

## Conspiracies and morphophonological (a)symmetry

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“[T]he study of the interconnections between rules in specific grammars is a profitable pursuit for phonologists.”  
Kisseberth (1970:306)

### 1 Introduction

- With a few well-defined exceptions, Axininca Campa (Payne 1981, Payne et al. 1982, Spring 1990, McCarthy & Prince 1993a) has a strict CV syllable structure: obligatorily open syllables with obligatory onsets. There is an interesting pattern of deletion and epenthesis processes enforcing this structure when sequences of vowels or consonants arise at morpheme boundaries. Relevant examples are given in (1). (Throughout the handout, ‘ $p$ ’ indicates a prefixable stem boundary and ‘ $s$ ’ indicates a suffixable stem boundary.)

#### (1) Axininca consonant cluster and vowel hiatus resolution

##### a. Deletion under prefixation

- i. /  $p$ [ **ir**  $p$ [ **saik** ] $s$  **i** ] $s$  / → *i.sai.ki* ‘will sit’
- ii. /  $p$ [ **no**  $p$ [ **ana** ] $s$  **ni** ] $s$  / → *na.na.ni* ‘my black dye’

##### b. Epenthesis under suffixation

- i. /  $p$ [ **no**  $p$ [  $N$   $p$ [ **č<sup>h</sup>ik** ] $s$  **wai** ] $s$  **i** ] $s$  / → *noñ.č<sup>h</sup>i.ka.wai.ti* ‘I will continue to cut’
- ii. /  $p$ [ **i**  $p$ [  $N$   $p$ [ **koma** ] $s$  **ako** ] $s$  **i** ] $s$  / → *ij.ko.ma.ta.ko.ti* ‘he will paddle for’

- Because this pattern of deletion and epenthesis does not distinguish vowel hiatus from consonant cluster resolution, I refer to it as *phonologically symmetrical*, and because it does distinguish prefixation from suffixation, I refer to it as *morphologically asymmetrical*. Addressing the morphological asymmetry, McCarthy & Prince surmise that there must be a “fundamental difference in constraint ranking” between a prefix level and a suffix level:<sup>1</sup>

#### (2) Reasoning behind level analysis of the morphological asymmetry in Axininca

- a. Where MAX prohibits deletion and DEP prohibits epenthesis, deletion requires that DEP dominate MAX and epenthesis requires that MAX dominate DEP.
- b. For both deletion and epenthesis to exist as strategies within a single grammar, DEP must dominate MAX and MAX must dominate DEP. This is a ranking paradox.
- c. Therefore, there must be (at least) two grammars: one corresponding to the prefix level (where there is deletion and DEP dominates MAX) and the other corresponding to the suffix level (where there is epenthesis and MAX dominates DEP).

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<sup>1</sup> This is embedded in the context of a brief discussion of various differences that exist between prefixal and suffixal morphophonology in Axininca. This discussion serves mostly to rationalize the fact that the rest of the manuscript focuses exclusively on suffixal morphophonology, and is not meant to be conclusive: “It may well be that there is no Prefix level in the phonology, and that all of its alternations are consequences of allomorph selection, which can just as well be done in parallel with the Suffix level phonology and morphology.” (McCarthy & Prince 1993a:27)

- But as it turns out, it is perfectly possible for multiple processes that serve the same purpose (e.g., satisfaction of a syllable structure constraint) to co-exist in a single OT grammar. The analysis of such a *conspiracy* (Pater 1999, Kisseberth 1970) proceeds as follows:

(3) Conspiracy analysis in OT


- The markedness constraint M responsible for the processes outranks all of the faithfulness constraints  $F_x$  that are violated by each of the processes:  $M \gg \{ F_1, F_2 \}$ .
  - One of the faithfulness constraints,  $F_1$ , is ranked lowest. The corresponding process is thus generally preferred since it generally incurs the lowest-ranked violation(s).
  - Another constraint X that is sometimes violated when  $F_1$  is violated is ranked together with M above  $F_2$ :  $\{ M, X \} \gg F_2 \gg F_1$ . When X is at stake, the preferred process is blocked and the dispreferred process defined by  $F_2$  violation is triggered instead.
- In the analysis of the Campa pattern,  $M = \text{ONSET}$  or  $\text{NOCODA}$ ,  $F_1$  and  $F_2 = \text{MAX}$  and  $\text{DEP}$ .<sup>2</sup> The fact that the deletion and epenthesis processes of Campa are divided along morphologically-definable lines simply means that the constraint X must be one that somehow distinguishes appropriately between the prefixation and suffixation contexts of application.

## 2 The Campa Conspiracy

### 2.1 Hiatus resolution

- Resolution of vowel hiatus is generally attributed in OT to the constraint ONSET, which demands that syllables begin with consonants (or, equivalently, not begin with nuclear vowels).<sup>3</sup> To actually compel an alternation, ONSET must dominate some conflicting faithfulness constraint. So, for example, in order to compel consonant epenthesis (e.g., under suffixation in Campa), ONSET must dominate DEP, the faithfulness constraint violated by epenthesis (McCarthy & Prince 1995, 1999). This is shown in Tableau 1.

**Tableau 1: ONSET >> DEP**

	Input: ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	ONSET	DEP	
<i>hiatus</i>	a. ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	* !		Syllable structure is transparent and so is not explicitly indicated in tableaux. Epenthetic segments are <b>outlined</b> . In OT, the identity of an epenthetic segment ( <i>t</i> or <i>a</i> in Campa) is standardly taken to be decided by the relative ranking of markedness constraints (McCarthy & Prince 1994).
<i>epenthesis</i>	b.  ... V <sub>1</sub> ] <sub>s</sub> <u>C</u> V <sub>2</sub> ...		*	

- In order to compel vowel deletion (e.g., under prefixation in Campa), ONSET must dominate MAX, the faithfulness constraint violated by deletion. This is shown in Tableau 2.

<sup>2</sup> One set of exceptions to strict CV structure are homorganic nasal + stop/affricate clusters, which are allowed morpheme-internally and under prefixation but are still resolved by epenthesis when derived under suffixation. McCarthy & Prince (1993a) adopt a CODA-COND constraint in place of stricter NOCODA to allow for this exception; I abstract away from the distinction between these two constraints here.

<sup>3</sup> ONSET thus penalizes not only vowel hiatus but also domain-initial nuclear vowels. I restrict attention to hiatus.

**Tableau 2: ONSET >> MAX**

	Input: ... V <sub>1</sub> p[ V <sub>2</sub> ...	ONSET	MAX
<i>hiatus</i>	a. ... V <sub>1</sub> p[ V <sub>2</sub> ...	* !	
<i>deletion</i>	b. <del>☞</del> ... ø <sub>1</sub> p[ V <sub>2</sub> ...		*

Here and throughout, a deleted input vowel  $V_i$  or consonant  $C_i$  is overtly represented as  $\emptyset_i$  in output candidates for perspicuity, even though this deviates from the standard conception of how deletion is technically represented in Correspondence Theory (McCarthy & Prince 1995, 1999).

- Because there is both consonant epenthesis (under suffixation) and vowel deletion (under prefixation) in Campa, ONSET must be ranked above both DEP and MAX. If MAX >> DEP, then consonant epenthesis results; if DEP >> MAX, then vowel deletion prevails.

**Tableau 3: ONSET >> MAX >> DEP**

*Suffixation: epenthesis, right result*

	Input: ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	ONSET	MAX	DEP
a.	... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	* !		
b.	<del>☞</del> ... V <sub>1</sub> ] <sub>s</sub> C V <sub>2</sub> ...			*
c.	... ø <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...		* !	

*Prefixation: epenthesis, wrong result!*

	Input: ... V <sub>1</sub> p[ V <sub>2</sub> ...	ONSET	MAX	DEP
a.	... V <sub>1</sub> p[ V <sub>2</sub> ...	* !		
b.	<del>☞</del> ! ... V <sub>1</sub> C <sub>p</sub> [ V <sub>2</sub> ...			*
c.	... ø <sub>1</sub> p[ V <sub>2</sub> ...		* !	

**Tableau 4: ONSET >> DEP >> MAX**

*Prefixation: deletion, right result*

	Input: ... V <sub>1</sub> p[ V <sub>2</sub> ...	ONSET	DEP	MAX
a.	... V <sub>1</sub> p[ V <sub>2</sub> ...	* !		
b.	... V <sub>1</sub> C <sub>p</sub> [ V <sub>2</sub> ...		* !	
c.	<del>☞</del> ... ø <sub>1</sub> p[ V <sub>2</sub> ...			*

*Suffixation: deletion, wrong result!*

	Input: ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	ONSET	DEP	MAX
a.	... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	* !		
b.	... V <sub>1</sub> ] <sub>s</sub> C V <sub>2</sub> ...		* !	
c.	<del>☞</del> ! ... ø <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...			*

## 2.2 Cluster resolution

- Consonant cluster resolution is due to NOCODA, demanding that syllables end in vowels (or, not with consonants). In order to compel vowel epenthesis (e.g., under suffixation in Campa), NOCODA must dominate DEP, as shown in Tableau 5. To compel consonant deletion (e.g., under prefixation), NOCODA must dominate MAX, as shown in Tableau 6.

**Tableau 5: ONSET >> DEP**

	Input: ... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	NOCODA	DEP
a.	... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	* !	
b.	<del>☞</del> ... C <sub>1</sub> ] <sub>s</sub> V C <sub>2</sub> ...		*

**Tableau 6: NOCODA >> MAX**

	Input: ... C <sub>1</sub> p[ C <sub>2</sub> ...	NOCODA	MAX
a.	... C <sub>1</sub> p[ C <sub>2</sub> ...	* !	
b.	<del>☞</del> ... ø <sub>1</sub> p[ C <sub>2</sub> ...		*

- Because there is both vowel epenthesis and consonant deletion, NoCODA must dominate both DEP and MAX. If MAX >> DEP, it's epenthesis; if DEP >> MAX, it's deletion.

**Tableau 7: NoCODA >> MAX >> DEP**

*Suffixation: epenthesis, right result*

Input: ... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	NoCODA	MAX	DEP
a. ... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	* !		
b. $\mathcal{E}$ ... V <sub>C1</sub> ] <sub>s</sub> V C <sub>2</sub> ...			*
c. ... $\emptyset_1$ ] <sub>s</sub> C <sub>2</sub> ...		* !	

*Prefixation: epenthesis,  $\mathcal{I}$ wrong result!*

Input: ... C <sub>1</sub> p[ C <sub>2</sub> ...	NoCODA	MAX	DEP
a. ... C <sub>1</sub> p[ C <sub>2</sub> ...	* !		
b. $\mathcal{I}$ $\mathcal{E}$ ! ... C <sub>1</sub> V p[ C <sub>2</sub> ...			*
c. ... $\emptyset_1$ p[ C <sub>2</sub> ...		* !	

**Tableau 8: NoCODA >> DEP >> MAX**

*Prefixation: deletion, right result*

Input: ... C <sub>1</sub> p[ C <sub>2</sub> ...	NoCODA	DEP	MAX
a. ... C <sub>1</sub> p[ C <sub>2</sub> ...	* !		
b. ... C <sub>1</sub> V p[ C <sub>2</sub> ...		* !	
c. $\mathcal{E}$ ... $\emptyset_1$ p[ C <sub>2</sub> ...			*

*Suffixation: deletion,  $\mathcal{I}$ wrong result!*

Input: ... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	NoCODA	DEP	MAX
a. ... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	* !		
b. ... V <sub>C1</sub> ] <sub>s</sub> V C <sub>2</sub> ...		* !	
c. $\mathcal{I}$ $\mathcal{E}$ ! ... $\emptyset_1$ ] <sub>s</sub> C <sub>2</sub> ...			*

### 2.3 Function and logic of a conspiracy

- The alternative to levels is to analyze the Campa pattern as a *conspiracy*. Kisseberth (1970) originally identified a conspiracy as a set of rules that serve the same purpose: to rid the surface forms of a language of a single undesirable (marked) configuration. The logic of a conspiracy in OT (Pater 1999) is clarified by the following tableaux.

**Tableau 9: Effect of conspiracy ranking { M, X } >> F<sub>2</sub> >> F<sub>1</sub>**

<i>General context (not marked by X); F<sub>1</sub> violation</i>					<i>Special context (marked by X); F<sub>2</sub> violation</i>				
Input: <i>input1</i>	M	X	F <sub>2</sub>	F <sub>1</sub>	Input: <i>input2</i>	M	X	F <sub>2</sub>	F <sub>1</sub>
a. <i>cand1</i>	* !				a. <i>cand1</i>	* !			
b. <i>cand2</i>			* !		b. $\mathcal{E}$ <i>cand2</i>			*	
c. $\mathcal{E}$ <i>cand3</i>				*	c. <i>cand3</i>		* !		*

- Applying this logic to the Campa pattern, both ONSET and NoCODA are the markedness constraints that conflict with and dominate the conflicting faithfulness constraints DEP and MAX. The mystery constraint X also dominates both faithfulness constraints, one of which crucially dominates the other. The two resulting potential rankings are given in (4).

(4) Potential Campa conspiracy rankings

- a. {ONSET, NoCODA, X} >> DEP >> MAX
- b. {ONSET, NoCODA, X} >> MAX >> DEP

- Under the ranking in (4)a, deletion is the preferred hiatus resolution or cluster simplification strategy because DEP >> MAX. However, the constraint X somehow blocks this strategy under suffixation. Epenthesis is then the only strategy available under suffixation. The reverse is the case under (4)b; now, epenthesis is the preferred hiatus resolution or cluster simplification strategy because MAX >> DEP. This strategy is somehow blocked under prefixation by X. Under prefixation, then, deletion is the only strategy available.

**2.4 Why is the first and not the second of two vowels/consonants deleted?**

- Deletion of the second of two vowels in potential hiatus is typically only found in restricted contexts compared to deletion of V<sub>1</sub> (Casali 1996, 1997; see also Rosenthal 1994, Lamontagne 1996, Lamontagne & Rosenthal 1996). V<sub>2</sub>-deletion tends to be found (only) if ...
  - 1. ... deletion of V<sub>1</sub> would involve loss of stem rather than affix material; i.e., only if the potential hiatus occurs at a stem+suffix boundary.
  - 2. ... resolution is dependent on the quality of the vowels in potential hiatus; e.g., when the less sonorous of the two vowels is systematically deleted.
- Deletion of the second of two consonants is also typically only found in restricted contexts compared to deletion of C<sub>1</sub> (Wilson 2000, 2001). C<sub>2</sub>-deletion tends to be found (only) if ...
  - 1. ... deletion of C<sub>1</sub> would involve loss of stem rather than affix material; i.e., only if the potential cluster occurs at a stem+suffix boundary.
  - 2. ... simplification is dependent on the sonority of the consonants; i.e., when the more sonorous of the two consonants is systematically deleted.
- There is no consensus as to how to formalize this; Casali opts for positional faithfulness, Wilson argues for a novel variant of positional markedness. Since it is not my aim to settle the matter here, I opt for Casali’s conceptually simpler positional faithfulness approach. For present purposes, we can encapsulate the preference for V<sub>1</sub>/C<sub>1</sub> deletion in a positional faithfulness constraint that disprefers deletion of morpheme-initial segments: MAX-INIT.

**Tableau 10: V<sub>1</sub>/C<sub>1</sub> deletion is preferred to V<sub>2</sub>/C<sub>2</sub> deletion (under prefixation)**

	Input: ... V <sub>1</sub> p[ V <sub>2</sub> ...	... C <sub>1</sub> p[ C <sub>2</sub> ...	ONSET / NoCODA	MAX	MAX-INIT
<i>hiatus / cluster</i>	a. ... V <sub>1</sub> p[ V <sub>2</sub> ...	... C <sub>1</sub> p[ C <sub>2</sub> ...	* !		
<i>V<sub>2</sub>/C<sub>2</sub>-deletion</i>	b. ... V <sub>1</sub> p[ ø <sub>2</sub> ...	... C <sub>1</sub> p[ ø <sub>2</sub> ...		*	* !
<i>V<sub>1</sub>/C<sub>1</sub>-deletion</i>	c. ☞ ... ø <sub>1</sub> p[ V <sub>2</sub> ...	... ø <sub>1</sub> p[ C <sub>2</sub> ...		*	

## 2.5 What is the identity of the mystery constraint X?

- X could be a constraint that blocks the preference for V<sub>1</sub>/C<sub>1</sub> deletion under suffixation. This would mean that DEP >> MAX, and that X forces violation of DEP (= epenthesis) when it blocks the otherwise preferable violation of MAX (= V<sub>1</sub>/C<sub>1</sub> deletion) under suffixation.<sup>4</sup>

**Tableau 11: Epenthesis due to blocking of V<sub>1</sub>/C<sub>1</sub> deletion by X (under suffixation)**

	Input: ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	ONSET / NoCODA	X	DEP	MAX
<i>hiatus / cluster</i>	a. ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	* !			
<i>epenthesis</i>	b. ☞ ... V <sub>1</sub> ] <sub>s</sub> C V <sub>2</sub> ...	... C <sub>1</sub> ] <sub>s</sub> V C <sub>2</sub> ...			*	
<i>V<sub>1</sub>/C<sub>1</sub>-deletion</i>	c. ... ∅ <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	... ∅ <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...		* !		*

- Likely candidates for the constraint X are stem-affixed form (SA) faithfulness constraints (Bakovic 2000, 2002; cf. Benua 1997, Kager 1999ab, Kenstowicz 1996, among others), regulating the identity between a stem and an affixed form directly derived from that stem.

### (5) Stem-affixed form faithfulness constraints

#### a. SA-MAX

Segments in a stem *x* have correspondents in forms directly derived from *x*.

#### b. SA-DEP

Segments in forms directly derived from a stem *x* have correspondents in *x*.

### (6) Satisfaction vs. violation of SA-MAX

#### a. Epenthesis under prefixation

SA-MAX **satisfied**:

No stem segment deleted.

... C V<sub>1</sub> C<sub>p</sub>[ V<sub>2</sub> ...

... V C<sub>1</sub> V<sub>p</sub>[ C<sub>2</sub> ...

#### b. Epenthesis under suffixation

SA-MAX **satisfied**:

No stem segment deleted.

... C V<sub>1</sub> ]<sub>s</sub> C<sub>p</sub> V<sub>2</sub> ...

... V C<sub>1</sub> ]<sub>s</sub> V<sub>p</sub> C<sub>2</sub> ...

#### c. V<sub>1</sub>/C<sub>1</sub> deletion under prefixation

SA-MAX **satisfied**:

Deleted segment not a stem segment.

... C ∅<sub>1</sub> p[ V<sub>2</sub> ...

... V ∅<sub>1</sub> p[ C<sub>2</sub> ...

#### d. V<sub>1</sub>/C<sub>1</sub> deletion under suffixation

SA-MAX **violated**:

Stem segment deleted.

... C ∅<sub>1</sub> ]<sub>s</sub> V<sub>2</sub> ...

... V ∅<sub>1</sub> ]<sub>s</sub> C<sub>2</sub> ...

<sup>4</sup> In order to explain why V<sub>2</sub>/C<sub>2</sub> deletion is not an option in Campa, it must be that MAX-INIT dominates DEP. The opposite ranking appears to be necessary in Chichewa and Avatime, which according to Casali (1996:18, 1997:497) both have V<sub>1</sub> deletion under prefixation but V<sub>2</sub> deletion under suffixation. (Though Avatime only “to some extent”.)

**Tableau 12: Campa conspiracy ranking, prefixation**

	Input: ... V <sub>1</sub> p[ V <sub>2</sub> ...	... C <sub>1</sub> p[ C <sub>2</sub> ...	ONSET / NoCODA	SA- MAX	DEP	MAX
<i>hiatus / cluster</i>	a. ... V <sub>1</sub> p[ V <sub>2</sub> ...	... C <sub>1</sub> p[ C <sub>2</sub> ...	* !			
<i>epenthesis</i>	b. ... V <sub>1</sub> C <sub>p</sub> [ V <sub>2</sub> ...	... C <sub>1</sub> V <sub>p</sub> [ C <sub>2</sub> ...			* !	
<i>V<sub>1</sub>/C<sub>1</sub>-deletion</i>	c. ☞ ... ø <sub>1</sub> p[ V <sub>2</sub> ...	... ø <sub>1</sub> p[ C <sub>2</sub> ...				*

**Tableau 13: Campa conspiracy ranking, suffixation**

	Input: ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	ONSET / NoCODA	SA- MAX	DEP	MAX
<i>hiatus / cluster</i>	a. ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	* !			
<i>epenthesis</i>	b. ☞ ... V <sub>1</sub> ] <sub>s</sub> C V <sub>2</sub> ...	... C <sub>1</sub> ] <sub>s</sub> V C <sub>2</sub> ...			*	
<i>V<sub>1</sub>/C<sub>1</sub>-deletion</i>	c. ... ø <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	... ø <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...		* !		*

**2.6 Could SA-DEP work to block epenthesis under prefixation instead?**

- No. SA-DEP is violated not only by an epenthetic segment in a derived form that is not present in its stem, but also by any and all underlying affix segments, since these are also not present in the stem. To prevent complete deletion of all affixal segments, MAX-INIT and MAX must dominate SA-DEP. But in order for the conspiracy to work, SA-DEP must outrank MAX and DEP. We thus have a (real) ranking paradox. Regardless, SA-DEP cannot distinguish epenthesis under prefixation from epenthesis under suffixation: in both cases, there is a segment in the derived form that is not present in its stem (or in its affix).

(7) Satisfaction vs. violation of SA-DEP

a.	V <sub>1</sub> /C <sub>1</sub> deletion under prefixation	
	SA-DEP <b>satisfied</b> :	... C ø <sub>1</sub> p[ V <sub>2</sub> ...
	No segment epenthesized.	... V ø <sub>1</sub> p[ C <sub>2</sub> ...
b.	V <sub>1</sub> /C <sub>1</sub> deletion under suffixation	
	SA-DEP <b>satisfied</b> :	... C ø <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...
	No segment epenthesized.	... V ø <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...
c.	Epenthesis under prefixation	
	SA-DEP <b>violated</b> :	... C V <sub>1</sub> C <sub>p</sub> [ V <sub>2</sub> ...
	Segment epenthesized.	... V C <sub>1</sub> V <sub>p</sub> [ C <sub>2</sub> ...
d.	Epenthesis under suffixation	
	SA-DEP <b>violated</b> :	... C V <sub>1</sub> ] <sub>s</sub> C V <sub>2</sub> ...
	Segment epenthesized.	... V C <sub>1</sub> ] <sub>s</sub> V C <sub>2</sub> ...

- Because epenthesis is allowed under suffixation in Campa, SA-DEP is not able to perform the necessary duties of the constraint X in the conspiracy analysis of the Campa pattern.

### 3 The Level Alternative

- The analysis is simplicity itself: MAX and DEP just switch places between the suffixation and prefixation levels, as shown in the following tableaux. Because the lower-ranked of the two faithfulness constraints in each level is the one that is optimally violated both in hiatus and in clusters, the phonological symmetry of the Campa pattern is accounted for.

**Tableau 14: Campa level analysis, prefixation**

	Input: ... V <sub>1</sub> p[ V <sub>2</sub> ...	... C <sub>1</sub> p[ C <sub>2</sub> ...	ONSET / NoCODA	DEP	MAX
<i>hiatus / cluster</i>	a. ... V <sub>1</sub> p[ V <sub>2</sub> ...	... C <sub>1</sub> p[ C <sub>2</sub> ...	* !		
<i>epenthesis</i>	b. ... V <sub>1</sub> C <sub>p</sub> [ V <sub>2</sub> ...	... C <sub>1</sub> V <sub>p</sub> [ C <sub>2</sub> ...		* !	
<i>V<sub>1</sub>/C<sub>1</sub> deletion</i>	c. ☞ ... ∅ <sub>1</sub> p[ V <sub>2</sub> ...	... ∅ <sub>1</sub> p[ C <sub>2</sub> ...			*

**Tableau 15: Campa level analysis, suffixation**

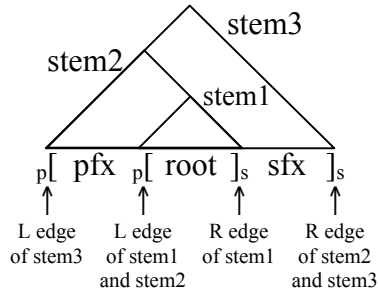
	Input: ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	ONSET / NoCODA	MAX	DEP
<i>hiatus / cluster</i>	a. ... V <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	... C <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...	* !		
<i>epenthesis</i>	b. ☞ ... V <sub>1</sub> ] <sub>s</sub> C V <sub>2</sub> ...	... C <sub>1</sub> ] <sub>s</sub> V C <sub>2</sub> ...			*
<i>V<sub>1</sub>/C<sub>1</sub> deletion</i>	c. ... ∅ <sub>1</sub> ] <sub>s</sub> V <sub>2</sub> ...	... ∅ <sub>1</sub> ] <sub>s</sub> C <sub>2</sub> ...		* !	

- There is no explanation here for why the morphological asymmetry of the Campa pattern is the way that it is and not exactly the other way around. Under the conspiracy analysis, the explanation for the morphological asymmetry lies in the counterfactual consideration that V<sub>1</sub>/C<sub>1</sub> deletion under suffixation would result in deletion of stem material, violating SA-MAX. This conspiracy analysis of the Campa pattern is not only possible, but desirable.

### 4 The Alignment Alternative

- Another constraint that appears to be a likely candidate for the mystery constraint X in a conspiracy analysis is a morphophonological alignment constraint (McCarthy & Prince 1993ab); specifically, one aligning stem edges with syllable edges. Following fairly standard practice (even if often only implicit), I define a ‘stem’ as a recursive morphological category that dominates the root and each subsequent affixed form derived from that root.

(8) Stems and edges



*Note:* It is very likely the case that prefixes are internal to suffixes at least in Axininca, for a number of reasons including the fact that prefixed subminimal roots are not augmented (McCarthy & Prince 1993a:49). The point is irrelevant, however, since alignment constraints are insensitive to degree of embedding.

- Note that since a prefix occurs to the left of its stem and a suffix occurs to its right, a stem-to-syllable alignment constraint should in principle be capable of correctly distinguishing prefixation and suffixation when it comes to deletion and epenthesis.

(9) Alignment constraints

- a. ALIGN-L: Align(Stem, Syllable, Left)

The left edge of a stem corresponds to the left edge of a syllable.

- b. ALIGN-R: Align(Stem, Syllable, Right)

The right edge of a stem corresponds to the right edge of a syllable.

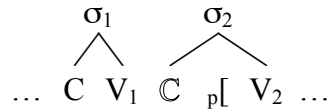
- ALIGN-L is satisfied by all suffixal deletions and epentheses — vacuously, because there is no left edge of a stem to speak of in the suffixation context. Focus on prefixation:

(10) Satisfaction vs. violation of ALIGN-L

- a. C epenthesis under prefixation

ALIGN-L **violated:**

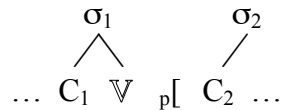
Left edge of stem 'p[ ]' is not aligned with left edge of  $\sigma_2$ .



- b. V epenthesis under prefixation

ALIGN-L **satisfied:**

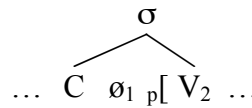
Left edge of stem 'p[ ]' is aligned with left edge of  $\sigma_2$ .



- c. V<sub>1</sub> deletion under prefixation

ALIGN-L **violated:**

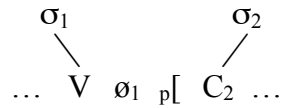
Left edge of stem 'p[ ]' is not aligned with left edge of  $\sigma$ .



- d. C<sub>1</sub> deletion under prefixation

ALIGN-L **satisfied:**

Left edge of stem 'p[ ]' is aligned with left edge of  $\sigma_2$ .



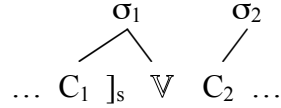
- Note that ALIGN-L is satisfied by all consonant cluster resolution strategies. ALIGN-L is thus unable to account for the cluster resolution half of the Campa pattern, and thus for its phonological symmetry. ALIGN-L fails as a substitute for SA-MAX as the constraint X.

- Furthermore, ALIGN-L is incorrectly violated by a form that must be allowed in Campa; namely, V<sub>1</sub> deletion under prefixation (10)c: the deleted vowel forces a syllable to straddle the left stem boundary. ALIGN-L thus fails to distinguish prefixation from suffixation in a way that corresponds to the morphological asymmetry of the Campa pattern.
- ALIGN-R is (vacuously) satisfied by all prefixal deletions and epentheses, because there is no right edge of a stem in the prefixation context. Focus on suffixation:

(11) Satisfaction vs. violation of ALIGN-R

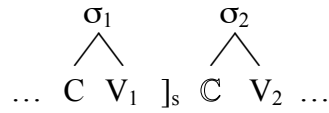
a. V epenthesis under suffixation

ALIGN-R **violated**:  
Right edge of stem ‘]s’ is not aligned with right edge of  $\sigma_1$ .



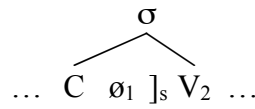
b. C epenthesis under suffixation

ALIGN-R **satisfied**:  
Right edge of stem ‘]s’ is aligned with right edge of  $\sigma_1$ .



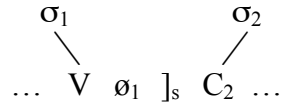
c. V<sub>1</sub> deletion under suffixation

ALIGN-R **violated**:  
Right edge of stem ‘]s’ is not aligned with right edge of  $\sigma$ .



d. C<sub>1</sub> deletion under suffixation

ALIGN-R **violated??**:  
Is the right edge of stem ‘]s’ aligned with right edge of  $\sigma_1$ ?



- ALIGN-R is violated by vowel epenthesis (11)a, which needs to be allowed under suffixation in Campa. It may seem at first that we can capitalize on the ambiguity surrounding C<sub>1</sub> deletion (11)d; if ALIGN-R is violated by this kind of candidate, then the resulting tie with vowel epenthesis could lead to the latter’s optimality. However:

**Tableau 16: Incorrect deletion pattern predicted by ALIGN-R**

	Input: ... C <sub>1</sub> ]s C <sub>2</sub> ...	NoCODA	ALIGN-R	DEP	MAX
<i>cluster</i>	a. ... C <sub>1</sub> ]s C <sub>2</sub> ...	* !			
<i>epenthesis</i>	b. ... C <sub>1</sub> ]s V C <sub>2</sub> ...		*	* !	
<i>C<sub>1</sub> deletion</i>	c. <del>!]</del> ... empty <sub>1</sub> ]s C <sub>2</sub> ...		*		*

- In sum, alignment constraints cannot account for the Campa pattern, much less capture the basic generalization that appears to govern its morphological asymmetry: that the preferred resolution strategy, deletion, is blocked just in case stem material would be lost.

## 5 Typological considerations

(12) Questions that must be addressed

- a. Which analysis captures linguistically more significant generalizations?
- b. What phonologically symmetrical and/or morphologically asymmetrical (specifically, prefix vs. suffix) deletion and epenthesis patterns are attested in natural languages?
- c. What patterns are and are not predicted by each analysis?
- d. Which analysis provides a better fit with the attested patterns?

- 4 outcomes, 2 contexts, 2 situations: total number of possible patterns =  $\left((4)^2\right)^2 = 256$
- 7 constraints: total number of possible rankings =  $7! = 5040$

*Stem-affixed form faithfulness predicts 22 patterns*

- ⇒ Campa pattern correctly accounted for.
- ⇒ Phonological symmetry. A particular hiatus resolution strategy is never matched with a different cluster resolution strategy in the same context (prefix/suffix).
- ⇒ Resolution strategies for hiatus and clusters are otherwise independent, due to independence of ONSET and NOCODA.
- ⇒ Prefixal  $V_2 / C_2$  deletion not possible.

*Alignment-1 (violated by deleted segments caught between edges) predicts 38 patterns*

*Alignment-2 (not violated by deleted segments caught between edges) predicts 39 patterns*

- ⇒ Campa pattern incorrectly unaccounted for.
- ⇒ No phonological symmetry. A particular hiatus resolution strategy may be matched with a different cluster resolution strategy in the same context (prefix/suffix).
- ⇒ *Alignment-1*: Prefixal  $V_2 / C_2$  deletion not possible, suffixal  $C_2$  deletion not possible either.
- ⇒ *Alignment-2*: Neither  $C_2$  deletion is possible, but prefixal  $V_2$  deletion is possible.

*SA-Faith + Alignment-1 ( $9! = 362,880$ ) predicts 44 different patterns*

- ⇒ The Campa pattern is predicted, but phonological symmetry is compromised.
- ⇒ Prefixal  $V_2 / C_2$  deletion still not possible.
- ⇒ Suffixal  $C_2$  deletion is possible again.

*SA-Faith + Alignment-2 ( $9! = 362,880$ ) predicts 60 different patterns*

- ⇒ The Campa pattern is predicted, but phonological symmetry is compromised.
- ⇒ Prefixal  $C_2$  deletion still not possible, but prefixal  $V_2$  deletion is possible.
- ⇒ Suffixal  $C_2$  deletion is possible again.

- Though preliminary, the results just shown reveal that either of the two alignment analyses on its own has the capacity to undermine known cross-linguistic generalizations about how hiatus and clusters are resolved — namely, they can't account for the Campa pattern.
- Phonological symmetry may be too strong, so some combination of stem-affixed form faithfulness and alignment (I would think probably Alignment-1) may be necessary.

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