

Faith in Moras: A New Account of Prosodic Faithfulness¹

Rebeka Campos-Astorkiza
University of Southern California
rebekaca@usc.edu

1. Goals of the paper

- To present the traditional formulation of DEP- μ and the problems raised by this constraint:

1- it predicts that coda consonants may contrast in moraic status within a language

2- it gives rise to unattested syllabification patterns (ak.la vs. a.kla).

- To argue for a new definition of this prosodic constraint: it will distinguish between regular syllabification and lengthening phenomena.

2. Traditional formulation of DEP- μ

- McCarthy (1997) presents the following definition of DEP- μ within the Correspondence Theory framework:

(1) DEP- μ

Every mora in S_2 has a correspondent in S_1 .

- S_1 and S_2 are two structures in correspondence relation, e.g. input and output.

- DEP- μ penalizes insertion of a mora.

- DEP- μ doesn't distinguish between:
 - insertion of mora to syllabify segment as nucleus or moraic coda.
 - insertion to lengthen a segment.

3. Problems for DEP- μ

3.1. 1st Problem: Weight-contributing coda consonants

- Coda consonants may be weight-contributing (linked to a mora) or weightless (not linked to a mora), depending on the language.

- **Weight-by-Position (WBP)** (Hayes 1989): coda consonants are moraic/weight-contributing.

¹ I'm gratefully indebted to Elliott Moreton, Mario Saltarelli and Rachel Walker for insightful comments and constant support. I'd also like to thank the phonology-phonetics group at USC. This work was partially funded with a Basque government scholarship.

- WBP stands in conflict with some other constraint: their relative ranking indicates whether codas are moraic.
- Given Richness of the Base (Prince and Smolensky 1993), we cannot predict moraic input specification: ranking of constraints is responsible for output distribution of moras.

➤ Conflict between WBP and DEP- μ :

- Consider conflict between DEP- μ and WBP, crossed with the possibilities made available by Richness of the Base:

(2) for a non-moraic input.	(3) for a moraic input.	
a. WBP >> DEP- μ : CVC \rightarrow CVC ^{μ} μ -insertion to satisfy WBP (weight-contributing coda)	a. WBP >> DEP- μ : CVC ^{μ} \rightarrow CVC ^{μ} WBP satisfied by presence of μ (weight-contributing coda)	} No Contrast
b. DEP- μ >> WBP: CVC \rightarrow CVC μ -insertion to satisfied WBP is blocked (weightless coda)	b. DEP- μ >> WBP: CVC ^{μ} \rightarrow CVC ^{μ} WBP satisfied by presence of μ (weight-contributing coda)	

- **Problem:**

- ranking (b), DEP- μ >> WBP, yields language in which coda consonants contrast in moraic status.
- prediction is problematic: not aware of any such languages.

➤ Conflict between WBP and * μ /C:

- WBP is in conflict with a constraint against moraic consonants:

(4) * μ /C (Broselow, Chen and Huffman 1997)
A mora must not be headed by a consonant.

- Consider the interaction between WBP and * μ /C w.r.t. two inputs varying in their moraic status:

(5) for a non-moraic input.	(6) for a moraic input.	
a. WBP >> * μ /C: CVC \rightarrow CVC ^{μ} weight-contributing coda	a. WBP >> * μ /C: CVC ^{μ} \rightarrow CVC ^{μ} weight-contributing coda	} No Contrast
b. * μ /C >> WBP: CVC \rightarrow CVC weightless coda	b. * μ /C >> WBP: CVC ^{μ} \rightarrow CVC ^{μ} weightless coda	

- We get the same result with both rankings regardless of the moraic specification of the input.

Observations:

- ✦ DEP- μ is not necessary for deciding the moraicity of the coda consonants.
- ✦ However, DEP- μ is able to block insertion of a mora to satisfy WBP.

3.2. 2nd Problem: Unattested syllabification contrasts

3.2.1 Background factorial typology

- Let's consider the factorial typology of WBP, $*\mu/C$ and DEP- μ , w.r.t. two inputs with different moraic status:

(7) for non-moraic inputs:

- a- (DEP- μ >>), $*\mu/C$ >> WBP, (>>DEP- μ) → weightless coda.
- b- WBP>> $*\mu/C$ (>>), DEP- μ → weight-contributing coda.
- c- **DEP- μ >>WBP>> $*\mu/C$ → weightless coda.**

(8) for moraic inputs:

- a- (DEP- μ >>), $*\mu/C$ >> WBP, (>>DEP- μ) → weightless coda.
- b- WBP>> $*\mu/C$ (>>), DEP- μ → weight-contributing coda.
- c- **DEP- μ >> WBP>> $*\mu/C$ → weight-contributing coda.**

- the outcome of these rankings is exemplified in the following tableaux:

(7') for a non-moraic input

a. CVC → CVC.

/CVC/	DEP- μ	$*\mu/C$	WBP
a. CVC ^μ	*(!)	*(!)	
☞ b. CVC			*

b. CVC → CVC^μ.

/CVC/	WBP	$*\mu/C$	DEP- μ
☞ a. CVC ^μ		*	*
b. CVC	*!		

c. CVC → CVC.

/CVC/	DEP- μ	WBP	$*\mu/C$
a. CVC ^μ	*!		*
☞ b. CVC		*	

(8') for a moraic input.

a. CVC^μ → CVC.

/CVC ^μ /	DEP- μ	$*\mu/C$	WBP
a. CVC ^μ		*!	
☞ b. CVC			*

b. CVC^μ → CVC^μ.

/CVC ^μ /	WBP	$*\mu/C$	DEP- μ
☞ a. CVC ^μ		*	
b. CVC	*!		

c. CVC^μ → CVC^μ.

/CVC ^μ /	DEP- μ	WBP	$*\mu/C$
☞ a. CVC ^μ			*
b. CVC		*!	

- when $*\mu/C$ dominates WBP (7'a, 8'a), codas are weightless regardless of position of DEP- μ .
- when WBP dominates $*\mu/C$, we get different results:
 - (7'c): DEP- μ penalizes insertion of a mora to satisfy WBP and this results in a weightless coda.
 - (8'c): the same ranking gives a weight-contributing coda since the mora of the coda is present in the input.

➤ fixed hierarchy?

- Whenever codas are moraic, fixed hierarchy: WBP >> $*\mu/C$, DEP- μ
- Reasons against a fixed hierarchy:
 - fixed hierarchies on OT involved constraints of the same type. For example: markedness constraints governing place of articulation and faithfulness to the root over faithfulness to the affix (Prince & Smolensky 1993, Padgett 2002). WBP is a markedness constraint and DEP- μ is a faithfulness constraint.
 - DEP- μ may be relevant for lengthening phenomena.

3.2.2. Unattested syllabification contrasts: ak.la vs. a.kla:

- interaction of the ranking in (c) above, i.e., DEP- μ >> WBP >> $*\mu/C$ with other markedness constraints give rise to unattested patterns of syllabification. (see Bermúdez-Otero (2001) for a similar observation)
- consider a language where:
 - coda consonants are moraic → WBP >> $*\mu/C$
 - intervocalic biconsonantal clusters are heterosyllabic regardless of their sonority contour → $*\text{ComplexOnset}$ >> CONTACT
- (9) $*\text{ComplexOnset}$ (Prince and Smolensky 1993)
The onset comprises no more than one segment.
- (10) CONTACT (Davis & Shin 1999, Venneman 1988)
Given a syllable contact $\alpha.\beta$, α must be more sonorous than β
- DEP- μ and WBP dominate $*\text{ComplexOnset}$.
- final ranking → DEP μ , WBP >> $*\text{ComplexOnset}$ >> CONTACT, $*\mu/C$

- Two potential inputs differing on moraic status give different outputs.

(11)² moraic specification for coda consonant in the input.

/a^μk^μla^μ/ → [a^μk^μ.la^μ]

/a ^μ k ^μ la ^μ /	DEP-μ	WBP	*ComplexOnset	CONTACT	*μ/C
<p>a. a k.l a</p>		*!		*	
<p>b. a k.l a</p>		*!	*		
<p>c. a k.l a</p>				*	*
<p>d. a k.l a</p>			*!		*
<p>e. a.k l a</p>			*!		

- candidate (c) is the optimal output. It satisfies the high ranked constraints, including DEP-μ.

² Weightless coda consonants are linked to the mora headed by preceding vowel, following (Hayes 1989)

(12) non-moraic specification for coda consonant in the input.

/a^μkla^μ/ → [a^μ.kla^μ]

/a ^μ kla ^μ /	DEP-μ	WBP	*ComplexOnset	CONTACT	*μ/C
<p>a. a k.l a</p>		*!		*	
<p>b. a k.l a</p>		*!	*		
<p>c. a k.l a</p>	*!			*	*
<p>d. a k.l a</p>	*!		*		*
<p>e. a . k l a</p>			*		

- Candidate (e) is the optimal output. It satisfies the top ranked constraints.
- Candidate (c), the winner in tableau (11), is ruled out due to its violation of DEP-μ. If insertion of a mora by WBP were not penalized by this prosodic constraint, (c) would be the winner.

• Consequently, we get the syllabification contrast ak.la versus a.kla. According to Hayes (1989), this pattern is unattested.

Summary of Problems:

- 1- DEP- μ predicts that coda consonants may contrast in moraicity within the same language.
- 2- DEP- μ predicts unattested syllabification contrast such as [ak.la] vs. [a.kla].

4. Proposal: New moraic faithfulness constraint

- Problems suggest that DEP- μ should not penalize insertion of a mora in the processes of syllabification of vowels or coda consonants by WBP.
- It should penalize lengthening phenomena.
- To bring this idea into the formulation of the constraints, I make use of the notion of positional μ -licensing. (cf. Bermúdez-Otero n.d.)

➤ positional μ -licensing

- Vowels and coda consonants linked to mora due to their position, i.e., nucleus or coda → these segments are positionally μ -licensed.
- Mora links segments into prosodic structure:
 - only one mora is necessary to positionally μ -license a segment.
 - if another mora is linked to the segment, lengthening is obtained (lengthened vowels)
 - if segment is directly linked to another prosodic unit, lengthening takes place (geminate consonants).

(13) Positional μ -licensing

A segment α is positionally μ -licensed by a mora μ iff μ is the only prosodic unit directly dominating α .

- A mora is a positional μ -licenser if it is the only prosodic unit heading the relevant segment.

(14) Positional μ -licenser

Let μ be a mora and α be a segment, μ is a positional μ -licenser of α , iff μ is the only prosodic unit immediately dominating α .

(15) Non-positional μ -licenser

Let μ be a mora and α be a segment, μ is a non-positional μ -licenser of α , iff μ is not the only prosodic unit immediately dominating α .

- This notion is incorporated into the definition of a new moraic faithfulness constraint:

(16) P(ositional)-DEP- μ :

A non-positional μ -licenser mora in S_2 has a correspondent in S_1 .

Result: P-DEP- μ only penalizes moras inserted that lead to lengthening.

- Let's illustrate how P-DEP- μ works. Consider which output representation violate this constraint:

(17)³ Non-moraic inputs

Input	Output	Positional μ -licenser	P-DEP- μ	
a. V C	$\begin{array}{c} \mu_1 \\ \backslash \\ V \ C \end{array}$	Yes	✓	(a) non-moraic coda
b. V C	$\begin{array}{c} \mu_1 \ \mu_2 \\ \ \\ V \ C. \end{array}$	Yes	✓	(b) moraic coda
c. V	$\begin{array}{c} \mu_1 \ \mu_2 \\ \ / \\ V \end{array}$	No	* *	(c) lengthened vowel
d. C	$\begin{array}{c} \mu_1 \ \sigma \\ \ / \\ C. \end{array}$	No	*	(d) geminate consonant

5. New Constraint solves previous problems.

5.1. New constraint and codas contrasting in moraic status

- Remember the ranking that predict that coda consonant may contrast in moraicity:

(18) DEP- μ >> WBP

- Let's consider the interaction of P-DEP- μ and WBP with respect to two possible inputs.

³ I follow Hayes (1989) representation of weightless coda consonants as being linked to the mora headed by the vowel in the syllable nucleus, but this constraint works in the same way with other kind of representations.

(19) non-moraic input
CVC → CVC^μ

/CVC/	DEP-μ	P-DEP-μ	WBP
a. CVC			*!
b. CVC ^μ	*		

(20) moraic input
CVC^μ → CVC^μ

/CVC ^μ /	DEP-μ	P-DEP-μ	WBP
a. CVC			*
b. CVC ^μ			

No Contrast

- compare how DEP-μ and P-DEP-μ work:
 - for moraic input → they behave similarly since mora is already in input, there is no insertion.
 - For non-moraic input → they behave differently. P-DEP-μ does not penalize insertion of mora to satisfy WBP.
- P-DEP-μ gets rid of the wrong prediction made by traditional DEP-μ

5.2 New Constraint and unattested syllabification patterns

- Traditional DEP-μ gives to following unattested syllabification patterns: ak.la vs. a.kla.
- Problematic ranking was that from tableaux (9) and (10), repeated in (16)

(21) DEP-μ, WBP >> *_{[σ} CC >> CONTACT, *_μ/C

- Tableaus (22) and (23) show interaction of P-DEP-μ with other constraints w.r.t to a moraic and a non-moraic input. Also, a column with traditional DEP-μ is seen in order to compare how both constraints behave.

(22) moraic specification for coda consonant in the input.

/a^μk^μla^μ/ → [a^μk^μ.la^μ]

/a ^μ k ^μ la ^μ /	Traditional DEP-μ	P-DEP-μ	WBP	*Complex Onset	CONTACT	*μ/C
<p>a. a k.l a</p>			*!		*	
<p>b. a k l a</p>			*!	*		
<p>c. a k.l a</p>					*	*
<p>d. a k . l a</p>				*!		*
<p>e. a . k l a</p>				*!		

- When input is moraic, P-DEP-μ behaves like traditional DEP-μ

(23) non-moraic specification for coda consonant in the input.

$/a^{\mu}kla^{\mu}/ \rightarrow [a^{\mu}k^{\mu}.la^{\mu}]$

$/a^{\mu}kla^{\mu}/$	Traditional DEP- μ	P-DEP- μ	WBP	*Complex Onset	CONTACT	* μ/C
<p>a. a k.l a</p>			*!		*	
<p>b. a k . l a</p>			*!	*		
<p>c. a k . l a</p>	*				*	*
<p>d. a k . l a</p>	*			*!		*
<p>e. a . k l a</p>				*!		

- When input is non-moraic, P-DEP- μ behaves differently from traditional DEP- μ
- Unattested syllabification is lost. Output of both tableaux is [ak.la]
- In tableau (23), P-DEP- μ does not penalize insertion of mora to satisfy WBP in candidate (c).

6. Conclusion and further issues

- Traditional DEP- μ proves to be problematic in different aspects:
 - it predicts that moraic and non-moraic coda consonants can be contrastive in a language.
 - It gives rise to unattested syllabification contrasts (ak.la vs.a.kla)
- Main problem with DEP- μ → it does not distinguish between syllabification and lengthening processes.
- New definition of P-DEP- μ is based on the positional μ -licenser character of moras.
- A mora is sufficient to link a mora-bearing segment to the prosodic hierarchy: the intervention of more prosodic elements leads to lengthening.
- Moras that do not positionally μ -license a segment are subject to P-DEP- μ .
- This new approach to moraic faithfulness solves the problem raised by previous accounts, and provides an insight to the dual status of moras, which can be inserted to satisfy structural demands such as WBP or to lengthen a segment.

➤ Further issues

- MAX- μ , no deletion of moras: do we extend the notion of positional μ -licensers to this moraic faithfulness constraint?
- What about the consequences for correspondence theory? Can the same definition apply to other prosodic units?
- Does the P-DEP- μ help explain phenomena that DEP- μ failed to explain?
- Further explore the behavior of moras and implications for moraic theory.

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