Mora Augmentation in the Alabama Imperfective: an Optimality Theoretic Perspective

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Abstract

In the Alabama language an imperfective aspect can be formed by geminating the onset consonant or lengthening the vowel of the penultimate syllable of a word. The imperfective morpheme consists of a single mora (with a linked high tone), and I demonstrate that whether gemination or lengthening takes place follows directly from a ranking of relevant constraints. The current optimality analysis differs from previous analyses (Hardy and Montler 1988a; Samek-Lodovici 1992) as I propose the imperfective mora is underlyingly aligned at the right edge of the word, instead of treating it as an infix. Also addressed briefly is a secondary issue in which geminate /b/ surfaces as an [mb] sequence. I conclude with a discussion comparing Alabama mora augmentation with strategies in other languages. I suggest there may be a universal tendency to prefer consonantal strategies to vowel strategies in morphological mora augmentation processes.

1. Introduction

Alabama is a Muskogean language currently spoken by several hundred inhabitants of the Alabama-Coushatta Indian Reservation in Polk County, Texas. A small group of linguists has actively studied the language, resulting in a publication of a dissertation in 1982 (Lupardus) and an Alabama dictionary in 1993 (Sylestine, Hardy et al.).

It has long been known that Muskogean languages possess a range of radical morphological processes involving apparent internal modification of roots (Sapir 1921). In Alabama, examples of radical morphology include gemination of consonants, lengthening of vowels, infixation of segments, affixation of high tone accent, nasalization, and subtraction of morphemes (Hardy and Montler 1988a; 1988b). This paper examines the formation of the Alabama imperfective, in which either consonant gemination or vowel lengthening takes place. The present study constitutes a reanalysis of the phonology of the Alabama imperfective form, described in detail by Hardy and Montler (1988a).

A study of morphological gemination by Samek-Lodovici (1992) gave a treatment of the Alabama imperfective from a constraint-based perspective. However, the development and expansion of the optimality theory framework (Prince and Smolensky 1993), including the use of generalized alignment constraints (McCarthy and Prince 1993), allows for new insights into this morphological and phonological issue.

2. Description of imperfective alternation

The imperfective aspect of an Alabama word is based on its perfective form and is obtained by adding both weight and prominence (high tone) to the stem. In the first group of examples in (1), the added syllable weight results in the gemination of the onset of the penultimate syllable. Periods indicate syllable boundaries.

(1)		Perfective	Imperfective	Gloss
	a.	ci.pii.la	cíp.pii.la	small
	b.	ho.co.ba	hóc.co.ba	big
	c.	mi.sii.li	mís.sii.li	close eyes
	d.	a.taa.nap.li	a.tán.nap.li[1]	rancid

[1] This example is taken from personal communication between Samek-Lodovici and Montler, cited in Samek-Lodovici (1992).

Note that in (1d) the vowel of the antepenultimate syllable is long, but this does not prevent gemination from taking place. A trimoraic syllable does not result, however – syllable weight is maintained by shortening the long vowel. In contrast, when a bimoraic antepenultimate syllable is closed by a consonant, gemination is prevented. The data in (2) show that when the antepenultimate syllable is closed or when the word is disyllabic, the result is the lengthening of the vowel of the penultimate syllable.

(2)		Perfective	Imperfective	Gloss
	a.	i.bak.pi.la	i.bak.píi.la	turn upside down
	b.	i.si	íi.si	catch
	c.	hof.na	hóof.na	smell
	d.	is.ko	íis.ko	drink

Note that the example *ho.co.ba* (1b), which has the imperfective form *hóc.co.ba,* contains both an open antepenultimate syllable and a short penultimate vowel. This form crucially illustrates that onset gemination is preferred over vowel lengthening as a strategy for realizing the imperfective morpheme. I summarize the data in (1) and (2) by giving a descriptive generalization accounting for the observed alternations in (3).

(3) a. If the antepenultimate syllable is open, then the onset of the penultimate syllable is geminated. A high tone is realized on the antepenultimate syllable nucleus.

b. If the antepenultimate syllable is closed (or the word has only two syllables), then the vowel of the penultimate syllable is lengthened. A high tone is realized on the penultimate syllable nucleus.

In each of the cases in (3), the location of the accompanying high tone is predictable. Linked to the augmented mora, the high tone appears on the first vocalic peak to the left of the geminated segment[2]. The full realization of the imperfective morpheme requires the realization of the high tone. The high tone aids the hearer in distinguishing the perfective and imperfective forms; however, due to the predictable nature of the high tone placement, I omit further discussion of it in the present study.

3. Optimality theoretic analysis

The principle of lexicon optimization (Prince and Smolensky 1993) in optimality theory derives from Stampe's (1972) formulation that underlying forms should always seek to match surface forms unless given evidence to the contrary. The unmarked form, which I refer to as the perfect, differs from the imperfect only in weight an tone; I will assume it is the input for the imperfective. Since syllabification is relevant to constraints governing the placement of the augmented imperfective mora, I will argue for the existence of base-identity constraints that reference the perfective form in determining the imperfective.

This analysis will differ from previous analyses (Hardy and Montler 1988a; Samek-Lodovici 1992) in that I assume the imperfective mora (μ_i) is not simply "placed" between the onset and vowel segments of the penultimate syllable. Instead, I show that underlying the imperfective mora is at the right edge of the word, according to the constraint ALIGN-R.

[2] An alternate formulation of the tone placement rule would be that tone is realized on the tautosyllabic vocalic peak of the syllable in which the additional weight is realized. Both this description and the one above are accurate, though the one given in the text is more theory-neutral. Specifically, as I will argue later, it is preferable to view the mora augmentation as affecting the segments in the penultimate syllable in each case, not the penultimate for vowel lengthening and the antepenultimate in onset gemination.

(4) ALIGN-R(μ_i,PRWD) – Align the imperfective mora at the right edge of the prosodic word. (This constraint is taken to be gradient: for every syllable left of the final syllable that μ_i appears in, one violation is assessed.)

ALIGN-R is a dominated constraint because mora augmentation never actually results in a heavier final syllable. This is a result of a highly ranked constraint in Alabama requiring that the identity of segments standing in the final syllable be preserved[3]. IDENT-BA(FINALσ), which is formulated in (5), is similar to constraints in other languages preserving the identity of the input syllable (often the initial syllable). It is also reminiscent of a NON-FINALITY or extrametricality (Liberman and Prince 1977) constraint for metrical stress theory in which stress placement rules seem to disregard final segments or syllables.

(5) IDENT-BA(FINALσ) – Let α be a segment in the base, and β be a correspondent in the output form. If α is a segment in the final syllable of the base, then α and β must agree in their feature specifications.

IDENT-BA(FINALσ) will specifically be used to ensure that segments in the base and output forms agree in their specification for weight.

Some additional explanation of the constraints in (4) and (5) is required. Specifically, I claim that ALIGN-R(μ_i,PRWD) considers both the onset gemination and vowel lengthening strategies for mora augmentation as incurring an identical number of violations, despite the fact that the added weight of a geminate consonant is realized in the preceding syllable. I will also show gemination of the onset consonant of the final

[3] Research in the Muskogean language family shows that, historically, the final syllable of Alabama words was a suffix. This insight provides a diachronic explanation of why the mora surfaces close to the right edge, but never *at* the right edge of a word. However, child language learners are not familiar with the history of the Alabama language; hence, the learner must adopt some type of constraint in order to preserve the integrity of the final syllable.

syllable *does* result in a violation of IDENT-BA(FINALσ). Examining in the tableau in (6), note that candidate (6b) does not incur a violation of ALIGN-R(μ_i,PRWD); however, it does incur a violation of IDENT-BA(FINALσ).

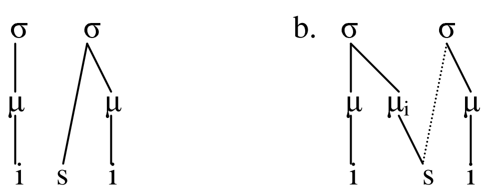
(6) /isi/ → [ii.si] 'catch'

Input: /isi + μ_i / Base: [i.si]	IDENT-BA(FINALσ)	ALIGN-R
a. i.sii	*!	
b. is.si	*!	
c. ☞ ii.si		*

IDENT-BA(FINALσ) >> ALIGN-R

I claim the candidate in (6b) violates IDENT-BA(FINALσ) due to the representation of geminate consonants in (7). As shown in (7a), the segment [s] stands in the final syllable of the base form. The segment [s] in (7b), which is in a correspondence relationship with the [s] in (7a), is linked to the imperfective mora. Because the two [s] segments are in correspondence but do not agree in their specification for weight, the form *is.si is disallowed as a potential imperfect.

(7) a. b.



[i.si] 'catch (perfect)' *[is.si] 'catch (imperfect)'

Along a similar line of reasoning, I claim gemination of [s] in the suboptimal candidate *is.si (6b) does not violate ALIGN-R. Although not explicitly stated above, ALIGN-R serves as a type of base-identity constraint also. Because [s] is in the final syllable of the base form, linking the imperfective mora to [s] in *is.si is treated as having augmented the weight of the final syllable; a violation of ALIGN-R is not incurred.

Continuing with the analysis, I consider the following constraints immediately relevant:

(8) a. IDENT-WT-VOWEL – An output vowel segment has the same moraic weight as its input correspondent.

b. *GEM – An output consonant shall not be a geminate.

c. MAX-μ_i – Realize the imperfective mora.

MAX-μ_i is an undominated constraint, and for now I only consider candidates in which it is respected. The interaction between IDENT-WT-VOWEL and *GEM is crucial. To obtain the result that the imperfective mora prefers to be realized further to the left of the right edge of the word, IDENT-WT-VOWEL is ranked over *GEM, as demonstrated in the tableau in (9).

(9) /hocoba/ → [hoc.co.ba] 'big'

Input: /hocoba + μ_i/ Base: [ho.co.ba]	IDENTBA(FINALσ).	ALIGN-R	IDENT-WT-VOWEL	*GEM
c. ho.coo.ba		*	*!	
d. ☞ hoc.co.ba		*		*

IDENT-IO(FINALσ) >> ALIGN-R, IDENT-WT-VOWEL >> *GEM

The candidates in (9) minimally violate *ALIGN-R while respecting IDENT-BA(FINALσ). This tableau crucially shows that gemination is indeed preferred over vowel lengthening to realize the imperfective mora.

In order for vowel lengthening to occur, the base form must consist of two syllables or have its antepenultimate syllable closed by a consonant. In either case, two seemingly competing markedness constraints are *COMPLEX and *μμμ-σ. These constraints, formulated in (10), both in turn compete against the mora morpheme realization constraint.

(10) a. *μμμ-σ – Trimoraic syllables are not permitted.

b. *COMPLEX – No tautosyllabic geminates or consonant clusters.

*COMPLEX prevents output containing either a complex onset or a complex coda, and, as evidenced by the lack of triconsonantal clusters, it is undominated. The μμμ-σ constraint is violated at the expense of syllable wellformedness constraint *COMPLEX, as shown in (11) below.

(11) /hof.na/ → [hoof.na] 'smell'

Input: /hofna + μ_i / Base: [hof.na]	*COMPLEX	*μμμ-σ
a. hoff.na	*!	
b. ☞ hoof.na		*
c. hhof.na	*!	

* COMPLEX >> μμμ-σ

However, *μμμ-σ is very much active in Alabama. The tableau in (12) has a base form of the input in which the penultimate and antepenultimate syllables are bimoraic,[4] thus making the realization of the imperfective mora "a bit more difficult." In this case, however, both *μμμ-σ and the imperfective mora realization constraint MAX-μ_i are respected. Instead, the underlyingly long vowel is shortened. This is considered a violation of IDENT-WT-VOWEL.

[4] The long vowel in the antepenultimate syllable is underlyingly bimoraic, while the penultimate syllable is assumed to be bimoraic due to a high-ranked WEIGHT-BY-POSITION constraint.

(12) /ataanapli/ → [a.tan.nap.li] 'rancid'

Input: /ataanapli + μ_i / Base: [a.taa.nap.li]	MAX-μ_i	ALIGN-R	*$\mu\mu\mu$-σ	IDENT-WT-VOWEL	*GEM
a a.taa.nap.li	*!				
b. a.taa.naap.li		*	*!	*	
c. a.taan.nap.li		*	*!		*
d. ☞ a.tan.nap.li		*		*	*

MAX-μ_i , ALIGN-R ,*$\mu\mu\mu$-σ >> IDENT-WT-VOWEL >> *GEM

To this point I have assumed that ALIGN-R is highly ranked, only clearly dominated by IDENT-BA(FINALσ). It could be reasonable to assume that when onset gemination is prevented in the penultimate syllable, perhaps gemination of the antepenultimate onset would be possible. This, however, is not the case – vowel lengthening is preferred:

(13) /ibakpila / → [i.bak.pi.la] 'turn upside down'

Input: /ibakpila + μ_i / Base: [i.bak.pi.la]	*COMPLEX	ALIGN-R	IDENT-WT-VOWEL	*GEM
a i.bakp.pi.la	*!	*		*
b. ib.bak.pi.la		**!		*
d. ☞ i.bak.pii.la		*	*	

*COMPLEX, ALIGN-R >> IDENT-WT-VOWEL >> *GEM

The constraints discussed thus far completely determine the observed alternations in the Alabama imperfective formation. A ranking summary appears in (14).

(14) IDENT-BA(FINALσ), MAX-μ_i , * COMPLEX
|
ALIGN-R, *$\mu\mu\mu$-σ
|
IDENT-WT-VOWEL
|
*GEM

4. A hypothetical form

One advantage of the optimality theory framework is that the constraints can make predictions about unseen forms. Hardy and Montler do not give any data with a closed antepenultimate and a heavy penultimate syllable, perhaps because no such form exists. However, the tableau in (15) illustrates the prediction the constraint ranking makes should such a form be considered by EVAL.

(15) /ibakpiila/ 'hypothetical form'

Input:/ibakpiila/ Base:[i.bak.pii.la]	MAX-μ_i	IDENT-BA(FINALσ),	*COMPLEX	ALIGN-R	*μμμ-σ	IDENT-WT-VOWEL	*GEM
a i.bak.pii.la	*!						
b. i.bak.pii.laa		*!					*
c. i.bak.piil.la		*!			*		
d. i.bakp.pii.la			*!		*		*
e. ib.bak.pii.la				**!		*	*
f. ☞ i.bak.pi**i**.la				*		*	

The predicted winning candidate in (15f) is similar to a failed candidate, (15a). However, in (15f), I assume that the underling long [ii] as underwent "shortening", following by "lengthening" when the imperfective mora was linked to it. I have treated the loss of the underlying mora as a violation of IDENT-WT-VOWEL, though it could also be viewed as a violation of a similarly ranked MAX-μ constraint instead. Interestingly, this hypothetical form would lend evidence to a functional reason as to the existence of the imperfective tone – the only difference between the base perfective form and the imperfective form in this hypothetical case would be the high tone over the penultimate syllable.

5. Another issue

In cases where mora augmentation results in gemination of /b/, the geminate /b/ is realized as an [mb] sequence. According to Hardy & Montler (1988a), /b/ is the only voiced stop in Alabama and it never occurs in coda position[5].

(16)

	Perfective	Imperfective	Gloss
a.	a.ban.ni	am.ban.ni	cross
b.	ta.bat.ka	tam.bat.ka	grab
c.	so.bay.li	som.bay.li	learn

Issues of positional faithfulness can be analyzed in two ways (Kager 1999). We can either assume that [b] is disallowed in coda position, or we can assume there is a highly ranked constraint imposing faithfulness to a [b] in onset position. These two views are presented in (17) and (18).

(17) Contextual markedness:

*VOICED-STOP]$_\sigma$ >> FAITH(VOICED-STOP) >> *VOICED-STOP

(18) Positional faithfulness

FAITH([$_\sigma$ VOICED-STOP) >> *VOICED-STOP >> FAITH(VOICED-STOP)

I will adopt the ranking in (17), though I note that further information about Alabama phonology could lead to an analysis supporting the constraints in (18). In order to predict that the imperfective form of ta.bat.ka is tam.bat.ka, we must have that *VOICED-STOP]$_\sigma$ and *μμμ-σ outrank DEP-CONS[6] and ICC-ORAL. Note that other consonant cluster

[5] The reverse analysis that /m/ → [b] in onset position cannot be correct; [m] widely appears in onset position.

[6] As shown further by the example in (XX), the DEP-CONS constraint seem to fail to capture the notion that consonant gemination is indeed occurring and that the coda /b/ surfaces as [m].

constraints, such as ICC-PLACE, ICC-VOICE, and ICC-CONTINUANCY, are respected in the choice of the optimal candidate in (19c).

(19) /tabatka/ → [tam.bat.ka] 'grab'

Input: /tabatka + μ_i / Base: [ta.bat.ka]	*VOICED-STOP]$_\sigma$	*$\mu\mu\mu$-σ	DEP-CONS	ICC-ORAL
a. ta.baat.ka		*!		
b. tab.bat.ka	*!			
c. ☞ tam.bat.ka			*	*

The tableau in (19) allows for a reformulation of the overall constraint hierarchy originally given in (14). Note that DEP-CONS must be ranked lower than *GEM in order to ensure gemination takes place instead of segment insertion. *VOICED-STOP]$_\sigma$ is presumably undominated, and the ranking of ICC-ORAL cannot readily be determined. These facts together yield the final constraint hierarchy in (20).

(20) IDENT-BA(FINALσ), MAX-μ_i , * COMPLEX, *VOICED-STOP]$_\sigma$

|

ALIGN-R, *$\mu\mu\mu$-σ

|

IDENT-WT-VOWEL

|

*GEM

|

DEP-CONS, ICC-ORAL

The issue of the [m] allomorph of /b/ has several other interesting features. First of all, an underlying /b/ always surfaces as [m] in coda position. In (21), the Alabama "subtractive" morphology removes two segments from the penultimate syllable to create the plural[7], showing an environment other than gemination in which /b/ surfaces as [m].

[7] It is not immediately clear from Hardy and Montler's description whether this could be a weight-sensitive process or not. "Two segments" can refer to a long vowel, a vowel and coda consonant, or, in the case of a light syllable, the entire syllable.

(21) /lobaf+ka/ [lo.baf.ka] 'hole'
/lob+ka/ [lom.ka] 'holes'

The [m] resulting from underlying /b/ is not like other [m]'s in the language; it does not undergo consonant place assimilation processes expected of other nasals. This is shown in (22).

(22) <u>/lom-/</u>
[lom.mi] 'hide'[8]
[lon.ci.ti] 'you hid'
[loŋ.ka] 'be hidden'

This type of example would be an interesting problem to look at in optimality theory; a serial rule-ordering approach would treat this as a case of counter-feeding where a nasal assimilation rule appears to apply before the positional rule changing /b/ to [m] in coda position. Furthermore, interactions with the subtractive morphology could prove quite interesting, especially if more data was available. However, I have only raised these issues to note that mora augmentation in Alabama is not completely devoid of secondary phonological processes; a full-fledged examination of the alternation between [b] and [m] is beyond the scope of the present examination of mora augmentation.

6. Cross-linguistic mora augmentation processes

As noted earlier, the affixation of weight to the Alabama stem is a common type of radical morphological process found in Muskogean languages. However, it is interesting to wonder whether such processes are common in other languages as well. For languages

[8] This is the only example given in Hardy and Montler, and it seems unfortunate that stems in (21) and (22) could be related semantically, calling into question whether /lom-/ is the truly the underling form.

that do have morphological mora augmentation, are there any generalizations that can be made about its use?

This section briefly looks at mora augmentation is three unrelated language families. In the first two languages, Saanich and Fula, I show that realization of a morphological mora prefers a consonantal strategy rather than a vowel strategy. That is, processes such as gemination or glottal stop insertion are preferred over vowel lengthening or light syllable reduplication. In a third language, Kariña, I examine a stress-based mora augmentation in which vowel lengthening is actually preferred over consonant gemination. I suggest that while consonantal processes are the preferred strategy for morphological mora augmentation, vowel processes are preferred in stress-based mora augmentation[9].

6.1 Saanich

In Saanich, a Salishan language, an actual aspect is created by mora augmentation. This data, taken from a second-hand source (Marlo 2002), shows three distinct strategies for forming the actual aspect, given in (23). The data can be assumed to be representative.

(23)	<u>Non-Actual</u>	<u>Actual</u>	<u>Gloss</u>
	a. tkʷə	təkʷ	breaking (stick)
	b. wə.qəs	wəʔ.qəs	send
	c. ɬap’	ɬa.ɬap’	eating (soup)

The formation of the actual aspect seeks to add weight to the left edge of the word. The patterning of the data is as follows: If the first syllable is light (23a-b), a consonant is

[9] The proposed classification of mora augmentation processes and their preferred lengthening strategies was suggested to me by Stuart Davis. Davis and Euda (2001) consider mora augmentation processes in Shizuoka Japanese, a language also supporting the proposed generalization.

placed in the coda position of the first syllable. This consonant is either the second consonant of a complex onset, or a glottal stop if the onset is simplex. If the first syllable of a word is closed by a consonant, as in (23c), partial reduplication of the first syllable is permitted in order to add syllable weight.

Crucially, reduplication is not the preferred strategy. Partial reduplication of a light initial syllable would in fact succeed in adding the desired weight, but the data show that this is not the default strategy. A coda consonant is used to add weight whenever possible, and hence a consonantal process appears to be the default morphological mora augmentation strategy in Saanich.

6.2 Fula

Fula is a Niger-Congo language spoken in West Africa. Purvis (2002) cites data in which the assumed underling form undergoes mora augmentation in order to be realized phonetically. The data in (24) exemplifies the general pattern given by Purvis, omitting details about the phonetic realization of certain geminate consonants.

(24)	Underling Form	Phonetic Representation	Gloss
	a. /lam-i/	[lam.mi]	(no gloss available)
	b. /gild-i/	[gil.di]	worm
	c. /kaak-i/	[kaa.ki]	leaf

All examples given by Purvis involve a CVC, CVVC, or CVCC form suffixed by a single vowel. The example in (24a) shows the added mora is realized only when the underlying stem is CVC. Presumably weight augmentation in (24b-c) would result in trimoraic syllables or tautosyllabic consonant clusters, resulting in violations of syllable markedness constraints.

Purvis assumes in his analysis that the augmented mora is specified as consonantal. However, in line with my analysis of Alabama moraic alternations, the pattern in Fula can be viewed as a ranking of IDENT-WT-VOWEL over *GEM. (An additional constraint against final long vowel might also have to be assumed). Regardless of the exact analysis, the output form for (24a) is not [laa.mi] or [la.mii]. Hence, the data paint a clear picture showing a consonantal strategy for mora augmentation is preferred.

6.3 Kariña

In Kariña, a Cariban language spoken in Eastern Venezuela, a regular pattern of rhythmic stress adds syllable weight. The data is taken from an analysis given by Grimes, Hathorn et al. (2002). As opposed to morphological mora augmentation, stress-based mora augmentation tends to prefer vowel lengthening.

In Kariña, the second syllable of a word always receives stress. The data in (25a-b) illustrate that the addition of a mora to the stressed syllable results in the lengthening of the vowel. However, as shown in (25c-d), when the vowel of the second syllable is [+high], the onset of the third syllable is geminated, resulting in added weight in the second syllable[10].

[10] Note that geminate fricatives are not allowed in Kariña; instead, weight is added by [h] insertion in the coda of the second syllable. Additionally, when the onset of the third syllable is [h], no weight is added, presumably due to the fact [h] is considered a fricative. Data exemplifying these generalizations have been omitted for the sake of clarity of presentation.

(25)	Underlying Forms	Phonetic Representation	Gloss
	a. /apo-rü/	[a.pǿ:.rü]	to touch
	b. /vena-ta-no/	[ve.ná:.ta.no]	to vomit
	c. /adu-ko/	[a.dúk.ko]	fry it!
	d. /asuka/	[a.súk.ka]	sugar

Because consonant gemination is not allowed in (25a-b), a consonantal strategy to mora augmentation in Kariña cannot be considered to be default. However, mora augmentation in this case is not considered morphological; it is the result of a WEIGHT-TO-STRESS constraint requiring stressed syllables to be heavy. Viewed as a stress-induced process, mora augmentation here appears to prefer vowel lengthening as the primary strategy for weight-addition, in line with stress-induced vowel lengthening in other languages.

7. Discussion

This paper presented a detailed analysis of morphological mora augmentation in Alabama. Relatively few key constraints were involved in producing the observed alternations, making this analysis rather straightforward and natural. An interesting idea for further work would be to examine how such radical morphological processes behave in the related Muskogean languages such as Choctaw or Koasati and whether any parallels can be drawn.

The ranking of IDENT-WT-VOWEL over *GEM was able to account for preference for the Alabama imperfective mora to attach to a consonantal segment. The discussion concerning mora augmentation strategies in other languages points towards a typology of mora augmentation in which morphological mora augmentation prefers consonant gemination over vowel lengthening. This could be viewed as a type of evidence for the idea of fixed or "universal" constraint rankings across languages. Indeed, other authors have proposed universal rankings, often for phonetic constraints (cf. Boersma 1998; Dinnsen and O'Connor 2001).

It is natural to wonder whether languages exist in which both morphological and stress-based mora augmentation are possible. This would present an interesting problem, as a ranking paradox between *GEM and IDENT-WT-VOWEL would result: IDENT-WT-VOWEL would need to be higher ranked for morphological mora augmentation, but *GEM would need to be required to be higher ranked for WEIGHT-TO-STRESS situations. If such a language exists[11], an analysis in which morphological moras are specified as [+consonantal] (and/or stress moras are specified [+vowel]) may be able to supercede this ranking paradox. In such a case, the Alabama analysis presented in this paper would require slight revisions.

In summary, I have presented a unified account for the alternation between two classes of imperfective forms in Alabama. I showed that the data could be accounted for using generally accepted constraints in optimality theory. I have also showed that, irrespective of any one particular analysis, the data clearly demonstrate a preference for consonant gemination over vowel lengthening in morphological mora augmentation in Alabama.

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[11] Perhaps there are many such languages; there existence is not unexpected, just unknown to me.

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