

# Metathesis in Bonggi

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In Bonggi, the alveolar sonorants—/r/, /l/, and /n/—metathesize with a following vowel before [–continuant] alveolars.<sup>1</sup> Section 1 lays out background facts about the language and then sections 2 through 4 provide evidence of metathesis involving /r/, /l/, and /n/ in turn.

The data in (1) through (3) illustrate the phenomenon briefly using each of the three sonorants. There is a paradigmatic relationship between each (a) example, showing no metathesis, and its corresponding (b) example, in which the sonorant metathesizes with the following vowel.<sup>2</sup>

- |        |                                      |   |
|--------|--------------------------------------|---|
| (1) a. | [ <sup>1</sup> gam.bar]              | [gəm.'ba.ər <sup>d</sup> n]                       |
|        | /gambar/                             | /gambar-on/                                       |
|        | 'picture'                            | 'picture-UND' (= 'have photograph taken')         |
| (2) a. | [ <sup>1</sup> is.k <sup>w</sup> ol] | [φis.'k <sup>w</sup> u.i <sup>d</sup> n]          |
|        | /iskul/                              | /po-iskul-on/                                     |
|        | 'school'                             | 'CAUS-school-UND' (= 'make someone go to school') |

\* Linguists rarely admit in print that a previous analysis of theirs was wrong. Howard McKaughan wrote the best retraction by a linguist that I have read (McKaughan 1973). This paper was written to express my appreciation for Howard's humility regarding his own work and his ability to encourage others in theirs. (See also Kroeger, this volume/Eds.) In the spirit of McKaughan (1973), the following are my errors in previous analyses of Bonggi metathesis. Soon after my wife and I began studying Bonggi in 1983, we noticed that /r/ metathesizes with the following vowel before a word-final alveolar. As Boutin (1993:125) incorrectly concluded, metathesis in Bonggi "always involves" /r/. Subsequently, I discovered that metathesis is not restricted to /r/; namely, /l/ can also metathesize. The metathesis involving /l/ was harder to recognize than that of /r/, because /l/ changes to [i] after it metathesizes. Having determined that both /r/ and /l/ are subject to metathesis, Boutin (2000, 2002) described a process of liquid metathesis in Bonggi. That analysis resolved two problems. First, prior to widening my analysis of /r/ metathesis to liquid metathesis, I was puzzled as to why [l] occurs in only some forms in a paradigm. Second, I was previously perplexed by other forms appearing to be exceptions to my nasal-preplosion rules. Having broadened my analysis of Bonggi metathesis from simple /r/ metathesis to liquid metathesis and in the process resolved two other problems, I was quite confident in 2000 that my analysis of metathesis was correct. I was wrong again! Since then, I have discovered that metathesis in Bonggi involves /n/ as well.

<sup>1</sup> "Metathesis is the process whereby in certain languages the expected linear ordering of sounds is reversed under certain conditions" (Hume 2004:202).

<sup>2</sup> Actor and Undergoer are core arguments of the verb, either of which can be the subject. Verbs glossed ACT occur in sentences whose subject is an Actor, whereas verbs glossed UND occur in sentences whose subject is an Undergoer. Other abbreviations in this paper are as follows. CAUS: causative, IE: internal experience (a subtype of stative verb and marked UND), IMP: imperative, and REAL: realis.

- (3) a. [s<sup>h</sup>i.ɸu<sup>d</sup>n]                      b. [s<sup>h</sup>i.ɸu.ʔn]  
       /sipun/                                /sipun-an/  
       ‘mucus from nose’                ‘mucus.from.nose-IE’ (= ‘afflicted.with.runny.nose’)

In each of these (b) examples, additional phonological phenomena obscure the metathesis itself. These are laid out in the next section.

## 1. Background facts

Bonggi is a western Austronesian language spoken on Banggi and Balambangan islands in Sabah, Malaysia. This language has seventeen underlying consonants /p, t, k, ʔ, s, b, d, g, dʒ, m, n, ɲ, l, r, j, w/ and five underlying vowels /i, u, e, o, a/. Stress falls on the penultimate syllable.

The two liquids, /l/ and /r/, can occur in either the syllable’s onset or coda:

**Table 1: Liquid contrasts and allophones**

		Word-initial	Intervocalic	Medial (preconsonantal)	Word-final
/l/	[l]	/labi/ [ˈla.βi] ‘freshwater turtle’	/bulag/ [ˈbʷu.ləg] ‘blind’	/sultan/ [ˈsʊl.tə <sup>d</sup> n] ‘sultan’	/kabul/ [ˈka.βʷʊl] ‘lazy’
	[ɭ]	/liaa/ [ɭi.ˈa.a] ‘ginger’	/bali/ [ˈba.ɭi] ‘house’	—	—
/r/	[r]	/reŋan/ [ˈrə.ŋān] ‘lightweight’	/arag/ [ˈa.rəg] ‘back’	/burtus/ [ˈbʷʊr.tus] ‘flying fish’	/dabar/ [ˈda.βar] ‘type of jellyfish’
	[rʲ]	/rikut/ [ˈrʲi.hʷʊt] ‘grass’	/kiri/ [ˈkʲi.rʲi] ‘eyebrow’	—	—

Table 1 illustrates various other phonological processes:

- (4) a. *Nasal spread* to the following vowel (e.g., /reŋan/ [ˈrə.ŋān] ‘lightweight’).
- b. *Laxing* of the high vowels /i, u/ to [ɪ, ʊ], respectively, only in syllables which are closed by [+consonantal] consonants, where laryngeals are [–consonantal] (e.g., /sultan/ [ˈsʊl.tə<sup>d</sup>n] ‘sultan’), or preceding /r/ (e.g., /kiri/ [ˈkʲi.rʲi] ‘eyebrow’).
- c. *Spirantization* of labial and velar stops word-medially between vowels (e.g., /kabul/ [ˈka.βʷʊl] ‘lazy’, /rikut/ [ˈrʲi.hʷʊt] ‘grass’).
- d. *Palatalization* of (nonliquid) consonants before front vowels (e.g., /kiri/ [ˈkʲi.rʲi] ‘eyebrow’).
- e. *Labialization* of labial and velar consonants before back vowels /u, o/ (e.g., /burtus/ [ˈbʷʊr.tus] ‘flying fish’, /rikut/ [ˈrʲi.hʷʊt] ‘grass’).
- f. *Preplosion* of word-final nasals only if the preceding vowel is non-nasalized (e.g., /raaŋ/ [ˈra.a<sup>ŋ</sup>] ‘low tide’); word-final nasals are simple if the preceding vowel is nasalized (e.g., /reŋan/ [ˈrə.ŋān] ‘lightweight’).

Several additional rules are introduced below in connection with the discussion of metathesis.<sup>3</sup>

## 2. Metathesis of /r/

As seen in (1) above, /r/ metathesizes with the following vowel. Metathesis does not occur before non-alveolars (e.g., /garam/ ['ga.rəbm] 'salt'; cf. Malay *garam*). Most borrowed words undergo metathesis.<sup>4</sup>

Metathesis of /r/ is supported by alternations with affixes. The examples in (5) through (9) show verb roots with a root-final /r/. The /r/ occurs in word-final position in ACT forms, but it metathesizes with the suffix vowel in suffixed forms. Before metathesis occurs, the suffix vowel in UND /-on/ harmonizes with the last vowel in the root (which is the controlling vowel).

	Root	Gloss	a. ACT /η-/	b. UND /-on/
(5)	/adʒar/	teach	['ŋã.dʒar]	[ə.'dʒa.ər <sup>d</sup> n]
(6)	/ansur/	dissolve	['ŋã.nsur]	[ʊn.'su.ər <sup>d</sup> n]
(7)	/atur/	arrange	['ŋã.tur]	[ʊ.'tu.ər <sup>d</sup> n]
(8)	/biaar/	pay	[mĩ.'ã.ãr]	[bi.'a.ər <sup>d</sup> n]
(9)	/gambar/	picture	[ŋã.'gam.bar]	[gəm.'ba.ər <sup>d</sup> n]

The rule of sonorant metathesis is shown in (10). The formal features in this rule and others below follow Halle (1995).

### (10) Sonorant-metathesis rule

C <sub>1</sub>	V <sub>1</sub> → V <sub>1</sub> C <sub>1</sub> / V ____	C
$\begin{bmatrix} +\text{sonorant} \\ \text{coronal} \\ +\text{anterior} \end{bmatrix}$		$\begin{bmatrix} -\text{continuant} \\ \text{coronal} \\ +\text{anterior} \end{bmatrix}$

## 3. Metathesis of /l/

The rule in (10) applies not just to /r/. This section presents the phonological complications relevant to how /l/ also undergoes metathesis in (10).

<sup>3</sup> Additional rules indicated in the data where relevant but not otherwise discussed include unreleased word-final plosives (for example, /bulag/ ['b<sup>w</sup>ul.əg] 'blind' in table 1). In connection with (4b), syllable-final low vowel /a/ is lax to [ə] except when it is immediately preceded by another /a/ or the coda is /r/ or /l/.

<sup>4</sup> Borrowed words which do not undergo metathesis include [mʊ.su.'a.rət] 'meeting' (Malay *mesyuarat* 'meeting'), [dʒu.'a.lə<sup>d</sup>n] 'items for sale' (Malay *jual* 'sell'), [ŋu.rət] 'flirt<sub>v</sub>' (Malay *mengurat* 'womanize'), [a.lu<sup>d</sup>n-'a.lu<sup>d</sup>n] 'road' (perhaps from Javanese *alun-alun* 'road'), [bi.lun] 'balloon', [fə.lən] 'plan', [ne.lun] 'nylon', [ma.rin] 'marine', [gi.ln] 'container for liquids' (source: *gallon*), and [wa.r<sup>d</sup>n] 'warden' (presumably from a nonrhotic variety of English, where the flap, not the preplosion, reflects the English *d*).

Nasality spreads from nasal consonants to following non-nasal segments in the same word. Nasality persists through the word until it is blocked by a non-nasal consonant. As seen in (11), semivowels do not block nasal spread; however, as shown in (12), the two liquids, /l/ and /r/, block nasal spread.

- (11)a. /ɲawa/ [ʲɲ.ãwã] ‘life, soul’  
 b. /minjen/ [ʲmĩn.ǰẽn] ‘son-in-law, daughter-in-law’
- (12)a. /<om>sulaŋ/ [sʊ.ʼmʷũ.ləᵑ] ‘<ACTIVITY>take.discarded.item’  
 b. /<om>ilaŋ/ [ʼmĩ.ləᵑ] ‘<ACTIVITY>lie.down’  
 c. /ŋ-tuluŋ/ [ʼnũ.luᵑ] ‘ACT-assist’  
 d. /<in>giliŋ/ [gʲɪ.ʼnĩ.liᵑ] ‘<REAL>grind’

Recall from (4f) above that word-final nasals are not preploded if the preceding vowel is nasalized, as in (11b), but word-final nasals undergo prepllosion if the preceding vowel is non-nasalized as shown, as the forms in (12a–d) show.<sup>5</sup>

When the UND suffix /-on/ is added to a root ending in /l/, several processes are involved, including harmony between the suffix vowel and the controlling vowel, metathesis (of /l/ with the suffix vowel), /l/ vocalization to [i], and coalescence. All of these processes are illustrated by the derivations in table 2.

**Table 2: Undergoer voice with metathesis of root-final /l/**

	/tombol-on/ ‘patch-UND’	/po-iskul-on/ ‘CAUS-school-UND’	/buntal-on/ ‘throw-UND’
Stress	tom.ʼbo.lon	po.is.ʼku.lon	bun.ʼta.lon
Vowel harmony	—	pi.is.ʼku.lun	bun.ʼta.lan
<b>Sonorant metathesis</b>	tom.ʼbo.ɔln	pi.is.ʼku.ɯln	bun.ʼta.aln
Vocalization of /l/	tom.ʼbo.oĩn	pi.is.ʼku.uĩn	bun.ʼta.aĩn
Coalescence	tom.ʼbo.in	pis.ʼku.in	bun.ʼta.in
Vowel laxing	təm.ʼbo.in	pɪs.ʼku.in	bʊn.ʼta.in
Spirantization	—	ϕɪs.ʼku.in	—
Labialization	təm.ʼbʷo.in	ϕɪs.ʼkʷu.in	bʷʊn.ʼta.in
Nasal prepllosion	təm.ʼbʷo.iᵊn	ϕɪs.ʼkʷu.iᵊn	bʷʊn.ʼta.iᵊn
	[təm.ʼbʷo.iᵊn]	[ϕɪs.ʼkʷu.iᵊn]	[bʷʊn.ʼta.iᵊn]

<sup>5</sup> Activities are a subclass of verbs. The ACTIVITY infix is realized as a prefix [m-] with vowel-initial roots, as (12b) shows. The infix vowel /o/ harmonizes with the initial vowel of the root, as (12a–b) show.

The rule in (13) accounts for vocalization of /l/. Conant (1916/1973:236) describes a similar process for the Mandaya language of Mindanao in which intervocalic /l/ vocalizes to [i] or [j] (Gallman 1979:7, 12). Kenstowicz (1994:90–94) discusses vocalization of /l/ in Serbo-Croatian and argues that it is a natural process found in many languages. Vocalization of /l/ often results in /i/ following a nonhigh vowel and, consequently, an offglide occurs.

(13) Vocalization of /l/ rule

$$\left[ \begin{array}{c} +\text{consonantal} \\ +\text{lateral} \end{array} \right] \rightarrow \left[ \begin{array}{c} -\text{consonantal} \\ \text{dorsal} \\ +\text{high} \\ -\text{back} \end{array} \right] / V \_ \left[ \begin{array}{c} +\text{consonantal} \\ \text{coronal} \\ +\text{anterior} \end{array} \right]$$

Sonorant metathesis must be ordered before vocalization of /l/ since vocalization of /l/ blocks sonorant metathesis. Metathesis and vocalization of root-final /l/ is productive in verbs suffixed with UND /-on/. Historically, some roots, including those in (14), contained an /l/ word-medially which has undergone metathesis and vocalization. Thus, the synchronic description reflects diachronic processes.<sup>6</sup>

(14)		Sonorant metathesis	Vocalization of /l/	Coales- cence	Pre- plosion		
a.	*dalan	> daaln	> daain	> dain	> dai <sup>d</sup> n	[ <sup>l</sup> da.i <sup>d</sup> n]	‘path, way, trail’
b.	*palad	> paald	> paaid	> paid		[ <sup>l</sup> ɸa.id <sup>ɾ</sup> ]	‘palm of hand’
c.	*bulan	> bualn	> buain		> buai <sup>d</sup> n	[b <sup>w</sup> u. <sup>l</sup> a.i <sup>d</sup> n]	‘moon’
d.	*kulit	> kuilt	> kuiit	> kuit		[ <sup>l</sup> k <sup>w</sup> u.it <sup>ɾ</sup> ]	‘bark, rind’
e.	*kulat	> kualt	> kuait			[k <sup>w</sup> u. <sup>l</sup> a.it <sup>ɾ</sup> ]	‘mushroom’
f.	*bulud	> buuld	> buuid	> buid		[ <sup>l</sup> b <sup>w</sup> u.ɪd <sup>ɾ</sup> ]	‘hill, ridge’

Sonorant metathesis is also supported by the alternations in (15), in which the /l/ shows up only on the unprefixated form [<sup>l</sup>lat.ə<sup>d</sup>n] ‘wait-UND’ in (15d). In all the other forms, the /l/ has metathesized and vocalized.<sup>7</sup>

<sup>6</sup> The unmetathesized forms preceded by an asterisk hypothesize a previous stage of Bonggi through internal reconstruction. These forms are consistent with some protolanguage from which this language descended.

<sup>7</sup> Initial nonhigh root vowels which are followed by /r/ or /l/ are frequently deleted if the root is suffixed, as seen in (15d).

- (15)a. /m-g-alat/      [ŋ.<sup>1</sup>ga.it<sup>ː</sup>]      ‘IRREALIS-PROGRESSIVE-wait’  
       b. /pog-alat/      [pə.<sup>1</sup>ga.it<sup>ː</sup>]      ‘IMP-wait’  
       c. /ki-alat/      [ki.<sup>1</sup>a.it<sup>ː</sup>]      ‘PETITIVE-wait’  
       d. /alat-on/      [ˈlat.ə<sup>d</sup>n]      ‘wait-UND’

Metathesis is prosodically motivated. Both liquids—/r/ and /l/—metathesize before alveolar plosives and nasals—e.g., (5) through (9), table 2, (14), and (15) above.

An alternative to the /l/-metathesis analysis presented in this section might be vowel deletion, whereby VIVn → Vln. Though vowel deletion could account for the synchronic forms in table 2, it fails to provide an explanation for the presence of [a] in [b<sup>w</sup>u.<sup>1</sup>a.i<sup>d</sup>n] ‘moon’ (14c) and [k<sup>w</sup>u.<sup>1</sup>a.it<sup>ː</sup>] ‘mushroom’ (14e), since [a] would be deleted according to vowel deletion. Under a deletion account, one might claim that deletion occurs with affixes as in table 2, whereas metathesis occurs only in roots. However, any vowel-deletion account misses the generalization that sonorant metathesis occurs synchronically and diachronically before alveolars which are [–continuant]. Bonggi CV metathesis is an example of what Blevins & Garrett (1998:509) call “perceptual metathesis” which is limited to certain segment types; in Bonggi this type is sonorants.

As shown in (16) through (19), some UND and UND.IMP forms have a word-medial [l] which does not surface in ACT forms.

		a. ACT /ŋ-/	b. UND /-on/	c. UND.IMP /-aʔ/
(16)	/tolon/      ‘swallow’	[ˈnõ.i <sup>d</sup> n]	[ˈtəɭ.nõn]	[ˈtəɭ.nõʔ]
(17)	/bolun/      ‘fold clothes’	[ˈm <sup>w</sup> õ.i <sup>d</sup> n]	[ˈb <sup>w</sup> ol.nõn]	[ˈb <sup>w</sup> ol.nõʔ]
(18)	/bilid/      ‘turn sth. over’	[ˈmi.i <sup>d</sup> ː]	[ˈbɪɭ.dɪ <sup>d</sup> n]	[ˈbɪɭ.dəʔ]
(19)	/salin/      ‘change clothes’	[ˈn <sup>j</sup> ẽ.i <sup>d</sup> n]	[ˈs <sup>j</sup> ɛɭ.nĩn]	[ˈs <sup>j</sup> ɛɭ.nõʔ]

The derivations for the UND forms in the (b) examples are shown in table 3 below; for the UND.IMP forms in the (c) examples, in table 4 below; and for the ACT forms in the (a) examples, in table 5 below.

To derive the UND forms in the (b) examples from strictly ACT-based roots would require an arbitrary rule that changes /i/ to /l/, thus reversing the process of vocalization described above. However, the source of the /l/ in the UND forms can be recovered by taking the UND.IMP forms as the basis for the underlying root and then deriving the ACT and UND forms accordingly. Vowel harmony is total and spreads from the root in both directions, with root vowels being the controllers and nonhigh affix vowels being the targets (Boutin 2000, 2002). Nasal spread is described at the beginning of this section. The vowels /a/ and /i/ monophthongize to [ɛ] in stressed syllables. Long monophthongs undergo coalescence when they precede another vowel in the same word.

Table 3: Undergoer voice with metathesis of root-medial /l/

	/tolon-on/ 'swallow-UND'	/bolun-on/ 'fold-UND'	/bilid-on/ 'turn.over-UND'	/salin-on/ 'change.clothes-UND'
Stress	to.'lo.non	bo.'lu.non	bi.'li.don	sa.'li.non
Vowel harmony	—	bo.'lu.nun	bi.'li.din	sa.'li.nin
Nasal spread	to.'lo.nõn	bo.'lu.nũn	—	sa.'li.nin
<b>Sonorant metathesis</b>	to.'ol.nõn	bo.'ul.nũn	bi.'il.din	sa.'il.nin
Monophthongization	—	—	—	'sel.nin
Coalescence	'tõl.nõn	—	'bil.din	—
High-vowel deletion	—	'boØl.nũn	—	—
Vowel laxing	'tõl.nõn	'bol.nõn	'bɪl.din	'sel.nin
Palatalization	—	—	—	'sʲel.nin
Labialization	—	'bʷol.nõn	—	—
Nasal prelosion	—	—	'bɪl.drɪn	—
	[tõl.nõn]	[bʷol.nõn]	[bɪl.drɪn]	[sʲel.nin]

Next, the derivations for the UND.IMP (c) forms above in (16) through (19) are provided in table 4. Because the vowel sequence nonhigh vowel plus high vowel cannot be followed by another vowel in the same word, the high vowel /u/ in /bolun/ 'fold clothes' is deleted after metathesis occurs in the derivation.

The derivations for the ACT (a) forms in (16) through (19) are provided in table 5. Nasal substitution occurs when root-initial voiced bilabial plosives and root-initial voiceless consonants coalesce with prefix-final /ŋ/ to form a nasal homo-organic to the root-initial consonant.

Although the ACT forms appear to be exceptions to nasal prelosion, the derivations in table 5 show why prelosion occurs in these forms. Nasal spread must be ordered prior to vocalization of /l/ in order for the /l/ to block nasal spread. As seen in table 5, the underlying /l/ blocks nasal spread, thus, ultimately preventing the vocalized [i] from being nasalized. The word-final nasal is then preploded since it is preceded by a non-nasalized vowel. Whereas (14) shows that sonorant metathesis followed by vocalization of /l/ is the correct path of diachronic change in Bonggi, table 5 indicates that both nasal spread and sonorant metathesis must precede vocalization of /l/. The next section shows furthermore that nasal spread must precede sonorant metathesis.

Although vocalization of /l/ is restricted to word-final syllables (e.g., in table 5), sonorant metathesis can occur in other syllables, as seen in tables 3 and 4, as well as (20a–c).

- (20)a. [nũ.ũrɪn]      b. [tʊr.nõn]      c. [tʊr.nõʔ]  
       /ŋ-turun/  
       'ACT-follow'      'follow-MARKED.UND'      'follow-UND.IMP'

Coalescence does not occur if it deletes the final syllable's vowel, as in (20a).

**Table 4: Undergoer voice, imperative mood with metathesis of root-medial /l/**

	/tolon-aʔ/ ‘swallow -UND.IMP’	/bolun-aʔ/ ‘fold -UND.IMP’	/bilid-aʔ/ ‘turn.over -UND.IMP’	/salin-aʔ/ ‘change.clothes -UND.IMP’
Stress	to. 'lo.naʔ	bo. 'lu.naʔ	bi. 'li.daʔ	sa. 'li.naʔ
Vowel harmony	to. 'lo.noʔ	—	—	—
Nasal spread	to. 'lo.nõʔ	bo. 'lu.nãʔ	—	sa. 'li.nãʔ
<b>Sonorant metathesis</b>	to. 'ol.nõʔ	bo. 'ul.nãʔ	bi. 'il.daʔ	sa. 'il.nãʔ
Monophthongization	—	—	—	'seɪ.nãʔ
Coalescence	'tɔl.nõʔ	—	'bɪl.daʔ	—
High-vowel deletion	—	'boØl.nãʔ	—	—
Vowel laxing	'tɔl.nõʔ	'bɔl.nõʔ	'bɪl.dəʔ	'seɪ.nõʔ
Palatalization	—	—	—	'sʲeɪ.nəʔ
Labialization	—	'bʷol.nõʔ	—	—
	['tɔl.nõʔ]	['bʷol.nõʔ]	['bɪl.dəʔ]	['sʲeɪ.nõʔ]

**Table 5: Actor voice with root-medial /l/**

	/ŋ-tolon/ ‘ACT-swallow’	/ŋ-bolun/ ‘ACT-fold’	/ŋ-bilid/ ‘ACT-turn.over’	/ŋ-salin/ ‘ACT-change.clothes’
Stress	ŋ. 'to.lon	ŋ. 'bo.lun	ŋ. 'bi.lid	ŋ. 'sa.lin
Nasal substitution	'no.lon	'mo.lun	'mi.lid	'na.lin
Nasal spread	'nõ.lon	'mõ.lun	'mĩ.lid	'nã.lin
<b>Sonorant metathesis</b>	'nõ.oln	'mõ.uln	'mĩ.ild	'nã.iln
Vocalization of /l/	'nõ.oɪn	'mõ.uɪn	'mĩ.iid	'nã.iin
Monophthongization	—	—	—	'nẽ.in
Coalescence	'nõ.in	—	'mĩ.id	—
High-vowel deletion	—	'mõ.Øin	—	—
Palatalization	—	—	—	'nʲẽ.in
Labialization	—	'mʷõ.in	—	—
Nasal prelosion	'nõ.i <sup>d</sup> n	'mʷõ.i <sup>d</sup> n	—	'nʲẽ.i <sup>d</sup> n
	['nõ.i <sup>d</sup> n]	['mʷõ.i <sup>d</sup> n]	['mĩ.ĩdʷ]	['nʲẽ.i <sup>d</sup> n]

#### 4. Metathesis of /n/

The rule in (10) accounts for metathesis of /r/ (§2), of /l/ (§3), and now of /n/. Metathesis of /n/ occurs when stems which end in /n/ are affixed by UND /-on/ or marked-UND /-an/. Consider the data in (21) through (25). The (a) forms are prefixed with ACT /ŋ-/ and show that these roots end in an alveolar nasal /n/ which is preploded, since the preceding vowel is not nasalized. However, the root-final nasal /n/ is deleted in the (b) forms which are suffixed with UND /-on/. (Prior to being deleted, the root-final /n/ nasalizes the following vowel of the UND suffix. Nasalization of this vowel then prevents prepllosion of the suffix-final /n/. Some allophonic alternations are omitted for simplicity.)

	Root	Gloss	a. ACT /ŋ-/	b. UND /-on/	c. UND.IMP /-aʔ/
(21)	/akun/	agree	[ <sup>h</sup> ŋã.hu <sup>d</sup> n]	[u. <sup>h</sup> hu.ũn]	[u. <sup>h</sup> hu.nãʔ]
(22)	/ampun/	forgive	[ <sup>h</sup> ŋãm.pu <sup>d</sup> n]	[um. <sup>h</sup> pu.ũn]	[um. <sup>h</sup> pu.nãʔ]
(23)	/bitin/	hang	[ <sup>h</sup> mĩ.tr <sup>d</sup> n]	[bɪ. <sup>h</sup> ti.ĩn]	[bɪ. <sup>h</sup> ti.nãʔ]
(24)	/rasun/	poison	[ <sup>h</sup> ŋð. <sup>h</sup> ra.su <sup>d</sup> n]	[rʊ. <sup>h</sup> su.ũn]	[rʊ. <sup>h</sup> su.nãʔ]
(25)	/sorɔŋgon/	touch	[nð. <sup>h</sup> rɔŋ.gɔ <sup>d</sup> n]	[sə.rəŋ. <sup>h</sup> gɔ.ɔ̃n]	[sə.rəŋ. <sup>h</sup> gɔ.nɔ̃ʔ]

Further evidence that the underlying forms in (21) through (25) contain a root-final nasal is provided by the UND.IMP (c) forms. Because the suffix-final consonant is not alveolar, sonorant metathesis does not occur in the (c) forms and the root-final nasals are retained.

Sonorant metathesis involving root-final /n/ can also occur with roots affixed by /-an/, as (3b) above already shows. Although the (b) examples in (3) and (21) through (25) provide evidence for a root-final /n/ which is deleted when the suffix /-on/ or /-an/ occurs, these data do not necessarily establish that metathesis has occurred. However, evidence for sonorant metathesis and nasal deletion is seen in table 6, where nasal spread is ordered prior to sonorant metathesis so that the final syllable's vowel is nasalized. This nasalization subsequently blocks nasal prepllosion. Nasal deletion occurs word-finally because homo-organic nasal clusters are permitted only word-initially.

Nasal deletion is a more general process than the deletion of root-final nasals in forms like those in (3), (21) through (25), and table 6. In (26a), the quantifier-linking prefix /ŋ-/ is deleted before a nasal-initial root; compare (26b), where [ŋ] is not dropped.

- (26)a. /si-/ 'one' + /ŋ-/ + /mɪŋguʔ/ 'week' → [s<sup>h</sup>ɪ.<sup>h</sup>mĩŋ.g<sup>w</sup>uʔ] 'one week'
- b. /si-/ 'one' + /ŋ-/ + /olu/ 'day' → [s<sup>h</sup>ɪ.<sup>h</sup>ŋð.lu] 'one day'

Table 6: Undergoer voice with metathesis of root-final /n/

	/rasun-on/ 'poison-UND'	/bitin-on/ 'hang-UND'	/akun-on/ 'agree-UND'
Stress	ra.'su.non	bi.'ti.non	a.'ku.non
Vowel harmony	ru.'su.nun	bi.'ti.nin	u.'ku.nun
Nasal spread	ru.'su.nũn	bi.'ti.nĩn	u.'ku.nũn
<b>Sonorant metathesis</b>	ru.'su.ũnn	bi.'ti.ĩnn	u.'ku.ũnn
Nasal deletion	ru.'su.ũn	bi.'ti.ĩn	u.'ku.ũn
Vowel laxing	ɾʊ.'su.ũn	bɪ.'ti.ĩn	ʊ.'ku.ũn
Spirantization	—	—	ʊ.'hʊ.ũn
Palatalization	—	bi.'tʃi.ĩn	—
Labialization	—	—	ʊ.'hʷu.ũn
	[ɾʊ.'su.ũn]	[bi.'tʃi.ĩn]	[ʊ.'hʷu.ũn]

Other examples of nasal deletion can be seen by comparing the following irrealis (a) forms in with their realis (b) counterparts.<sup>8</sup>

	Root	Gloss	a. /ŋ-/ ACT.CAUS-	b. /in-ŋ-/ REAL-ACT.CAUS-
(27)	mati	die	[m̩.'mã.tʃi]	[i.'mã.tʃi]
(28)	mokon	eat	[m̩.'mʷɔ.hɔ <sup>d</sup> n]	[i.'mʷɔ.hɔ <sup>d</sup> n]
(29)	matarj	come	[m̩.'mã.tə <sup>9</sup> ŋ]	[i.'mã.tə <sup>9</sup> ŋ]
(30)	monsu?	bathe	[m̩.'mʷɔn.suʔ]	[i.'mʷɔn.suʔ]
(31)	meig	water	[m̩.'mẽ.ĩg]	[i.'mẽ.ĩg]
(32)	nula?	mention	[ŋ.'nũ.ləʔ]	[i.'nũ.ləʔ]

Although one could argue that the underlying realis marker in the (b) examples of (27) through (32) is /i-/ (not /in-/) because the nasal in the underlying form does not surface in these examples, a counterargument is that the [n] does show up as part of the prefix /in-/ with the vowel-initial roots of a different class, illustrated as follows (where allophonic alternations are omitted for simplicity).

<sup>8</sup> The resulting CAUS stems' meanings are straightforward in some forms, such as 'kill' in (27) and 'feed' in (28). However, in other stems the meaning of the causative stems is less predicable: 'name someone' in (28), 'criticize someone' in (32).

- (33)a. /in-aap/ → inaap ‘REAL.UND-get’  
 b. /in-adak/ → inadak ‘REAL.UND-smell’  
 c. /in-ampun/ → inampun ‘REAL.UND-forgive’  
 d. /in-obuʔ/ → inobuʔ ‘REAL.UND-cut.open’

The rule in (34) accounts for nasal deletion.

- (34) Nasal deletion rule

$$\begin{array}{ccc} \text{C} & \rightarrow \emptyset / \text{V} \_\_ & \text{C} \\ [+nasal] & & [+nasal] \end{array}$$

Sonorant metathesis can only occur once in a derivation. Rule (10) requires the sonorant to be preceded by a vowel. The application of the rule to the first V-sonorant-V sequence of the word, shown in bold type in (35a–e), eliminates the initial vowel of the next V-sonorant-V sequence, underlined in these examples. If sonorant metathesis could apply twice in a derivation, then the root-final nasals in (35) would metathesize with the following vowel and nasal deletion would subsequently occur; instead, only the root-medial liquids in (35) undergo metathesis.

- (35)a. /**ur**un-an/ → **ur**.nan [ʼ**ur**.nõn] ‘land.on-MARKED.UND’  
 b. /**tol**on-on/ → **tol**.non [ʼtɔl.nõn] ‘swallow-UND’; cf. table 3  
 c. /**bol**un-on/ → **bol**.nun [ʼb<sup>w</sup>ol.nõn] ‘fold-UND’; cf. table 3  
 d. /**sal**in-on/ → **sel**.nin [ʼs<sup>j</sup>el.nĩn] ‘change.clothes-UND’; cf. table 3  
 e. /**tur**un-an/ → **tur**.nan [ʼtɔr.nõn] ‘follow-MARKED.UND’; cf. (20b)

## 5. Conclusion

Besides having typical phonological features of western Austronesian languages such as reduplication, nasal assimilation, and nasal substitution, Bonggi also has vowel harmony, neutralization of vowels, CV metathesis of sonorants, and vocalization of /l/. This paper has proposed a unified sonorant-metathesis analysis, accounting for the presence of /l/ in some forms—e.g., the UND forms in (16) through (19)—and its absence in others—namely, the corresponding non-UND forms in the same examples. The current analysis also explains why some words’ final nasals are preploded even though only vowels separate it from the preceding nasal consonant—e.g., the ACT forms in (16) through (19). The current analysis also accounts for the presence of root-final /n/ in some forms and its absence in others: respectively, the ACT and UND forms in (21) through (25). This analysis also explains why some words’ final nasals are not preploded even though the preceding consonant is non-nasal—e.g., the UND forms in (21) through (25) and table 6. Finally, the sonorant-metathesis analysis results in a uniform account of nasal deletion.

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