

BLOCKING NASAL SPREAD IN BONGGI

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1 Introduction¹

Bonggi is a Western Malayo-Polynesian language spoken in Sabah, Malaysia. Word-final nasals are either simple [m], [n] and [ŋ], or preploded [^bm], [^dn] and [^kŋ] depending upon the nasalization of the preceding vowel.² Word-final nasals are simple if the preceding vowel is nasalized as in (1).

- (1) *onom* /ɔ.nɔm/ [^ɔnɔ̃m] 'six'
mien /mi.ən/ [^mmĩɛn] 'aunt'
tingaang /ti.ŋa.aŋ/ [^ttĩŋããŋ] 'scorpion'

Final nasals are preploded if the preceding vowel is non-nasalized as in (2).

- (2) *agubm* /a.gum/ [^ag^wu^bm] 'type of shellfish'
Sandahadn /san.da.kan/ [^ssən^dda^hə^dn] 'Sandakan' (city)
adakng /a.daŋ/ [^ada^kŋ] 'charcoal'

Nasality is initiated by the articulation of a nasal consonant and continues irrespective of syllable boundaries until checked (Robins 1957:90). Nasality (Robins 1957), nasal harmony (Court 1970) and nasal spread (Walker & Pullum 1999) refer to the spread of the feature [+nasal] to underlying non-nasal segments. As seen in (3), nasal spread persists from a nasal consonant through the word until it is blocked by a word boundary or a non-nasal consonant. Thus, nasal spread nasalizes vowels across syllables. Semivowels, for example, /j/ in (3c) and /w/ in (3d), do not block nasal spread.

- (3) a. *naga'* /na.gaʔ/ [ⁿnãgəʔ] 'dragon'
b. *nana'* /na.naʔ/ [ⁿnãnəʔ] 'pus'
c. *minyen* /min.jən/ [^mmĩnjɛn] 'son/daughter-in-law'
d. *nyawa* /nja.wa/ [ⁿjãwã] 'life; soul'

Nasal spread and nasal prepllosion occur when affixation takes place as seen in (4) and (5).³ Nasal spread is illustrated in (4a), (4b), (4c) and (5a), whereas nasal prepllosion is illustrated in (4b), (5b) and (5c). The final nasal is not preploded in (4a) and (5a) since the preceding vowel is nasalized.

- (4) a. *naan* /ŋ/ + /saan/ [ⁿnããŋ] 'ACT.IND.SOA-carry.on.shoulder'
b. *ngorikng* /ŋ/ + /kɔriŋ/ [ⁿŋ^wõrɪ^kŋ] 'ACT.IND.SOA-dry'
c. *masa'* /ŋ/ + /basaʔ/ [^mmãsaʔ] 'ACT.IND.SOA-wash'

- (5) a. *inumun* /inum/ + /ɔn/ [i'nũm^wʊn] 'drink-UND.IND.SOA'
 b. *lebohodn* /ləbək/ + /ɔn/ [lə'b^wɔhɔ^dn] 'pound.with.pestle-
 UND.IND.SOA'
 c. *atadadn* /atad/ + /ɔn/ [ə'tadə^dn] 'bring-UND.IND.SOA'

Nasal spread (e.g. (6a)) and nasal prepllosion (e.g. (6b) and (6c)) also occur in monosyllabic words.

- (6) a. *man* /man/ ['mɔ̃n] 'why'
 b. *bakng* /baŋ/ ['bək^kŋ] 'if'
 c. *fudn* /pun/ [ʔ^wu^dn] 'also'

Since the nasality of the preceding vowel determines whether or not final consonants are simple or preploded, an important question is, what blocks nasal spread? Different linguists including Robins (1957), Scott (1964), Court (1970), Blust (1997) and Walker & Pullum (1999) have pointed out various phonetic features which block nasal spread. This paper offers an explanation for the occurrence of preploded nasals in certain Bonggi words. To my knowledge, the explanation offered here has not been previously proposed for any other language. I show that some Bonggi words have an underlying /l/ which blocks nasal spread; the /l/ then metathesizes and palatalizes resulting in forms as in (7).

- (7) *noidn* /ŋ/ + /tɔlɔn/ [nɔ̃^dn] 'ACT.IND.SOA-swallow'
moidn /ŋ/ + /bɔlun/ [m^wɔ̃^dn] 'ACT.IND.SOA-fold.clothes'
neidn /ŋ/ + /salin/ [nɛ̃^dn] 'ACT.IND.SOA-change.clothes'

In (7), nasal spread is initiated by the word-initial nasal (cf. (4)). The word-final nasals in (7) are preploded despite the fact that there are no surface phonetic consonants to block nasal spread. Since only vowels occur between word-initial and word-final nasals in (7), one would expect both vowels to be nasalized and the final nasal to be simple as in *naan* [nããn] 'ACT.IND.SOA-carry.on.shoulder' in (4a). Instead, prepllosion occurs in *noidn* [nɔ̃^dn] 'ACT.IND.SOA-swallow.something' and the other forms in (7) just as it does in *toidn* [tɔ̃^dn] 'jungle'.

This paper accounts for 'apparent' exceptions like those in (7) by showing how an underlying /l/ blocks nasal spread in these forms. Subsequently, the /l/ is metathesized and then palatalized to [i]. This non-nasalized [i] then provides the proper environment for nasal prepllosion.

Bonggi has sixteen underlying consonants /p t k ʔ b d g s dʒ m n ŋ l r w j/, one of which is borrowed (/dʒ/), and five underlying vowels /i u ə ɔ a/. Stress is predictable; it falls on the penultimate syllable of multisyllabic words as in (8).⁴

- (8) *onsi* /ɔn.si/ [ʼonʃi] 'contents; flesh'⁵
took /tɔ.ɔk/ [ʼtɔɔkʰ] 'ripe'⁶
sulufi /su.lu.piʔ/ [suʼlu.ʔiʔ] 'small locally-made purse'⁷

2 Elements which block or trigger nasal spread

2.1 Robins (1957)

Nasality in Sundanese is blocked by a word boundary (Robins 1957:90). If word boundaries did not block nasal spread in Bonggi, the vowels in *iudn* 'hammock' in (9) would be nasalized and the final nasal would not be preploded.

- (9) *Sia* *m-asakng* *iudn*.⁸
 sia ŋ-pasaŋ iun
 3SG.NOM ACT.IND.SOA-install hammock
 'He will install a hammock.'

Nasality in Sundanese is blocked by consonants other than /h/ and /ʔ/ (Robins 1957:90). In Bonggi, glottal stop /ʔ/ is restricted to word-final coda position (e.g. /su.lu.piʔ/ 'small locally-made purse' in (8)); thus, it is irrelevant for blocking word-medial nasal spread. /k/ weakens to [h] intervocalically in unstressed syllables as in (10).

- (10) *fakahas* /pakakas/ [ʔəʰkahəs] 'tools; equipment'⁹
tikuhur /tikukur/ [ʔiʰkʷuhur] 'spotted dove'¹⁰
lebohodn /ləbɔk/ + /ɔn/ [ləʰbʷɔhɔ^dn] 'pound.with.pestle-
 UND.IND.SOA'
ngelobok /ŋ/ + /ləbɔk/ [ŋəʰləbʷɔkʰ] 'ACT.IND.SOA-
 pound.with.pestle'

In Bonggi, [h] blocks nasal spread as in (11).

- (11) *manahadn* /manakan/ [mǎʰnǎhɔ^dn] 'nephew; niece'
ngahudn /ŋ/ + /akun/ [ŋǎhu^dn] 'ACT.IND.SOA-admit'
mohodn /əm/ + /ɔkɔn/ [mʷɔhɔ^dn] 'ACY-eat'¹¹

Nasal prefixes and infixes trigger nasality in Sundanese (Robbins 1957:93) and in Bonggi. In (12a) and (12d) the final nasal is preploded since the preceding vowel is non-nasalized, whereas the affixes in (12b), (12c), (12e) and (12f) trigger nasal spread which results in the final nasal being simple since the preceding vowel is nasalized.¹²

- (12) a. *iudn* /iun/ [iʊ^dn] 'hammock'
 b. *ngiun* /ŋ/ + /iun/ [ŋĩũn] 'ACT.IND.SOA-swing.in.
 hammock'
 c. *iniun* /in/ + /iun/ [iĩũn] 'REALIS-swing.in.hammock
 -UND.IND.SOA'

- d. *igbiakng* /ig/ + /bian/ [ɪg'biə^kŋ] 'RECIPROCAL-separated'
 e. *miang* /ŋ/ + /bian/ [mĩã^ũŋ] 'ACT.IND.SOA-separate'
 f. *biniang* /in/ + /bian/ [bi'nĩã^ũŋ] 'REALIS-separate-
 UND.IND.SOA'¹³

2.2 Scott (1964)

A number of Bukar-Sadong forms have word-final preploded nasals even though they are preceded by a nasal consonant with no intervening consonant to block nasal spread. Such forms often correspond to a Malay or Sea Dayak word which contains a word-medial consonant cluster consisting of a nasal followed by a homorganic stop as in (13). "The presence of a stopped final nasal in a word that has a medial nasal consonant always indicates that this medial nasal is not simple" (Scott 1964:434).

(13)	Bukar-Sadong		Malay	Sea Dayak
a.	[ɐmudn]	'dew'	<i>embun</i>	<i>embun</i>
b.	[ɐna:ugŋ]	'prawn'	<i>udang</i>	<i>undang</i>
c.	[banugŋ]	'tapioca'		

Bonggi has a few forms, including those in (14), which can only be accounted for in terms of Malay correspondences. On the one hand, as we would expect from what has been said thus far, the final nasal in (14a) is preploded since the preceding vowel is non-nasalized. On the other hand, we do not expect the final nasal in (14b) and (14c) to be preploded since the affixes *ŋ-* and *-in-* trigger nasal spread (cf. (12)). (14b) contrasts with the regular forms in (4a), (12b) and (12e), while (14c) contrasts with the regular forms in (12c) and (12f). Malay /h/ > Ø in Bonggi; e.g., Malay *haram* 'forbidden' is realized as [ʔarə^bm] in Bonggi. The irregular forms in (14b) and (14c) are accounted for by reference to history because there is no surface consonant to block the nasal spread triggered by the affixes. The presence of /h/ in the protoform blocks nasalization in the following vowel, which in turn provides the proper environment for nasal preplexion.

- (14) a. *taadn* /taan/ [ʔaa^dn] 'endure' (Malay *tahan*)
 b. *naadn* /ŋ/ + /taan/ [nãa^dn] 'ACT.IND.SOA-endure'
 c. *tinaadn* /in/ + /taan/ [tĩnãa^dn] 'REALIS-endure-
 UND.IND.SOA'

Glottal stop [ʔ] does not block nasality in Bukar-Sadong, but in some cases [h], [j] and [w] do block nasality (Scott 1964:435). (11) shows that [h] blocks nasal spread in Bonggi, whereas (15) shows that [j] and [w] do not block nasal spread.

- (15) *minyen* /min.jən/ ['mĩnjẽn] 'son/daughter-in-law'
nyawa /nja.wa/ [ɲãwǽ] 'life; soul'

Borrowed words are treated like native Bukar-Sadong words in terms of final nasal consonants (Scott 1964:435). As seen in (16), many borrowed words in Bonggi are treated like native words in terms of prepllosion. However, as seen in (17), monosyllabic borrowed words are not preploded.

- (16) *garabm* /ga.ram/ ['garə^bm] 'salt' (Malay *garam*)
bawakng /ba.waŋ/ ['bawə^kŋ] 'onion' (Malay *bawang*)
Mirihadn /mi.ri.kan/ [mi'rihəⁿ] 'American'
simin /si.min/ ['simĩn] 'cement'
- (17) *bing* /biŋ/ ['biŋ] 'bank'
bam /bam/ ['bəm] 'bomb' (Malay *bom*)
sing /siŋ/ ['ʃiŋ] 'zinc' (Malay *zing*)

2.3 Court (1970)

Court (1970) discusses phonetic characteristics or 'nasalization laws' in Western Malayo-Polynesian languages. His first law maintains that vowels are nasalized following nasal consonants (1970:204) (cf. (3)). Court's second law of nasalization states that voiced stops disappear following homorganic nasal consonants (1970:205). He cites data from a number of sources including Scott (1964) (cf. (13)). Court's third law asserts that, "When a voiced stop drops out according to the second law, the nasal consonant never projects its nasality onto any following vowel" (Court 1970:205). While Court's third law provides an explanation for prepllosion in the Bukar-Sadong forms in (13), it does not account for the forms in (14b) and (14c) since they do not involve the loss of a voiced stop.

Court's fourth law is, "Nasality may persist until it encounters an oral contoid. Specifically it may persist through vocoids, syllabic and non-syllabic ([w, j]) and laryngeals ([ʔ, h])" (1970:206). Court distinguishes languages in which semivowels and laryngeals do not block nasal spread from those in which they sometimes block nasal spread. While Robins (1957), Scott (1964) and Court (1970) show that [h] does not block nasal spread, (11) shows it does in Bonggi.

Court's fifth law claims that where nasality could by law four run on from a nasal consonant in the penultimate syllable into the last syllable and yet fails to do so in certain words, the initial nasal in such words corresponds to a sequence of nasal + homorganic voiced stop in other languages/dialects (1970:206).¹⁴

Court's sixth law states that in some languages final nasal consonants are preploded when preceded by a non-nasalized vowel. His evidence is from a number of Land Dayak languages of Borneo (cf. Topping 1990:262ff.).

2.4 Blust (1997)

Blust (1997) provides the most comprehensive picture to date of nasalization in Borneo. He points out that nasal spread is onset-driven in most Austronesian languages. That is, nasal spread is initiated by a syllable onset. This is the case in Bonggi. If nasality was coda-driven resulting in anticipatory nasalization, then the vowel in the first syllable of the forms in (18) would be nasalized.

- (18) *Sandahadn* /san.da.kan/ [sən'dahə^dn] 'Sandakan' (city)
 onsi /ɔn.si/ [ʔonʃi] 'contents; flesh'
 ontokng /ɔn.tɔŋ/ [ʔontɔ^kŋ] 'type of plant'

Blust (1997:152) shows that in Uma Juman Kayan three types of consonants are transparent to nasal harmony: 1) semivowels /j/ and /w/; 2) glottal stop /ʔ/ and glottal spirant /h/; and 3) the liquid /l/ (Blust 1977:83).

Blust (1997:168) reaches the following conclusions regarding nasal prepllosion in Austronesian languages: a) Nasal spread is onset-driven; b) Preploded nasals develop from earlier simple nasals; c) Preploded nasals are only found word-finally; d) Nasal prepllosion is suspended in a syllable which begins with a nasal consonant; and e) In time preploded nasals simplify to homorganic voiceless stops. Bonggi meets all of these criteria with the exception of (e).

Blust claims that two phonological conditions have a strong tendency to suspend nasal prepllosion. First, preploded nasals do not occur if the syllable onset is a nasal consonant. His explanation is, "If nasal harmony is onset driven it would nasalize the next vowel, and so suspend prepllosion in a succeeding nasal" (Blust 1997:172). Second, in some languages preploded nasals do not occur following long vowels. (19) shows that Bonggi meets the first condition, whereas (20) shows that it does not meet the second condition.¹⁵

- (19) *onom* /ɔ.nɔm/ [ʔnɔ̃m] 'six'
 man /man/ [ʔmɔ̃n] 'why'
 inumun /inum/ + /ɔn/ [i'nũm^wʊ̃n] 'drink-UND.IND.SOA'
- (20) *tingaang* /ti.ŋa.aŋ/ [ti'ŋããŋ] 'scorpion'
 gibiidn /gi.bi.in/ [gi'iβii^dn] 'afternoon'¹⁶
 fuudn /pu.un/ [p^wuu^dn] 'tree'

2.5 Walker & Pullum (1999)

Walker & Pullum (1999) discuss Cohn's (1990, 1993) analysis of nasal spread in Sundanese along with nasal spread in other languages. They consider several potential nasalization hierarchies and conclude that the hierarchy in (21) is best (Walker & Pullum 1999:775).

(21)

Vowels Laryngeals Semivowels Liquids Fricatives Obstruent Stops
 ← high — compatibility with nasalization — low →

Walker & Pullum (1999) locate laryngeals between vowels and semivowels in the nasalization hierarchy. They define laryngeals as a phonological classification of glottal segments, whereas glottal refers to the phonetic segments [ʔ] and [h] independent of their phonological patterning. Following Walker & Pullum's (1999:776) explanation for Tereno (Arawakan), although [h] in Bonggi is realized phonetically with glottal articulation, it corresponds phonologically to a voiceless stop which is highly incompatible with nasalization, rather than being grouped with the phonological class of laryngeals, which pattern more closely with semivowels.

3 Preplosion in forms without a blocking consonant

3.1 Vowel harmony

Bonggi vowel harmony (VH) has been described in Kroeger (1992). As Kroeger (1992:286) points out, high vowels /i/ and /u/ as well as the mid vowel /ɔ/ can spread in Bonggi. VH operates in terms of the affects of root vowels on affixes; i.e., root vowels are the controlling vowels. Only non-high vowels can be targeted for VH. Spreading is bi-directional.

Kroeger (1992:287) posits two vowel harmony rules. Kroeger's first rule spreads high vowels /i/ and /u/ to replace mid vowels /ɔ/ and /ə/. High vowels may spread either from right to left as in (22a) and (22b), or from left to right as in (23a) and (23b) (allophonic alternations are suppressed for simplicity). The suffix vowel in (23a) and (23b) is a copy of the controlling vowel which is the last vowel in the root.

(22) Causative prefix /pə/:

- a. /pə/ + /bian/ 'to separate' pibian 'cause to separate'
- b. /pə/ + /bunuʔ/ 'to fight' pubunuʔ 'cause people to fight'
- c. /pə/ + /lanɣu/ 'length' pəlanɣu 'to lengthen something'

(23) Undergoer suffix /ɔn/ 'UND.IND.SOA':

- a. /piliʔ/ 'to select' + /ɔn/ piliin 'select.someone'¹⁷
- b. /bunuʔ/ 'to fight' + /ɔn/ bunuun 'scold.someone'
- c. /abat/ 'answer' + /ɔn/ abatɔn 'answer.someone'

Kroeger's second rule spreads the mid back vowel /ɔ/ to replace non-high vowels. This rule only applies from left to right as in (24) and (25) (again, allophonic alternations are suppressed for simplicity). Mid vowel right (MidVR) affects both mid vowels as in (24) (cf. (23)) and low vowels as in (25a) and (25b) (cf. (25c) and (25d)).

(24) Undergoer suffix /ɔn/ 'UND.IND.SOA':

- /lɔbɔk/ 'to pound' + /ɔn/ lɔbɔkɔn 'pound.with.pestle'
- /sɔkɔm/ 'to soak' + /ɔn/ sɔkɔmɔn 'soak.something'

(25) Undergoer imperative suffix /aʔ/:

- a. /lɔbɔk/ 'to pound' + /aʔ/ lɔbɔkɔʔ 'pound it with pestle!'
- b. /sɔkɔm/ 'to soak' + /aʔ/ sɔkɔmɔʔ 'soak it!'
- c. /dindiŋ/ 'wall' + /aʔ/ dindiŋaʔ 'construct the wall!'
- d. /abat/ 'answer' + /aʔ/ abataʔ 'answer!'

High vowel right (HiVR) is illustrated in (26) by the derivation for *inumun* [i'nūm^wūn] 'drink-UND.IND.SOA'. Mid vowel right (MidVR) is illustrated with the derivation for *lebohɔdn* [lɔ'b^wɔhɔ^dn] 'pound.with.pestle-UND.IND. SOA'. VH does not occur if the final vowel of the root is /a/ (e.g. *atadadn* [ə'tadə^dn] 'bring-UND.IND.SOA' in (26)).

(26) Underlying form	/inum/ + /ɔn/	/lɔbɔk/ + /ɔn/	/atad/ + /ɔn/
HiVR	inumun		
MidVR		lɔbɔkɔn	
Nasal spread	inūmūn		
Stress	i'nūmūn	lɔ'bɔkɔn	a'tadɔn
Neutralization		lɔ'bɔkɔn	ə'tadɔn
Final /ɔ/ weakening			ə'tadən
High vowel laxing	i'nūmūn		
Fricativization		lɔ'bɔhɔn	
Labialization	i'nūm ^w ūn	lɔ'b ^w ɔhɔn	
Nasal prelosion		lɔ'b ^w ɔhɔ ^d n	ə'tadə ^d n
Derived form	[i'nūm ^w ūn]	[lɔ'b ^w ɔhɔ ^d n]	[ə'tadə ^d n]

The suffix /-aʔ/ is not a target for HiVR as seen by the derivation for *induraʔ* [in'durəʔ] 'move it!' in (27). However, /-aʔ/ is a target for MidVR as seen by the derivation for *lebohoʔ* [lə'bʷəhoʔ] 'pound it with a pestle!'. When the final vowel of the root is /a/, neither HiVR nor MidVR apply as seen by the derivation for *etadaʔ* [ə'tadəʔ] 'bring it!'.

(27) Underlying form	/indur/ + /aʔ/	/ləbək/ + /aʔ/	/atad/ + /aʔ/
MidVR		ləbəkəʔ	
Stress	in'duraʔ	lə'bəkəʔ	a'tadaʔ
Neutralization		lə'bəkəʔ	ə'tadaʔ
Final /a/ weakening	in'durəʔ		ə'tadəʔ
High vowel laxing	in'durəʔ		
Fricativization		lə'bəhoʔ	
Labialization		lə'bʷəhoʔ	
Derived form	[in'durəʔ]	[lə'bʷəhoʔ]	[ə'tadəʔ]

High vowels spread left across morpheme boundaries as in (22) and within the root itself as in (28). As seen in (28), if the last vowel of a root is high, it spreads left onto preceding non-high root vowels when the root is suffixed (allophonic alternations are suppressed for simplicity). High vowels are never targets for vowel harmony in Bonggi.

(28) a.	/bagi/ + /ən/	bigiin	'divide.something-UND.IND.SOA'
a'.	/ŋ/ + /bagi/	magi	'ACT.IND.SOA-divide.something'
b.	/ampun/ + /ən/	umpunun	'forgive.someone-UND.IND.SOA'
b'.	/ŋ/ + /ampun/	ŋampun	'ACT.IND.SOA-forgive.someone'
c.	/təluʔ/ + /ən/	tuluun	'pursue-UND.IND.SOA'
c'.	/ŋ/ + /təluʔ/	nəluʔ	'ACT.IND.SOA-pursue'

High vowel left (HiVL) is illustrated in (29) by derivations for *ifiidn* [i'fiid^dn] 'cook-UND.IND.SOA', *biliidn* [bi'lii^dn] 'buy-UND.IND.SOA' and *ubungun* [u'bʷuŋ^wũn] 'surround-UND.IND.SOA'.

(29) Underlying form	/api/ + /ən/	/bəli/ + /ən/	/abuŋ/ + /ən/
HiVR	apiin	bəliin	abuŋun
HiVL	ipiin	biliin	ubuŋun
Nasal spread			ubuŋũn
Stress	i'piin	bi'liin	u'buŋũn
High vowel laxing			u'buŋũn

Fricativization	i'phiin		
Labialization			u'b ^w uŋ ^w ũn
Fronting		bi'liin	
Nasal preplosion	i'phiid ^d n	bi'liid ^d n	
Derived form	[i'phiid ^d n]	[bi'liid ^d n]	[u'b ^w uŋ ^w ũn]

Geminate vowels cannot precede another vowel in the same word. When a root with geminate vowels is suffixed, the geminate vowels are reduced to a single vowel. Geminate vowel reduction is illustrated in (30) with derivations for *tugudn* ['tug^wu^dn] ‘dry-UND.IND.SOA’ and *fididn* [ʔidɪ^dn] ‘wipe-UND.IND.SOA’. Geminate vowels are illustrated with the derivation for *nuug* [nũũg] ‘ACT.IND.SOA-dry.something’.

(30) Underlying form	/tuug/ + /ɔn/	/piid/ + /ɔn/	/ŋ/ + /tuug/
Consonant coalescence			nuug
HiVR	tuugun	piidin	
Nasal spread			nũũg
Geminate reduction	tugun	pidin	
Stress	'tugun	'pidin	'nũũg
High vowel laxing	'tugun	'pidɪn	
Fricativization		ʔidɪn	
Labialization	'tug ^w un		
Fronting		ʔidɪn	
Unrelease			'nũũg'
Nasal preplosion	'tug ^w u ^d n	ʔidɪ ^d n	
Derived form	['tug ^w u ^d n]	[ʔidɪ ^d n]	['nũũg']

When roots containing an offglide (a non-high vowel followed by a high vowel) are suffixed as in (31), the underlying high vowel is copied onto the suffix vowel in accordance with HiVR. Then, the high vowel in the root is deleted.

(31) <i>sohudn</i>	/sɔ.uk/ + /ɔn/	['sohu ^d n]	‘dip.out-UND.IND.SOA’
<i>gohudn</i>	/gɔ.uk/ + /ɔn/	['g ^w ohu ^d n]	‘pester-UND.IND.SOA’
<i>ketidn</i>	/kə.it/ + /ɔn/	['k ^j etɪ ^d n]	‘hook.with.pole-UND.IND.SOA’

3.2 /r/ metathesis

Bonggi has two liquids, /l/ and /r/, which are fronted to dental position [l̪ ɾ̪] before front vowels. Both liquids can occur in either the syllable onset or coda. /r/ frequently occurs in the coda as part of a consonant cluster due to metathesis.

/l/ metathesis	təmbəɔln	buntaɔln	
Palatalization of /l/	təmbəɔin	buntaɔin	
Vowel assimilation		buntaain	
Tensing of vowel	təmbəɔin		
Geminate reduction	təmbəɔin	buntain	
Offglide formation	təmbəɔ'n	buntaɔ'n	
Stress	təmbəɔ'n	bun'taɔ'n	bun'tala?
Neutralization	təmbəɔ'n		
Final /a/ weakening			bun'talə?
High vowel laxing		bun'taɔ'n	bun'talə?
Labialization	təmbəwəɔ'n	bəwəun'taɔ'n	bəwəun'talə?
Nasal prelosion	təmbəwəɔ ^{jd} n	bəwəun'ta ^{jd} n	
Derived form	[təmbəwəɔ ^{jd} n]	[bəwəun'ta ^{jd} n]	[bun'talə?]

/l/ metathesis must be ordered before palatalization of /l/ since palatalization of /l/ blocks /l/ metathesis. Metathesis and palatalization of root-final /l/ in verbs which are suffixed with -ən is productive. Historically, some roots which contained /l/ word-medially have also undergone metathesis and palatalization. Thus, the synchronic description reflects diachronic processes. (36) provides examples of nouns which have developed along these lines.

(36)	Proto form	/l/ metathesis	Palatalize /l/	Geminate reduction	Prelosion
a)	*dalan 'path, way, trail'	> daaln	> daain	> dain	> [da ^{jd} n]
b)	*palad 'palm of hand'	> paald	> paaid	> paid	
c)	*talun 'forest, jungle'	> tauln	> tauin		> [to ^{jd} n]
d)	*bulan 'moon'	> bualn	> buain		> [bua ^{jd} n]
e)	*kult 'bark; rind'	> kuilt	> kuiit	> kuit	
f)	*kulat 'mushroom'	> kualt	> kuait		

Palatalization of /l/ often results in /i/ following a nonhigh vowel and consequently an offglide occurs.¹⁸ /l/ metathesis is also supported by the alternations in (37) in which the /l/ only shows up on the suffixed form.

(37)	/m/ + /g/ + /alat/	→ [ŋ'ga ^{jd} t ^ɪ]	'IRREALIS-PROGRESSIVE-wait'
	/in/ + /g/ + /alat/	→ [i'ga ^{jd} t ^ɪ]	'REALIS-PROGRESSIVE-wait'
	/pəg/ + /alat/	→ [pə'ga ^{jd} t ^ɪ]	'IMP.ACTOR-wait'
	/ki/ + /alat/	→ [ki'a ^{jd} t ^ɪ]	'ask.someone.to-wait'
	/alat/ + /ən/	→ ['latə ^{jd} n]	'wait-UND.IND.SOA'

In Bonggi, metathesis is prosodically motivated. Both /r/ and /l/ metathesize before alveolar stops and nasals (e.g. (32), (33), (35), (36), (37), (40), (41) and (42)). There are only a few borrowed forms in which metathesis does not occur, e.g. (38).

- (38) *bilun* 'ballon'
falan 'plan'
gilin 'container for liquids' (source: gallon)
nelun 'nylon'
marin 'marine'
jualan/jualadn 'fried bananas' (source Malay *jual* 'sell')
aludn-aludn 'road' (perhaps from Javanese *alun-alun*)

An alternative to my /l/ metathesis analysis would be vowel deletion, whereby $VIVn \rightarrow Vln$. While vowel deletion can account for the synchronic forms in (35), it fails to provide a diachronic explanation for the /a/ in both *buaidn* 'moon' (36d) and *kuait* 'mushroom' (36f). Furthermore, it weakens a unified account of synchronic and diachronic CV metathesis before alveolars which are [-continuant]. Bonggi CV metathesis is an example of what Blevins & Garrett (1998:509) call "perceptual metathesis." Perceptual metathesis is limited to certain segment types; for example, liquids in Bonggi.

3.4 Preplosion in forms with underlying /l/

As seen in (39) (cf. (7)), a few undergoer forms have a word-medial /l/ which does not occur in actor forms. To derive the undergoer forms in (39) from actor-based roots would require an arbitrary rule that changes /i/ to /l/, thus reversing the process of palatalization described above. However, the source of the /l/ in undergoer forms can be recovered by taking the undergoer forms as the basis for the underlying root and then deriving the actor and undergoer forms accordingly. The derivations for the first three undergoer forms in (39) are shown in (40).

- | | | | |
|---------------------|--------------|------------------|-----------------------------|
| (39) | <u>actor</u> | <u>undergoer</u> | <u>undergoer imperative</u> |
| 'to swallow' | <i>noidn</i> | <i>tolnon</i> | <i>tolno'</i> |
| 'to turn over' | <i>miid</i> | <i>bilidn</i> | <i>bilda'</i> |
| 'to change clothes' | <i>neidn</i> | <i>selnin</i> | <i>selna'</i> |
| 'to fold clothes' | <i>moidn</i> | <i>bolnun</i> | <i>bolna'</i> |

- | | | | |
|----------------------|----------------|----------------|----------------|
| (40) Underlying form | /tɔlɔn/ + /ɔn/ | /bilid/ + /ɔn/ | /salin/ + /ɔn/ |
| HiVR | | bilidin | salinin |
| MidVR | tɔlɔnɔn | | |
| Nasal spread | tɔlɔnɔ̃n | | salinĩn |

/l/ metathesis	tɔɔlnɔ̃n	biildin	sailnĩn
Geminate reduction	tɔlnɔ̃n	bildin	
Vowel coalescence			selnĩn
Stress	'tɔlnɔ̃n	'bildin	'selnĩn
High vowel laxing		'bɪldɪn	'selnĩn
Fronting			'ʂelnĩn
Nasal prelosion		'bɪldr ^d n	
Derived form	['tɔlnɔ̃n]	['bɪldr ^d n]	['ʂelnĩn]

The derivations for the first three undergoer imperative forms in (39) are shown in (41).

(41) Underlying form	/tɔɔln/ + /aʔ/	/bilid/ + /aʔ/	/salin/ + /aʔ/
MidVR	tɔɔlnɔʔ		
Nasal spread	tɔɔlnɔ̃ʔ		salinãʔ
/l/ metathesis	tɔɔlnɔ̃ʔ	biildaʔ	sailnãʔ
Geminate reduction	tɔlnɔ̃ʔ	bildaʔ	
Vowel coalescence			selnãʔ
Stress	'tɔlnɔ̃ʔ	'bildaʔ	'selnãʔ
Final /a/ weakening		'bɪldəʔ	'selnɔ̃ʔ
High vowel laxing		'bɪldəʔ	
Fronting			'ʂelnɔ̃ʔ
Derived form	['tɔlnɔ̃ʔ]	['bɪldəʔ]	['ʂelnɔ̃ʔ]

The derivations for the first three actor forms in (39) are shown in (42).

(42) Underlying form	/ŋ/ + /tɔɔln/	/ŋ/ + /bilid/	/ŋ/ + /salin/
Consonant coalescence	nɔɔln	milid	nalín
Nasal spread	nɔ̃ɔln	mĩlid	nãĩln
/l/ metathesis	nɔ̃ɔln	mĩild	nailn
Palatalization of /l/	nɔ̃ɔin	mĩiid	nãĩin
Tensing of mid vowel	nõoin		
Geminate reduction	nõin	mĩid	
Vowel coalescence			nẽin
Offglide formation	nõ ^j n		nẽ ^j n
Stress	'nõ ^j n	'mĩid	'nẽ ^j n
Unrelease		'mĩid'	

Nasal prepllosion	'nõ ^{jd} n		'nẽ ^{jd} n
Derived form	[nõ ^{jd} n]	['mĩld']	['nẽ ^{jd} n]

While the actor forms in (39) are 'apparent' exceptions to nasal prepllosion, the derivations in (42) provide an explanation for why prepllosion occurs in these forms. Nasal spread must be ordered prior to palatalization of /l/ in order for the /l/ to block nasal spread. As seen in (42), the underlying /l/ blocks nasal spread, thus ultimately preventing the palatalized [i] from being nasalized. The word-final nasal is then preploded since it is preceded by a non-nasalized vowel. Whereas (36) shows that /l/ metathesis followed by palatalization of /l/ is the correct path of diachronic change in Bonggi, (42) indicates that both nasal spread and /l/ metathesis must precede palatalization of /l/. The order between nasal spread and /l/ metathesis does not matter in the derivations in (40), (41) and (42).

4 Conclusion

In Western Malayo-Polynesian languages with preploded nasals, word-final nasals are simple if the preceding vowel is nasalized and preploded if the preceding vowel is non-nasalized. While the types of consonants that block nasal spread vary across languages, the mechanism for blocking is the same. Two sorts of exceptions to prepllosion have been discussed in this paper: 1) borrowed words which have not been assimilated (e.g. (17)); and 2) preploded nasals which follow a nasal with no intervening consonant to block nasal spread.

When preploded nasals follow a nasal with no intervening consonant to block nasal spread, an original blocking consonant has been lost. Three types of consonant loss have been reported: 1) the loss of a voiced stop in Bukar-Sadong from a word-medial consonant cluster consisting of a nasal followed by a homorganic voiced stop (e.g. (13)); 2) the loss of proto /h/ in Bonggi (e.g. (14b) and (14c)); and 3) the loss of /l/ in Bonggi due to metathesis and palatalization (e.g. actor forms in (39)). While the first type of consonant loss has been previously described by others including Scott (1964) and Court (1970), the loss of /h/ and /l/ are potential explanations for aberrant preploded nasals in other Austronesian languages.

The loss of /l/ is particularly interesting. An underlying /l/ blocks nasal spread. This /l/ then metathesizes and subsequently is palatalized as [i]. This non-nasalized vowel then provides the environment for final-nasal prepllosion. The process is productive and it provides an account for otherwise anomalous

preploded forms in Bonggi. This paper has also provided evidence for both diachronic and synchronic metathesis of liquids.

Notes

¹I am grateful to Mike Cahill for his helpful comments on this paper.

²While preploded nasals are more commonly known as pre-stopped nasals (Ladefoged & Maddieson 1996), the term prepllosion is used here following Court (1970) and Blust (1997).

³The meanings of affixes are not in focus. Abbreviations include: ACT actor, ACY activity, IMP imperative, IND.SOA induced state-of-affairs, NOM nominative, SG singular and UND undergoer.

⁴Footnotes describe elements of the phonology which are not directly relevant to the discussion.

⁵/ɔ/ is realized as [o] when /ɔ/ is followed by a high vowel (/i/ or /u/). Alveolar consonants /t d s n l r/ are fronted to dental position [t̪ d̪ s̪ n̪ l̪ r̪] before front vowels.

⁶[ɔ] only occurs if the last two vowels in the word are [ɔ]. Stops /p t k b d g/ are unreleased [p̚ t̚ k̚ b̚ d̚ g̚] word-finally.

⁷Voiceless bilabial stop /p/ weakens to fricative [ɸ] intervocalically.

⁸The prefix /ŋ/ and root-initial voiceless consonants coalesce and are replaced by a nasal homorganic to the root-initial consonant, e.g. /ŋ/ + /pasan/ → /masan/. Root-initial voiced bilabials also coalesce with /ŋ/.

⁹Voiceless bilabial stop /p/ weakens to fricative [ɸ] word-initially. Non-high vowels /ə ɔ a/ are neutralized as [ə] in prestressed position. Final low vowels /a/ which are not geminate weaken to [ə] except before liquids /r l/.

¹⁰Bilabial consonants /p b m/ are rounded [p^w ɸ^w b^w β^w m^w] and velar consonants /k g ŋ/ are labialized [k^w g^w ŋ^w] before round vowels /u ɔ/. High tense vowels /i u/ are lowered (laxed) to [ɪ ʊ] in syllables which are closed by consonants other than glottal stop [ʔ].

¹¹The infix -əm- is realized as a prefix before vowel-initial roots and the /ə/ is lost resulting in *m-*, e.g. /əm/ + /ɔkɔn/ → /mɔkɔn/.

¹²The infix -in- is realized as a prefix before vowel-initial stems, e.g. /in/ + /iun/ → /iniun/ in (12c) (cf. (12f)).

¹³In realis modality, verbs which index the undergoer in induced states of affairs are Ø marked, e.g. (12c) and (12f).

¹⁴Cf. Scott's (1964:434) explanation for the forms in (13).

¹⁵While Blust (1997:23) suggests long vowels in Bonggi are likely exceptions to prepalatalization, my dictionary contains over 70 such forms.

¹⁶/b/ weakens to fricative [β] intervocalically in unstressed syllables.

¹⁷Glottal stop only occurs word-finally. If a root ends in /ʔ/, the /ʔ/ is deleted when a suffix is added.

¹⁸Conant (1916/1973) reports on the loss of /l/ in a number of Philippine languages including: **bulan* 'moon' > *buan* (Tagalog), *fuan* (Bontok); **dalan* 'way' > *daʔan* (Tagalog); **palad* 'palm (of hand)' > *payad* (Tagalog). For the Mandaya language of Southeast Mindanao, Conant (1916/1973:236) describes a process similar to that characterized for Bonggi whereby intervocalic /l/ palatalizes to [i] or [y] (cf. Gallman 1979:7, 12).

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