

The Consequences of Dissimilation in Sundanese*

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1. Introduction

Studies of phonological assimilation have played a central role in the development of current phonological theory. As widely discussed in the literature, assimilation is an extremely common phonological process cross-linguistically and therefore an adequate phonological theory should represent it simply and naturally. This has led to the current view of assimilation as spreading (Goldsmith 1976, Clements 1976, Hayes 1986, among others). Much less work has addressed itself to the issue of dissimilation, but recently it has been suggested that dissimilation should be analyzed as delinking followed by default fill-in (Odden 1987, Poser 1987, McCarthy 1988, Yip 1988). This approach is schematized in (1).

(1) Dissimilation as delinking

$$\begin{array}{cc} \cdot & \cdot \\ \neq & | \\ +F & +F \end{array} \rightarrow \begin{array}{cc} \cdot & \cdot \\ \vdots & | \\ -F & +F \end{array}$$

Missing value filled in by default: $[\emptyset F] \rightarrow [-F]$

In the case of two tier adjacent identical feature specifications, one of the specifications is delinked. The missing value is then filled in by a default rule. Dissimilation, thus consists of two independent processes, delinking and default fill-in.

It has been argued that dissimilation is motivated by the Obligatory Contour Principle (OCP), the principle that adjacent identical elements are prohibited. (McCarthy 1985, 1988, Kaisse 1988, Yip 1988). Yip (1988, p. 73), following earlier work by McCarthy, takes the position that "all rules involving identity of target and trigger with an output in which they are no longer identical and adjacent are OCP-triggered rules." It is thus an OCP violation which requires delinking of one of the offending specifications in a sequence of identical feature specifications. When this is followed by default fill-in, this yields dissimilation. "Another possible result of deleting a feature matrix occurs if deletion is

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As exemplified in (2a & b), the plural marker, either =*ar*= or =*al*=, is usually infixated after the first consonant of the root. The process is highly productive, as exemplified in (1c) by the pluralization of a recent borrowing such as *visualisasi*. Verbs, adjectives, and a few nouns exhibit such infixated forms.¹ The observed pattern of allomorphic alternation is triggered by both assimilation and dissimilation. As this morphophonemic process is productive and regular, it should be accounted for by rule. The pattern of infixation also merits attention, as it is directly related to an adequate account of the allomorphic alternation.

The structure of the paper will be as follows. In §2, we consider the process of infixation. In §3, the pattern of allomorphy is presented and it is shown that the allomorphy results from both assimilation and dissimilation. An analysis is proposed. Yet, on the face of it, the analysis of dissimilation is not motivated by the OCP as predicted and it poses questions regarding the issues of markedness and underspecification. We address these issues in §4 and conclude in §5. The data discussed here are from work with two native Sundanese speakers from Bandung, the capital of Sunda (West Java), where what is considered to be the standard dialect is spoken. This process has also been briefly described in the literature on Sundanese (see Eringa 1949 and Robins 1959).

2. Infixation

Sundanese has a rich system of affixation, including prefixes, suffixes and infixes. Both prefixes and suffixes are of course extremely common cross-linguistically and are fairly straightforward to account for formally. True infixes, on the other hand, are much rarer and pose problems in terms of their structural representation. Sundanese has three infixes, all of the shape VC (V = vowel, C = consonant): =*ar*=/=*al*=, =*in*=, =*um*=. Of these, only the plural marker is productive and we therefore focus our attention on it. Noteworthy is the difference between CV and VC affixes at the beginning of a root in Sundanese, as exemplified in (3):

¹Although the infix is typically referred to as a plural marker, Ewing (1991) has shown that the formative actually creates distributive forms. I will nevertheless continue to refer to it as a plural marker. The reader is referred there for discussion of both the semantics and pragmatics of such forms.

(3)a. CV affixes at the beginning of a word

- | | | | | | |
|-----|------------------------------|-----------------|-------------------|----|-----------------------|
| i. | CV + V initial root = prefix | di
'passive' | atur
'arrange' | —> | di-atur
'arranged' |
| ii. | CV + C initial root = prefix | di
'passive' | dahar
'eat' | —> | di-dahar
'eaten' |

b. VC affixes at the beginning of a word

- | | | | | | |
|-----|------------------------------|-------------|------------------------|----|---------------------------|
| i. | VC + V initial root = prefix | ar
'pl.' | anj+n
'you' | —> | ar-anj+n
'you, pl.' |
| | | ar
'pl.' | ay+m
'patient' | —> | ar-ay+m
'patient, pl.' |
| ii. | VC + C initial root = infix | ar
'pl.' | damaŋ
'well (adj.)' | —> | d=ar=amaŋ
'well, pl.' |
| | | ar
'pl.' | poho
'forget' | —> | p=ar=oho
'forget, pl.' |

In (3) we observe that a CV affix at the beginning of a word is always prefixed, whether the root starts with a vowel (3ai) or a consonant (3aai). In contrast, a VC affix at the beginning of a word is prefixed with a vowel initial root (3bi), but infixed after the root initial consonant with a consonant initial root.² A generalization emerges: The placement of infixes in Sundanese is prosodically conditioned and has the net effect of maximizing open (CV) syllables and avoiding unallowable CC sequences. (Anderson 1972 makes a similar observation.) An adequate formal account of infixation in Sundanese needs to incorporate this generalization.

McCarthy and Prince (1986) argue that infixation should be analyzed as melodic extraprosodicity. Following this view, they sketch out an analysis of infixation in Sundanese, whereby the initial C is extraprosodic; the infix is really a prefix; and the "Onset Rule", which resyllabifies a consonant to become a syllable onset, applies twice. Their analysis is exemplified in (4) (following McCarthy and Prince 1986, p. 48).

- | | | | |
|--------|-------------------|-----------|-------------|
| (4) a. | sg. | pl. | |
| | [niʔis] | [nariʔis] | |
| | 'to cool oneself' | | |
| b. | σ | c. | a r |
| | \ | | \ |
| | a r | | σ σ σ |
| | | | \ / \ |
| | | | (n) i ʔ i s |
| | | | [nariʔis] |

²Root initial consonant clusters are very rare and I have yet to find such a root from which a plural form can be constructed.

The infix is proposed to have the shape in (4b). (Note that the proposed representation seems to assume underlying syllabification.) The root initial /n/ is extraprosodic, and the Onset Rule applies twice, yielding the derived representation in (4c). Basic to this analysis is Planar Segregation (see McCarthy 1989) which assumes that separate morphemes constitute independent phonological planes. In support of their analysis, McCarthy and Prince (1986) claim that "The representation of the affixal melody on a separate tier is independently required by Sundanese nasal harmony. . . ." (p. 48).³

There are a number of problems with this view. (1) The basic insight that the infix is located prosodically, not melodically is missed. The pattern of infixation has to do with syllable structure, not melodic structure as implied by McCarthy and Prince's view of melodic extraprosodicity. All consonant initial verbal and adjectival roots in the language would need to have an extraprosodic initial consonant. Clearly a generalization is being missed.⁴ (2) A widely held view is that there can be no phonological interaction between separate planes, before Plane Conflation (see McCarthy 1989 and Yip 1988 for discussion). Yet several phonological rules of Sundanese refer to both the infix and the rest of the form, including nasal harmony. These processes include both lexical and post-lexical ones. This would require Plane Conflation before the relevant phonology, but there is no evidence that the intervening unconfliated stage exists in the derivation. (3) The facts of nasal harmony do not constitute an argument in favor of the plural infix being represented on a separate tier (plane). As argued by Cohn (1990), the facts of Sundanese nasal harmony can be accounted for in a straightforward manner by a cyclic analysis within the framework of Lexical Phonology. Nasal harmony is shown to be a lexical rule, applying both before and after infixation. Such an analysis accounts directly for the apparent overapplication of the rule.

I propose, instead, a single plane analysis of Sundanese infixation. The infixes in Sundanese are basically like prefixes, except that they are located before the first mora of the root. Infixation results in reapplication of the rules of syllabification. In order to see how the analysis works, we need to establish explicit principles of syllabification. Following Hayes (1989), I will assume the following syllabification algorithm:

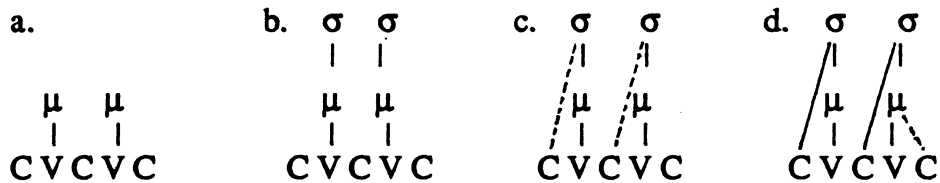
³I understand the use of *tier* here to the same as *plane* as discussed by McCarthy (1989).

⁴See also Anderson (1991) for a similar criticism of McCarthy and Prince's view of infixation.

(5) Syllabification (following Hayes 1989)

Basic syllable structure in Sundanese is (C) V (C)

- Assign a mora to each vocalic element.
- Each mora is dominated by a syllable.
- Associate a preceding consonant directly to the syllable node (as "onset").
- Associate a following consonant to the preceding mora (into the "rime").



Following Hyman (1985) and McCarthy and Prince (1986), the mora is argued to be the basic unit of phonological weight, basic to the representation of stress, tone, and the syllable. As widely noted, certain aspects of syllabification are universal and others language specific. In a language with no underlying moras, a mora is assigned to each vocalic element by rule (5a). Sundanese allows only one mora per syllable, as there are no long vowels and coda consonants do not affect the weight count, thus each mora is dominated by a syllable (5b). Hayes (1989) captures the fact that onsets (typically) do not contribute to phonological weight, by associating onset consonants directly to the syllable node (5c). Finally in a language where coda consonants do not contribute weight, an unsyllabified consonant following a vocalic element is associated to the preceding mora (5d).

Following this view of syllabification, the plural marker of Sundanese can be correctly positioned, occurring initially with a vowel initial root or following the first consonant of a consonant initial root, as shown in the derivations in (6).

(6) Sample derivations
UR:

a. dahar

b. ayim

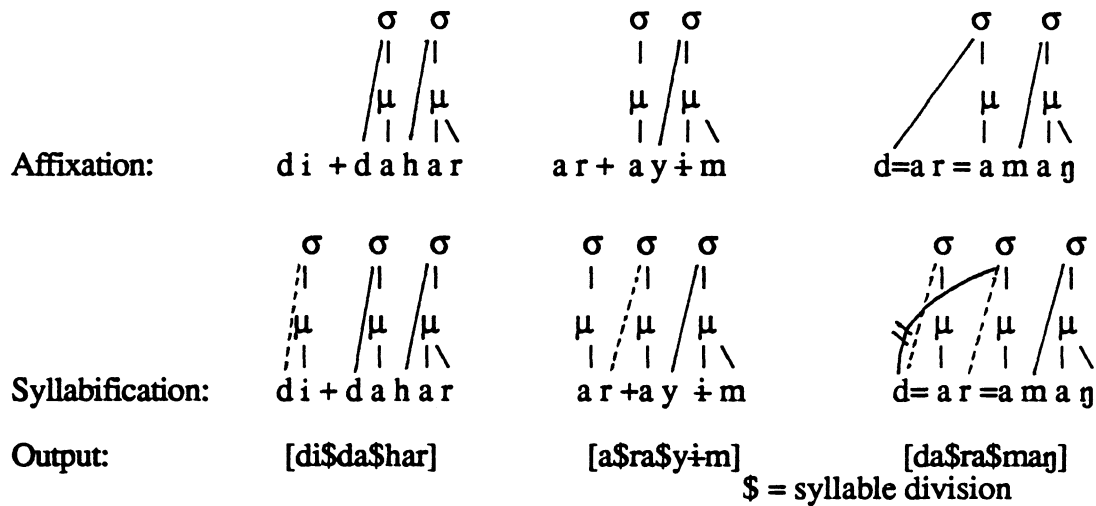
c. damar

Syllabification:

d a h a r

a y i m

d a m a r



Assuming that syllabification is either an "everywhere process" or applies cyclically, the root is syllabified at the beginning of the derivation, as shown in each of the three examples. Affixation then occurs, triggering a reapplication of the syllabification algorithm. In (6a), *di-* is prefixed and syllabified as an additional syllable. In (6b) *=ar=* is positioned before the first mora of the root. The vowel is assigned a mora and a syllable, while the consonant is syllabified as the onset of the first syllable of the root. In (6c) *=ar=* is again located before the first mora of the root, necessarily detaching /d/ from the first root syllable. The vowel is again assigned both a mora and a syllable and then Rule 5c is applied twice, making /d/ the onset of the first syllable of the word and /r/ the onset of the first syllable of the root. This is parallel to McCarthy and Prince's application of the Onset Rule, but this approach differs in the fact that no underlying syllabic structure is assumed for the infix and all aspects of its syllabification follow from the general rules of syllabification in the language. The fact that *=ar=* is located before the first mora of the root might be specified as part of the lexical entry of the affix, or it might be specified as part of the more general prosodic and phonotactic patterns for VC root initial affixes in Sundanese.

We see then that the simple assumption that infixes are located before the first mora of the root in Sundanese, together with independently motivated principles of syllabification, account directly for the observed location of the plural marker in Sundanese. If we refer directly to the prosodic structure, there is no motivation for representing the infix in Sundanese on a separate plane. This accounts directly for the morphological domains in which phonological rules are observed to apply in Sundanese and avoids an unmotivated stage of the derivation before Plane Conflation. The placement of the infix in Sundanese

lends support to Hayes' (1989) claim that onset consonants link directly to the syllable node and not to the initial mora.

3. Allomorphy of the plural marker

As exemplified above in (2a & b), the plural marker may take the shape of =ar= or =al=. This allomorphic alternation is a systematic one and can be characterized in terms of the canonical root pattern of Sundanese. The consonant and vowel inventories of Sundanese are presented in (7a & b) respectively and the canonical root patterns are schematized in (8).

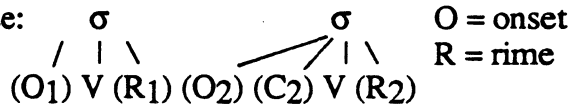
(7) a. Sundanese consonant inventory

p	t	c	k
b	d	j	g
m	n	ɲ	ŋ
		s ⁵	
	l/r		
w		y	h (?)

b. Sundanese vowel inventory

	front		back
high	i	ɨ	u
mid	e	ə	o
low		a	

(8) a. Canonical root pattern of Sundanese:



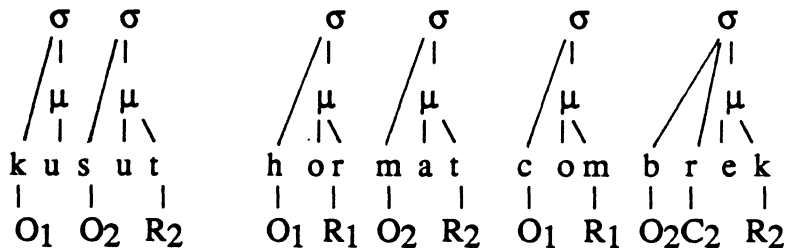
O₁, O₂ = any consonant

R₁ = nasal homorganic to the following stop, /r/ and a few others marginally

R₂ = most consonants, except palatal [-continuant] consonants

C₂ = /r/, /l/ after a stop (quite rare)

b.



As schematized in (8a), most roots are disyllabic, with each syllable consisting minimally of a vowel. Both syllables have an optional onset (O₁, O₂), typically consisting

⁵/s/ patterns as a palatal in Sundanese.

of a single consonant; although in the second syllable, a stop may be followed by a liquid (C₂). Both syllables may have an optional consonant in the rime (R₁, R₂). These root patterns are exemplified in (8b).

As shown in the chart in (9), the allomorphic alternation between =ar= and =al= is conditioned by the presence of either /r/ or /l/ in the root. In all other cases, the =ar= variant is used.

(9)	/r/		/l/				
				a.			
O ₁	rVCVC rah+i-t 'wounded' ri-wat 'startled'	r=ar=VCVC r=ar=ah+i-t r=ar=i-wat	IVCVC li-tik 'little' ləga 'wide'	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>l=al=VCVC</td></tr> <tr><td>l=al=i-tik</td></tr> <tr><td>l=al=əga</td></tr> </table>	l=al=VCVC	l=al=i-tik	l=al=əga
l=al=VCVC							
l=al=i-tik							
l=al=əga							
				b.			
R ₁	CVrCVC hor-mat 'respect' pər-ceka 'handsome'	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>C=al=VrCVC</td></tr> <tr><td>ŋa-h=al=or-mat</td></tr> <tr><td>p=al=ər-ceka</td></tr> </table>	C=al=VrCVC	ŋa-h=al=or-mat	p=al=ər-ceka	CVICVC not attested (so far)	predicted: C=ar=VICVC
C=al=VrCVC							
ŋa-h=al=or-mat							
p=al=ər-ceka							
O ₂	CV(C)rVC di-kirim 'sent (pass.)' curiga 'suspicious'	C=ar=V(C)rVC di-k=ar=irim c=ar=uriga	CV(C)IVC g+i-lis 'beautiful' ŋuliat 'stretch'	C=ar=V(C)IVC g=ar=i-lis ŋ=ar=uliat			
				c.			
C ₂	CV(C)CrVC combrek 'cold' motret 'take a picture'	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>C=al=V(C)CrVC</td></tr> <tr><td>c=al=ombrek</td></tr> <tr><td>m=al=otret</td></tr> </table>	C=al=V(C)CrVC	c=al=ombrek	m=al=otret	CV(C)CIVC ŋajləŋ 'jump' ŋoplok 'flop down'	C=ar=V(C)CIVC ŋ=ar=ajləŋ ŋ=ar=oplok
C=al=V(C)CrVC							
c=al=ombrek							
m=al=otret							
				d.			
R ₂	CVCVr bocor 'leaking' bi-ŋhar 'rich'	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>C=al=VCVr</td></tr> <tr><td>b=al=ocor</td></tr> <tr><td>b=al=i-ŋhar</td></tr> </table>	C=al=VCVr	b=al=ocor	b=al=i-ŋhar	CVCVI mahal 'expensive' gətol 'diligent'	C=ar=VCVI m=ar=ahal g=ar=ətol
C=al=VCVr							
b=al=ocor							
b=al=i-ŋhar							
				e.			
O ₃	CVCVrV ŋumbara 'go abroad' siduru 'sit by a fire'	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>C=al=VCVrV</td></tr> <tr><td>ŋ=al=umbara</td></tr> <tr><td>s=al=iduru</td></tr> </table>	C=al=VCVrV	ŋ=al=umbara	s=al=iduru		
C=al=VCVrV							
ŋ=al=umbara							
s=al=iduru							

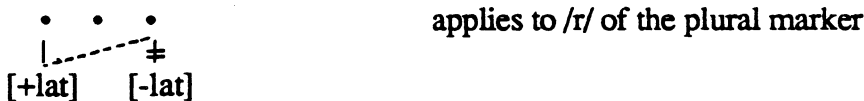
Consider first roots with /l/'s in them. If an /l/ occurs anywhere in the root, except root initially, the infixed form appears with the =ar= variant. But in the case of a root initial /l/, as seen in box a, the infixed form appears with the =al= variant. In the case of roots with /r/, if either of the first two syllables starts with an /r/ (O₁ or O₂), the infixed variant appears with the =ar= variant. But if /r/ occurs in the rime of the first syllable or second syllable (boxes b & d respectively), or as the second member of a complex onset to a

second syllable (box c), or as the onset of a third syllable (box e); then the infix form occurs with the =al= variant. The patterns observed for the two speakers in the present study concur with the observations made by Robins (1959, p. 343): "The variants -ar-/al- are contextually determined; -al- is used with forms whose initial consonant is *l*, and with those containing a following *r*, except as initial consonant of the second syllable. Words of any other structure regularly infix -ar- . . ."

With /l/ initial roots, we have a case of assimilation, that is, the infix assimilates to the initial /l/ (box a). Whereas, when an /r/ occurs in the root, except as the beginning of the first or second syllable, there is dissimilation between the two /r/'s (boxes b-e). I will first propose an analysis to account for these facts, then in the next section (§4), I will turn to the question of why these rules should obtain.

In order to account for the observed pattern of allomorphy, I assume that the underlying form of the infix is =ar= and propose two rules to account for the assimilation and dissimilation: Lateral Assimilation and /r/ Dissimilation respectively. I assume that only the liquids /l, r/ are specified for the feature Lateral in Sundanese.⁶

Following the view of assimilation as spreading, I propose a rule of Lateral Assimilation to account for the assimilation of the /r/ of the infix to a root initial /l/:

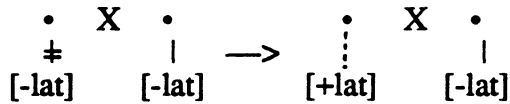
- (10) Lateral Assimilation: $r \rightarrow l / l = V _ \neq$

 applies to /r/ of the plural marker

When the /r/ of the infix is preceded by an /l/, the [+lateral] specification of the /l/ spreads to the right, with concomitant delinking of [-lateral].

As discussed in §1, dissimilation has been argued to consist of delinking of two tier adjacent identical feature specifications, followed by default fill-in of the deleted feature specification. Following this approach, /r/ Dissimilation can be represented as follows.

⁶/l, r/ also differ in their specifications for Continuant (see Cohn 1990). I assume that appropriate Continuant specifications result automatically from a change in specification for the feature Lateral.

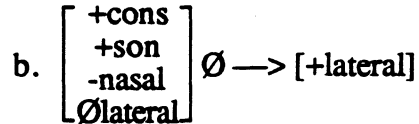
(11) /r/ Dissimilation: $r \rightarrow l / \text{a} _ _ = X r$ where X = intervening segmental material



applies to /r/ of the plural marker

Condition: except if the trigger is the onset of the second syllable

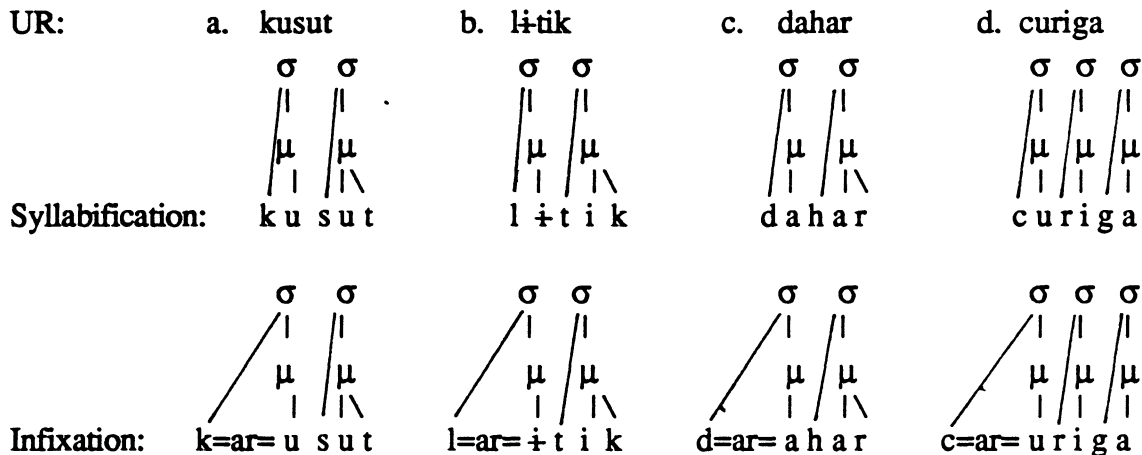
a. The first [-lateral] is delinked (due to tier adjacent [-lateral] specifications)



When the /r/ of the plural infix is followed by a tier adjacent [-lateral] specification, the first lateral specification is delinked. However Delinking is blocked if the second [-lateral] specification occurs as the onset of the second syllable. Stated this way, the rule does not apply if the /r/ of the infix is preceded by an /r/, an issue that we return to below. Delinking then is followed by a rule filling in a [+lateral] specification for liquids unspecified for Lateral. Note, however, that the filling-in of [+lateral] is not a general default rule in Sundanese, as /r/ appears to be less marked than /l/, another issue we return to below.

Sample derivations of both Lateral Assimilation and /r/ Dissimilation are presented in (12).

(12) Sample derivations



Syllab.:	karusut	larit̄tik	dalahar	caruriga
Lat. Assim.:	—	••• (it̄tik) +L -L	—	—
/r/ Dissimilation:				
a. Delinking	—	—	(da) • (aha) • ‡ -L -L	blocked
b. [+lat] Insertion			(da) • (aha) • +L -L	
Output:	[karusut]	[larit̄tik]	[dalahar]	[caruriga]

In each case, the root is first syllabified, following the principles of syllabification discussion above in §2. The plural marker =ar= is then inserted before the first mora of the root. This results in resyllabification as shown. In (12a), as there are no /r/'s or /l/'s in the root, neither Lateral Assimilation or /r/ Dissimilation is applicable, resulting in the form [karusut]. In (12b), the root initial consonant is an /l/, which triggers the application of Lateral Assimilation. The [+lateral] specification of the root initial /l/ spreads to the /r/ of the infix, triggering delinking of the [-lateral] specification, resulting in the form [larit̄tik]. In (12c), Lateral Assimilation is not applicable; but /r/ Dissimilation is, due to the root final /r/. The [-lateral] specification of the /r/ of the infix is delinked and a [+lateral] specification is inserted, giving the form [dalahar]. In (12d), an /r/ occurs in the root, but the /r/ is the onset of the second syllable, so /r/ Dissimilation is blocked, yielding the form [caruriga]. We see, then, that the two proposed rules, Lateral Assimilation and /r/ Dissimilation, account for the observed allomorphy of the plural marker in Sundanese. But some questions remain; we address these in the next section.

4. Problems and issues

Although the allomorphy of =ar/=al= is accounted for straightforwardly under the proposed analysis, some basic issues remain. (1) How does this view of dissimilation relate to questions of markedness and underspecification? (2) How general are the rules of /r/ Dissimilation and Lateral Assimilation? Do they apply only to the /r/ of the plural

marker? (3) Why tolerate closer /r/'s, but not ones farther away? We address the first question in §4.1 and the remaining questions in §4.2.

4.1. Dissimilation: markedness and underspecification

Adequate formal accounts of dissimilation need to address issues of markedness and underspecification. In order to consider the nature of these issues, we turn to liquid dissimilation in Latin. As discussed by Steriade (1987),

... the adjectival suffix /-alis/ (as in /nav-alis/ 'naval') becomes /-aris/ when preceded by a stem containing /l/: /sol-aris/ 'solar', /milit-aris/ 'military', /Lati-aris/ 'of Latium'. Dissimilation fails only when the stem /l/ is separated by the suffix by an intervening /r/: /flor-alis/ 'floral', /sepulchr-alis/ 'funereal', /litor-alis/ 'of the shore'. (p. 351)

These facts can only be accounted for if both + and - specifications are present within the class of liquids at the time that the rule applies, since an intervening /r/ blocks dissimilation between two /l/'s. As argued by Steriade, these facts can be accounted for directly under the view of Contrastive Underspecification, whereby both values of a feature are specified within a contrasting class (in this case the class of liquids) and no value is specified otherwise, as exemplified in the following derivation:⁷

(13) Phono Input:	milit-alis	litor-alis
	+L +L	+L -L +L
Liquid Dissimilation:	milit-alis	—
a. Delinking	≠	
	+L +L	
b. Default fill-in	milit-aris	litor-alis
[] → [-L]		
	-L +L-L -L -L	+L-L -L +L -L
Output:	[militaris]	[litoralis]

Following a view of Radical Underspecification (Kiparsky 1982, Archangeli and Pulleyblank 1986, among others), whereby only one value is specified underlyingly, a default fill-in rule must apply before dissimilation to block the application of dissimilation in cases such as [litoralis]. But the rule must only provide default values to /r/, not to any other consonants, since only an intervening /r/, not any other intervening consonant, blocks

⁷Steriade does not provide explicit derivations of dissimilation in Latin, but her discussion is consistent with the view of dissimilation presented here.

the application of the rule. Since delinking is followed by default fill-in, then separate default fill-in rules must apply before and after delinking as exemplified in (14).

(14) Phono Input:	milit - alis	litor - alis
	+L +L	+L +L
Default fill-in:	—	litor - alis
[+cons]		
[+son] → [-L]		+L -L +L
[-nasal]		
Liquid Dissimilation:	milit - alis	—
a. Delinking	‡	
	+L +L	
b. Default fill-in	milit - aris	litor - alis
[] → [-L]		
	-L +L -L -L -L	+L -L -L +L -L
Output:	[militaris]	[litoralis]

As argued by Steriade (1987), these facts constitute a strong argument in favor of Contrastive Underspecification; since there is no independent evidence of the stage before the first default rule applies.⁸

As observed by Odden (1987, p. 237), following the assumption that "default rules introduce unmarked feature values. . . . This entails that the result of dissimilation should be relatively less marked." For the feature Lateral, [+lateral] is usually assumed to be the marked value (as are + values in general) and thus liquid dissimilation in Latin is consistent with this prediction.

The facts of dissimilation in Sundanese are quite similar to those of liquid dissimilation in Latin, except that in Sundanese, the dissimilation is triggered by /r/'s, not /l/'s and it is thus /l/, not /r/ that gets filled in by default. This difference could be accounted for, if we assume that markedness relations are language specific (though contra the basic notion of markedness) and that Sundanese differs from Latin in that it is /r/, and not /l/, that is marked in the former. But this view is not tenable, as within the phonology of Sundanese, it is /r/ that appears to be less marked, e.g. it has a broader phonotactic distribution. It is not then a difference in markedness per se that accounts for the difference

⁸Archangeli (1988) argues that, although the above facts constitute a convincing argument, other arguments suggest the opposite conclusion. The reader is referred there for consideration of these other arguments.

between dissimilation in Sundanese and Latin. In the case of Latin, dissimilation results in unmarked segments, as predicted by Odden, while in Sundanese, dissimilation applies between unmarked segments resulting in marked ones. Kaisse (1988) makes a similar observation based on the facts of Continuant Dissimilation in Modern Greek. Dissimilation occurs between two adjacent obstruents that agree in continuancy, resulting in the delinking and feature fill-in of both values of the feature Continuant. Thus, although an attractive suggestion, the view that feature specifications lost due to the delinking of tier adjacent identical specifications are filled in by general default rules cannot be maintained.

The fact that dissimilation may occur between unmarked values poses additional problems for a Radical Underspecification account of dissimilation. Following Radical Underspecification, it is generally assumed that it is marked values that are specified underlyingly. Thus in Sundanese, only [+lateral] would be specified underlyingly. But before dissimilation applies, default fill-in must provide [-lateral] specifications to /r/'s, but not to other consonants, since it is between /r/'s that dissimilation occurs. Yet following delinking, it is [+lateral] specifications that must be provided to account for the observed outputs. Thus again two fill-in rules are required, the first to assign [-lateral] specifications to /r/, the second to reassign [+lateral] specifications to those /r/'s which lose their lateral specifications.

We conclude then that the facts of dissimilation in Sundanese lend additional support to the conclusion that both values are specified within a contrasting class, as dissimilation itself requires the presence of [-lateral] specifications. The facts of Sundanese, however, argue against the view that dissimilation necessarily occurs between more marked values, resulting in less marked ones. But following Contrastive Underspecification, this poses no formal problem, since both values are present underlyingly and plausibly either could be filled-in by rule after delinking applies. In the case of Latin, it is the unmarked [-lateral] specification that is inserted after delinking, while in Sundanese is the [+lateral] specification which is filled in.

4.2. Dissimilation and the OCP

Dissimilation in Latin and Sundanese differ, at least superficially, in another respect. In Latin the process of dissimilation is seen to be strictly local (on the lateral tier). While in Sundanese dissimilation appears to apply between /r/'s which are farther apart and not ones that are closer together, e.g. /s=ar=iduru/ → [saliduru], but /r=ar=hɪt/ → [rarahɪt]. This brings us back to the two remaining questions posed at the beginning of this section, repeated from above: (2) How general are the rules of /r/ Dissimilation and Lateral

the most complete dictionary of Sundanese, with an estimated 17,000 entries. These observations are based on a consideration of /r/ and /l/ initial forms.

Of approximately 960 /r/ initial entries, 105 have more than one /r/. These 105 cases fall into the following three patterns:

(16) Phonotactic constraints on /r/'s (. . . = additional segments)

a.	rV ₁ rV ₂ . . .	67	57 V ₁ = V ₂ = copying of 1st syllable	e.g. <i>rara</i> 'braid'
b.	rVCrVC	20	19 V ₁ C ₁ = V ₂ C ₂ = copying of monosyll. form	e.g. <i>ragrag</i> 'fall'
c.	r . . . r	18	17 are recent borrowings	e.g. <i>radar</i>

As summarized in (16a), in the majority of /r/ initial cases with two /r/'s (67 forms), the form consists of a /rVrV . . . / sequence, where the second /r/ is the onset of the second syllable. In 57 of these 67 cases, the first and second vowels are the same, thus constitute a "phonological copy" of the first syllable.⁹ As shown in (16b), in 20 cases the /r/'s are onsets to the first and second syllable, both of which are heavy. In 19 of these 20 cases, the vowel and consonant of the rime in the first and second syllable are the same, thus the forms consist phonologically of a copy of a monosyllabic form. Finally, as summarized in (16c), in 18 cases, there is a second /r/ in the form, not occurring as an onset to the second syllable. Of these 18 cases, 17 are clearly recent borrowings. Based on /r/ initial forms, we conclude then that roots with two /r/'s in the indigenous vocabulary are almost non-existent, unless the form involves a phonological copy of the first syllable. In addition there are no cases with /r/'s in both the onset and rime of the same syllable. Thus

* $\begin{array}{c} \sigma \\ / | \backslash \\ r \ V \ r \end{array}$ appears to be disallowed in any case.

⁹I use the term "phonological copy" to refer to a sequence of phonological material that is the same as another sequence. I do not mean to imply that these sequences are phonologically derived through a process of copying. I use the term to distinguish from the morphological process of reduplication. The former may or may not be due to the latter. Morphologically, partial reduplication of an initial syllable occurs in Sundanese, serving a number of functions. Although some of the cases of phonological copy may result from such partial reduplication, it is unlikely that all of them do. Since a monolingual dictionary was used for this investigation, further study would be needed to determine the morphological structure of these forms. But of the cases where I know the gloss, these do not appear to be morphologically derived forms in any obvious sense.

Constraints also obtain on the distribution of /r/'s and /l/'s. Although /r/'s and /l/'s may cooccur in some positions within the word, clear restrictions apply in cases with /r/ and /l/ in the onset of the first two syllables.

(17) Phonotactic constraints on /r/'s and /l/'s

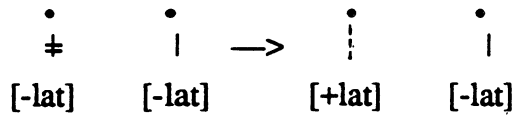
a.	rVlV . . .	4	4 are recent borrowings	e.g. <i>rəlatip</i>
b.	lVrV . . .	25	4 are recent borrowings	e.g. <i>lori</i>
			12 have an alternate form rVrV	e.g. <i>loris ~ roris</i> 'check'

As summarized in (17a), of the approximately 960 /r/ initial roots, the pattern rVlV . . ., with /r/ as the onset of the first and /l/ as the onset of the second syllable, only occurs in four forms and all four of these forms are recent borrowings. As shown in (17b), of the approximately 990 /l/ initial entries, 25 are of the shape lVrV . . ., where /l/ is the onset of the first and /r/ the onset of the second syllable. Of these 25 cases, four are recent borrowings and of the remaining cases, twelve have alternate forms of the shape rVrV Thus we see that forms of the shape #[αlat] V [-αlat] V . . . are rare and when they occur they often have an alternate form of the shape rVrV

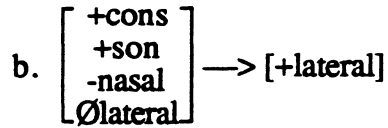
The following generalizations emerge. (1) In both monomorphemic forms and morphologically complex ones, two /r/'s are avoided unless they are in the onset of adjacent syllables, usually a phonological copy of an initial syllable. (2) Additionally, there is a tendency to avoid two unlike liquids in the onsets of the initial two syllables of a form. In answer to our second question above, we see that constraints on the distribution of two /r/'s and /r/'s and /l/'s hold much more generally than just in the context of the plural marker. /r/ Dissimilation applies (optionally) in other morphologically complex forms and across word boundaries. Basic phonotactic patterns also conform to such constraints. The behavior of Lateral Assimilation is less systematic, but there is a strong tendency against dissimilar liquids occurring as onsets of the initial two syllables of the form. Thus other aspects of the phonology of Sundanese display the same restrictions exhibited by the allomorphic alternation of the plural marker.

This leads us to our third question. Yip argues that if dissimilation is indeed motivated by the OCP, then other aspects of a phonological system should display similar constraints. Thus the fact that sequences of /r/'s are constrained more generally in Sundanese is as predicted by Yip. Yet if dissimilation is motivated by the OCP, it should

(20) /r/ Dissimilation:



a. The first [-lateral] is delinked (due to tier adjacent [-lateral] specifications)



Sample derivations exemplifying both Lateral Node Merger and /r/ Dissimilation are presented in (21):

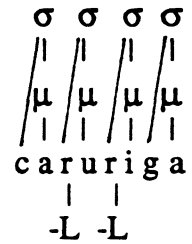
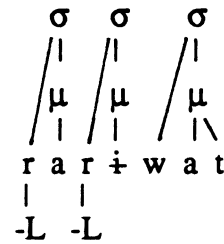
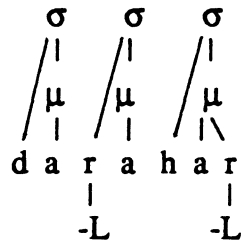
(21) Derivations:

UR:

a. dahar

b. rɪwat

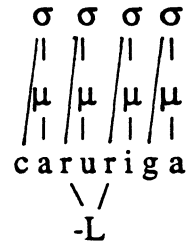
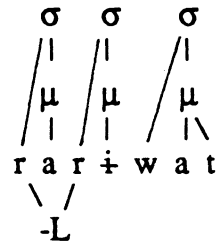
c. curiga



Infix & Syllab:

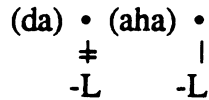
Lateral Node Merger:

—



/r/ Dissimilation:

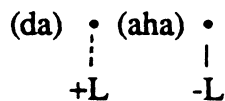
a. Delinking



—

—

b. [+lat] Insertion



Output:

[dalahar]

[rarɪwat]

[caruriga]

In (21a) the environment for Lateral Node Merger is not met; the tier adjacent [-lateral] specifications create an OCP violation, triggering the application of /r/ Dissimilation. But, as exemplified in (21b), with an /r/ initial root, the outcome of

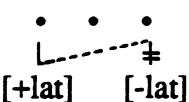
infixation is a sequence of two /r/'s in the onset of adjacent syllables, which meets the structural description of Lateral Node Merger, thereby bleeding the application of /r/ Dissimilation. Similarly if the onset of the second syllable is an /r/, as shown in (21c), this also results in a sequence of two /r/'s in adjacent onsets, again triggering Lateral Node Merger.

Lateral Node Merger does not apply when the /r/ of the root is in the rime of the first syllable, e.g. /pərceka/, /p=al=ərceka/, since the structural description is not met. I believe that this relates to a more general constraint whereby sequences of two /r/'s within a

syllable are disallowed in Sundanese: $\begin{array}{c} * \sigma \\ / | \backslash \\ r \quad V \quad r \end{array}$. Finally, Lateral Node Merger does

not apply if the /r/ of the root appears in the second syllable as part of a complex onset, e.g. /motret/, /m=al=otret/. This suggests that there is something special about the structure of these complex onsets, though I do not have a formal mechanism to propose to block the application of Lateral Node Merger in these cases. We conclude that the interaction of Lateral Node Merger and /r/ Dissimilation accounts for the observed pattern of allomorphy of the plural marker when an /r/ is present in the root (as summarized above in (9)).

Finally consider the case where the =al= allomorph appears in /l/ initial roots, e.g. /l̥tik/, /l=al=̥tik/. These forms were accounted for with the proposed rule of Lateral Assimilation, repeated in (22).

- (22) Lateral Assimilation: $r \rightarrow l / l = V _ =$

 applies to /r/ of the plural marker

The derivational outcome of the rule of Lateral Assimilation is parallel to the tendency to avoid sequences of two unlike liquids in the onsets of the two initial syllables of a word (*#[αlat] V [-αlat] V . . .) discussed above for both /r/ and /l/ initial roots. The structure and output of Lateral Assimilation look suspiciously similar to the rule of Lateral Node Merger, except that the lateral specifications are opposite. This raises the possibility that Lateral Assimilation and the parallel constraint on underlying forms could be accounted for with a more general statement of Lateral Node Merger, involving any two lateral specifications, whether the same or the opposite. Two observations argue against such a generalized rule of Lateral Node Merger. First, the underlying constraint on *#[αlat] V [-αlat] V . . . sequences is less systematic than that observed for forms with two /r/'s. Second, the =al= variant of the plural marker appears with /l/ initial roots, but not for roots

where /l/ appears as the onset of the second syllable; the environment of Lateral Assimilation is more limited than the environment of Lateral Node Merger. Thus, although the parallel is interesting, these differences argue that the two rules cannot be collapsed and that we need to maintain both Lateral Assimilation and Lateral Node Merger as distinct rules.¹⁰

In summary, we see, assuming a rule of Lateral Node Merger, that the patterns of allomorphy observed in the plural marker are as expected, if the OCP holds both underlyingly and derivationally in Sundanese. These results lend strong support to the view that rules of dissimilation are motivated by the OCP.

5. Conclusions

We have examined in some detail the formal properties of the plural marker =ar= of Sundanese. We have considered both its behavior as an infix and the allomorphic alternation between the =ar= and =al= variants. The unusual property of the plural marker, whereby it usually appears as an infix, but can also occur as a prefix, results in maximizing preferred syllable types. Its placement is accounted for straightforwardly within a moraic framework, in which the affix is located before the first mora of the root. The allomorphy of the plural marker involves both assimilation and dissimilation, accounted for in the proposed analysis by three rules: /r/ Dissimilation, Lateral Node Merger and Lateral Assimilation. The facts of Sundanese are compatible with the current view of dissimilation as delinking and subsequent feature fill in. Yet Sundanese provides strong evidence that dissimilation does not always result in less marked segments as had been previously suggested. Furthermore the case of Sundanese lends further support in favor of Contrastive Underspecification, rather than Radical Underspecification. Finally, examination of the general phonological patterns of Sundanese reveals that Sundanese offers clear support for the view that dissimilation is an OCP driven process, in that both the rule of /r/ Dissimilation and more general phonotactic patterns behave alike.

¹⁰Anderson (1991) suggests that the =al= allomorph in /l/ initial roots is not a general phonological rule of Sundanese, but specific to the plural marker. This may be the case and could possibly be determined by closer inspection of sequences of two /l/'s in Sundanese.

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