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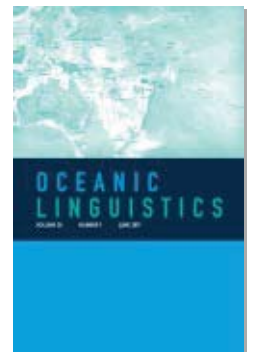
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Squib

Postnasal Devoicing in Nasioi

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The investigation of the prohibition on sequences consisting of a nasal followed by a voiceless stop across languages has yielded a productive analytical approach to typology in phonology. Assuming phonetically grounded constraints banning these sequences makes the strong prediction that there should be no symmetrical process of postnasal devoicing. This paper presents evidence from Nasioi to challenge this claim, where sequences of nasals followed by voiceless stops are favored structures. The Nasioi pattern of postnasal devoicing is placed in a larger South Bougainville context, where it is shown that there are slight, but notable, differences across the consonant inventories and processes relevant to postnasal phenomena.

1. INTRODUCTION.¹ This squib investigates the phonological phenomenon of postnasal voicing. The voicing of obstruents immediately following a nasal is relatively common cross-linguistically, and there have been phonetic reasons cited for the recurrence of this process. The analysis of postnasal voicing has played a key role in the development of the theory of constraints in phonological theory, and launched a discussion around the phonetic grounding of constraints. Specifically, there has emerged a movement toward viewing constraints that are phonetically *motivated* as being more desirable than constraints that are arbitrary. This approach to phonetically grounded constraints makes the prediction that postnasal voicing is an asymmetric process, as there are constraints that favor nasal+voiced obstruent sequences, but no constraints that favor nasal+voiceless obstruent sequences. The lack of these latter constraints in a phonological grammar makes the prediction that postnasal devoicing is not an option available to languages.

There have been recent challenges to this approach, including typological studies that have uncovered several languages that exhibit some form of postnasal devoicing. The majority of these cases involve diachronic changes, but a few appear to be genuine cases of synchronic grammars that exhibit postnasal devoicing.

The contribution of this squib is to highlight a synchronic dynamic pattern, with the idea that it will complement existing typological investigations of related phenomena cross-linguistically. The contention is that Nasioi, a Papuan language of Bougainville, constitutes a genuine synchronic case of postnasal devoicing. An accompanying investi-

1. Thanks to Beth Evans for a general discussion of Nasioi and South Bougainville, and to Julie Cervinkova for discussion of the Nasioi data. Thanks also to my Nasioi consultant, Florence Korokoro, and to Allan Gioni for his ongoing partnership in the investigation of the Nasioi language. Thanks also to John Lynch for guidance that has surely improved this article. All errors are my own.

gation into the other related languages of the area indicates that there exists a cline of microvariation, ranging from a full contrast of stop voicing after nasals, to cases of limited postnasal voicing. The existence of postnasal devoicing in Nasioi stands as a challenge to the idea that postnasal voicing emerges from the action of a phonetically grounded, asymmetric constraint.

2. POSTNASAL (DE)VOICING. Postnasal voicing is a phonological process whereby underlying voiceless obstruents occurring in surface positions following a nasal become voiced. This is a strategy employed both synchronically and diachronically in a significant number of languages. An example of synchronic postnasal voicing is from the Papuan language Awtuw (Feldman 1986:18), where underlying voiceless stops become voiced following nasals:

- (1) AWTUW
- | | | |
|-------------|-----------|----------------------|
| /kaŋ-kuw/ | [kaŋguw] | 'give!' |
| /kam-po/ | [kambo] | 'Kampo (man's name)' |
| /d-waŋ-kaj/ | [dwaŋgaj] | 'has heard' |

Typological research has determined that postnasal voicing is a common process cross-linguistically (Herbert 1986; Steriade 1993; Pater 1999, 2001; Hayes and Stivers 2000; Hyman 2001). As Pater (1999) points out, there seems to be a phonetic basis to the constraint, as postnasal voicing is inherently directional; that is, prenasal obstruents do not become voiced. One phonetic mechanism that facilitates the voicing of obstruents after nasal consonants is nasal leakage (Ohala and Ohala 1993; Hayes and Stivers 2000). During the production of a nasal consonant, the velum is lowered, and as it is raised to seal the velopharyngeal port for the articulation of a following obstruent, there are portions in the transition where there is incomplete closure, allowing air to escape through the nasal cavity. Nasal leakage facilitates voicing, as it allows for airflow to continue across the glottis beyond what the closed oral tract would normally allow, where the cessation of airflow would result in voicing decay. The second mechanism, identified by Hayes and Stivers (2000), is termed "nasal pumping." As Hayes and Stivers point out, the articulatory action of raising the velum can result in a movement of the velum upward beyond the point of complete closure. This upward movement enlarges the oral cavity, which also facilitates voicing during the production of obstruents. Thus, the combination of these two mechanisms is thought to be the source of the grounding of a phonological constraint that militates against nasal+voiceless obstruent sequences (*NT), and that directly explains the directionality inherent in the implementation of postnasal voicing.

Under the assumption that the phonetic facts cited above constitute a phonetic motivation or grounding for the constraint *NT, the presumed nonoccurrence of postnasal devoicing cross-linguistically is due to the nature of constraints and the typology that they generate (a standard assumption in Optimality Theory; cf. Prince and Smolensky 1993 [2004]). Since there is a putative markedness constraint *NT that bans these marked structures across languages, and since many languages repair this structure through postnasal voicing (Pater 1999; Hayes and Stivers 2000), the prediction is that if NT sequences are tolerated in a language, then ND sequences should also be tolerated, as there is no symmetrical markedness constraint *ND (cf. Pater 1999). There is, thus, nothing avail-

able in a grammar that could generate cases of postnasal devoicing; that is, there is no markedness constraint that could trigger a repair of *devoicing*. It is this devoicing pattern that will be claimed to exist in Nasioi in the following section.

There have been several challenges to the proposal that *NT is a phonetically grounded constraint. With respect to postnasal phonology, Blust (2004) and Hyman (2001) claim that phonological operations do not need to be phonetically grounded, as many processes appear to defy the logic of this type of grounding; that is, they are unmotivated, or are the result of regular historical change(s). Furthermore, Hyman (2001) and Beguš (2016) report several languages that exhibit postnasal devoicing. Many of these are the result of diachronic changes that ultimately convert voiced stops into voiceless stops in postnasal position, but a few cases of synchronic postnasal devoicing have been claimed to exist. For instance, Hyman (2001), Coetzee and Pretorius (2010), and Solé, Hyman, and Monaka (2010) report on a synchronic postnasal devoicing process in some Sotho-Tswana languages. While the empirical facts and generalizations around this particular process in these languages have been contested (cf. Gouskova, Zsiga, and Tlale 2011), phonetic evidence generally supports the claim that there is, at least for some speakers, postnasal devoicing (Coetzee and Pretorius 2010; Solé, Hyman, and Monaka 2010). Blust (2004) has also raised a challenge to the phonetic grounding of constraints like *NT, citing a wealth of typological evidence from Austronesian languages. While much of Blust's discussion is focused on the process of nasal substitution as a response to *NT, he carefully points out that there are diachronic cases of (a) postnasal devoicing in Murik and Buginese; (b) voiced stops deleting postnasally, but where a voiceless stop is retained in that position, such as in Iban; and (c) prenasalized voiced stops being eliminated, but where prenasalized voiceless stops were retained, such as in Acehnese.

It will be argued below that a Papuan language, Nasioi, exemplifies a genuine case of postnasal devoicing. It will be further shown that this case constitutes a synchronic process with active alternations, and that this is a challenge for a theory of phonetically grounded constraints.

3. NASIOI POSTNASAL DEVOICING. Nasioi is a Papuan language spoken in Bougainville, Papua New Guinea, and it belongs to the South Bougainville language group (cf. Allen and Hurd 1963; Wurm 1975; Ross 2001; Evans 2009).² The grammatical structure of the language has been described in detail by Hurd and Hurd (1966, 1970) and Hurd (1977). The basic phonological characteristics of the language described here, including preliminary generalizations about nasals and postnasal devoicing, can be found in these sources.

The language has the following phonemic consonant inventory: /p t k ʔ b d m n ŋ/. Of interest here are the contrasting series of voiced and voiceless stops. Examples of contrasts in word-initial position include:

- (2) NASIOI
- | | | | | |
|--------|--------------------|-----|--------|------------|
| [pa:ʔ] | 'to not know' | vs. | [ba:ʔ] | 'leaf' |
| [ti:ʔ] | 'to put, to leave' | vs. | [di:ʔ] | 'you (PL)' |

2. Language data come from fieldwork on Nasioi, though all of the forms cited can also be found in the dictionary portion of Hurd and Hurd (1966), unless otherwise indicated. Glosses have remained faithful, as far as is practical, to the original sources.

The voiced stops are phonetically prevoiced, and the voiceless stops are very often unaspirated. /b/ and /d/ surface as stops word-initially and following [ʔ]; elsewhere they are lenited to the voiced bilabial fricative [β] and alveolar flap [ɾ], respectively. There are also allophonic distributions involving /t/: word-initially, it can be produced with affrication, as [ts], and before the high front vowel /i/ it surfaces as [s]. This allophony involving the stops is relevant for two reasons: (i) it defines the types of stops that might be found in consonant clusters, and (ii) it highlights the fact that the fricative allophones of the stops are the only occurrences of fricatives in the language (that is, there are no underlying fricatives, as indicated above).

The syllable structure of Nasioi is relatively simple, but does allow for a limited set of coda consonants, including glottal stops and nasals. When a glottal stop closes a syllable, it can be followed heterosyllabically by any of the oral stops. Postnasal position, however, is more limited. Word-initial nasals followed by consonants surface as syllabic. When a nasal closes a syllable, it undergoes place assimilation to the following stop; however, only voiceless stops are allowed in this position. The possible consonant clusters of Nasioi are thus: [ʔp, ʔt, ʔk, ʔb, ʔd, mp, nt, ŋk]. While voiced stops are allowed following glottal codas, they are not tolerated in postnasal environments. Examples of lexical items with intervocalic nasal clusters are as follows: [ampaʔ] 'to forget', [anta] 'to cause', [aŋkaʔ] 'there'. Word-initial syllabic nasals exhibit the same static restriction against voiced stops: [mpaŋ] 'a hunting bow', [ptaʔ] 'fire'; though there is no place assimilation with following dorsal stops, [ŋka] 'but'. As noted above, nasal+stop sequences do not constitute licit syllable codas, so these clusters are absent in word-final position.

The fact that only voiceless stops, and not voiced stops, are allowed following nasals implies a process of postnasal devoicing. This is not, however, simply a static distribution, as there are alternations that illustrate that postnasal devoicing is an active phonological repair. The following examples from Hurd and Hurd (1970:39) involve an alternation of the third person object suffix /-b/, which appears as [b] intervocalically (3a), but as voiceless [p] when following a nasal (3b):

- (3) NASIOI
- a. kara-b-ant-Ø-in
talk-him-I-SG-did
'I talked to him.'
 - b. tiom-p-ant-Ø-in
follow-him-I-SG-did
'I followed him.'

The same generalization holds true for the second person object suffix /-d/, in precisely the same environments (example from Hurd and Hurd 1970:65):

- (4) NASIOI
- a. oo-d-a-Ø-maan
see-you-I-SG-do
'I see you.'
 - b. manton-t-a-Ø-maan
feel-you-I-SG-do
'I feel you.'

One potential explanation of the patterns above is that the voiced stops could be reanalyzed as fricatives, and that postnasal *devoicing* could then be reinterpreted as postnasal *hardening*. According to Padgett (1994), nasal+fricative sequences are avoided in languages (even more severely than nasal+stop sequences). This fact could account for the avoidance of nasal+[d] or nasal+[b] if these surface stops could be reanalyzed as fricatives or flaps underlyingly. The avoidance of a nasal followed by a continuant obstruent could then result in a hardening of the continuant (cf. also a related explanation of postnasal devoicing by Gouskova, Zsiga, and Tlale 2011). This analysis, however, does not account for why the stops devoice, rather than simply harden. The problem is that neither voiced stop nor voiced fricative allophones appear in this environment, which obfuscates the nature of the underlying form. In addition, there are cases of fricatives derived from underlying voiceless stops, which are licit in postnasal position. As noted briefly above, there is an allophonic condition that can be formalized as /t/ → [s] / __i, and this can apply in postnasal position, yielding actual surface forms such as /kanti/ → [kansi] ‘disembowel, operate’. Thus, it appears that the restriction is not simply one on nasal-continuant obstruent sequences, but rather, one on voiced obstruents (specifically, stops).

A related possibility is that devoicing is the product of the Syllable Contact Law (Murray and Vennemann 1983; Vennemann 1988), such that sequences like ...N.T... create a greater sonority difference between a coda and a following onset than ...N.D... sequences do, with the former having a stop that is *lower* in sonority. This may be a compelling motivation for the phenomenon, though it remains to be seen whether the existence of derived postnasal fricatives, which are higher in sonority than stops, is consistent with this approach. At the very least, this would require constraints on [ti] sequences to dominate constraints on syllabic contact. A tougher case involves word-initial syllabic nasals followed by a nasal onset, a configuration that is possible in the language, and if the definition of the Syllable Contact Law is such that it favors steeper sonority falls over a syllable *boundary* (rather than over a coda and onset), then these sequences may, in fact, trigger an unmitigated violation of that constraint.

The NT sequences and related process of postnasal devoicing are typologically unusual, and present theoretical problems for the treatment of nasal sequences. Recalling the discussion in the previous section, under the articulatory grounding approach, the presence of NT in a language entails the presence of ND, so long as there is a voicing contrast to begin with. Under the assumption that there is no symmetric (and at present ungrounded) constraint like *ND, which penalizes sequences of nasals followed by voiced obstruents, there would be no constraint that would favor NT over ND, and, thus, no constraint interaction to trigger postnasal devoicing. The Nasioi patterns challenge this viewpoint.

4. OTHER SOUTH BOUGAINVILLE LANGUAGES. The Nasioi patterns outlined above can now be meaningfully compared to the other South Bougainville languages: Buin, Motuna, and Nagovisi (Allen and Hurd 1963; Wurm 1975; Ross 2001; Evans 2009). It will be shown that the grammars of these languages have slightly different inventories, and also slightly different responses to nasal-obstruent sequences. It will be demonstrated that Nasioi appears to be the only member of the family to exhibit post-

nasal stop devoicing, while Nagovisi exhibits the typologically common process of post-nasal voicing.

There exist somewhat limited data for these languages, which makes direct comparison of lexical items relatively difficult. However, generalizations have been drawn for each language about underlying inventories, allophonic relations involving stops, and postnasal environments. Where original sources employ orthographic representations (notably Nagovisi), phonetic forms have been extrapolated from discussion within the source, and target sounds have been enclosed in brackets. Buin data come from Laycock (2003) and are largely phonemic; Motuna generalizations are from Onishi (2011), and Nagovisi data are from Decker (1981).

4.1 BUIN. Buin (Laycock 2003) has the following phonemic consonantal inventory: /p t k g m ŋ ɾ/. This differs from Nasioi in that Buin has the voiced velar stop /g/ (though not in word-initial position), but lacks an underlying /b/ and /d/. The velar stops contrast in voicing, evidenced by pairs such as /ne-ge/ '1SG-AG' vs. /neke/ 'shove in, wedge in.' In addition, there is an underlying /ɾ/, which surfaces as [d] following [n], and also (sometimes) word-initially.³

The structure of the possessive suffix /-ŋke/ is *prima facie* evidence that voiceless stops are legal following nasals, as the stop surfaces faithfully as voiceless in all contexts. So far this is parallel to the Nasioi pattern; however, in addition, there are contrasts that demonstrate that voiced stops are also allowed. (5) illustrates this with both voiced and voiceless stops after the sequence [tiŋ-].

- (5) BUIN
- | | |
|----------|------------------------------|
| tiŋgare | 'splinter (n)' ⁴ |
| tiŋgori | 'name of a locality in Buin' |
| tiŋkirou | 'kind of bird' |

The paradigm for the root /ruŋ/⁵ 'child' also illustrates the fact that both voiceless and voiced stops are licit after the root-final nasal:

- (6) BUIN
- | | |
|----------|-------------------------------|
| rooŋ | '(your) child' |
| rooŋkaro | masculine dual |
| rooŋgetu | masculine plural |
| rooŋkagi | masculine plural ⁶ |

3. A complicating factor is that elsewhere the flap [ɾ] is in free variation with [l]. It is possible, then, that /ɾ/ has the underlying status of a sonorant. Laycock (2003) notes that northern dialects use the [l] allophone of /ɾ/ more frequently, and that other dialects have phonemically replaced what would be /ɾ/ in central Buin with /n/. However, since the allophonic subset of stops pattern consistently, it is probably safe to assume that the underlying obstruent/sonorant status of these sounds is immaterial.

4. Laycock (2003:216) actually lists this form as *tingare*, with a coronal nasal; however, Laycock also notes that nasals assimilate to the place of articulation of a following stop. In addition, the form appears alphabetically with forms beginning with <tiŋ>. As such, it has been assumed here that the nasal in this form is phonetically dorsal.

5. Laycock (2003:187) lists *ruŋ* 'child' as a related form for the main entry *rooŋ* '(your) child', leading the reader to infer that the forms are morphologically related, but involve stem modification.

6. Laycock lists two masculine plural forms in this paradigm, but it is not clear whether there is a grammatical difference, whether they are in free variation, or whether they are dialectal variants.

rooŋito	feminine dual
rooŋgemi	feminine plural

There is one pocket of Buin grammar where it appears that the restriction on ND holds: with word-initial syllabic nasals, only #nt- is allowed. There appear to be no cases of [p] or [k] following a word-initial nasal, suggesting that the restriction extends to place of articulation, as well. The following forms illustrate: [nta] ‘Show me! Give it here!’, [ntai] ‘refuse, deny (s.o. s.t.)’, [ntikara] ‘be hot’, [nto] ‘dislike’, [ntu] ‘depart, leave (a person)’. Thus, while Buin seemingly allows free contrasts in postnasal position, after word-initial syllabic nasals, the contrasts are restricted in both place of articulation, and also voicing.

4.2 MOTUNA. Motuna (Onishi 2011) exhibits differences with both Nasioi and Buin. According to Onishi (2011), Motuna has the following phonemic consonantal inventory: /p t k ʔ s h m n ŋ r w j/. Unlike Buin, but like Nasioi, Motuna lacks /g/. Motuna contrasts with Nasioi in having a slightly different set of allophonic relations pertaining to the voiced stops. According to Onishi, underlying /t/ can surface as [t] or [d], and the stop variant [d] can occur in postnasal environments. Likewise, the underlying glide /w/ surfaces as [b] in postnasal environments. According to Onishi’s analysis, there are no underlying voiced stops in the language.

Nasals undergo place assimilation with a following stop, typical of the other languages in the South Bougainville group. As noted above, nasals can be followed by voiceless stops, but also by voiced stops (and, in fact, this is one of the few environments where surface voiced stops are found). One way in which Motuna differs from the other members of the group is in the treatment of clusters of a nasal plus a following fricative. Underlying nasal+/s/ clusters result in deletion of the nasal consonant, and nasalization of the preceding vowel (Onishi 2011:14–15). Thus, Motuna exhibits no postnasal devoicing, and instead, allows both the voiceless stops and the (limited set of) voiced stop allophones in postnasal contexts. The language also bans nasal+fricative sequences, in line with predictions made by Padgett (1994).

4.3 NAGOVISI. Nagovisi (Decker 1981) has the following consonantal inventory: /p t k b d g s v m n l r w ʔ/. True minimal pairs appear to be lacking in Decker (1981), but both voiceless and voiced stops appear in positions that would not be expected to induce voicing/devoicing, such as in intervocalic contexts. Nasals exhibit place assimilation with following stops, and postnasal environments license a voicing contrast, but also, in some morphophonological environments, neutralization of the contrast in favor of the voiced variant (that is, postnasal voicing). These distributions will be discussed in turn.

Voiceless stops can occur in postnasal position, evidenced by words with the plural number suffix *-pöö* (where the preceding nasal /n/ has undergone place assimilation): [ŋg]ampöö ‘my things’, neeka[mp]öö ‘the things belonging to us two’, and so on. In a similar fashion, velar voiceless stops maintain their voicelessness in the (highly lexicalized) suffix *-ka* (glossed as ‘these 2’): aro[ŋ] ‘this one ear’, aro[ŋk]a ‘these 2 ears’, wadu[ŋ] ‘(this one) carrying pole (carried over shoulder)’ vs. awadu[ŋk]a ‘(these two) men’s carrying poles (carried over shoulder)’ (Decker 1981:40–41). Voiced stops are also licit after nasals, as the following words attest:

- (7) NAGOVISI
 [ŋg]anaboreka 'my 2 round things' (Decker 1981:3)
 tee[ŋg]a 'with him' (Decker 1981:7)
 na[nd]awe 'you just went' (Decker 1981:15)
 na[nd]es 'you 2 went' (Decker 1981:15)
 taarime[nd]imai 'we (PL) are putting it aside for you' (Decker 1981:18)

Thus far, there appears to be a postnasal voicing contrast in the language. For some affixes, though, there appears to be postnasal voicing occurring.⁷ Observe the initial stop of the root /kaŋ/, which surfaces as voiceless with vowel-final possessive prefixes, but as voiced when the prefix is a nasal (Decker 1981:5):⁸

- (8) NAGOVISI
 [lakaŋ] 'your thing'
 [vi:kaŋ] 'their thing'
 [ŋgaŋ] 'my thing'

As far as is evident from the data, postnasal voicing appears to be a product of allomorphy that is triggered by certain morphemes.

There is one further complicating factor that sets Nagovisi aside from the other languages in the group. Like Nasioi, it is fairly clear that there are voiced stops in the underlying inventory, though like Buin, the language also has /r/ in the inventory. Similar to Motuna, this underlying /r/ has a surface allophone [d] in postnasal contexts, observable in words with the dual suffix (9) or with tense suffixes (10):

- (9) NAGOVISI
 ta[m]eai 'you will kill me'
 ta[nd]eai 'you two will kill me' (cf. *more* 'we two come')
 (Decker 1981:12)
- (10) NAGOVISI
 nanu[r]awe 'he just went'
 na[nd]awe 'you just went'
 na[n]ures 'they 2 went'
 na[nd]es 'you 2 went' (Decker 1981:15)

Decker (1981:15, 22) also notes that, in some circumstances, the second person agreement morpheme /-u/ deletes between a nasal and suffixal /r/, resulting in the process seen above. This is the same pattern of /r/ allophony as exhibited by Motuna.

Finally, since the fricatives have been a relevant point of discussion in the other languages, it is worth noting that Nagovisi allows (at least) [s] in postnasal contexts. Observe the tense suffix *-ns* (here the apostrophe orthographically represents a glottal stop): *po* 'nsi' 'will be coming', *we* 'nsi' 'will be going', and so on (Decker 1981:36).

Thus, it appears as though Nagovisi exhibits postnasal voicing, which is the opposite of the effect found in Nasioi. While it appears to be a robust process, it also seems to be allomorphically restricted, such that some morphemes resist postnasal voicing and retain

7. Tangentially, there is also morphophonemic (nonpostnasal) voicing of stops (see Decker 1981:24, 30–31 for examples).

8. Note that while in Nasioi place assimilation was blocked with initial syllabic nasal targets, in Nagovisi assimilation appears to obtain in these contexts.

the underlying [–voice] specification of some stops. This same situation obtains in modern Basque varieties (Mascaró 2007), where a regular process of postnasal voicing is retained in only a subset of morphological contexts. Thus, it stands to reason that postnasal voicing was present in Proto-South Bougainville, with remnants remaining in Nagovisi. While this scenario is at the moment speculative, it would render the postnasal devoicing of Nasioi an innovation, and one not apparently derived from the confluence of multiple independent changes (cf. Hyman 2001, Beguš 2016).

5. DISCUSSION. Thus, it appears that all members of the South Bougainville group exhibit slightly different stop inventories, and slightly different distributions of stops in postnasal position. While Motuna lacks underlying voiced stops, it has allophonic voiced stops following nasals, thus, allowing for both voiced and voiceless stops in that position. Buin exhibits a similar pattern, but allows a full contrast between voiced and voiceless stops. Nagovisi allows the same type of contrast, but also a limited, morphophonemic postnasal voicing in some morphemes, as well as the allophonic voiced stops (from underlying /r/) following nasals in the same way that Motuna does. Finally, Nasioi exhibits the typologically unexpected pattern of postnasal devoicing that has served as the centerpiece of this squib. The relevant underlying inventories, processes, and general patterns for each language are provided in table 1.

Postnasal devoicing is a noteworthy pattern, because put into context, it defies the logic of articulatory grounding for the *NT constraint proposed by Pater (1999), which makes the prediction that there is no constraint *ND. Instead, it constitutes a genuine case of postnasal devoicing, a pattern that is unexpected under the assumption that constraints must be phonetically grounded, or motivated. This is also a noteworthy pattern because it is a synchronic process, and not simply a static result of diachronic change.

In sum, while this squib has not shed any new light on how diachrony yields these patterns, nor how the theory should be constructed in order to account for these patterns, it does lend support to the idea that *ND is just as valid a phonological constraint as *NT (cf. Hyman 2001). This motivates a move away from a reliance on articulatorily grounded constraints, as the uncovering of symmetrical systems (in terms of phonological markedness) argues instead for symmetrical, potentially arbitrary constraints. Within the South Bougainville family, it is apparent that there are conflicting forces at play. This

TABLE 1. SUMMARY OF SOUTH BOUGAINVILLE LANGUAGES

Language	Consonant Inventory	Processes	Generalizations
Nasioi	p t k ʔ b d m n ŋ	/t/ → [s] / ____ i /b, d/ → [β, r] / V ____ V nasal place assimilation	postnasal stop devoicing
Buin	p t k g m ŋ r	/r/ → [d] / [+nasal] ____ #nt only #NT cluster nasal place assimilation	postnasal stop contrast
Motuna	p t k ʔ s h m n ŋ r w j	/r/ → [d] / [+nasal] ____ /w/ → [b] / [+nasal] ____ /VNs/ → [Ŵs] nasal place assimilation	postnasal stop contrast
Nagovisi	p t k ʔ b d g s v m n l r w	/r/ → [d] / [+nasal] ____ /u/ → Ø / [+nasal] ____ r nasal place assimilation	postnasal stop contrast postnasal stop devoicing (limited)

is akin to Hyman's (2001) discussion of what he terms "processes" and "counter-processes" in Bantu languages. This includes the existence of postnasal voicing/devoicing, postnasal aspiration/deaspiration, postnasal affrication/deaffrication, as well as nasalization/denasalization. The postnasal devoicing in Nasioi and postnasal voicing in Nagovisi provide just an instance of process/counter-process within South Bougainville.

Finally, while the articulatory grounding for an asymmetrical constraint like *NT has been called into question, this leaves open the possibility that the relevant constraints are perceptually grounded (Hamman and Downing 2017). For instance, Kirchner (2000:534–35) sees the result of Hyman's *ND as fortition driven by perceptual considerations. Kirchner claims that voiceless stops are more recoverable after nasals, whereas voiced stops run the risk of perceptual neutralization with /n/. Postnasal devoicing, thus, makes a stop more distinctive. Hamman and Downing (2017) follow through with this line of reasoning, and provide a perceptual analysis of systems employing different stop contrasts. While perhaps premature for the South Bougainville languages, this type of approach may help to shed light on the symmetrical patterns that have emerged within this family.

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