THE PHONOLOGICAL BEHAVIOR OF MALAY PREFIXES WITH A NASAL ENDING

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1.1. This paper is an attempt, within the framework of generative phonology, to set up the rules governing the behavior of a certain class of Malay[1] prefixes, namely those which end in a nasal consonant. There are two of them, /məN/ and /pəN/ (where the morphophonemic symbol N stands for 'nasal consonant'), and both behave in a similar manner: the nasal consonant becomes homorganic with the following sound (that is, the initial sound of the stem) and in certain cases both the nasal consonant of the prefix and the initial consonant of the stem undergo further regular changes as exemplified in Tables 1 and 2 below.

TABLE 1

initial sound			stem	preceded by /məN/	plus stem reduplication	preceded by /pəN/
1			2	3	4	5
1.	/p/	(a)	pindah *move*	məmindah *to move*	məmindahmindah *to spread, infect*	pəmindahan[2] *transfer*
		(b)	pəduli *heed*	məmpədulikan[3] *to heed*		
2.	/b/		bəsar[4] *big*	məmbəsar *to get bigger*	məmbəsarbəsarkan[5] *to exaggerate*	pəmbəsar *prominent person*
3.	/t/	(a)	tari *dance*	mənari *to dance*	mənarinari *to dance for joy*	pənari *dancer*
		(b)	tərǰəmah *translate*	məntərǰəmahkan[6] *to translate*		pəntərǰəmah *translator*
4.	/d/		doroŋ *push*	məndoroŋ *to push*	məndoroŋdoroŋ *keep pushing*	pəndoroŋ *incentive*
5.	/k/	(a)	kirə[7] *count*	məŋirə *to count*	məŋirəŋirə *to estimate*	pəŋirə *enumerator*

Table 1 (cont.)

initial sound			stem	preceded by /məN/	plus stem reduplication	preceded by /pəN/
1			2	3	4	5
5.	/k/	(b)	kritik[8] *criticism*	məŋkritik *to criticize*		pəŋkritik *critic*
6.	/g/		goso?[9] *rub*	məŋgoso? *to scour*	məŋgoso?goso? *to polish*	pəŋgoso? *scrubber*
7.	/f/		fitnah *slander*	məmfitnah *to slander*		pəmfitnahan[10] *defamation*
8.	/v/		vito[11] *veto*	məmvito *to veto*		
9.	/θ/		θabet[12] *authentic*	mənθabetkan *to authenticate (a tradition)*		
10.	/ð/		ðarab[13] *multiply*	mənðarab *to multiply (numbers)*		pənðarab *multiplier*
11.	/s/	(a)	sapu *broom*	məŋapu *to sweep*	məŋapuŋapu *to wipe*	pəŋapu *sweeper*
		(b)	sah *legal*	mənsahkan[14] *to legalize*		pənsahan[15] *legalization*
12.	/z/		ziarah *pilgrimage*	mənziarahi[16] *to visit a holy place*		pənziarah *pilgrim*
13.	/š/		šarah *lecture*	məŋšarahkan[17] *to lecture in*		pəŋšarah *lecturer*
14.	/x/		xianat *betray*	məŋxianati[18] *to betray*		pəŋxianat *traitor*
15.	/ɣ/		ɣaeb *invisible*	məŋɣaebkan[19] *to make invisible*		
16.	/č/		čuri *steal*	məŋčuri[20] *to steal*	məŋčuričuri *to be stealthy*	pəŋčuri *thief*
17.	/ǰ/		ǰilat *lick*	məŋǰilat[21] *to lick*	məŋǰilatǰilat *to spread (fire)*	pəŋǰilat *flatterer*
18.	/m/		masa?[22] *cook*	məmasa? *to cook*	məmasa?masa? *prepare a feast*	pəmasa? *cook, chef*
19.	/n/		nanti *wait*	mənanti *to wait*	mənantinanti *to await eagerly*	pənanti *receptionist*
20.	/ɲ/		ɲaɲi *sing*	məɲaɲi *to sing*	məɲaɲiɲaɲi *sing all the time*	pəɲaɲi *singer*
21.	/ŋ/		ŋaŋə[23] *gape*	məŋaŋə *to gape*		
22.	/l/		lompat *jump*	məlompat *to jump*	məlompatlompat *keep jumping*	pəlompat *jumper*
23.	/r/		rasə[24] *taste*	mərasə *to taste*	mərasərasə *to touch, feel*	pərasə *sensitive*
24.	/h/		harap *hope*	məŋharap *to hope*		pəŋharapan[25] *hope*
25.	/ʔ/		ʔibarat *comparison*	məŋʔibaratkan[26] *to compare, liken*		

Table 1 (cont.)

initial sound	stem	preceded by /məN/	plus stem reduplication	preceded by /pəN/
1	2	3	4	5
26. /y/	yaken *convinced*	məyakenkan[27] *to convince*		
27. /w/	warnə *colour*	məwarnəkan[28] *to colour*		pəwarnə *pigment*
28. /i/	intay *spy*	məŋintay *to spy on*		pəŋintay *spy*
29. /e/	ekor *tail*	məŋekori[29] *to tail*		pəŋekor *follower*
30. /ə/	əmbarə[30] *roam*	məŋəmbarə *to roam*		pəŋəmbarə *wanderer*
31. /a/	aŋgo?[31] *nod*	məŋaŋgo? *to nod*	məŋaŋgo?aŋgo? *to nod repeatedly*	pəŋaŋgo? *bob-stay*
32. /o/	olah *process*	məŋolah *to process*		pəŋolah *manufacturer*
33. /u/	undaŋ *enact*	məŋundaŋkan[32] *to enact a law*		pəŋundaŋundaŋ *legislator*

TABLE 2

	stem	preceded by /məN/ and /pər/	preceded by /məN/ and /tər/	preceded by /pəN/ and /pər/
1.	hati *heart*	məmpərhatikan[33] *to pay attention to*		pəmərhati *observer*
2.	čəŋaŋ *surprise*		məntərčəŋaŋkan[34] *to astonish*	

The rules to be set up must be able to account for all the forms contained in the above tables.

1.2. Within the theoretical framework proposed by Chomsky and Halle (1968)[35] the sounds of Malay can be described in terms of fifteen binary features as in Table 3.

TABLE 3

		p	b	t	d	k	g	f	v	θ	ð	s	z	š	x	ɣ	č	ǰ	m	n	ɲ	ŋ	l	r
1.	syllabic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	sonorant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+
3.	consonantal	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4.	continuant	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	-	-						
5.	delayed release	-	-	-	-	-	-										+	+						
6.	strident							+	+	-	-	+	+	+	-	-								
7.	nasal																		+	+	+	+	-	-
8.	lateral																						+	-
9.	anterior	+	+	+	+	-	-	+	+	+	+	+	+	-	-	-			+	+	-	-		
10.	coronal	-	-	+	+			-	-			+	+						-	+	+	-		
11.	high																							
12.	low																							
13.	back																							
14.	rounded																							
15.	voiced	-	+	-	+	-	+	-	+	-	+	-	+		-	+	-	+						

		h	ʔ	y	w	i	e	ə	a	o	u
1.	syllabic	-	-	-	-	+	+	+	+	+	+
2.	sonorant	-	-	+	+						
3.	consonantal	-	-	-	-						
4.	continuant	+	-								
5.	delayed release										
6.	strident										
7.	nasal										
8.	lateral										
9.	anterior										
10.	coronal										
11.	high					+	-	-	-	-	+
12.	low						-	-	+	-	
13.	back				-	+	-	-	+		+
14.	rounded								-		+
15.	voiced										

With regard to Table 3 the following remarks are in order. Since Malay has no syllabic consonants, the feature [+ syllabic] is sufficient to distinguish the vowels from the consonants (including the laryngeal glides and the semi-vowels), which are all [- syllabic]. The vowels are redundantly [+ sonorant, - consonantal]. For the [+ low] vowel the feature [- high] is redundant by reason of universal redundancy.

1.3. Returning to the examples in Tables 1 and 2, the behavior of the nasal ending of the prefix and the changes in the stems can be described as follows.

(i) Except in examples 1(a), 3(a), 5(a), 11(a), 18 - 23, and 26 - 27 in Table 1, the final nasal consonant of the prefix becomes homorganic with the initial sounds of the following stem.

(ii) In the case of items 18 - 23 and 26 - 27, the nasal consonant of the prefix is deleted when followed by stems beginning with /m, n, ɲ, ŋ, l, r, y, w/, that is, when followed by segments having the features [- syllabic, + sonorant].

(iii) In examples 1(a), 3(a), 5(a) and 11(a), which are representative of the majority of Malay stems beginning with /p, t, k, s/, the initial consonants of the stems undergo a further change through assimilation to the preceding nasal by becoming /m, n, ŋ, ɲ/ respectively, while the final nasal consonant of the prefix is deleted. These changes do not occur in a class of stems beginning with /p, t, k, s/ represented by examples 1(b), 3(b), 5(b) and 11(b), comprising mostly unassimilated borrowings from foreign languages.

(iv) Column 4 of Table 1 shows that the second member of reduplicated stems undergoes the same change as the one occurring in the first member, if any.

(v) Although they begin with /p/ and /t/ respectively, the prefixes /pər/ and /tər/ are not subject to the changes described under (iii) above when preceded by the prefix /məN/, but /pər/ is regular when preceded by /pəN/. This is shown in Table 2.

2.1. Based on the description of Malay sounds in Table 3, the following rules can be set up to account for the changes described in section 1.3.

The changes in 1.3. (i), in which the nasal consonant of the prefix becomes homorganic with the initial segment of the stem can be handled by a rule with multiple variables involving the features 'anterior' and 'coronal'. Given the following table of the values of the features 'anterior' and 'coronal' for all sounds of Malay:

TABLE 4

	p	b	t	d	k	g	f	v	θ	ð	s	z	š	x	ɣ	č	ǰ	m	n	ɲ	ŋ	l	r	h	ʔ	y	w	i	e	ə	a	o	u
anterior	+	+	+	+	-	-	+	+	+	+	+	+	-	-	-	-	-	+	+	-	-	+	+	-	-	-	-	-	-	-	-	-	-
coronal	-	-	+	+	-	-	-	-	+	+	+	+	-	-	+	+	-	+	+	-	+	+	+	-	-	-	-	-	-	-	-	-	-

the following rule can be set up:

$$(1)\quad \begin{bmatrix} - \text{ syll} \\ + \text{ nasal} \end{bmatrix} \longrightarrow \begin{bmatrix} \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix} \;/\; \text{——} + \begin{cases} \begin{bmatrix} - \text{ syll} \\ - \text{ son} \\ \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix} & (a) \\ \begin{bmatrix} + \text{ syll} \\ \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix} & (b) \end{cases}$$

This rule states that the final nasal consonant of the prefix (the + sign between the segments is the morpheme boundary) becomes homorganic with the initial segments of the following stems if they are obstruents (which have the features [- syllabic, - sonorant]) (rule 1(a)) or vowels (which are [+ syllabic]) (rule 1(b)), that is, the nasal consonant is realized as [m] ([+ anterior, - coronal]) when followed by /p, b, f, v/ all of which are [+ anterior, - coronal], as [n] ([+ anterior, + coronal]) when followed by /t, d, θ, ð, s, z/ (all of them [+ anterior, + coronal]), as [ɲ] ([- anterior, + coronal]) when followed by /š, č, ǰ/ (all of them [- anterior, + coronal]), and as [ŋ] ([- anterior, - coronal]) when preceding /k, g, x, ɣ, h, ʔ/ or the vowels /i, e, ə, a, o, u/ all of which have the features [- anterior, - coronal]. Thus rule 1 accounts for all the examples in columns 3 and 5 of Table 1, with the exception of 1(a), 3(a), 5(a), 11(a), 18 - 23, and 26 - 27.

2.2. The items in columns 3 and 5 of examples 18 - 23 and 26 - 27 can be accounted for by setting up rule 2.

$$(2)\quad \begin{bmatrix} - \text{ syll} \\ + \text{ nasal} \end{bmatrix} \longrightarrow \phi \;/\; \text{——} + \begin{bmatrix} - \text{ syll} \\ + \text{ son} \end{bmatrix}$$

which states that the final nasal consonant of the prefix is deleted when preceding sonorant consonants, that is, the nasals /m, n, ɲ, ŋ/, the liquids /l, r/ and the semivowels /y, w/ all of which have the features [- syllabic, + sonorant]. This accounts for the changes described in section 1.3. (ii). Rules 1 and 2 can be collapsed into one rule:

$$(3)\quad \begin{bmatrix} - \text{ syll} \\ + \text{ nasal} \end{bmatrix} \longrightarrow \begin{cases} \begin{bmatrix} \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix} \;/\; \text{———} + \begin{cases} \begin{bmatrix} - \text{ syll} \\ - \text{ son} \\ \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix} & \text{(a)} \\ \begin{bmatrix} + \text{ syll} \\ \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix} & \text{(b)} \end{cases} \\ \phi \;/\; \text{———} + \begin{bmatrix} - \text{ syll} \\ + \text{ son} \end{bmatrix} & \text{(c)} \end{cases}$$

2.3. Two further rules are needed to account for the fact that the vast majority of Malay stems undergo a further change as stated in section 1.3. (iii):

$$(4)\quad \begin{bmatrix} - \text{ son} \\ - \text{ del.rel.} \\ \alpha \text{ ant} \\ \beta \text{ cor} \\ - \text{ voice} \end{bmatrix} \longrightarrow \begin{bmatrix} + \text{ nasal} \\ \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix} \;/\; \begin{bmatrix} - \text{ syll} \\ + \text{ nasal} \end{bmatrix} + \text{———}$$

$$(5)\quad \begin{bmatrix} - \text{ son} \\ + \text{ strid} \\ + \text{ ant} \\ + \text{ cor} \\ - \text{ voice} \end{bmatrix} \longrightarrow \begin{bmatrix} + \text{ nasal} \\ - \text{ ant} \end{bmatrix} \;/\; \begin{bmatrix} - \text{ syll} \\ + \text{ nasal} \end{bmatrix} + \text{———}$$

Rule 4 states that /p, t, k/ in the stem assimilate to the preceding nasal in the prefix by becoming their respective homorganic nasals, namely /m, n, ŋ/, while by rule 5 an initial /s/ in the stem assimilates to the preceding nasal by becoming /ɲ/. Both rules can be collapsed into:

$$(6)\quad \left\{ \begin{array}{ll} \begin{bmatrix} - \text{ son} \\ - \text{ del.rel.} \\ \alpha \text{ ant} \\ \beta \text{ cor} \\ - \text{ voice} \end{bmatrix} \longrightarrow \begin{bmatrix} + \text{ nasal} \\ \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix} & \text{(a)} \\ \begin{bmatrix} - \text{ son} \\ + \text{ strid} \\ + \text{ ant} \\ + \text{ cor} \\ - \text{ voice} \end{bmatrix} \longrightarrow \begin{bmatrix} + \text{ nasal} \\ - \text{ ant} \end{bmatrix} & \text{(b)} \end{array} \right\} \;/\; \begin{bmatrix} - \text{ syll} \\ + \text{ nasal} \end{bmatrix} + \text{———}$$

Since the output of rule 6 meets the condition of rule 3(c) the final nasal consonant of the prefix is deleted. Thus the application of rules 6 and 3(c) accounts for examples 1(a), 3(a), 5(a) and 11(a) in Table 1.

As mentioned earlier the vast majority of Malay stems beginning with /p, t, k, s/ behave in the manner of the above examples, that is, they undergo rule 6. On the other hand, a small class of stems beginning with /p, t, k, s/, consisting of unassimilated borrowings from foreign languages represented in Table 1 by examples 1(b), 3(b), 5(b) and 11(b), do not undergo rule 6.

This can be handled by a minus rule feature, that is, their lexical entries are specified [- rule 6], or rather [- rule 7] (see following section), for example:

$$\begin{bmatrix}\text{pəduli}\\ +\text{ STEM}\\ -\text{ rule 7}\\ \vdots\end{bmatrix}^{36},\quad \begin{bmatrix}\text{tərǰəmah}\\ +\text{ STEM}\\ -\text{ rule 7}\\ \vdots\end{bmatrix},\quad \begin{bmatrix}\text{kritik}\\ +\text{ STEM}\\ -\text{ rule 7}\\ \vdots\end{bmatrix},\quad \begin{bmatrix}\text{sah}\\ +\text{ STEM}\\ -\text{ rule 7}\\ \vdots\end{bmatrix},\text{ etc.}$$

2.4. In order to account for the changes in reduplicated stems described in section 1.3. (iv), rule 6 must be changed as follows.

$$(7)\quad \left.\begin{array}{ll}\begin{bmatrix}-\text{ son}\\ -\text{ del.rel.}\\ \alpha\text{ ant}\\ \beta\text{ cor}\\ -\text{ voice}\end{bmatrix} & \longrightarrow \begin{bmatrix}+\text{ nasal}\\ \alpha\text{ ant}\\ \beta\text{ cor}\end{bmatrix} \quad (a)\\ \begin{bmatrix}-\text{ son}\\ +\text{ strid}\\ +\text{ ant}\\ +\text{ cor}\\ -\text{ voice}\end{bmatrix} & \longrightarrow \begin{bmatrix}+\text{ nasal}\\ -\text{ ant}\end{bmatrix} \quad (b)\end{array}\right\} \;/\; \begin{bmatrix}-\text{ syll}\\ +\text{ nasal}\end{bmatrix} + [_{\text{STEM}}[\text{——}]X_i]_{\text{STEM}} +$$

$$([_{\text{STEM}}[\text{——}]X_j]_{\text{STEM}})$$

Conditions: $X_i = X_j$, $X_i \neq \phi$, $X_j \neq \phi$

Rule 7 (in which the variables X_i and X_j stand for nonnull segment sequences) states that in reduplicated stems preceded by /məN/ the second member undergoes the same change as the first, if any. This accounts for all forms in column 4 of Table 1.

2.5. As stated in section 1.3. (v) the prefixes /pər/ and /tər/ do not undergo rule 7 when preceded by /məN/, but /pər/ is regular when preceded by /pəN/[37]. This can be accounted for by rule 8.

$$(8)\quad \left.\begin{array}{l}\begin{bmatrix}\text{pər}\\ +\text{ PREFIX}\end{bmatrix}\\ \begin{bmatrix}\text{tər}\\ +\text{ PREFIX}\end{bmatrix}\end{array}\right\} \longrightarrow [-\text{ rule 7}] \;/\; \begin{bmatrix}\text{məN}\\ +\text{ PREFIX}\end{bmatrix} + \text{——}$$

Being an exception, rule 8, which accounts for the examples in Table 2, must apply before rules 3 and 7, if those examples are to be derived correctly.

2.6. From the above it would seem that, in addition to a minus rule feature in the lexical entries of a small class of stems, only three rules, namely rule 8, rule 3 and rule 7, in that order, are needed to account for the following facts of the Malay language:

(a) The final consonant of the prefixes /məN/ and /pəN/ becomes homorganic with the initial segment of the following stem (including vowels), except when it precedes segments with the specifications [- syllabic, + sonorant], in which case it is deleted. In other words, the final nasal consonant of the prefix is realized as [m] before /p, b, f, v/, as [n] before /t, d, θ, ð, s, z/, as [ɲ] before /š, č, ǰ/ and as [ŋ] before /k, g, x, ɣ, h, ʔ/ and the vowels /i, e, ə, a, o, u/, but deleted before /m, n, ɲ, ŋ, l, r, y, w/, that is, before nasals, liquids and semivowels. As can be seen from the above, these changes also involve the so-called 'secondary consonants' of Malay (Maris 1966: 144 ff), namely /f, v, θ, ð, z, š, x, ɣ/, which are borrowed from foreign languages, mainly from Arabic and English. Malay has only one native fricative phoneme: /s/.

(b) Native Malay stems beginning with /p, t, k, s/ undergo a further change. In stems beginning with /p, t, k/ the initial stops assimilate to the preceding nasal by becoming their homorganic nasals, whereas in those beginning with /s/ the initial fricative assimilates to the preceding nasal by becoming /ɲ/. The final nasal consonant of the prefix is then deleted since they are followed by a nasal (see (a) above). A small class of stems beginning with /p, t, k, s/, however, do not undergo this further change. This class includes only borrowings from foreign languages that have not been assimilated (represented by examples 1(b), 3(b), 5(b) and 11(b) in Table 1). Loan words which have been assimilated, such as /palsu/ *false* (from Portuguese), /tayp/ *type* (spelled taip, from English), /kontrol/ *control* (from English) and /səkolah/ *school* (from Portuguese)[38] behave like native Malay stems:

məmalsu *to counterfeit*
mənayp *to typewrite*
məŋontrol *to control*
məɲəkolahkan *to enrol (somebody) in a school*

The following simplified derivations of some examples representative of the above changes (cf. Tables 1 and 2) prove the adequacy of the rules set up so far.

(i) /p/ Stem: pindah
məN + pindah
məm + pindah # (rule 3(a))
məm + mindah # (rule 7(a))
mə + mindah # (rule 3(c))
məmindah[39]

Stem: pəduli [- rule 7]
məN + pəduli + kan
məm + pəduli + kan # (rule 3 (a))
məmpədulikan

(ii) /t/ Stem: tari

məN + tari
mən + tari # (rule 3(a))
mən + nari # (rule 7(a))
mə + nari # (rule 3(c))
mənari

Stem: tərǰəmah [- rule 7]
məN + tərǰəmah + kan
mən + tərǰəmah + kan # (rule 3(a))
məntərǰəmahkan

(iii) /k/ Stem: kirə

məN + kirə
məŋ + kirə # (rule 3(a))
məŋ + ŋirə # (rule 7(a))
mə + ŋirə # (rule 3(c))
məŋirə

Stem: kritik [- rule 7]
məN + kritik
məŋ + kritik # (rule 3(a))
məŋkritik

(iv) /s/ Stem: sapu

məN + sapu
mən + sapu # (rule 3(a))
mən + ɲapu # (rule 7(b))
mə + ɲapu # (rule 3(c))
məɲapu

Stem: sah [- rule 7]
məN + sah + kan
mən + sah + kan # (rule 3(a))
mənsahkan

(v) /ǰ/ Stem: ǰilat

məN + ǰilat
məɲ + ǰilat # (rule 3(a))
məɲǰilat

(vi) /i/ Stem: intay

məN + intay
məŋ + intay # (rule 3(b))
məŋintay

(vii) /m/ Stem: masa?

məN + masa?

mə + masa? # (rule 3(c))

məmasa?

(viii) /l/ Stem: lompat

məN + lompat

mə + lompat # (rule 3(c))

məlompat

(ix) /w/ Stem: warnə

məN + warnə + kan

mə + warnə + kan # (rule 3(c))

məwarnəkan

(x) Stem: hati

məN + pər + hati + kan

məN + $\begin{bmatrix} \text{pər} \\ \text{- rule 7} \end{bmatrix}$ + hati + kan # (rule 8)

məm + pər + hati + kan # (rule 3(a))

məmpərhatikan

(xi) Stem: čəŋaŋ

məN + tər + čəŋaŋ + kan

məN + $\begin{bmatrix} \text{tər} \\ \text{- rule 7} \end{bmatrix}$ + čəŋaŋ + kan # (rule 8)

mən + tər + čəŋaŋ + kan # (rule 3(a))

məntərčəŋaŋkan

3.1. Although, as shown above, the three rules set up so far, do generate the relevant forms, there is some question as to their naturalness.

It is very common for a nasal consonant to become homorganic with the following consonant as, for instance, in Yoruba (see Schane 1973:51). However, rule 3 states that the nasal ending of the prefix becomes homorganic only with a following obstruent or vowel, whereas it is deleted when preceding a nasal, liquid or semivowel. It is much more natural for the nasal ending of the prefix to become homorganic - that is, to totally assimilate - to a following nasal than to be dropped. If it is assumed that this is indeed the case in Malay, it will be necessary to find a well-motivated rule to account for the deletion of the nasal ending of the prefix. As a matter of fact there is a quite general rule in Malay which can account for it. Consider the following facts. There is a prefix /bər/ which, when followed by the stem /rumah/ *house*, would give *[bərrumah] *possessing a house*. Actually the

resulting form is [bərumah]. In other words, geminate consonants are degeminated.[40] This can be expressed by rule 9 (where C stands for 'consonant', that is, sounds having the feature [- syllabic]):

(9) $C_i \longrightarrow \phi \; / \; \text{——} + C_j$
Condition: $C_i = C_j$

Rule 9 also provides an explanation for another phenomenon. When /bər/ precedes the stem /layar/ *sail* the resulting form with some speakers is [bərlayar] *to sail*, which is regular, but with others it is [bəlayar]. The latter case cannot be accounted for by simply stating that in the case of some speakers [r] is deleted if /bər/ is prefixed to /layar/. The form [bəlayar] results from the application of a dissimilation rule present in the phonology of some speakers which specifies the non-lateral liquid of the prefix with the opposite value of the non-lateral liquid in the stem, that is, the final [r] of the prefix becomes [l] which is [+ lateral], giving the form # bəl + layar #, which in turn becomes # bə + layar # by rule 9.[41]

The dissimilation rule is also operative in such changes as /bər/ + /aǰar/ *study* → # bəl + aǰar # *to study*. Now that rule 9 is available, rule 3(c) can be dropped and rules 3(a) and (b) replaced by a quite general rule:

(10) $\begin{bmatrix} - \text{ syll} \\ + \text{ nasal} \end{bmatrix} \longrightarrow \begin{bmatrix} \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix} \; / \; \text{——} + \begin{bmatrix} \alpha \text{ ant} \\ \beta \text{ cor} \end{bmatrix}$

This rule states that the final nasal consonant of /məN/ and /pəN/ is realized as a nasal homorganic with the initial segment of the following stem.

Now rules 8, 10, 7 and 9, in that order, will acound for all the examples in Tables 1 and 2, except for the items containing stems beginning with a liquid or a semivowel.

3.2. In order to account for the latter two further rules are needed:

(11) $\begin{bmatrix} - \text{ syll} \\ + \text{ nasal} \end{bmatrix} \longrightarrow \begin{bmatrix} - \text{ nasal} \\ \alpha \text{ lateral} \end{bmatrix} \; / \; \text{——} + \begin{bmatrix} - \text{ syll} \\ + \text{ son} \\ - \text{ nasal} \\ \alpha \text{ lateral} \end{bmatrix}$

(12) $\begin{bmatrix} - \text{ syll} \\ + \text{ nasal} \end{bmatrix} \longrightarrow \begin{bmatrix} - \text{ cons} \\ \alpha \text{ back} \end{bmatrix} \; / \; \text{——} + \begin{bmatrix} - \text{ syll} \\ + \text{ son} \\ - \text{ cons} \\ \alpha \text{ back} \end{bmatrix}$

Rule 11 states that the homorganic nasal of the prefix assimilates to the initial liquid of the stem (a common occurrence, cf. Schane 1973: 55), and rule 12 that the nasal assimilates to the initial semivowel of the stem. The application of rule 9 will automatically degeminate

the resulting geminate liquids and semivowels.

Rules 10, 11 and 12 can be collapsed into rule 13.

$$(13)\quad \begin{bmatrix} -\text{ syll} \\ +\text{ nasal}\end{bmatrix} \longrightarrow \begin{cases} \begin{bmatrix}\alpha\text{ ant}\\ \beta\text{ cor}\end{bmatrix} \;/\; \text{——} + \begin{bmatrix}\alpha\text{ ant}\\ \beta\text{ cor}\end{bmatrix} & \text{(a)} \\ \begin{bmatrix}-\text{ nasal}\\ \alpha\text{ lateral}\end{bmatrix} \;/\; \text{——} + \begin{bmatrix}-\text{ syll}\\ +\text{ son}\\ -\text{ nasal}\\ \alpha\text{ lateral}\end{bmatrix} & \text{(b)} \\ \begin{bmatrix}-\text{ cons}\\ \alpha\text{ back}\end{bmatrix} \;/\; \text{——} + \begin{bmatrix}-\text{ syll}\\ +\text{ son}\\ -\text{ cons}\\ \alpha\text{ back}\end{bmatrix} & \text{(c)} \end{cases}$$

3.3. The application of rules 8, 13, 7 and 9, in that order, will account for all forms in Tables 1 and 2. The addition of rule 9, a general rule which is needed anyhow for independent reasons, does not add to the complexity of the phonological description of Malay, although the replacement of rule 3 by rule 13 admittedly has been made at some cost from the viewpoint of the simplicity metric.

It is, however, the contention of this paper that the above sequence of rules accounts for the facts of Malay under discussion in a more natural way. More specifically, the rules assert that the changes exemplified in Tables 1 and 2 are the result of the following processes:

(a) The oppositions amongst nasal consonants in final position in the two existing Malay prefixes with nasal ending (/məN/ and /pəN/) are neutralized, that is, the nasal consonant is realized as a nasal homorganic with the initial segment of the stem. In the case of stems beginning with a nasal consonant this means that the nasal ending of the prefix totally assimilates to the stem initial (rule 13(a)).

(b) Subsequently the homorganic nasal undergoes assimilation when followed by a liquid (rule 13(b)) or a semivowel (rule 13(c)).

(c) Native Malay stems and assimilated borrowed ones beginning with /p, t, k, s/ undergo a further change. Stem initial /p, t, k/ assimilate to the preceding nasal by becoming their homorganic nasals [m, n, ŋ] (rule 7(a)), whereas stem initial /s/ becomes [ɲ] (rule 7(b)). In the latter case the preceding [n] becomes homorganic with the stem initial [ɲ] as a result of rule 13(a). Non-assimilated stems beginning with /p, t, k, s/ are prevented from being affected by rule 7 by a minus rule feature, that is, they have the feature [- rule 7] in their lexical entries.

(d) The resulting geminate consonants are degeminated by rule 9.

(e) The application of rule 8 (which is ordered prior to the above rules) and rule 13(a) results in the forms exemplified in Table 2.

A few illustrative simplified derivations are given below for the purpose of comparison with those given in section 2.6. above.

(i) /p/ Stem: pindah
məN + pindah
məm + pindah # (rule 13(a))
məm + mindah # (rule 7(a))
mə + mindah # (rule 9)
məmindah
Stem: pəduli [- rule 7]
məN + pəduli + kan
məm + pəduli + kan # (rule 13(a))
məmpədulikan

(ii) /s/ Stem: sapu
məN + sapu
mən + sapu # (rule 13(a))
mən + ɲapu # (rule 7(b))
məɲ + ɲapu # (rule 13(a))
mə + ɲapu # (rule 9)
məɲapu
Stem: sah [- rule 7]
məN + sah + kan
mən + sah + kan # (rule 13(a))
mənsahkan

(iii) /m/ Stem: masa?
məN + masa?
məm + masa? # (rule 13(a))
mə + masa? # (rule 9)
məmasa?

(iv) /l/ Stem: lompat
məN + lompat
mən + lompat # (rule 13(a))
məl + lompat # (rule 13(b))
mə + lompat # (rule 9)
məlompat

(v) /w/ Stem: warnə
məN + warnə + kan
məŋ + warnə + kan # (rule 13(a))
məw + warnə + kan # (rule 13(c))

mə + warnə + kan # (rule 9)
məwarnəkan

(vi) Stem: hati

məN + pər + hati + kan

məN + [pər, − rule 7] + hati + kan # (rule 8)

məm + pər + hati + kan # (rule 13(a))
məmpərhatikan

4.1. As in the case with most rules, the rules governing the behaviour of the prefixes under discussion have their exceptions. In this section and the next the discussion will concern an apparent exception and the handling of a genuine one.

The apparent exception involves monosyllabic stems, which constitute a very small minority in Malay, where the vast majority of stems are disyllabic.

A majority of speakers have, instead of [mənsahkan] (see section 3.3. (ii), the form [mənəsahkan]. Another case in point is [mənəbom] *to bomb*, derived from the monosyllabic stem /bom/ *bomb*, instead of [məmbom], which also exists. For these speakers the following rule applies.

(14) $\phi \longrightarrow \begin{bmatrix} +\text{ syll} \\ -\text{ high} \\ -\text{ low} \\ +\text{ back} \\ -\text{ round} \end{bmatrix} / \left\{ \begin{bmatrix} \text{məN} \\ +\text{ PREFIX} \end{bmatrix}, \begin{bmatrix} \text{pəN} \\ +\text{ PREFIX} \end{bmatrix} \right\} + \text{——} \begin{bmatrix} S_1^1 \\ +\text{ STEM} \end{bmatrix}$

Rule 14 states that monosyllabic stems (for the symbol S for SYLLABLE, see Harms 1968: 117) are made disyllabic by adding a schwa in front of them when preceded by /məN/ or /pəN/. This results in disyllabic stems with an initial vowel, which regularly undergo rule 13.

4.2. The real exception involves the following cases. The prefix /pəN/ added to the stem /lihat/ *see* gives [pəlihat] *one who sees, a seer*, which is regular. However, when /pəN/ and the suffix /an/ are added to the stem the resulting form is not the expected *[pəlihatan] but [pəŋlihatan] *sight, perception*. There exists also a literary form [pəŋlihat] meaning *vision*. Furthermore, there is the form [pəŋlipor] as in penglipur lara *comfort, diversion* in the speech of some speakers where others have the regular [pəlipor]. These exceptional forms can be handled by the use of minus and plus rule features in the following rules.

(15) $\begin{bmatrix} \text{pəN} \\ +\ \text{PREFIX} \end{bmatrix} \longrightarrow \begin{bmatrix} -\ \text{rule 13} \\ +\ \text{rule 16} \end{bmatrix} / \text{——} + \begin{bmatrix} \text{STEM} \\ [+\ \text{rule 16}] \end{bmatrix} \begin{bmatrix} -\ \text{syll} \\ -\ \text{nasal} \\ +\ \text{lateral} \end{bmatrix}$

(16) $\begin{bmatrix} -\ \text{syll} \\ +\ \text{nasal} \end{bmatrix} \longrightarrow \begin{bmatrix} -\ \text{ant} \\ -\ \text{cor} \end{bmatrix} / \left[\begin{bmatrix} -\ \text{son} \\ -\ \text{del. rel.} \\ +\ \text{ant} \\ -\ \text{cor} \\ -\ \text{voice} \end{bmatrix} \begin{bmatrix} +\ \text{syll} \\ -\ \text{high} \\ -\ \text{low} \\ +\ \text{back} \\ -\ \text{round} \end{bmatrix} \begin{bmatrix} \text{——} \end{bmatrix} \right.$

$\left. \begin{matrix} +\ \text{PREFIX} \\ -\ \text{rule 13} \\ +\ \text{rule 16} \end{matrix} \right]$

$+ \begin{bmatrix} \text{STEM} \\ [+\ \text{rule 16}] \end{bmatrix} \begin{bmatrix} -\ \text{syll} \\ -\ \text{nasal} \\ +\ \text{lateral} \end{bmatrix}$

Rule 15 states that the final nasal consonant of the prefix /pəN/ does not become homorganic with, or assimilated to, the initial consonant of the stem (that is, has the feature [- rule 13]) if the stem begins with /l/ and has the feature [+ rule 16]. Instead the prefix undergoes rule 16 (that is, acquires the feature [+ rule 16]), which states that /pəN/ is realized as [pəŋ] when followed by stems beginning with /l/ and having the feature [+ rule 16]. The two rules imply that the exceptional behavior of /pəN/ only involves a very limited number of stems beginning with a lateral liquid.

In order to generate the correct forms, in their lexical entries the stems of the words [pəŋlihatan] *sight, perception,* [pəŋlihat] *vision* and [pəŋlipor] *comfort, diversion* are specified [+ rule 16]. The stem of the word [pəlihat] *seer* and that of [pəlipor] *comfort, diversion* (for speakers who have the latter form) do not have the feature [+ rule 16].

5. In conclusion, some remarks must be made regarding the ordering of the rules. As has been demonstrated above, the vast majority of cases involving the two Malay prefixes with a final nasal consonant can be accounted for by a set of four rules, namely rules 8, 13, 7 and 9, in that order. Rule 14, for those speakers that have it, must apply prior to the above set of rules. Since rules 15 and 16 account for exceptions, they also must precede the same set. In other words, the ordering of the rules is: (i) rule 15, (ii) rule 16, (iii) rule 14, (iv) rule 8, (v) rule 13, (vi) rule 7 and (vii) rule 9. Rules (i) - (vii), in addition to the minus rule feature discussed at the end of section 2.3, account for all the changes involving the prefixes /məN/ and /pəN/ in Malay.

NOTES

1. Malay refers here to Standard Malay, that is, the variety of Malay which is used in formal gatherings, on radio and television, and taught in schools in Malaysia and Singapore. For a description of the sounds of Standard Malay, see Maris 1966.

2. The addition of a suffix (in this case /an/) will in no way affect the arguments set forth in this paper.

3. Plus suffix /kan/.

4. The non-lateral liquid /r/ is realized as ϕ in word final position by many speakers in Malaysia and Singapore (Maris 1966: 126 note 1).

5. Plus suffix /kan/.

6. Plus suffix /kan/.

7. The underlying form is /kira/; /a/ is realized as [ə] in certain positions by a rule which is not relevant to the subject of this paper.

8. The final /k/ of this recent borrowing is not realized as [ʔ] as in the following example. See note 9.

9. The underlying form is /gosok/; morpheme final /k/ is realized as [ʔ] by a rule not relevant to the discussion.

10. Plus suffix /an/.

11. Spelled veto. Speakers who have not been exposed to English replace /v/ by /f/.

12. Spelled thabit. Speakers not familiar with Arabic replace /θ/ by /s/. The underlying form is /θabit/; the opposition between /i/ and /e/ is neutralized in closed syllables in morpheme final position where only [e] occurs, except in unassimilated borrowed forms such as [kritik] (see example 5 above).

13. Spelled dharab or dzarab. A foreign sound borrowed from Arabic, /ð/ is replaced with /d/ by some speakers. Since in native Malay words the opposition between voiced and unvoiced for stops (in addition to the fact that there is only one native fricative in Malay: unvoiced /s/) is neutralized in syllabic final position (where only the unvoiced variety occurs), the final /b/ is often replaced by /p/. No affricates occur in syllabic final position.

14. Plus suffix /kan/.

15. Plus suffix /an/.

16. Plus suffix /i/.

17. Plus suffix /kan/. The word is spelled mensyarahkan.

18. Plus suffix /i/. The stem is spelled khianat. Some speakers substitute /k/ for /x/, in which case the form is [meŋkianati].

19. Plus suffix /kan/. For [b] in the stem, see note 13. The stem is spelled ghaib. With many speakers /ɣ/ is replaced by /g/.

20. Spelled mencuri.

21. Spelled menjilat.

22. For the final [ʔ] in the stem, see note 9.

23. See note 7.

24. See note 7.

25. Plus suffix /an/.

26. Plus suffix /kan/. The stem begins with /ʔ/ (the noncontinuant laryngeal glide), which is substituted by Malays for Arabic /ʕ/ (the

voiced pharyngeal fricative). It must, therefore, be represented in the underlying form. In the speech of many speakers any vowel in word initial position is realized with [ʔ] preceding it (Maris 1966: 102 note 1), but in the latter case [ʔ] is non-phonemic and need not be represented in the underlying form.

27. Plus suffix /kan/. For [e] in the stem, see note 12.

28. Plus suffix /kan/. For [ə] in the stem, see note 7.

29. Plus suffix /i/. When preceding suffixes beginning with a vowel, [r] must be pronounced. Cf. note 4.

30. For the final [ə] in the stem, see note 7.

31. For the final [ʔ] in the stem, see note 9.

32. Plus suffix /kan/.

33. Plus suffix /kan/.

34. Plus suffix /kan/.

35. Except for the feature 'vocalic', which has been replaced by 'syllabic'. For a different description of the sounds of Malay in terms of the Jakobsonian distinctive features, see Abas 1971:131.

36. For convenience a sequence of unit symbols is used here to represent the stem morpheme, but it should be kept in mind that all such sequences in this paper should be interpreted as bundles of specified features.

37. As far as I know **pemerhati** *observer* (see column 3 of Table 2) is the only word in Malay in which /pəN/ is followed by /pər/. In Indonesian there is the word **pemersatu** *unifier* (= /pəN/ + /pər/ + **satu** *one*).

38. For the origin of loan words, see Winstedt 1963.

39. The word - and morpheme boundaries (# and + respectively) are eliminated by a general rule which is irrelevant to the discussion.

40. Another example is: /tər/ + /rasə/ *feel* → #tər + rasə # → # tə + rasə # *felt*.

41. The deletion of [r] in the prefix also takes place in such forms as [bəkərǰə] which results from the application of another rule which states that /bər/ is reduced to /bə/ before stems of which the first syllable is of the shape /Cər/ (where C stands for 'consonant'). Since this rule applies to other prefixes ending in /r/ as well, it can be put in the following form:

$$\begin{bmatrix} -\text{ syll} \\ -\text{ nasal} \\ -\text{ lateral} \end{bmatrix} \longrightarrow \phi \;/\; C_i \begin{bmatrix} +\text{ syll} \\ -\text{ high} \\ -\text{ low} \\ +\text{ back} \\ -\text{ round} \end{bmatrix} \text{——} + C_j \begin{bmatrix} +\text{ syll} \\ -\text{ high} \\ -\text{ low} \\ +\text{ back} \\ -\text{ round} \end{bmatrix} \begin{bmatrix} -\text{ syll} \\ -\text{ nasal} \\ -\text{ lateral} \end{bmatrix} C_k$$

The rule accounts for such forms as: /bər/ + /kərǰə/ *work* → # bə + kərǰə # *to work*; /pər/ + /kərǰə/ → # pə + kərǰə # *worker;* /pər/ + /sərtə/ *along with* → # pə + sərtə # *participant*, etc. The addition of C_k in the rule is to prevent it from applying to such stems as /kəras/ *hard*, where /r/ belongs to the second syllable of the stem. The prefixing of /bər/ to /kəras/ results, regularly, in # bər + kəras # *to be obstinate*. The deletion of /r/ expressed by the above rule is due to the fact that in Malay C_iərC_jər is not a preferred syllable sequence.

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