Featural Morphology: Evidence from Muna Irrealis Affixation[1]

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1. Introduction

Affixation has been extensively analyzed within Optimality Theory as a phenomenon relating two domains of linguistics, morphology and phonology. McCarthy and Prince (1993a, b) have developed a theory of prosodic morphology in which prosodic criteria delimit where an affix may be placed in a word. McCarthy (1995) and McCarthy and Prince (1995) have also examined this phenomenon in light of Correspondence Theory, looking at faithfulness relations between strings of phonological elements. Correspondence Theory was originally conceived to explain reduplicative copying (McCarthy and Prince 1993a), but has since been developed into a general theory of faithfulness relationships between lexical-surface forms, base-reduplicant forms and other analogous relations (McCarthy 1995, McCarthy and Prince 1995). In each of these cases, affixation is limited by the interaction of prosodic constraints and/or other phonological constraints with these correspondence relations.

In this paper I examine one such affixation process in Muna, an Indonesian language spoken on the island of Muna, southeast of Sulawesi and Indonesia (van den Berg, 1989). This affix takes four different forms: prefixation, substitution of the root initial segment, apparent deletion of the affix, and infixation. First, I argue that this affixation system cannot be determined solely on the language's prosodic criteria, but that any analysis of this data must also hinge on *featural morphology*, in which featural criteria are necessary to delimit the shape and position of this affix. A three-way interaction between syllable structure, input-output featural correspondence relations, and alignment accounts for the four distinct positions and shapes of this particular affix. Second, I argue that Correspondence can explain two different data patterns, resembling substitution and deletion, as one: coalescence. The substitution of the root initial segment is a case of overt coalescence, and the apparent deletion of the affix is a case of covert coalescence. The analysis presented here is similar to that of McCarthy and Prince (1993a) and Pater (1995), in which one constraint is able to

[1] Special thanks to Diana Archangeli, Amy Fountain, Sean Hendricks, Barb Meek, Melissa Niswonger, Sachiko Ohno, Keiichiro Suzuki, and the participants of the Linguistics 600, Fall 1995 class for their very helpful comments and questions.

account for a conspiracy of phenomena. My analysis is more complicated in that it employs a set of related identity constraints to decide if and how coalescence will occur, and it also relies on the interaction of two alignment constraints with these correspondence relations to allow for infixation. Finally, I show that these data provide one more piece of evidence for OT over a serial, rule-based approach.

In section 2 of this paper I give a description of the affixation paradigm. Sections 3.1 through 3.3 give the analysis of each related phenomenon. In section 4 I motivate an Optimality Theoretic analysis over a rule-based approach. Finally, I conclude in section 5.

2. The Affix

In Muna, the irrealis form of the verb has three purposes: one, to depict future tense, conditional tense, or a wish; two, to help form the negative; and three, to form special adjective forms (van den Berg, 1989). This affix is manifested in four different ways depending on the phonological features of the root initial segments in relation to the affix. The four manifestations are prefixation, nasal substitution, prefix deletion, and infixation.

Prefixation of /m-/ occurs when the root initial segment is a vowel:

(1)	**Root**	**Irr. + Root**	**Gloss**
(a)	ala	mala	'take, irr.'
(b)	ere	mere	'stand up, irr.'
(c)	uta	muta	'pick fruit, irr.'
(d)	o^{m}ba	mo^{m}ba	'appear, irr.'
(e)	a^{ŋ}kafi	ma^{ŋ}kafi	'follow, irr.'

The second pattern, nasal substitution of the affix /m-/ for the root initial segment, occurs when the root initial segment is voiceless and labial:

(2)	**Root**	**Irr. + Root**	**Gloss**
(a)	pili	mili	'choose, irr.'
(b)	po^{ŋ}ko	mo^{ŋ}ko	'kill, irr.'
(c)	foni	moni	'climb, go up, irr.'
(d)	fekiri	mekiri	'think, irr.'

The third pattern, an apparent deletion of the prefix, occurs when the root initial segment is voiced and either labial, nasal, or prenasalized:

(3)	Root	Irr. + Root	Gloss
(a)	baru	baru	'happy'
(b)	bala	bala	'big'
(c)	ma^{n}da	ma^{n}da	'repent, irr.'
(d)	nale	nale	'soft, weak'
(e)	^{m}bolaku	^{m}bolaku	'steal, irr.'
(f)	^{n}diwawa	^{n}diwawa	'yawn, irr.'

Notice that in the cases in (2), the feature [labial] is common to the root onsets and the affix, and in the cases in (3), the feature [voice] and either of the features [labial] or [nasal] (or both) are common to the root onsets and the affix. Compare these cases to those in which infixation occurs (in (4)): if the root initial segment is a consonant that is neither labial nor nasal, infixation of /m-/ occurs, along with epenthesis of the vowel /u/.[2]

(4)	Root	Irr. + Root	Gloss
(a)	turu	t-um-uru	'sleepy'
(b)	dadi	d-um-adi	'live, irr.'
(c)	ɗuɗu	ɗ-um-uɗu	'push, irr.'
(d)	kala	k-um-ala	'go, irr.'
(e)	gaa	g-um-aa	'marry, irr.'
(f)	ɣuse	ɣ-um-use	'rain, irr.'
(g)	suli	s-um-uli	'return, irr.'
(h)	re^{n}de	r-um-e^{n}de	'alight, irr.'
(i)	li^{m}ba	l-um-i^{m}ba	'go out, irr.'
(j)	horo	h-um-oro	'fly, irr.'

We see in (1) that in the case of an onsetless root, the form of the affix is a single consonant prefix that precedes the onsetless vowel. In the case of a root with an onset, three allomorphs surface: with voiceless labial root onsets, the form that the affix takes is substitution of the onset; with voiced labial, nasal, and prenasalized root onsets, the affix appears to be hidden; and with onsets that lack both the labial and nasal features, the form of the affix is VC, infixed directly after the onset. The important generalizations to make from these alternations are that the shape and location of the affix change in order to be consistent with the unmarkedness of open syllables that contain an onset, and specifically a single onset (i.e., no consonant clusters are allowed):

[2] I will discuss a possibility why specifically this vowel is the epenthetic one, in section 3.4.

(5)

	ROOT	ROOT + AFFIX
V-initial root	a.la	ma.la
C-initial root a)	fo.ni, pi.li	mo.ni, mi.li
b)	ba.ru, na.le	ba.ru, na.le
c)	da.di	du.ma.di

These generalizations are consistent with van den Berg's (1989) account of syllable structure in the language.

3. The Analysis

In this section, I first posit the underlying form of the affix (3.1.). In 3.2.-3.4. I show the constraints necessary to determine the surface forms of each of the four affix patterns. I maintain that one constraint ranking is able to account for all four patterns. This ranking capitalizes on syllable structure of the language, featural correspondence between the root intial segment and the affix, and the relative alignment of the affix and root initial segment. Finally, in sections 3.3.1.-3.3.2. I argue that the nasal substitution case and the prefix deletion case are actually two types of coalescence: overt and covert.

3.1. The Input Form of the Affix

From the data and generalizations above, I posit that the underlying form of the affix is /m-/, a consonantal prefix with the features [voice], [nasal], and [labial].[3] Evidence for this form is as follows. First, it surfaces as a prefix in the vowel-initial root form when no other consonants are root initial to create a conflict (1). Second, the application of the affix lacks consistency with consonant initial roots (2-4). One of its forms is an infixal /-um-/ (4), identical in shape and position to an infix in the related Austronesian language, Tagalog. It could be argued that the underlying form of the affix under scrutiny in this research is /-um-/, as it is in Tagalog (McCarthy and Prince 1993a, b). If this were the case, then the affix would be expected to surface in all environments as /-um-/, regardless of the shape of the root. However, this is not the case (2-3). Third, in Muna there exist no other infixes and no other prefixes of the form VC, which

[3] Throughout this paper, I use the privative feature [voice] to distinguish between the presence of voice and the absence of voice. I have posited that the affix /m-/ is specified for the privative feature [voice], but this may not be the case. Underspecification would have different implications, but not different enough to unravel my analysis. Therefore, I leave this for another paper.

would have given support for a VC affix.[4] In my analysis I will explain exactly how each of the surface forms occur.

3.2. Prefixation

In cases of vowel-initial roots ((1) above), the affix is simply prefixed to the root initial vowel in the output:

(6) m-ala mala 'take, irr.'

These prefixed forms obey both optimal syllable structure and prefix alignment constraints, as well as general input-output faithfulness constraints. The constraints relevant to the prefix allomorph of the irrealis affix are:

(7) NoCoda
Syllables are open.
(8) Max-IO
Every segment of the input has a correspondent in the output.
(9) Align-Affix
Align the left edge of every affix with the left edge of some prosodic word.

NoCoda states that open syllables are preferred. Since this is a universal fact in Muna, we know this constraint must be undominated. Max-IO assesses the completeness of mapping from the input to output, and states that every segment that is present in the input must also be realized in the output. The alignment constraint states that the affix should be leftmost in the output form. The interaction of these constraints is shown in the following tableau. (For all of the tableaux in this paper, subscripted numerals are used for purposes of evaluation by Max-IO).

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[4] Going into more depth on this issue is possible, but not in the scope of this paper. I have addressed this issue already as the focus of a previous paper (Carter, 1995). The implication for positing /m-/ as the underlying form is that perhaps McCarthy and Prince's (1993a, b) examination of languages whose affixes change shape and form (e.g., Tagalog, Dakota) could be re-analyzed more cohesively under an analysis similar to the one presented here. More investigation is of course necessary to come to a resolution of this issue.

(10) /m - ala/

	NoCoda	Max-IO	Align-Affix
☞ (a) m_1a_2la			
(b) a_2m_1la	*!		*
(c) a_2la		*!	
(d) Ca_2m_1la	*!		*

Simply, the syllable structure constraint dictates where this prefix will be located, and Max-IO will dictate that it be realized at all. The correct output form, *mala*, does not violate any of the three constraints. Candidate (c) violates Max-IO, because /m-/ is not realized in the output. Candidates (b) and (d) violate NoCoda and Align-Affix, because in both forms the affix is realized as the coda of the first syllable. Note that at this point, since the correct surface form does not violate any of the three constraints, Max-IO and Align-Affix have no ranking hierarchy with regard to each other. However, an argument for their respective rankings will be given later.

In summary, I have shown that /m-/ surfaces as a prefix when combined with vowel-initial roots. Syllable structure requirements and constraints governing the mapping of input to output delimit the position of the affix. The next three sections deal with more complicated issues in which the features of the root initial elements determine the outcome of the affixation phenomenon.

3.3. Coalescence

In this section I will try to convince the reader that there is a better analysis of the substitution and deletion cases, namely that they are both types of coalescence, one overt and one covert. Let us look at the generalizations to be made about the two patterns first. The data in (2), shown again in brief in (11), show us that being prefixal, alignment requires that /m-/ be leftmost in the word:

(11) m-pili mili 'choose, irr.'

However, recall that Muna does not allow complex onsets. In these cases, the affix /m-/ does not appear in combination with labial or nasal root initial consonants; this resembles Russell's (1995) description of Nisgha coalescence.[5] Instead, compensatory measures are taken. Remember from the data that some or all of the features [labial], [nasal], and [voice] are what appear to be in common between the affix and root onsets in the cases of substitution and deletion,

[5] Russell points out that the coronal consonants /s/, /t/, and /ɬ/ do not occur in the presence of one another. Since /t/ shares features with /s/ and /ɬ/, he claims that it is contained in these other segments, allowing coalescence.

whereas they are not common between the affix and root onsets in the cases of infixation. With that in mind, with regard to roots that contain voiceless labial onsets (e.g., *pili, foni*), if the feature [labial] is common to both the affix and root initial consonant, but not [voice] or [nasal], then the combination of the affix and root onset resembles nasal substitution. However, I posit that this process illustrated in (2) and here again in (11) is actually a case of overt coalescence, as in Nisgha (Russel, 1995). The feature [labial] is shared between the affix and root onset, and that shared feature forms the basis of the coalescence. I will flesh out this analysis in section 3.3.1. below, but first let us turn to the data in (3), those forms that resemble prefix deletion.

In the cases of apparent prefixal deletion in (3) above, given again in part in (12) for the reader's ease, one will notice that the features [voice] and either [labial] or [nasal] (or both) are common to the affix and the root initial consonant:

(12a)	m-baru	baru	'happy'
(b)	m-nale	nale	'soft, weak'

In these cases, it appears that the prefix is not realized. However, it could be the case that this is also a type of covert coalescence, in which the affix and the root onset coalesce since they share two of the three features that make up the affix. On this analysis, it would seem that if the onset of the root shares two of the appropriate features with the affix, then this is a sufficient portion of the featural matrix of the affix to be realized, and the third feature is unnecessary. Again, I will elaborate on this analysis in 3.3.2.

3.3.1. Overt Coalescence

In the case of the voiceless labial root initial forms, coalescence seems to be dictated by a combination of constraints. The first is the constraint on syllable structure which prohibits tautosyllabic clusters (from Prince and Smolensky 1993):

(13) *COMPLEX

No more than one C or V may associate to any syllable position node.

This constraint is inviolable in Muna, and is therefore ranked at the top with NOCODA (7). Second, the correspondence constraint MAX-IO, defined in (8) assesses the faithfulness between input and output crucially of the affix and the root initial segment. This constraint must be satisfied in order to allow coalescence, which means that the affix and root initial segments will both be realized in the output forms. Third, we need an alignment constraint on the root onset, that states that the root be leftmost in the prosodic word:

(14) ALIGN-ROOT
Align the left edge of a every root with the left edge of some prosodic word.

Satisfying both this constraint and the alignment constraint on the affix (9) are necessary to allow coalescence in forms with root initial voiceless labial consonants (whereas we will see in the case of infixation that there is an interaction between the two). Finally, a set of constraints that assesses featural identity between the input and output forms of each morpheme is necessary to explain this case of overt coalescence. The two constraints on featural identity for voiceless labial root onsets are:

(15) IDENTITY-AFFIX, VOICE (IDENT-AF(V))
Correspondent elements of an affix are identical for [voice] in input and output
forms.

(16) IDENTITY-ROOT, NASAL (IDENT-RT(N))
Correspondent elements of a root are identical for [nasal] in input and output forms.

We have established that the shared [labial] feature of the affix and root onset is maintained in the output of these forms. It is also important that the voice specification of the affix /m-/ be realized, since there are no voiceless nasal consonants in Muna. Finally, for these forms, it is an important property of the root to maintain the [nasal] specification or lack thereof between the input and output; if it is present in one, it should be present in the other, and likewise if it is not present in the input, it should not be present in the output.

Therefore, a surface form such as *mili* (*m-pili*) requires satisfaction of each of the above constraints at the expense of IDENT-RT(N):

(17) *COMPLEX >> IDENT-RT(N)

	*COMPLEX	IDENT- RT(N)
☞ (a) $m_{12}ili$		*
(b) m_1p_2ili	*!	
(c) p_2m_1ili	*!	

In this case, the inviolable constraint *COMPLEX rules out any surface forms with consonant clusters (17b-c). The winning surface candidate obeys this constraint at the expense of failing to be faithful in root nasality to the input.

(18) MAX-IO >> IDENT-RT(N)

	MAX-IO	IDENT- RT(N)
☞ (a) $m_{12}ili$		*
(b) $m_{1}ili$	*!	
(c) $p_{2}ili$	*!	

MAX-IO rules out forms such as (18b-c), which truly delete a segment, in favor of a coalesced segment such as in (18a). The winning candidate, (18a) *$m_{12}ili$*, satisfies MAX-IO because both the affix and root initial segment are represented in the output form (this is possible because they share the feature [labial]).

(19) ALIGN-AFFIX >> IDENT-RT(N)

	ALIGN-AFFIX	IDENT- RT(N)
☞ (a) $m_{12}ili$		*
(b) $p_{2}um_{1}ili$	**!	

(20) ALIGN-ROOT >> IDENT-RT(N)

	ALIGN- ROOT	IDENT- RT(N)
☞ (a) $m_{12}ili$		*
(b) $m_{1}up_{2}ili$	**!	

The candidates *pumili* (19b) and *mupili* (20b) fatally violate ALIGN-AFFIX and ALIGN-ROOT, respectively. Again, these are ruled out in favor of the correct surface candidate in which the indices corresponding to both the affix and the root onset are leftmost in the prosodic word. However, this optimal candidate lacks nasal identity between root input and output forms.

(21) IDENT-AF(V) >> IDENT-RT(N)

	IDENT-AF(V)	IDENT- RT(N)
☞ (a) $m_{12}ili$		*
(b) $p_{12}ili$	*!	

The candidate *$p_{12}ili$* (21b) crucially violates IDENT-AF(V), because it lacks the important [voice] quality of the affix. This is a worse violation than that of the optimal candidate (21a). The pairwise evaluations above are shown together in (22):

(22) /m - pili/[6]

	*COMPLEX	MAX-IO	ALIGN-AFFIX	ALIGN-ROOT	IDENT-AF(V)	IDENT-RT(N)
☞ (a) m$_{12}$ili						*
(b) m$_1$p$_2$ili	*!			*		
(c) p$_2$m$_1$ili	*!		*			
(d) m$_1$ili		*!				
(e) p$_2$ili		*!				
(f) p$_{12}$ili					*!	
(g) m$_1$up$_2$ili				*!*		
(h) p$_2$um$_1$ili			*!*			

The hierarchy of constraints so far in the analysis is:

> (23) NOCODA, *COMPLEX, MAX-IO, ALIGN-AFFIX, ALIGN-ROOT, IDENT-AF(V) >> IDENT-RT(N).

The cases involving root initial [f] also follow this tableau.[7] (Note that since *Complex is inviolable, I will henceforth leave it out of the subsequent tableaux. The analogous forms to *m$_1$p$_2$ili* and *p$_2$m$_1$ili* in the other tableaux, which are always ruled out by this constraint, will also be left out of the tableaux (for space reasons)).

3.3.2. Covert Coalescence

In 3.3.1. I examined a case that involves coalescence in which the affix and root onsets shared one of the features ([labial]) that satisfies coalescence; this was a case of overt coalescence, because one can see that the surface form has changed. The next case is also a type of coalescence because the relevant segments share the features that allow coalescence ([voice], [labial], and/or [nasal]). However, it is covert in that the change does not surface (see (12) above). No new constraints are needed to show the analysis of consonant-initial forms with voiced labial consonants:

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[6] In the language there are many prenasalized segments, so forms like *mpili* and *mbaru* should not be a problem to derive and would satisfy the MAX-IO constraint necessary for coalescence. However, it seems that inherent prenasalized segments are allowed, but those derived (from morphemic processes) are not. This would need some extra constraint (like *derived prenasals).

[7] Cases like *m-foni* also require an IDENT-ROOT (+cont) constraint that is low-ranked and therefore violable.

(24) /m - baru/

	MAX-IO	ALIGN-AFFIX	ALIGN-ROOT	IDENT-RT(N)
☞ (a) b_{12}aru				
(b) $m_1$aru	*!			
(c) $b_2$aru	*!			
(d) m_{12}aru				*!
(e) m_1u$b_2$aru			*!*	
(f) b_2u$m_1$aru		*!*		

In this tableau, both candidates (24b-c) *$m_1$aru* and *$b_2$aru* fatally violate the high-ranked MAX-IO, since each candidate lacks one of the elements in the output that was present in the input. Candidate (24d), *m_{12}aru*, is ruled out because its root nasality is not identical in the input and output. The fifth candidate, *mubaru*, fatally violates ALIGN-ROOT, because the root initial segment is not next to the prosodic word edge. (24f), *bumaru*, incurs a similar violation for ALIGN-AFFIX. The correct form, (24a) *b_{12}aru*, does not incur any violations, and therefore is the clear winner.

For consonant-initial forms with nasal onsets such as *nale* (12b), there is one new constraint to consider:

(25) IDENTITY-ROOT, PLACE (IDENT-RT(PL))
Correspondent elements of the root are identical for (place) in input and output
forms.

This constraint is needed to ensure that the place specification of the root element in the input is identical to that of the output. If it is not, the form will be ruled out. IDENT-RT(PL) at this point has no relative ranking order with regard to the other constraints, since the optimal candidate does not violate any of the constraints. The tableau for these consonant-initial forms with nasal consonants is:

(26) /m - nale/

	MAX-IO	ALIGN-AFFIX	ALIGN-ROOT	IDENT-RT(PL)
☞ (a) n_{12}ale				
(b) $m_1$ale	*!			
(c) $n_2$ale	*!			
(d) m_{12}ale				*!
(e) m_1u$n_2$ale			*!*	
(f) n_2u$m_1$ale		*!*		

This tableau mirrors that of (24) *baru*, except that the form in (26d), *m_{12}ale*, crucially violates IDENT-RT(PL) now because the input and output correspondents of the root initial segment are not identical in place.

To summarize this section, coalescence can only occur if one or both of the features [nasal] and [labial] are common to the relevant segments. If [voice] is also a feature of the root initial segment, then it seems that [voice] and either [labial] or [nasal] are sufficient to surface, and covert coalescence occurs. However, if [voice] is not present, then [labial] on its own is not sufficient to surface, and it is best if all the necessary features of the affix surface, giving way to overt coalescence.

3.4. Infixation

In consonant-initial roots where the initial consonant shares neither a [labial] nor a [nasal] feature with the affix, coalescence cannot occur. In this case, /m-/ surfaces as an infix. In order to obey the syllable structure of the language, a vowel (/u/) must be epenthesized (see (4), shown in brief in (27)):

(27a)	m-dadi	dumadi	'live, irr.'
(b)	m-suli	sumuli	'return, irr.'

According to van den Berg (1989), the three main epenthetic vowels of Muna are /i/, /a/, and /u/. I argue that /u/ is the designated vowel in this case of irrealis infixation, because it is the only labial vowel of the three, and this seems to be an important feature to maintain in the affix.

In order to capture the generalization that either [labial] or [nasal] must be shared by the affix and root initial consonant for coalescence to occur, or else irrealis affixation results in an infix, one new constraint must be added to the analysis. This constraint is a locally conjoined constraint, based on the idea introduced by Smolensky (1995), in which either one or both constraints must be true to be satisfied, but both must be false to be violated:

(28) IDENTITY-AFFIX, LABIAL or NASAL (IDENT-AF{L,N})
Correspondent elements of the affix are identical for one or both of the features
[labial] or [nasal] in input and output forms.

In the case of (27a) *dadi* and (27b) *suli*, neither share [labial] nor [nasal] with /m-/, whereas *baru* and *pili* share [labial], *nale* shares [nasal], and *ma^{n}da* (3c) shares both. Therefore, *dadi* and *suli* must violate this constraint, whereas the others do not. It stands to reason that if the necessary features are not present to share, there is no way the morphemes can combine, or coalesce.

Because *dumadi* is a case of infixation, ALIGN-AFFIX must necessarily be low in the hierarchy to allow it. Pairwise rankings between the crucial constraints for infixation, showing the crucial dominance of ALIGN-AFFIX, are in (29-31).

(29) ALIGN-ROOT >> ALIGN-AFFIX

	ALIGN-ROOT	ALIGN-AFFIX
☞ (a) d_2um_1adi		**
(b) m_1ud_2adi	*!*	

In this tableau, ALIGN-ROOT must outrank ALIGN-AFFIX in order for the correct form to surface. The violation of Align-Root that the form *mudadi* incurs is more fatal than the violation of ALIGN-AFFIX that the optimal form *dumadi* incurs.

(30) IDENT-AF{L,N}>> ALIGN-AFFIX

	IDENT-AF{L,N}	ALIGN-AFFIX
☞ (a) d_2um_1adi		**
(b) $d_{12}adi$	*!	

In (30), the nonoptimal form $d_{12}adi$ fatally incurs a violation of IDENT-AF{L,N}, because it shares neither feature with the affix, whereas both the features [labial] and [nasal] of the affix are present in the optimal form.

(31) IDENT-RT(PL) >> ALIGN-AFFIX

	IDENT-RT(PL)	ALIGN-AFFIX
☞ (a) d_2um_1adi		**
(b) $m_{12}adi$	*!*	

In (31), $m_{12}adi$ violates IDENT-RT(PL) because the place specification of the root has not been maintained between the input and the output. The optimal and correct candidate, (31a) *dumadi*, only incurs a violation of the now necessarily low-ranking ALIGN-AFFIX. The full tableau for *dumadi* is in (32):

(32) /m-dadi/

	ALIGN-ROOT	IDENT-AF{L,N}	IDENT-RT(PL)	ALIGN-AFFIX
☞ (a) d_2um_1adi				**
(b) $d_{12}adi$		*!		
(c) $m_{12}adi$			*!	
(d) m_1ud_2adi	*!*			

A form like *suli* will also follow this pattern. (33) shows the tableau for *sumuli*.

(33) /m-suli/

	ALIGN-ROOT	IDENT-AF(V)	IDENT-AF{L,N}	IDENT-RT(PL)	ALIGN-AFFIX
☞ (a) s_2um_1uli					**
(b) $s_{12}uli$		*!	*		
(c) $m_{12}uli$				*!	
(d) m_1us_2uli	*!*				

The only difference between *dumadi* and *sumuli* is that in *sumuli*, IDENT-AF(V) is at work again. (33b) *$s_{12}uli$* is therefore ruled out either by this constraint, because the identity of [voice] is not identical in the affix between input and output, or by the equal-level constraint IDENT-AF {L,N}. The optimal candidate (33a) does not violate IDENT-AF(V) because the [voice] of the affix is identical in input and output. This allows us to reach the final ranking step of IDENT-AF(V) >> ALIGN-AFFIX. Therefore, the entire hierarchy is:

(34) NOCODA, *COMPLEX, MAX-IO,ALIGN-ROOT, IDENT-AF(V), IDENT-AF{L,N}, IDENT-RT(PL) >> ALIGN-AFFIX >>IDENT-RT(N).

In summary, this analysis has attempted to bring to light the necessity of featural constraints to determine the prosodic shape and position of the irrealis affix in Muna. In doing so, I have argued for the necessity of covert coalescence, in addition to the more firmly accepted overt coalescence.[8] I have also made an argument for local conjunction constraints, in that they are necessary in order to allow coalescence in some cases but ban it in others.

[8] There are interesting data in Muna branching out from the irrealis affixation, in which reduplication is combined with irrealis affixation and results in the phenomenon of overcopying (van den Berg, 1989, McCarthy and Prince, 1995). See Carter and Suzuki (1997) for an analysis of these data.

4. The Benefit of Optimality Theory

In the past, a serial approach based on rules would have been used to analyze complicated affixation paradigms, such as those in Muna. However, a serial approach does not account for this data alternation as well as Correspondence Theory does under OT, for several reasons. With a rule-based approach, for example, we would have to list many different rules for deletion, insertion, and movement:

(35) deletion:

(a) baru:

$$m \dashrightarrow 0 \,/\, \_\_ \begin{bmatrix} \text{NAS} \\ \text{VOI} \end{bmatrix} ; \begin{bmatrix} \text{LAB} \\ \text{VOI} \end{bmatrix}$$

(b) mili:

$$\{\text{LAB}\} \dashrightarrow 0 \,/\, m\_\_$$

(36) infixation:

(a) movement of /m/ to the right of any other initial consonant

(b) insertion (ordered after (36a)):

$$0 \dashrightarrow u \,/\, \underset{\begin{bmatrix} -\text{LAB} \\ -\text{NAS} \end{bmatrix}}{C} \; \_\_ \; m$$

Also, with this serial approach, it is hard to specify exactly what the environment for the rules is.

Another possible way to look at this is in light of floating features. For example, due to syllable structure, there is only one slot for the initial consonant of the word that both the affix and root initial consonant compete for. The floating features try to attach to this slot. However, this analysis yields a handful of paradoxes. For example, in looking at the roots *pili*, *baru* ,and *nale*, if both [labial] and [nasal] attach (which would give identical outcomes as attaching [labial], [nasal], and [voice]), we get the correct form in (37a) but the incorrect forms in (37 b-c).

```
(37a) [lab]          (b) [lab]          (c) [lab]
        |                  |                  |
        m ili            * m aru            * m ale
        |                  |                  |
      [nas]              [nas]              [nas]
```

Similarly, if [labial] and [voice] attach, we get the correct outcome for (38b) but not for (a):

```
(38a) [lab]          (b) [lab]
        |                  |
      * b ili              b aru
```

Attaching [nasal] and [voice] would have the same outcome as attaching [nasal], which would give a placeless nasal segment. Attaching only [voice] obviously would not give enough information to identify the segment, and attaching only [labial] would yield either a voiced or voiceless segment, which would only hold true for the *baru* input. Any way this could be examined will not give the correct results.

Optimality Theory and Correspondence are able to explain the different manifestations of the affix. Constraints on syllable structure determine the prefix in vowel-initial forms and demand an alternative to the co-occurrence of the affix and root initial consonant. Input-output constraints demand the realization of every segment. Featural correspondence demands a relation between what can and can't be coalesced together: identity constraints state that the root must share [labial] or [nasal] with the affix in order to coalesce, and that it must keep its place feature. Correspondence also decides how coalescence will surface: overtly or covertly depending on the identity of [voice] in the root initial consonant. Finally, if coalescence is not a viable option because identity does not hold, the interaction of Correspondence with Align constraints determines a fate of infixation.

5. Conclusion

In this paper I examine an affixation phenomenon in Muna that manifests itself in four distinct ways, depending on the features of the root initial segment. I argue for an Optimality Theoretic approach to account for the alternation, using Correspondence Theory to examine the relations between input and output, both on a general segmental level as well as a featural level. I demonstrate how these featural identity constraints interact with alignment and syllable structure constraints to establish the correct shape and position of each affix form. I also argue that coalescence can account for two of the four patterns (resembling onset substitution and affix deletion), if one accepts an analysis of both overt and covert types of coalescence, depending upon the features of the root initial consonant. Finally, I show that an Optimality Theoretic approach is better than a serial, rule-based analysis because one constraint ranking can account for the specific alternations, how the affix manifests itself, and why.

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