the unmarked” in derived environments (McCarthy and Prince (1993/4)). See also Archangeli & Pulleyblank (forthcoming: Chapter 3) for a discussion of this in terms of *grounding*. While the restriction to sonorants might seem strange, it is not otherwise unkown. In many Salishan languages, for example, only sonorants are targets for diminutive glottalization even though the languages do contain glottal obstruents

e.g., Twana diminutive (Nichols 1971: 844)
sap™l™l *flour*
s™-sp™lʔ™lʔ *little loaf* *s™-spʔ™lʔ™lʔ

(44) PARSE-FEATURE » ALIGN from {ʔelk, ˀaa}

		SSCs	PARSE-F	ALIGN
a.	ʔelkˀ-aa	*!		
b.	ʔelk-<ˀ>aa		*!	
c. p	ʔelˀk-aa			** (lk)

The lack of a sanctioned mooring at the edge of the root thus sends a latent feature sailing inside to look for one, since its need to be parsed exceeds the importance of alignment. But what sets the Yawelmani glottalization apart from prototypical examples of floating features is that under certain circumstances it does show up as an autonomous segment . Where there is no glottalizable sonorant, it will emerge as a full segment if, in the process, it neither displaces a full consonant nor requires vowel epenthesis. Due to the templatic restrictions on the form of Yawelmani words, this boils down to the statement that [constricted glottis] comes out as a full glottal stop in biconsonantal roots which contain no glottalizable sonorant (Archangeli and Pulleyblank (forthcoming) and references therein).

This is illustrated by the tableau in (46). There is no glottalizable (post-vocalic) sonorant in *maax* so secondary glottalization is impossible. The only way PARSE-FEATURE can be satisfied then is by the insertion of a full glottal stop (46b), despite the resulting vowel shortening. The need to parse the feature outweighs any cost incurred by shortening.[10] Note that the ALIGN constraint operates here to make sure that the resulting glottal stop surfaces as the onset to the suffix. Therefore the logically possible candidate in (46c), where metathesis has taken place, will never be optimal in Yawelmani. ALIGN thus subsumes the place-holding role usually attributed to the root node.

(46) PARSE-FEATURE » *preserve CVV template* , ALIGN

	Candidates	PARSE-F	*preserve CVV template*	ALIGN
a.	maa.x- <[c.g.]> aa	*!		
b. p	max-ʔaa		*	
c.	maʔx- aa		*	*!

5.2.3 *The role of *STRUC(σ):*

When [constricted glottis] manifests itself as a full segment in (46) it does so without adding an extra syllable to the output since it functions as the onset to a pre-existing vowel nucleus. Therefore it does not cause a violation of *STRUC(σ). This is not to say that the constraint plays no role in the system, however. *STRUC(σ), which kept the vocalic palatalization features from surfacing as a vowel in Chaha, does plays an important role in Yawelmani in regulating epenthesis, ruling out insertion of the vowel which would be necessary to allow [c.g.] to surface as a full glottal stop in what would otherwise be a triconsonantal cluster (47).

(47) Ranking: *STRUC(σ) » PARSE-FEATURE
Rationale: No vowel epenthesis to make room for latent feature as segment

For /hogn-ˀaa/, in the tableau in (48), for example, glottalization fails to surface as the release on an existing consonant since there is no post-vocalic sonorant (48a-c). Yet unlike the example in (47), it also fails to materialize as its own segment. This is because the CVX maximal syllable limit keeps [c.g.] from

[10] For discussion of the function of template preservation in Yawelmani see Zoll (1993b) and Broselow (1993).

turning up as a full glottal stop without vowel epenthesis, but epenthesis would lead to a fatal violation of *STRUC(σ) (48d). The most harmonic candidate fails to parse [constricted glottis], thereby avoiding the more serious Stegment Structure and *STRUC(σ) violations which would otherwise ensue.

(48) Segment Structure, *STRUC(σ) » PARSE-FEATURE from {hogn, ˀaa}

	Candidates	SSCs	*STRUC(σ)	PARSE-F
a.	hognˀ-aa	*!		
b.	hogˀn-aa	*!		
c.	hˀogn-aa	*!		
d.	hog[V] n-ʔaa		*!	
e. p	hogn- <ʔ> aa			*

Thus the mixed behavior of the Yawelmani glottal follows from the interaction of a hierarchy of general constraints with the latent (rootless) glottal feature. The ranking of the major constraints is given in (49). The domination of ALIGN by PARSE-FEATURE allows mobility of affixal material. High-ranking *STRUC(σ) favors deletion over epenthesis as the resolution of potentially triconsonantal clusters. Finally the effect of the low-ranking alignment constraint is to keep the glottalization as far to the right in the word as possible, subsuming what has been considered the place-keeping function of the root node. In the next two sections I will show how this hierarchy also accounts for the diverse behavior of Yawelmani's other latent consonants and vowels.

(49) Yawelmani Hierarchy:

SEGMENT STRUCTURE CONSTRAINTS ,*STRUC(σ) » PARSE-F » ALIGN

5.3 *Latent Consonants*

We saw in the previous section that this constraint hierarchy interacts with a latent feature such that it will dock on an existing segment where it can, will minimally disrupt the template and emerge as a full segment if it must, but in the face of impending epenthesis it will fail to be parsed. The only thing that sets the behavior of the other latent consonants apart from the glottal is that they never dock secondarily on an existing segment. I have repeated the list of suffixes with proposed underlying representations in (50).[11]

(50) Yawelmani suffixes with latent C

			UR of latent segment
a.	(h)nel	*passive adjunctive*	[SPREAD GLOTTIS]
b.	(m)aam	*decedent*	[LAB]
c.	(l)saa	*causative repetitive*	[LAT]
d.	(n)iit	*decedent*	[COR]

Under an account where the latent consonants are represented as floating CPlace or laryngeal features, the role of the Segment Structure Constraints is clear, since there is no secondary articulation in Yawelmani which corresponds to these features (Newman (1944)). The Segment Structure Constraints keep the latent features from turning up anywhere except as the primary articulation on an inserted root node. ALIGN insures that when there is room for the epenthetic root node it will be inserted suffix initially, so we need not depend on underlying root nodes to keep latent features in place. The ranking of *STRUC (σ) above PARSE-FEATURE entails that when there is no available spot in an existing syllable,

[11]See below, section 8 , for discussion.

the features will fail to appear. This is illustrated by the tableaux in (51-52). For the tri-consonantal root *hogon-* in (51), the only way for the suffix's latent *(h)* to surface would be through epenthesis of a vocalic nucleus. The consequent addition of an additional syllable produces a fatal violation of *STRUC, so instead the best choice (51b) is to let the feature go.

(51) hogonnel from /hogon, (h)nel/

	Candidates	*STRUC(σ)	PARSE-F	ALIGN
a.	ho. gon. hV nel	****!		
b. p	ho. gon. nel < [asp]>	***	*	

Compare that result to the biconsonantal root *maxaa*. Here with vowel shortening in (52a) the optimal candidate has room for the latent feature to surface as an independent segment. This candidate beats (52b) where the feature is left unparsed. Note again that a candidate like (52c), which differs from the winner only in that the inserted root appears further to the left, loses on the grounds that it violates ALIGN.

(52) maxahnel from /maxaa, (h)nel/

	Candidates	*STRUC(σ)	PARSE-F	ALIGN
a. p	ma. xa-h. nel	***		
b.	ma. xaa- nel < [asp]>	***	*!	
c.	mah. xaa- nel	***		***!

What differentiates the so-called floating glottal from the other latent consonants then is that the only secondary release possible in Yawelmani is glottalization. The other potentially mobile consonantal features can only turn up as independent segments. Again ALIGN functions to keep the latent consonant at the beginning of the suffix. Thus the behavior of the latent consonants does not entail that they have an underlying root node, since their form and position are completely predictable from the grammar.

5.4 *Latent Vowels*

Finally we return to the latent vowels. The relevant data is repeated in (53). Their behavior differs from that of the latent consonants, including the glottal, in that they do not materialize every time there is room for them. Rather they appear only when called upon to rescue an otherwise unparseable consonant, as in (53a).

(53) Vowel/ø alternation: Latent vowels surface only when they are necessary
-m(I) *precative* (Data from Newman 1944: 135)

a.	/amic-mI/	amic-mI	*amic-m•	*having approached*
b.	/panaa-mI/	panam•	*panaa-mI	*having arrived*

The behavior of the latent vowels, analyzed as floating V-place features, also follows from the constraint hierarchy already established. It is the *STRUC(σ) constraint, which militates against superfluous syllable building, that distinguishes the behavior of the latent vowels from the latent consonants. This constraint had no impact on the consonants themselves, since they emerge by simply slipping into existing syllable structure. The constraint functioned there only to exclude vowel epenthesis whose only purpose would have been to rescue an otherwise doomed latent feature. *STRUC(σ) will limit the realization of latent vowels themselves, on the other hand, because a vowel always heads its own syllable in this language. Every time a vowel comes on the scene, it triggers a violation of *STRUC(σ), so latent vowels only show up when violation of *STRUC(σ) is forced by some higher constraint, in this case the need to parse a full segment. Since the language has no secondary vocalic articulations, SEGMENT

STRUCTURE prevents them from otherwise docking on existing full segments. This state of affairs is illustrated by the tableaux in (54-55). The winner, in (54a), succeeds in parsing all the full segments into only two syllables so violates *STRUC (σ) only twice, while parsing the latent vowel in the non-optimal (54b) requires three syllables.

(54) panam from /panaa-m [hi]/

		PARSE-SEG	*STRUC(σ)	PARSE-F	ALIGN
a. p	pana-m<[hi]>		**	*	
b.	panaa-mI		***!		

In the tableau in (55), on the other hand, the latent vowel is needed to rescue the otherwise unparseable *m* . This causes an additional *STRUC violation but is necessary in order to avoid deleting a full segment. Therefore (55b) is optimal.[12]

[12]The potential candidate amic-Im is ruled out independently by other constraints on word shape. See Zoll (in preparation).

(55) amicmi from /amic-m [hi]/

		PARSE-SEG	*STRUC(σ)	PARSE-F	ALIGN
a.	amic<**m**><[hi]>	*!	*	*	
b. p	amic-mI		**		

Thus in Yawelmani there is no need to distinguish mobile features from those which must remain at the edge, since both their movement and/or possible segmenthood is predictable from the interaction of SEGMENT STRUCTURE with the three constraints ranked as in (56) embedded in the larger templatic grammar of the language.

(56) SEGMENT STRUCTURE » *STRUC » PARSE-FEATURE » ALIGN

5.5 Summary:

The resulting rankings for both Chaha and Yawelmani are given in (56-57). The same constraint family which accounted for the latent segments and mixed behavior of the Yawelmani glottal also makes the right predictions about the behavior of both the mobile and non-mobile latent features in Chaha. The distinctions between these patterns follow from the independently needed Segment Structure Constraints, the different possible relations between PARSE and ALIGN in the hierarchy, and the role of *STRUC(σ) in keeping down the number of syllables in the output.

(56) Chaha

SEGMENT STRUCTURE CONSTRAINTS » *STRUC(σ) » ALIGN-$[pal]_{aff}$ » PARSE-F» ALIGN-$[rd]_{aff}$

(57) Yawelmani

SEGMENT STRUCTURE CONSTRAINTS » *STRUC(σ) » PARSE-F » ALIGN

6 Another possible solution?

The last two sections developed an analysis of a variety of subsegmental phenomena which straightforwardly accounted for the independence of potential MOBILITY and AUTARCHY, the two characteristics usually used as diagnostics for the presence or absence of a root node. Alignment constraints took over the anchoring function of the root node, while potential autarchy was governed by the interaction of Segment Structure Constraints with *STRUC(σ). This led to the conclusion that there is no need to distinguish latent segments and floating features from each other representationally. However, it is not impossible to develop an account of the mixed cases such as Yawelmani glottalization even while maintaining a structural distinction between latent segments and floating features. In this section I will show, however, that this distinction complicates the representation without any simplification of the grammar overall.

If, following Hyman 1985, Kenstowicz and Rubach 1987 and Rubach 1993, ghost segments are not defective melodically but instead simply lack a skeletal slot, we can represent the Yawelmani glottalizing suffix -*ʔaa* as in (58) .

(58)

```
                          X    X
                          |    |
         ®                ®    ®
         |                |    |
[constricted glottis]     a    a
```

Despite its root node, this representation is not incompatible with fact that the glottal may surface independently (59a) or dock onto an existing segment (59b).

(59) Biconsonantal Yawelmani roots with -(ʔ)aa

a. no final sonorant /maax- (ʔ)aa-/ maxʔaa-

b. final sonorant /caaw-(ʔ)aa-/ caawˀaa-

If the glottal is underlyingly a segment, Segment Structure Constraints (60a) would be supplemented with a constraint on consonant clusters prohibiting the sequence sonorant-glottal stop (represented as *Rʔ*) in derived environments (60b). As before, these constraints outweigh the PARSE constraints (60c-d) since the glottal stop may fail to be parsed in certain circumstances. One apparent simplification in this grammar is that now ALIGN appears to be unnecessary, assuming that the root node can be relied upon to keep the segment in place. However some alignment statement will be needed in any case so we know that the affix is a suffix.

(60) Constraints for Rooted solution:

a. Segment Structure Constraints

b. Cluster Constraint *Rʔ

b. *STRUC(σ): Avoid syllables

c. PARSE-SEG, PARSE-FEATURE: Parse segments and features

d. Segment Structure Constraints » *STRUC(σ) » PARSE-R, PARSE-FEATURE

The tableaux in (61-62) illustrate how this hierarchy yields the desired output for each of the roots. The derivation of *maxʔaa* is quite straightforward, as shown in the tableau (61). There is room for the underlying glottal stop adjacent to an obstruent so it surfaces there without violating any constraints.[13] If rooted segments are kept from moving around in the unmarked case, we expect the stop to settle into this position automatically.

(61) /maax, (ʔ)aa /

	Candidates	SSCs	*STRUC(σ)	PARSEs
i.	maax- <ʔ>aa			*!
ii. p	max-ʔaa			

In a form with a sonorant such as */caaw-(ʔ)aa-/* , as shown in the tableau in (62), the glottal stop cannot surface since the [Rʔ] sequence is ruled out by the Cluster Condition (62a). *STRUC(σ) likewise rules out the candidate where a vowel has been epenthesized (62b). Faced with the choice of deleting the whole segment or saving at least a feature, [constricted glottis] docks on an eligible sonorant , sacrificing only a root node and thereby minimally violating the PARSE constraints (62c).

[13]Recall that vowel shortening is always possible when it will help to avoid a PARSE or *STRUC(σ) violation.

(62) caaw^{ʔ}- aa from /caaw, (ʔ)aa/ (® = root node)

	Candidates	Cluster Condition	*STRUC(σ)	PARSEs
a.	cawʔ- aa	*!		
b.	caa. wVʔ- aa		*!	
c.	caaw- aa ® « | » [constricted glottis]			*® *[constricted glottis] !
iii. p	caaw^{ʔ}- aa «®»			*®

The trade-off in this case then seems to be between relying on ALIGN vs. having an extra skeletal level to keep the ghost glottal in place. We might favor ALIGN just on the grounds of representational economy and the fact that most of its other functions of the skeletal tier have been subsumed by the mora and the root node (Hyman 1985, McCarthy & Prince1986, Hayes 1989, Ito 1989). But there is yet another reason to favor ALIGN: ALIGN is needed independently for the floating feature no matter how we choose to represent the latent sesgments. Recall that in Chaha there is a distinction between mobile labialization and stationary palatalization (63). Neither feature ever surfaces as an independent segment, so these would be classified as floating features. If real floating features lack root nodes then we must rely on some grammatical constraint to keep the non-mobile floating palatalization in place.

(63) Chaha again

a. Labialization: rightmost labial or velar

nækæb	nækæb^{w}	*find*
mækær	mæk^{w}ær	*burn*

b. Palatalization: final coronal or velar obstruent

g^{y}æk^{y}‘t	g^{y}æk^{y}‘t^{y}	*accompany*
qætær	q^{w}ætær	*kill*

This is illustrated by the tableau in (64) for palatalization. Segment Structure Constraints keep a floating feature from showing up on the final segment since it is a sonorant (64a). In the absence of either a root node or an ALIGN constraint there is no way to prevent the palatalizing feature(s) from floating into the word to find a suitable mooring. Under this analysis we would expect to find it medially, on analogy with the behavior of the labializing suffix, and (64b) would be optimal.[14]

(64)

	Candidates	SSCs	PARSE-FEATURE
a.	*qætær ^{y}	*!	
b. k	*qæt^{y}ær		
c.	qætær «y»		*!

---

[14]One could imagine a situation where the difference between labialization and palatalization is that the palatalizing morpheme has an underlying root node and the labial one does not (following the reasoning of Swingle (1992)). But once the feature detached from the root and associated with something else what would force it to stay local? Since the root node itself would not be parsed this would entail a representation where the palatalizing feature remained parsed by the unparsed root node and doubly linked to an adjacent palatalizable segment. But that hardly seems like an advance over alignment.

It is necessary in this case to bring in some sort of alignment constraint to keep the palatalizing feature from floating into the word (65). The domination of PARSE-FEATURE by this constraint restricts the floating feature to final position, so in this case (65c) is optimal.

(65) ALIGN-R » PARSE

	Candidates	SSC	ALIGN	PARSE-F
a.	qætær ^{y}	*!		
b.	qæt^{y}ær		*!	
c. p	qætær «y»			*

Therefore not only is it possible to do without an extra level to distinguish the different phenomena associated with defective parsing, but it is desirable since its introduction is not necessary nor does it allow any simplification of the overall grammar otherwise. This result further supports a solution which unifies the representation of latent segments and floating features.

7 Grammar Factorial

This paper has argued that the traditional rigid dichotomy between floating features and latent segments should be abandoned since the primary diagnostics for the division, potential mobility and autarchy, do not correlate either with each other or with the presence or absence of a root node. In its place a new typology has begun to develop where these properties vary independently of each other, governed by a grammar which consists of a hierarchy of violable constraints. In this section I wish to flesh out that typology by sketching the patterns predicted by the six possible rankings of the three basic constraints ALIGN, PARSE-FEATURE and *STRUC(σ). This reranking results in four distinct grammars, encompassing the behavior associated with prototypical floating features and latent segments, as well as other phenomena involving irregularly parsed phonological units not previously classified together with the more familiar cases. These rankings are summarized in (66).

(66)

(i) e.g., Chaha palatalization

*STRUC(σ), ALIGN » PARSE-FEATURE

(ii) e.g. Yawelmani, Chaha labialization

*STRUC(σ) » PARSE-FEATURE » ALIGN

(iii) (see below)

PARSE-FEATURE » *STRUC(σ) » ALIGN

(iv) e.g., Papago nominalization, Ikalanga copula high tone (see below)

ALIGN , PARSE-FEATURE » *STRUC(σ)

7.1 *Where PARSE-FEATURE is lowest: Chaha Palatalization*

*STRUC(σ) , ALIGN » PARSE-FEATURE

This ranking of the three basic constraints accounts for the pattern exemplified by Chaha palatalization. In any hierarchy where ALIGN dominates PARSE-FEATURE, latent features will be restricted to the position dictated by the alignment constraint. Here, where PARSE-FEATURE is the lowest ranked constraint, both *STRUC(σ) and ALIGN will always be obeyed, since the best option, if something must be violated, will be to flout PARSE-FEATURE by leaving the latent feature unparsed. Thus in Chaha the palatalizing feature could only surface as a secondary feature on a final coronal or velar obstruent. In the absence of an appropriate word-final target the feature failed to surface, since to move into the word would have violated ALIGN, and to project a vowel would have violated *STRUC(σ).

7.2 *When ALIGN is lowest*

When ALIGN is the lowest constraint it will be violated in order to avoid violation of the two higher ranked constraints, yielding mobile floating features, metathesis or infixation depending on the circumstances. In this case the conditions under which it will be violated vary contingent on the relative ranking of *STRUC(σ) and PARSE-FEATURE above it.

7.2.1 **STRUC(σ) » PARSE-FEATURE » ALIGN*

This is the ranking which accounted for Chaha labialization and the wide variety of latent segments in Yawelmani. In this hierarchy since ALIGN is the lowest constraint a floating feature will move to avoid underparsing. Since *STRUC(σ) dominates PARSE-FEATURE, however, in the absence of an eligible target anywhere the feature will fail to surface if it would otherwise add an extra syllable. Thus in Yawelmani the latent consonants, including the glottal, could sometimes surface as independent segments because they did not violate *STRUC(σ), but the latent vowels were only parsed in order to avoid violation of a constraint which itself dominated *STRUC(σ).

7.2.2 *PARSE-FEATURE » *STRUC(σ) » ALIGN*

This ranking predicts yet a third pattern, one for which I have not yet found a clear example. The ranking of PARSE-FEATURE above ALIGN entails that a feature will float to find a place to dock, but unlike Chaha labialization, when no good docking site is available anywhere in the word, *STRUC(σ) will be violated to avoid what would be here a more serious PARSE-FEATURE violation. This resembles the conditions under which the floating glottal feature in Yawelmani materializes as an independent segment, but because in this case PARSE-FEATURE dominates *STRUC(σ), it would allow floating *vocalic* features to surface independently as well. This account thus predicts the existence of a language like the hypothetical "Chacha" in (67). In such a language we might find a labialization process which searches for an appropriate target (PARSE-FEATURE » ALIGN), but not finding one settles at the edge as its own vowel (*STRUC(σ) » ALIGN) (63d). Since PARSE-FEATURE dominates *STRUC(σ), [labial] will not fail to surface unless final vowels are ruled out independently in the language.

(67) "Chacha" labialization

	TARGET	*no object*	*with object*	
a.	final C	dænæg	dænæg^{W}*hit*	
		nækæb	nækæb^{W}*find*	
b.	medial C	mækær	mæk^{W}ær	*burn*
		s^{y}æfær	s^{y}æf^{W}ær	*cover*
c.	initial C	qætæræ q^{W}ætær *kill*		
		mæsær	m^{W}æsær*seem*	

d.nonesædædæsædæd**U***chase*

*7.3 Where *STRUC(σ) is lowest*

ALIGN , PARSE-FEATURE » *STRUC(σ)

The final ranking accounts for a fourth pattern of irregular parsing which has not been discussed in the area of either floating features or latent segments but for which this analysis provides a straightforward account. When *STRUC(σ) is dominated by both PARSE-FEATURE and ALIGN a floating feature will always show up at the designated edge. When the final segment does not constitute an appropriate target for a floating feature the feature will surface as an autarchic segment even if it violates *STRUC(σ). [15]

Two examples of this phenomenon are shown here in (68-71). In Papago (68) floating palatalization docks on final coronal segments {d, n, ±, ‹} (68e-i). In the absence of an eligible target in this position, however, the features materialize as an independent vowel (68a-d).

(68) One kind of nominalization in Papago (Hale 1965: 301-2)

a. /du:k-i/ Ωú:ki *rain*
b. /waʔig-i/wáʔigi *water gotten*
c. /bɨ h-i/ bː h-i *taken*
d. /nɨ ʔ-i/ nː ʔ-i *song*

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[15]The different rankings of PARSE-FEATURE with respect to ALIGN in theory could yield different phenomena. We might expect that with PARSE-FEATURE ranked highest the feature would never fail to surface. But in both cases it is ultimately the Segment Structure Constraints which would keep the feature from surfacing. This dominates PARSE-FEATURE in either ranking, obliterating the distinction between the two hierarchies.

e. /na:d-i/ ná:Ω (di∅ Ω) *kindled*
f. /‹ɨ ±in-i/ ‹· li– (ni∅ –) *straightened*
g. /widin-i/ w'Ωi– *twisted, wrinkled*
h. /hɨ wɨ ±-i/ h· wɨ l (±i∅ l) *wind*
i. /ko:‹-i/ k—:s (‹i∅ s) *sleep*

The effect of having *STRUC(σ) at the bottom of the hierarchy is illustrated by the tableau in (69). This situation resembles Chaha palatalization in that the feature does not move into the word to find an eligible target (69a), since this violates the more highly ranked ALIGN constraint. Unlike Chaha, however, PARSE-FEATURE also outranks *STRUC(σ), so in the optimal form (69c) a final root is inserted to host the features instead, avoiding a parse violation while preserving alignment.

(69) ALIGN-R, PARSE-F » *STRUC(σ) from {nɨ ʔ, [high]}Stem

		ALIGN-R	PARSE-F	*STRUC
a.	–ɨ_ʔ	*!		
b.	nɨ ʔ «high»		*!	
c. p	nɨ ʔ-[i]			*

A similar type of phenomenon is illustrated by the copula high tone in Ikalanga (Mathangwane 1993). This high tone links to the mora of a noun class prefix, which may dominate either a vowel (70a) or a syllabic nasal (70b). In the absence of an overt noun class prefix, however, a vowel is epenthesized to carry the copula high tone (70c).[16]

(70) Ikalanga Copula High Tone Association to Class Prefix (Mathangwane 1993: 2)

a. /li-ʃaat'i/ l̀-ʃaat'i *It's a door*
b. /m-piini/ ḿ -piini *It's an axe or hoe handle*
c. /beepe/ ['] -beepe *It's a calabash*

The same constraint ranking also accounts for this pattern, as shown in (71). In the optimal candidate (71c), a vowel has been epenthesized in order to provide an anchor for the copular high at the edge, forcing violation of the lowest ranked *STRUC(σ). This is the most harmonic candidate because the PARSE-H and ALIGN constraints are paramount.

(71) ALIGN-R, PARSE-F » *STRUC(σ) from {ø-beepe, H}

		ALIGN	PARSE-H	*STRUC(σ)
a.	ø-béepe	*!		
b.	«H» ø-beepe		*!	
c. p	['] -beepe			*

8 Inventory

This paper has demonstrated that two functions usually attributed to the root node, feature immobility and the ability of an underlying set of features to manifest itself as an independent segment, cannot be used as diagnostics for the presence or absence of a root node. Rather, a hierarchy of ranked and violable constraints such as ALIGN and *STRUC(σ), in conjunction with language particular segment

[16] An ALIGN constraint keeps the tone out of the noun stem itself. See Mathangwane (1993) for details.

structure constraints, govern where and how latent features manifest themselves on the surface. It is intermediate cases such as Yawelmani glottalization and Chaha palatalization which necessitate such an account, but with a grammar that can determine position and segmenthood the divergent surface behavior of prototypical cases of latent segments and floating features no longer motivates an underlying representational distinction between them. The reranking of the constraints governing the behavior of floating features provides a cross-linguistic typology of the entire range of phenomena associated with subminimal phonological units, including latent features which always materialize as independent segments and other patterns that do not have a place in the traditional root/no-root dichotomy.

The third major function usually attributed to the root node is to anchor the different sets of features which comprise a segment. Lacking a root node, conventional floating features are thought to be limited to no more than a single node of the feature hierarchy (Clements 1985, 1986, Sagey 1986, 1987, and subsequent work on feature geometry). I will refer to this as the **Single Node Hypothesis** following Pulleyblank 1988. On the other hand, it is believed that any combination of features can constitute a ghost segment, and that therefore a root node is necessary in order to keep these features together (Rubach 1993). In this section I will demonstrate, however, that this last remaining motivation for an underlying representational distinction between ghosts and floating features is likewise untenable. First, not all cases of conventional floating features support the Single Node Hypothesis, and I will argue that where more than one node is crucially involved, ALIGN constraints subsume the organizing role attributed to the root node as well. Second, insofar as the Single Node Hypothesis does predict what we expect to find in the simplest case for floating features (Pulleyblank 1988), these expectations are also met in most, if not all, of the cases of latent segments described in the literature. Finally, understood as latent features underlyingly, the features typical of latent segments fill what would otherwise be a gap in the cross-linguistic inventory of floating features.

8.1 *Alignment of Multiple Nodes: Tiv*

Tiv, as analyzed by Archangeli and Pulleyblank (forthcoming), constitutes a clear counterexample to the Single Node Hypothesis for floating features. The Tiv vowel inventory is shown in (72). Archangeli and Pulleyblank (forthcoming) argue that these vowels are underlyingly unspecified for the features [low] and [round] but get their value through the linking of floating features, as illustrated in (73).[17] Association of a floating [low] yields ***a***, of floating [round] yields ***o***, and when the two link to a single vowel the result is ***ò***. In the absence of any association, default rules or markedness principles cause the vowel to surface as *e*.

(72) Tiv Vowels (Archangeli and Pulleyblank (forthcoming: 38))

i	u
e	o
a	ò

(73)

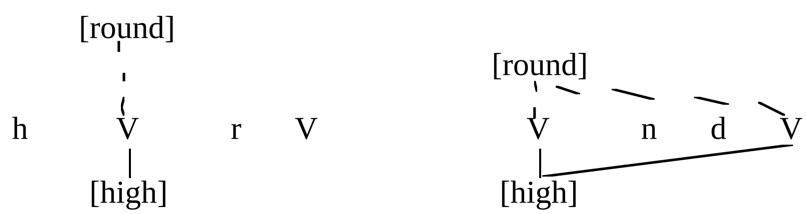
[17] They also argue that [high] is a floating feature, but the conditions on its association are independent from those on [low] and [round] and need not concern us here.

The ALIGN constraint which governs association of [low] and [round] is given in (74).[18] It is satisfied when the floating feature links to the leftmost vowel (75a, 76a-b), and thus there are no words where an eligible first vowel has been skipped in favor of association to the second. The (75b) example illustrates the further spread of [round] rightward to vowels with the same value of high. Otherwise the spread of [round] is blocked.

(74) **ALIGN-LEFT** (feature, morpheme) *floating feature links to leftmost vowel*

(75) [round] links to left edge (AP (forthcoming: 48))

a.	/hire/	hùre	*hiro	*drive away*
b.	/indi/	úndu		*leave person or thing behind*



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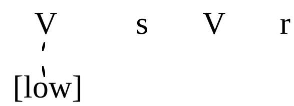
[18]In Archangeli and Pulleyblank (forthcoming) the features are associated in independent LINK operations. In the discussion which follows here ALIGN serves the function of a general LINK-FEATURE rule, where the target is the leftmost possible vowel, but the basic analysis is otherwise that of Archangeli and Pulleyblank (forthcoming).

(76) [low] links to left edge (AP (forthcoming: 44))

a. áser *esar *wrench off break off*
b. màse *mesa *somewhat later than the first verb, person did subsequent action*

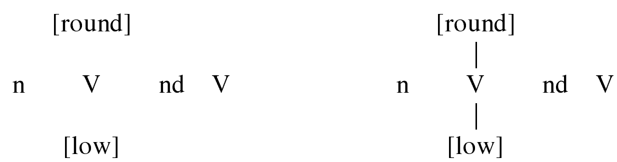


Contrary to what we might expect under the Single Node Hypothesis, however, some morphemes harbor both floating [low] and floating [round] features (77). In (77a-b), as illustrated in (77c), ALIGN favors the linking of both features to the leftmost vowel.

(77) floating [low] and [round] together (AP (forthcoming: 51))

a. nònde [nòndo] *drip*
b. sòsem [sòsom] *approach*

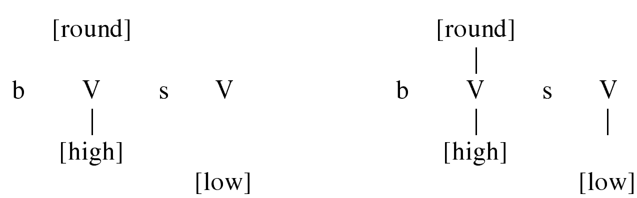
c.



The examples in (78a-b), illustrated in (78c), demonstrate that this is really a case of multiple floating features, rather than of a single Vplace node. When [high] is already associated to the initial vowel, linkage of [low] is blocked and is forced over one vowel to the right, while [round], which does not conflict with [high], links independently to the first vowel. Recall that spreading of [round] is blocked between vowels which do not agree for [high], so [round] cannot spread on to the low vowel in these examples.

(78) a. búsa *bisò *break fragment off*
b. kùma *kimò *suffice*

c.



In this case of multiple floating features it is necessary to rely on the ALIGN constraint to determine their respective surface positions. Note that alignment mimics the effect of a unifying node in the cases where nothing precludes association of both features to the same vowel. We could posit an underlying root or Vplace node to satisfy the Single Node Hypothesis, but this would unnecessarily complicate association in words where the features are forced to dock onto different vowels. This complication does not arise in an analysis where the active but violable ALIGN constraint governs the placement of individual floating features. Therefore, since the Single Node Hypothesis does not hold even for conventional floating features, and because alignment functions to aggregate disparate features in these cases, the Single Node Hypothesis cannot be invoked to motivate a representational distinction between floating features and latent segments underlyingly.

8.2 *Simplicity and the Single Node Hypothesis*

Although the Single Node Hypothesis is not an absolute, it does set a standard for simplicity in analyses of phenomena involving floating features (Pulleyblank 1988). The least complicated accounts link or spread just a single feature class, and when a target requires additional features they are supplied by default rules or markedness principles rather than by increasing the number of floating nodes (see Rice 1989's review of Lieber 1987). In this section I will show that the same standard of simplicity is met in most, if not all, of the cases of latent segments described in the literature.

The speech of Raven's Wife in Quileute (Frachtenberg 1920) illustrates the conventional division of labor between floating features and feature-filling/changing operations (79). When speaking in a myth the Raven's Wife prefixes *ts* - to each word and then nasalizes some of the consonants, changing *d* and *l* to *n* (79a-b) and *b* to *m*. (79c).

(79) Quileute Frachtenberg (1920: 297)

	Regular	Raven's Wife	
a.	L!ōx̣ wa'**d**ā s	ts-L!ōx̣ wa'**n**ā s	*old man*
b.	hē 'tku**l**i	ts-hē tku**n**i	*I am sick*
c.	**b**ō 'yū kwā 'ts!ō '	ts-**m**ō 'yū kwā 'ts!ō '	*something*

The differences between the input and output in (79) clearly involve more than a single featural node. In every case [nasal] has been added, but in addition (79b) requires [-cont], (79a,c) demand [+sonorant] etc. In a case like this, however, it is unnecessary to posit multiple floating nodes. Rather the standard procedure is to limit the floating feature to [nasal] and to rely on default rules or markedness principles to supply the rest (80).

(80)

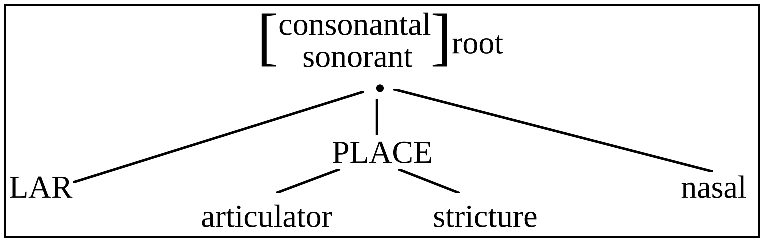
hē 'tku**l**i [nas] → [+son]

/ [nas] → [-cont]

[nas]

If, as I have argued, latent segments and floating features have the same underlying representation, then it is not unreasonable to expect the majority of latent segments to yield to the same sort of account. The restriction of the underlying representation of a latent segment to a single node in the unmarked case gives rise to certain predictions about the types of inventories of latent segments to be found most commonly cross-linguistically. Given the feature geometry in (81) we do not expect to find many languages whose latent segments are crucially distinguished by both place and laryngeal features, nasal and place features, or nasal and laryngeal features. Furthermore, since additional feature values must be determined by default rules or markedness constraints, we expect that a latent segment will represent the unmarked member of its class when fully specified on the surface. These expectations appear to be largely fulfilled.

(81) Geometry of features: (Clements 1985, Sagey 1986, McCarthy 1988, Selkirk 1988, Hume 1992, Padgett 1992)



The inventory of latent consonants in Yawelmani provides an excellent illustration of this point. The consonant inventory is repeated here in (82). The consonants which occur as latent segments in some contexts are enclosed in boxes.

(82) Yawelmani Inventory (Archangeli (1984: 60 from Newman (1944))

b p ∏	d t Ê	± Æ Æʔ	x g k □
	Û c Ç	Û ç çʔ	
	s ‹		
[m] mʔ [n] nʔ			
[w] wʔ y yʔ			[h] [÷]
	[l] lʔ		

First of all, if latent segments, like floating features, are commonly limited to a single node underlyingly then it is not surprising that although glottalized segments abound in Yawelmani there are no pairs of latent consonants which contrast solely with regard to the presence or absence of glottalization. This is to be expected, since this contrast would require both PLACE and LARYNGEAL features to be specified underlying (83).

(83) w *wʔ

In fact, in Yawelmani all of the latent consonants can be distinguished from each other on the basis of either laryngeal features or place/stricture features alone (84). While it is necessary to stipulate here that all of the latent consonants are [+sonorant], both inventory specific and universal default rules or markedness conventions easily supply the remaining features necessary for fully specified segments on the surface (see Archangeli (1984, 1988b), and more recently McCarthy and Prince (1993, Prince and Smolensky (1993, Archangeli and Pulleyblank (forthcoming)).

(84)

/m/	**/w/**	**/n/**	**/l/**	**/÷/**	**/h/**
			cor		
[lab]	[dors]	[cor]	[lat]	[constricted glottis]	[spread glottis]

In addition, given that default specification usually involves *minimal* feature addition, it follows that the plain sonorants rather than their glottalized counterparts serve as the latent segments. Although it is logically possible to assign [+constricted glottis] by default to every segment underlyingly unspecified for that feature, no theory of markedness that I know of would posit such a rule. If on the other hand the latent segments were not melodically defective, the absence of glottalized latent consonants would not follow from the representation. These sorts of asymmetries, which conform to the Single Node Hypothesis as well as any case of conventional floating features might, are merely accidental in other theories of latent segments which maintain a representational distinction between the latent segments and floating features, all of which leave the segment itself intact.

The Single Node Hypothesis puts the same limitations on the type of possible latent vowel contrasts we might expect in a language, but since vowels are primarily distinguished by PLACE, and since their place features constitute a single node in the feature tree (85), every plain (short) vowel can conceivably have a latent counterpart without contravening the hypothesis. This is the case in Slovak, for example, whose vowel inventory is shown in (86). All of these vowels do function as latent vowels in some words (Rubach (1993)).[19]

(85) a. Slovak Vowels (Rubach (1993: 631)

i	u
e	o
ä	a

In fact most documented cases of latent segments can be easily accomodated within the bounds of the Single Node Hypothesis. It is striking that most languages have only one or two latent consonants, and these are never complex (86). Furthermore, in every language the segments either are (i) at different places of articulation (e.g., Wolof), (ii) differ in stricture at the same place of articulation (e.g., Tiwi), or can be distinguished with nasal or laryngeal features alone (e.g., Armenian, Dakota). There appear to be no cases, for example, with both an alternating K and alternating G, since such a case would require both place and laryngeal features to make the right distinctions underlyingly.

(86)

a.	Armenian:	k, n	(field methods notes)
b.	Axininca Campa:	Ñ	(see MP 1993b)
c.	Dakota:	k, ʔ	(Shaw 1989)
e.	Swahili:	l	(Moxley (1993)
f.	Wolof:	k, d	(Ka (1994)
g.	Korean:	n, l , k	(Namkung (p.c.))
h.	French	t, z, g, Ù	(see below)

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[19] Rubach (1993:633) claims that on the contrary "such a prediction is not made by the featural [rootless] account, because multiplying the number of yers would lead to complicating the inventory, as many new underlying contrasts in terms of phonological features would have to be introduced....We would probably run out of phonological features." Without more detail about his assumptions regarding feature organization it is impossible to evaluate this claim.

j.	Tiwi	p,{,t,l,r,y	(Archangeli (1988)
h.	Polish:	e	(Szpyra (1992)
i.	Slovak:	o,u,e,a,ä,i	(Rubach (1993)

Even the large inventory of latent segments found in French may fall under the constraints of the Single Node Hypothesis. Tranel (1981) carefully separates out the different kinds of consonant/zero alternations in French. Apart from the consonants added to form the feminine nouns and adjectives the latent consonants all belong to the set {t,z,g,∏}. These are the consonants which participate in true phonologically conditioned alternations in various syntactic and morphological contexts. As we might expect, these latent consonants are easily distinguished on the basis of place/stricture, but none requires a combination of place and laryngeal features underlyingly. So for example, there is no liaison contrast between *k* and *g* , *t* and *d*, or *s* and *z*.

The apparent counterexamples to the Single Node Hypothesis reside entirely with the formation of the feminine. It is the only such inventory which has been described, and could be considered, like the floating features in Tiv, as a marked case which relies on alignment to keep disparate floating feature nodes in place. However, Tranel (1981: 266-272) presents several different kinds of evidence indicating that liaison and gender alternations are actually independent phenomena, the most compelling of which comes from dialects of French where adjective liaison has disappeared but where the gender distinctions remain. There is some reason to think that the gender consonants should not even be analyzed as latent segments, since unlike the other latent consonants the feminine forms do not undergo any kind of phonological alternation. In this case we would not expect the inventory to conform to the expectations of the Single Node Hypothesis.[20]

Thus there is no argument based on latent segment inventories for an underlying representational distinction between latent segments and floating features. On the contrary, the similarities between the two provide further evidence for a unified representation.

8.3 *Floating CPlace Features*

Finally, when latent segments are recognized as floating features an apparent gap in the cross-linguistic inventory of conventional floating features disappears. A list of the floating features I have found in the literature is shown in (87). It contains examples of all the features that could conceivably exist independently of the root node, and thus float, except for CPlace features. Yet given the organization of features in all versions of feature geometry there is nothing about CPlace which should preclude it from floating like this.

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[20] See Zoll (in preparation) for more detailed discussion.

(87) A survey of conventional floating features

	Example	Reference
nasal	Terena	Piggott (1987)
	Emai	Egbokhare (1990)
lateral	Quileute	Frachtenberg (1920)
cont	Fula etc.	Lieber (1984, 1987)
	Tepehua	Willett (1982)
voice	Otomi	Wallis (1948)
	Japanese Rendaku	Ito and Mester (1986)
c.g.	Danish stød	Basbøll (1985)
	Yawelmani	Archangeli and Pulleyblank (fcmng)
	Dakota	Shaw (1989)
	Tepehua	Watters (1987)
s.g.	Harauti	Allen (1957)
tone	many beginning with:	Leben (1973)
		Goldsmith (1979)
pal	Aizi?	Herault (1986)
	Gude	Hoskison (1974)
	Basque	Iverson (1985)
	Japanese	Mester and Ito (1989)
high	Ainu	Ito (1984)
	Chaha	McCarthy (1983 etc.)
round	Chaha	McCarthy (1983 etc.)
	Warlpiri	Hulst et. al. (1985)
RTR	Aramaic	Hoberman (1987, 1989)
	Kurdish	
	Syriac	
	Azerbaijani	
	Chilcotin Flattening	Cook (1987)

Under this account though we can see that this is not a real gap in the inventory of floating features but is rather an artifact of the improper diagnostics traditionally used to classify floating features. What really distinguishes Cplace features from the conventional floating features is that they cannot just add on to existing segments as easily as a release feature such as glottalization can. Since traditionally one of the major diagnostics for floating features in the literature is that they do not surface independently it would be the rare CPlace feature which would satisfy that condition. In other words, floating CPlace features, like those proposed for Yawelmani, would commonly behave like a latent segments, rather than like conventional floating features. Since this is a function of the nature of the feature itself, it should not be necessary to add an underlying root node to every instance of a floating CPlace which behaves as a latent segment. If, as I have argued, all latent segments are underlyingly floating features then we can eliminate this representational redundancy and fill the otherwise unmotivated gap in the cross-linguistic inventory of floating features.

9 Conclusion

This paper has provided several arguments against the traditional dichotomy between latent segments and floating features. It was shown that the traditional roles associated with the root node—immobility and autarchy—do not correlate with the presence or absence of a root node underlyingly, and a grammar based on a hierarchy of violable constraints was developed to account for the independent manifestations of these two functions. By positing a unified underlying representation for all instances of ghosts and floating features, this analysis utilizes the generalizations which govern the mixed behavior of some floating features to generate a cross-linguistic typology of the entire range of behavior associated with subminimal phonological units, while allowing a unique characterization of both the limited inventories of latent segments and floating features and their immunity from the demands of regular parsing. While this paper has not discussed every argument ever proposed to motivate the representational distinction between latent segments and floating features (see for example Rubach 1993), it does provide a strong basis for the re-evaluation of these claims in light of the evidence presented here supporting a unified representation.

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