A Case for Non-phonological Constraints on Nasal Substitution

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1. Introduction

One problem in phonology which continues to puzzle linguists in the field of Western Austronesian has to do with nasal assimilation. This seemingly simple and pervasive phonological process across languages may manifest certain complexities when it involves a prefix ending with a nasal followed by a base with an initial oral consonant. Tagalog, a major Philippine language, best illustrates these complexities. The facts of the language show that while homorganic nasal assimilation applies quite generally across morpheme boundaries, the related process called nasal substitution operates under certain restrictions which are not necessarily phonological. These two processes are defined below. They are shown to operate in derived forms with the prefixes paŋ- and maŋ- with four different effects as follows.[1]

(a) Nasal assimilation. This is the widespread rule of homorganic nasal assimilation, also known as partial assimilation, whereby a nasal assimilates the point of articulation of the following consonant. Unlike some dialects of English where /n/ does not assimilate before velars across morpheme boundaries, e.g., incorrect, incapable, ingratiate, Tagalog /ŋ/ does before labials, dentals and alveolars, and remains a velar before all other consonants. One exception to this general process is when the consonant following the velar nasal is a nasal itself. In this case, the velar nasal is not affected by the place of articulation of the following nasal.[2] Some words that manifest these cases are as follows:

paŋ- + pitas	pampitas	'something (henceforth, s.t.) used for picking'
paŋ- + takip	pantakip	's.t. for covering'
paŋ- + kamot	paŋkamot	's.t. for scratching'
paŋ- + ʔahit	paŋʔahit	's.t. for shaving'
paŋ- + bukas	pambukas	's.t. for opening'
paŋ- + hukay	paŋhukay	's.t. for digging'
maŋ- + basag	mambasag	'to go breaking things'
maŋ- + dukot	mandukot	'to go pick-pocketting'
maŋ- + gambalaʔ	maŋgambalaʔ	'to go disturbing'
maŋ- + habol	maŋhabol	'to go chasing'
paŋ- + negosyo	paŋnegosyo	's.t. for use in business'
paŋ- + masahe	paŋmasahe	's.t. used for massaging'
maŋ- + molestya	maŋmolestya	'to go asking for favours'

(b) Nasal substitution. In this process, the oral consonant following the nasal is lost or deleted after the nasal has assimilated to its point of articulation.[3] In a sense, this process can be described as consisting of two stages, namely, (1) nasal assimilation and (2) oral consonant deletion. To illustrate:

maŋ- + pitas	mamitas	'to go picking'
maŋ- + takot	manakot	'to frighten'
maŋ- + kuha	maŋuha	'to go taking/collecting'
maŋ- + bili	mamili	'to go shopping'
maŋ- + dalaŋin	manalaŋin	'to pray fervently'
maŋ- + gabay	maŋabay	'to toddle/walk along a support'

(c) Optional consonant deletion. There are cases where two alternant forms occur, one with partial assimilation and another with nasal substitution. Unlike the forms in (b), this group undergoes homorganic nasal assimilation and then allows the voiceless consonant in the sequence nasal plus consonant to stay or be deleted as in the following examples:

paŋ- + kayod	paŋkayod ~ paŋayod	's.t. for scraping'
paŋ- + sala?	pansala? ~ panala?	's.t. for filtering'
paŋ- + patay	pampatay ~ pamatay	's.t. to kill with'
paŋ- + paleŋke	pampaleŋke ~ pamaleŋke	's.t. for use to/at the market'
paŋ- + piyesta	pampiyesta ~ pamiyesta	's.t. for use/wear at a feast day'

(d) Distinctive deletion. In still other cases, when the consonant following the nasal deletes after homorganic nasal assimilation, the resulting form is not an alternant form but a different lexical item. It is distinctive in meaning from the similar form where only partial assimilation has taken place. For example:

paŋ- + tanim pananim 'aggregate plants in a garden or field'
(Cf. pantanim ~ pananim 's.t. used for planting')
paŋ- + pasko pamasko 'a Christmas present'
(Cf. pampasko ~ pamasko 's.t. for use at Christmas time')[4]
maŋ- + baril mamaril 'to go hunting'
(Cf. mambaril 'to go on a shooting rampage')
maŋ- + galit maŋalit 'to grit one's teeth in anger'
(Cf. maŋgalit 'to provoke one to anger')

In all four cases above, nasal assimilation is observed to apply quite generally. It may be mentioned that in (a), the forms with paŋ- plus a voiceless C, except /ʔ, h/, have alternant forms like those in (c) where the consonant may be deleted, whereas those forms with initial voiced consonants or /ʔ, h/, following the nasal do not undergo consonant deletion. In (b) and (d), however, nasal substitution operates obligatorily in forms with maŋ- with either voiceless, except /ʔ, h/, or voiced consonants following. The latter case with the voiced stop deleting is considered particularly problematic. Given the same phonological environments for nasal assimilation and nasal substitution to operate, the question to inquire into is when does nasal substitution occur. This paper addresses itself to two specific questions:

(a) Under what conditions does nasal substitution take place and under what conditions may it take place?
(b) In what way can these conditions be formalized?

Assessment of what others have said about this specific phenomenon in Tagalog will be made, in particular how nasal substitution is accounted

for. Then, I propose an explanation which I judge to be able to account for this phenomenon more accurately.

2. Assessment of accounts of nasal substituion in Tagalog

Previous accounts of nasal assimilation in Tagalog never failed to recognize the occurrence of nasal substitution (or full nasal assimilation), but these widely-referred sources do not provide any coherent explanation for this interesting phenomenon.

2.1 Starting with Bloomfield's analysis (1917:213), which is considered the most influential scientific work on Tagalog grammar, we read that "prefixes ending in ŋ (maŋ-, naŋ-, paŋ-) alter a following initial, always in much-used words, frequently in others.... Inital p, b, t, d, s, are often, initial k is always changed to the corresponding nasal: pamálo? (pálo? with paŋ-), but also paŋ-pa-rikìt; pamilmìt (bilmìt), but also paŋ-bambò; panáli? (táli?), but also paŋ-takìp: panálaŋin (daláŋin), but also paŋ-dilìg; nanaríwa? (saríwa?), but also paŋ-sakày; naŋapà? (kapà?)." In the examples cited, Bloomfield apparently calls attention to the operation of both nasal substitution and simple homorganic nasal assimilation on forms with identical initial consonants in the base. Unfortunately, even with such a caution, he does not inform us when either process applies. The criterion he uses for altering the consonant following the nasal is frequency of use of words. This is rather curious for it presupposes that one knows which are the "much-used words" and, concomitantly, what counts as a "much-used" word. This implies that new lexical items can only come about with the consonants in the base unaltered, which is, of course, contrary to many existing forms. Furthermore, it is inaccurate to state that initial k always changes to its corresponding nasal as evidenced by such forms as paŋkasalukuyan 'for the present', paŋkamay 'for the hand' and alternating items such as paŋkamot ~ paŋamot 's.t. for scratching' which are similar to the other alternating pairs cited in (c) above. In fact, the first form of the pair with the oral consonant occurring is more frequently used. On the other hand, with a particular class of derived verbs with maŋ- or paŋ-, the form which undergoes nasal substitution is the only acceptable form. Finally, in saying that the initial consonants are "changed" to their corresponding nasal, Bloomfield overlooks the consequence of this account, which as can be gleaned from his examples is not the result he wants, i.e., a sequence of two nasals. Disregarding these inaccuracies, we find Bloomfield's account lacking in explanation as to the exact conditions that trigger nasal substitution.

2.2 Another monumental work on Tagalog is Blake's (1925) in which he describes the combination of the final nasal of the prefix plus consonant as being "regularly reduced" to the homorganic nasal (1925:7). Thus, nb and np are reduced to m; nt, ns and sometimes nd to n; nk and sometimes ng to ŋ.[5] Except for the inclusion of nh as another sequence that may sometimes be reduced to its corresponding homorganic nasal, Blake's statement is essentially similar to that of Bloomfield. The distinction he makes between "regularly reduced" consonantal combinations and "occasionally reduced" ones is not clear. He does not show why, for instance, nb, np, nt, ns or nk are regularly reduced to their respective homorganic nasals whereas nd and nh are reduced only occasionally. Evidently, he fails to note the several instances of nb which do not reduce to m and the many cases where the sequence n plus a voiceless consonant does not have to undergo nasal substitution. One sequence which neither of these two linguists comments on is the ŋg which like the ŋb and ŋd sequences may or may not undergo nasal substitution. One final word on Blake's account is that his inclusion of ŋh as sometimes reducing to ŋ is

unattested. Actually, the velar nasal remains unaltered before /h, y, w/ and also before /ʔ/, except in lexicalized items, and these consonants do not delete.

2.3 From a more recent description of Tagalog grammar, we find Llamzon (1968:121-2) saying of complete assimilation that the root initial "p or b is lost and the ŋ nasal of the prefix becomes m...; if the root to which the prefix is attached begins with t, d, s or n, such consonants are lost and the ŋ nasal of the prefix becomes n...; if the root to which the prefix is attached begins with any other phoneme than those already mentioned, such a phoneme is lost and the prefix retains its final ŋ nasal..." His account of complete assimilation, regrettably, does not improve upon what Bloomfield and Blake have stated. It is even questionable why he orders the steps in the process such that the root-initial consonant is lost before the nasal ŋ has assimilated its point of articulation. Undoubtedly, current generative phonological principles dictate in this case that homorganic nasal assimilation followed by consonant deletion is the more 'natural' order in the process.

Llamzon's concluding statement that "choice between partial and complete assimilation is completely facultative" (1968:122) is rather ambiguous. It can mean either (1) that forms may be in free variation (as McGinn, 1971 interprets it) or (2) that there are forms that undergo the former and certain other forms that undergo the latter. Under the first interpretation, Llamzon is only partly correct in that there are forms of a given morphological class where there are alternants, as mentioned previously in 1 (c), but certainly, lest it be miscontrued, not any form has two alternants. In the second interpretation, the stated processes (of partial and full assimilation) become empty of significance for lack of distinguishing conditions that specify which items undergo which process. This is tantamount to marking each lexical item as positive for total assimilation or not, a very unhappy move towards the current goal of stating significant generalizations.

2.4 Presently, the more popular reference in Tagalog is the grammar written by Schachter and Otanes (1972). This work is essentially an affix-plus-base oriented description. Hence, the account on nasal substitution is spread over those sections dealing with Mang-nominals, Mang-verbs and Pang-adjectives. Of Mang-nominals, they say: "Base initial p, t, s, k are regularly replaced by their homorganic nasal counterparts. Base /b, ʔ/ are in some cases replaced by nasals, in others not. A nasal that replaces /p, t, s, k, b, ʔ/ is treated as the base-initial consonant in duplication. The final ŋ of the prefix is dropped before a nasal consonant, and is replaced by m before /b/, by n before /d, l/" (1972:104). The same assimilatory changes are described for Mang-verbs summarized as follows (1972:290-91):

(a)

	p, m		m
maŋ +	t, s, n	--->	ma + n
	k, ŋ		ŋ

(b)

maŋ + b	--->	ma + m mam + b

(c) maŋ + ? ---> ma + ŋ
maŋ + ?

(d) maŋ + $\begin{matrix} d \\ l \end{matrix}$ ---> man + $\begin{matrix} d \\ l \end{matrix}$

They note further that "when the base begins with g, h, w, or y, no assimilation changes occur" (1972:291).

The restriction on nasal substitution in what is identified as Pang-adjectives is more revealing of a non-phonological constraint. Schachter and Otanes state that "when the verb related to an instrumental adjective is an um or mag-verb whose base begins with one of the phonemes p, t, s, or k, there are usually two freely alternating ways of forming the adjective... the prefix assumes one of three shapes: pam before p , pan before t or s , paŋ before k . The alternative formation is not shared by the reservational adjectives. In this formation, the initial base consonant is replaced by its homorganic nasal counterpart -- p by m, t or s by n, k by ŋ -- and the final nasal of the prefix is simultaneously lost" (1972:220).[6] Thus, the instrumental adjective pampunas 's.t. for wiping' alternates with pamunas (see also those pairs in (c), section 1) but the reservational adjective paŋkamay 's.t. for the hand' does not alternate with *paŋamay. Finally "when the verb base used in the instrumental adjective begins with a consonant other than p, t, s, or k, ... the formation of the adjective is identical with that of the reservational adjective" (1972:221), i.e., without initial base consonant deletion.

Except for a few missing details, particularly in those forms with maŋ-, the two general rules stated above for nasal substitution would have been fairly adequate. Guided by the first rule, one will not expect to find instances of bases with initial /d, g/ prefixed with maŋ- with the oral voiced consonant deleting. However, the following forms occur:

maŋ- + dalaŋin	maŋalaŋin	'to pray fervently'
maŋ- + gabay	maŋabay	'to toddle/walk along a support'
maŋ- + dikit	maŋikit	'to get stuck'
maŋ- + gubat	maŋubat	'to stay/wander in a forest'

This indicates that there are just maŋ-forms with the voiced initial consonants in the base deleting (as in section 1 (b) and those not deleting (as in section 1 (a)). The question is when does each occur. Moreover, given the restriction that initial base consonants /h, w, y/, among others, do not delete after a nasal in the prefix, what explanation can be provided that will distinguish the /h/ in particular as falling together with the class of /w, y/ glides rather than with /s/ of the fricative class or with /?/ of the glottal class?

In the second rule, while it is true that nasal substitution may operate on forms of instrumental adjectives resulting in alternant forms, the lexicalized items identified in section 1 (d) where nasal substitution is used obligatorily or functionally in the same phonological environment as the instrumental adjective are not accounted for. There is a contrast between panamin and pantanim, and mamaso? can mean either 'to go scorching' (from maŋ- + paso?) or 'a burn; a welt or an ulcer'. The significant contribution of these two rules, however, is the identification of the particular subclass of Pang-adjectives (which by formal criteria are Pang-nouns) that allows the optional application of nasal substitution.

2.5 An unpublished paper by McGinn (1971) addresses itself to the problem of nasal sandhi in Tagalog. He proposes that "complete assimilation of the nasal (in prefix) takes place if the following consonant is p, t, k, ?, b, s or m, n, ŋ and if the morpho-syntactic class of the whole word is N or V (not Adj)" with the exception of two roots "/bi:ruh/ 'joke' and /buwi:sit/ 'annoyance' which retain their root-initial consonant after prefixation..." (1971:5-6). He also excludes /d/ and /g/ from the obstruents that undergo complete assimilation but lists four words that are "exceptions to the exceptions," namely, damit 'clothes', dalaŋin 'fervent prayer', dimdim 'meditation', and dikit 'stick'.

McGinn's proposal appears to be convincing and leading to the right direction. I cannot agree with him more, as noted in the preceding account, in the use of morpho-syntactic classes as a condition for nasal substitution. However, the broad classes N or V that he identifies need further subcategorization. In addition, the consonants he enumerates as undergoing complete assimilation, given that the prefixed words in which they appear are marked as either N or V, are short of being thoroughly accurate. Easily, there are instances of verbs with base initial /?/ that do not undergo complete nasal assimilation. To wit:

(a)	maŋ- + ?akap	maŋ?akap	'to go embracing'
	maŋ- + ?api	maŋ?api	'to maltreat'
	maŋ- + ?akit	maŋ?akit	'to lure'
	maŋ- + ?inis	maŋ?inis	'to go annoying/provoking'
(b)	maŋ- + ?awat	maŋ?awat	'to pacify two persons fighting'
	maŋ- + ?ako	maŋ?ako	'to claim responsibility for someone else's obligation'
	maŋ- + ?alalay	maŋ?alalay	'to provide support'

It also begins to look suspicious when in addition to the two words with root-initial /b/ which McGinn lists as exceptions we can add many more such as:

(c)	maŋ- + baril	mambaril	'to go on a shooting rampage' (Cf. mamaril 'to go hunting')
	maŋ- + bato	mambato	'to go stoning'
	maŋ- + basag	mambasag	'to go breaking'
	maŋ- + buntal	mambuntal	'to go punching/boxing'
	maŋ- + bigwas	mambigwas	'to go slapping/whcckcing'
	maŋ- + bugaw	mambugaw	'to go driving away'

All the above forms are also prohibited from undergoing nasal substitution even as the following words are not:

(d)	maŋ- + baril	mamaril	'to go hunting'
	maŋ- + bili	mamili	'to go shopping'
	maŋ- + buhay	mamuhay	'to live'
	maŋ- + bahay	mamahay	'to go managing a household; to reside'
	maŋ- + bintana?	mamintana?	'to pass the time staying by the window'

In connection with the /d, g/ exceptions, we can list more forms, in addition to those given in section 2.4, with these initial consonants that likewise undergo nasal substitution. For example:

(e)	maŋ- + duŋaw	manuŋaw	'to pass the time looking out the window'
	maŋ- + dilaw	manilaw	'to turn yellowish'
	maŋ- + da?ig	mana?ig	'to prevail; overcome'
(f)	maŋ- + gibik	maŋibik	'to shout for help'
	maŋ- + gatal	maŋatal	'to stammer; to be incomprehensible in one's speech'

These last three groups of examples show that nasal substitution operates obligatorily on certain base initial /b, d, g/ whereas it never does in those cases under (c) and those in section 1 (a). The burden is still to determine what the exact nature of each case is. How are they related to words with other base-initial consonants?

Lastly, turning to McGinn's condition that root-initial /m, n, ŋ/ occurring with a verbal or nominal prefix also undergo full assimilation is likewise doubtful, if not mistaken, as has already been noted at the beginning of this paper. It may be stressed that any occurrence of such stems do not affect the velar nasal of the prefix and neither is the initial nasal of the base altered. There is scarcely any item with such combinations because there are indeed very few roots with initial nasals. Of the few of them, we can mention the following:

(g)	maŋ- + masahe	maŋmasahe	'to go massaging'
		*mamasahe	
	maŋ- + maliit	maŋmaliit	'to go belittling someone'
	maŋ- + nipis	maŋnipis	'to gradually become thin/flat'
		(cf. tipis)	

For roots that begin with /ŋ/, there are no items to attest to the full assimilation of this initial consonant. There is reason to believe that forms such as <u>maŋasiwa?</u> 'to manage' or <u>maŋanyaya?</u> 'to cause or lead someone to an unfortunate end' may be confused as deriving from roots with initial /ŋ/. No noun or verb roots /ŋasiwa?/ and /ŋanyaya?/ are available to warrant a derivation similar to the previous examples. We can account for these items simply by analogical formations of the form /paŋasiwa?/ and /paŋanyaya?/, respectively. The examples given in Schachter and Otanes (1972:290) with root-initial nasals such as:

(h)	maŋ- + manhid	mamanhid	'to get numb'
	maŋ- + nood	manood	'to watch, to view'
	maŋ- + ŋaykay	maŋaykay	'to tremble'

are forms whose bases occur only in these verbal forms. Unlike the majority of <u>maŋ</u>-verbs which derive from other verb stems, these are petrified verb forms which semantically and syntactically belong to either the stative class or the perception class in which other similar forms such as <u>makinig</u> 'to listen (cf. <u>pakiŋgan</u>), <u>maniwala?</u> 'to believe' (cf. <u>paniwala?an</u>), <u>maŋako?</u> 'to promise' (cf. <u>ipaŋako?</u>), etc., belong. These verbs do not correspond regularly to any non-derived verb stems. The examples in (h) may then be considered as analogical formations and are thus not related to the many other <u>maŋ</u>-verbs derived from verb roots by certain productive derivation rules. (See De Guzman, 1976:150f.)

3. Alternative proposal

As an alternative proposal, I present a consonant deletion rule in

two parts that can best account for nasal substitution considering the forms where the process must apply, those where it optionally applies and those where it never applies. Given that the various cases are of identical phonological environments as outlined in the beginning of this paper, we look to non-phonological constraints in the application of the rule. Clearly, these can be derived from both syntactic and semantic features.

Thus, for general lexical derivation rules for creating verb stems with the affix paŋ- (maŋ- when inflected for the active voice) and adjective stems with paŋ-, two phonological rules apply as follows:

Rule 1: Nasal assimilation

$$\begin{bmatrix} +\text{nas} \\ -\text{ant} \\ -\text{cor} \end{bmatrix} \text{---}> \begin{bmatrix} \alpha\text{ant} \\ \beta\text{cor} \end{bmatrix} \Big/ \_\_\_ + \begin{bmatrix} +\text{cons} \\ -\text{nas} \\ \alpha\text{ant} \\ \beta\text{cor} \end{bmatrix}$$

The rule states that a velar nasal changes in its place of articulation according to the place of articulation of the initial non-nasal consonant of the following base. The form of the rule is simpler and more general than that which lists the exceptions. It is implied in the rule that non-consonantals (the glides) will not affect the form of the velar nasal. The rule as stated applies quite generally and is purely phonologically conditioned.

Rule 2: Consonant deletion

(a) Obligatory

$$\begin{bmatrix} \begin{bmatrix} +\text{obs} \\ +\text{vd} \end{bmatrix} \\ \begin{bmatrix} +\text{obs} \\ -\text{vd} \\ -\text{lo} \end{bmatrix} \end{bmatrix} \text{---}> \emptyset \Big/ \begin{bmatrix} /\ldots[+\text{nas}] + \_\_\_\ldots/_{V_i} \\ \\ /\ldots[+\text{nas}] + \_\_\_\ldots/_{V} \end{bmatrix}$$

Where V_i is a class of verb stems that have the semantic feature /-adversive/, /+stative/ or /+inchoative/.

(b) Optional

$$\begin{bmatrix} +\text{obs} \\ -\text{vd} \\ -\text{lo} \end{bmatrix} \text{---}> \emptyset // \ldots[+\text{nas}] + \_\_\_\ldots/_{Adj_i}$$

Where Adj_i represents a class of derived instrumental adjectives.

After Rule 1 has applied, Rule 2 applies to forms that meet the specified syntactic and semantic conditions. Rule 2 (a) is one process involving two similar but different inputs with correspondingly different semantic constraints. The first portion where the input specifies voiced obstruents, which include /b, d, g/, applies to a subclass of derived paŋ-verbs specified with semantic features other than [+adversive].[7] The second portion whose input specifies non-low voiceless obstruents /p, t, k, s/, with /ʔ, h/ excluded by the feature /-lo/, corresponds to derived paŋ-verbs without any semantic restrictions.

By implication, Rule 2 (a) prevents paŋ-verb stems with base-initial /b, d, g/ from undergoing nasal substitution or consonant deletion when they are further specified with the feature [+adversive]. This formulation represents most faithfully what is indicated by the various counter-examples given in the preceding two sections. This subclass of paŋ-verbs projects a semantic feature [+adversive] to mean an act perceived as harmful, destructive, or negative in contrast to one that is marked [-adversive], which may mean either a recreational, repeated, distributive or intensive activity, or to another labelled [+state] to mean non-active, descriptive state, or to still one other subclass marked [+inchoative] to mean a temporary reflection of some quality stated by the root. (These identifying features should suffice for the purpose of this paper.) Obviously, the use of a semantic feature as a constraint on the categorial restriction does not entail any complication in the formulation of the rule.[8]

The first portion of Rule 2 (a) then accounts for the occurrence of forms listed under section 1 (b) and section 2.5 (d), (e) and (f) and implicationally, the occurrence of the verb forms like those listed under section 1 (a) and section 2.5 (c) which bear the feature [+adversive].

The second portion of Rule 2 (a) accounts for the deletion of the voiceless consonant involved regardless of whether the verb stem is marked [-adversive] or [+adversive]. This shows the propensity of voiceless stops following a nasal to delete in paŋ-derived verbs. This accounts for forms such as those listed in 1 (b). It will be noted, however, that of the voiceless obstruents, the two low ones, /ʔ, h/, are excluded. Thus, whether paŋ-verb stems with base initial /ʔ/ or /h/ are marked /+adversive/ or not, these consonants do not generally delete. Thus, we see forms in 1 (a) and 2.5 (a) and (b). At this juncture, one may counter the observable deletion of the /ʔ/ in some /-adversive/ verb forms:

maŋ- + ʔanak	maŋanak	'to give birth'
maŋ- + ʔibig	maŋibig	'to pay court to'
maŋ- + ʔulila	maŋulila	'to be lonely'

The only explanation we can posit for these rare occurrences is the productive process of lexicalization which can also be observed in the instances cited in 1 (d). The above individually lexicalized items do not fall within the scope of the more general paŋ-verb derivational rules that add the feature [+distributive], [+stative], [+intensive] or [+inchoative]. Rather, they pattern like those items with petrified affixes, e.g., mano?od 'to watch', makinig 'to listen to', maniwala? 'to believe'. What is interesting is the resistance of the glottal stop, like the voiced stops, to delete when the paŋ-verb stem is [+adversive]. This particular tendency of /ʔ/ to conform with the rule affecting only voiced stops may yet find a physiological explanation. But I leave this open for now.

Similar to the second portion of Rule 2 (a), Rule 2 (b) allows for the optional deletion of base-initial consonants specified as non-low voiceless obstruents in derived paŋ-stems categorized as adjectives (Adj) with the additional feature subscript i for [+instrumental].[9] This rule accounts for the identifiable forms listed in 1 (c) and in 1 (a).[10] It may be added, however, that even as we mark the forms as [+instrumental] Adjectives, following Schachter and Otanes (1972:220), certain reservational adjectives, by analogy with the class of Adj_i, are gradually undergoing the same rule. Note the last two forms in 1 (c) repeated below

which are semantically [+reservational].

paŋ- + paleŋke pampaleŋke ~ pamaleŋke
paŋ- + piyesta pampiyesta ~ pamiyesta

Again, by implication, derived instrumental adjectives with base initial consonants other than non-low voiceless obstruents do not delete their consonants.

A semantic contrast between the alternating forms resulting from the application of Rule 2 (b) arises when the form with the deleted consonant takes on a specific meaning referring to a particular object with a particular use or a unique description. These items, as shown in 1 (d), are said to have been lexicalized, that is, they can no longer be predicted and must therefore be entered as separate lexical items in the dictionary. In this manner, the process of nasal substitution is used functionally in creating new lexical items, and consequently resulting in the loss or non-use of the alternant Adj_1 form. In this manner ambiguity is avoided. Similarly, the contrast between those paŋ-verb stems marked [+adversive] which do not undergo Rule 2 (a) and those that are [-adversive] and undergo the rule is maintained. It may be said that the same rule, although applying more widely in certain lexical derivation rules, is employed to prevent ambiguous forms.

One final point that needs to be clarified is the formation of what Schachter and Otanes call Mang-nominals (1972:104). It is superfluous to identify the same phonological rules as operating separately to this particular group of nominals with a concomitant duplication of the first CV of the base. For one thing the nominal forms are not derived from the roots or base through the affixation of the supposed maŋ-nominalizing affix. Rather, they derive from the active voice inflected form of the paŋ-verb stems involving a process of reduplication. The nasal initial consonant, where consonant deletion applied, plus the following vowel or the original base initial consonant, where consonant deletion did not apply, plus the following vowel is repeated to form nouns referring to the doer of what the maŋ-verb indicates. A sample derivation follows:

(a) paŋ- + bili >---> pamili 'to go shopping'

$$\begin{bmatrix} +V \\ -adversive \\ +distributive \end{bmatrix}$$

The verb /pamili/ when inflected for the active voice is /mamili/.

mamili >---> ma:mimili[11] 'buyer, shopper'

$$\begin{bmatrix} +N \\ +occupational \end{bmatrix}$$

(b) paŋ- + dukot >---> pandukot 'to go pickpocketting'

$$\begin{bmatrix} +V \\ +adversive \end{bmatrix}$$

The active voice inflected form of /paŋdukot/ is /mandukot/.
mandukot >---> mandudukot >---> mandurukot[12] 'a pickpocket'

Other similar forms that cannot be accounted for as having derived from a corresponding maŋ-verb source are analogical formations of the types exemplified above. For example, maŋ?a?awit 'a singer' for which there is no existing verb form maŋ?awit from ?awit 'song'; ma:nunula? 'one who recites poems' without a corresponding manula? from tula? 'poem'.

Evidence to support this contention comes from another form of nominalization. The gerundive form of derived verb stems with pag- and paŋ- are also formed by reduplicating the first CV of the base. Below are some examples of uninflected derived verb stems from which gerundive forms derive:

Derived verb stem	Active voice form	Derived gerundive form	
pagluto?	magluto	pagluluto?	'cooking'
pamili	mamili	pamimili	'shopping'
paŋhabol	maŋhabol	paŋhahabol	'the act of chasing'
paŋ?api	maŋ?api	paŋ?a?api	'the act of oppressing'

It is only by viewing lexical derivations as operating in successive stages, as demonstrated above, that the unity of the morphological processes can be captured and, hence, significant generalizations in the area of inflection and derivation may be stated.

4. Conclusion

In conclusion, this paper has shown that the four types of effects of the sequence nasal plus consonant across a morpheme boundary can be accounted for adequately by using syntactic and semantic feature constraints on the application of the phonological rules relating to nasal substitution. The category features V, Adj need to be identified along with the semantic feature oppositions [±adversive] and [±instrumental]. Rule 2 (a) accounts formally for the conditions under which consonant deletion or nasal substitution must apply and, implicationally, when it does not apply, while Rule 2 (b) specifies the conditions under which it may apply. Both parts of Rule 2 exhibit the great propensity of non-low voiceless obstruents to delete after a nasal. The fact that the deletion rule cannot apply across the board to the voiced obstruents implies that mere phonological or phonological and categorial conditions are not sufficient constraints to account for this type of consonant deletion. Only by specifying the input further by appropriate semantic features can the application of the rules be rendered systematic and likewise revealing of the morphological functioning of the phonological rules themselves.

Footnotes

[1]Maŋ- is the verbal affix analyzed as the inflectional voice affix m- + paŋ-, the latter being a derivational affix different from the instrumental affix paŋ-. A discussion of this analysis is found in De Guzman, 1976.

[2]Compare with Schachter and Otanes (1972:21) where this process also applies to a sequence of two nasals. Their account is questionable for the number of dialects outside Manila, on which this study is based.

[3]Dempwolff's account of the process (Lopez 1939:19), however, in which he cites ma-, na- and pa- as the prefixes occurring before roots whose initial consonants are replaced by a nasal homorganic to the consonant is inaccurate. These affixes should have been identified with a final /ŋ/; the pairs of prefixes maŋ- and ma-, paŋ- and pa- (not to mention naŋ- and na-, representing the past forms of the former pair), do contrast.

[4]Where the new lexical items correspond with certain alternant forms, such forms are obviously ambiguous. Soon, the alternant form falls out of use.

[5]Blake assumes that the final nasal of the prefix which assimilates is /n/, although he admits that it is possible to regard it as originally /ŋ/.

[6]It is not at issue here whether or not a homorganic nasal counterpart replaces the oral initial consonant with the simultaneous deletion of the nasal in the prefix. It is a theoretical problem whether as stated earlier (and I am persuaded that this is the proper analysis) the oral consonant deletes after the nasal in the prefix assimilates the point of articulation of the oral consonant.

[7]Perhaps, the reason /d, g/ have always been excluded from the class of consonants deleting is that only a few words in a Tagalog dictionary with these initials do occur with the paŋ-verbal affix that are [-adversive]. A definite majority of them are [+adversive]. Nevertheless, these few occurring forms follow the pattern for /b/ deletion.

[8]This, I contend, has significant implications to a semantic feature analysis and subcategorization of verb stems which has to be accomplished anyway in any given theoretical framework. For a discussion of semantic features in verb subcategorization, see De Guzman, 1976.

[9]It may also be argued that this subcategory identified as Adj_i, instrumental adjectives, are formally N_i, nominalized instruments, but a discussion of this can take us outside the scope of this paper into the complexities of lexical derivations. Hence, for efficiency, we adopt this category.

[10]The reason an item such as paŋ- + paligo? 'apparel for bathing' does not undergo Rule 2 (b) is that /pa-/ occurring after the /paŋ-/ is the prefix of the derived stem /paligo?/ and not a part of the base /ligo?/. This prohibition applies to forms with an intervening affix before the base, e.g., paŋ + paputi? = pampaputi? and not pamaputi? 'something for whitening/bleaching'. This presents another restriction which can only be stated in terms of morphological features or morphological boundaries.

[11]Note the consequent vowel length where consonant deletion applied.

[12]The phonetic form [mandurukot] results from the application of a d to r dissimilation rule.

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