A Comparative Study Of Nasal Final Prefixes In Malay And English

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ABSTRACT

*This paper compares nasal final prefixes in Malay and English. In many languages, nasal and voiceless obstruent clusters are not allowed to emerge in the surface representation. Therefore, the clusters undergo some repair strategies, e.g. nasal assimilation, nasal deletion, nasalisation, nasal substitution, denasalisation and post-nasal voicing. This paper thus intends to investigate how the occurrence of clusters in Malay and English is resolved. Based on the data from previous studies, this paper shows that nasal and voiceless obstruent clusters are not entirely prohibited in Malay, as in /məŋ-komersil/ → [məŋ-*komersil*] ACT.PRF-commercial 'to commercialise', and are allowed to emerge in English as in /un-traditional/ → [un-*traditional*]. The occurrence of nasal and voiceless obstruent clusters in those words is due to the phonological characteristics of English and Malay, i.e. Uniform Exponence and lexical strata respectively. The occurrence of such cases in Malay and English could be explained satisfactorily by adopting a constraint-based theory named Optimality Theory (Prince and Smolensky, 1993). In the analysis, I demonstrated how Uniform Exponence and lexical strata were used to explain the case in hand.*

Keywords: nasal final prefixes; Malay; English; Optimality Theory; nasal and voiceless obstruent clusters

INTRODUCTION

This study compares the morphological process of word formation, i.e. prefixation, in Malay and English. The analysis focuses more on prefixes, which end with a nasal, as they exhibit interesting morpho-phonemic alternations. When a prefix ending in a nasal combines with a voiceless obstruent initial root, it creates a sequence of nasal and voiceless obstruents.

In many languages, nasal and voiceless obstruent clusters are not allowed to emerge in the surface representation. Phonetically, a nasal consonant is produced by lowering the velum in the mouth, allowing air to exit freely through the nose. The change from a nasal consonant to an obstruent causes the velum to be raised and this blocks the airflow from passing through the nose (Kager 1999, p. 61). However, the process of raising the velum takes some time and is not complete at the time when the obstruent begins. At this point, there is still a little air flowing out through the nose because the velum has not been raised high enough. This is called 'nasal leak' (Kager 1999). Thus, the clusters undergo some repair strategies, e.g. nasal assimilation, nasal deletion, nasalisation, nasal substitution, denasalisation and post-nasal voicing.

In some languages, this phonological restriction is fully met, while in other languages it is disobeyed. Hence, this paper discusses why some languages, such as Malay and English, do not obey the phonological restriction and compares the differences and similarities between the two languages.

PREVIOUS STUDIES OF MALAY PREFIXATION

Generally, earlier studies of Malay concerning prefixation applied rule-based analysis. Their discussions focused on the classification of forms and grammatical functions and the meanings of affixes (Hassan 1974, 1987, Omar 1975, 1993, Karim 1995, Onn 1980). In Omar's (1986) description, for example, prefixation in Malay was described according to the meaning conveyed by the prefix, as shown in the following examples:

1. (a) məN- with the meaning of 'become like a... ' (from Omar, 1986: 106).

(i) /məN-abdi/ [məŋabdi]
ACT.PRF-slave
'become like a slave'

(ii) /məN-batu/ [məmbatu]
ACT.PRF-stone
'become like a stone'

(b) məN- with the meaning of 'producing a sound' (from Omar, 1986: 108)

(i) /məN-uak/ [məŋuwak]
ACT.PRF-croak
'to croak'

(ii) /məN-aduh/ [məŋaduh]
ACT.PRF-exclamation of pain
'to groan'

Prefixes which end with nasal consonants, such as /məN-/ and /pəN-/, have some allomorphs and their distribution depends on their phonological characteristics, namely segments (Omar 1986, Hassan 1987, Karim et al. 1989). The nasal segments of those prefixes assimilate to the subsequent initial segments of the following syllable of a root. Each of these prefixes has six variants: [mə], [mən], [məm], [məŋ], [məɲ] and [məŋə]; and [pə], [pən], [pəm], [pəŋ], [pəɲ] and [pəŋə]. Occurrences of these variants depend on the first consonant of the root to which they are attached (Omar 1986, Hassan 1987, Karim et al. 1989). In the process of combining a root to a prefix, an alternation in some segments, at either prefix or root occurs. As claimed by Malay scholars (Hassan 1974, Omar 1986, Hassan 1987, Karim et al. 1989, 1994, Karim 1995, Ahmad 1993) the process of combining a prefix to a root can be summarised as follows:

2.

mə- and pə-	before l, r, m, n, ɲ and ŋ
məm- and pəm-	before p, b, f, v
mən- and pən	before t, d, c, ʤ
məɲ- and pəɲ-	before c, s
məŋ- and pəŋ	before k, g, h, x, **ɣ**, w and vowels
məŋe- and pəŋə	before a monosyllabic base.

It has long been observed that obstruent voiceless consonants, /p, t, k and s/ where three of them i.e. /p, t, k/ are voiceless plosives[i] , in Malay affixation are deleted when the consonants are concatenated with nasal final prefixes, /pəN-/ and /məN-/. Meanwhile, the phonological behaviour of the nasal segments in the prefixes is always homorganic to the following consonant of the root. Let us consider some relevant examples below as cited in Karim et al. (1994).

3. Nasal final prefixes in Malay (from Karim et al., 1994: 147)

a) /məŋ-pukul/ [məmukul]
ACT.PRF-scold 'to scold'

b) /məŋ-tari/ [mənari]
ACT.PRF-dance 'to dance'

c) /məŋ-karaŋ/ ACT.PRF-compose 'to compose'	[məŋaraŋ]
d) /məŋ-sinar/ ACT.PRF-ray 'to ray'	[məɲinar]

From the data above, it is clear that the nasal segment is homorganic with the following voiceless consonant of the root. Thus, the descriptive generalization that is presented by Karim et al. (1994) above can be summarised as: the active prefix /meN-/ becomes [məm], [mən], [məŋ] and [məɲ] when the following consonant is /p/, /t/, /k/ or /s/, respectively. Although the examples given fulfil the descriptive rule, they may not be able to explain the real process of prefixation in Malay, since there is evidence that some voiceless obstruent consonants are not deleted when the combining process occurs. Thus, this phenomenon of undeleted voiceless obstruents, as claimed by scholars in many cases, has been retained. Most of them resort to the same solution, which is to treat the phenomenon as somehow exceptional.

PREVIOUS STUDIES OF ENGLISH PREFIXATION

There have been numerous studies concerned with nasal final prefixes in English, e.g. Chomsky and Halle (1968), Kiparsky (1982), Browsky (1986), Kang (1998) and many others. Previously, English nasal final prefixes were widely discussed under conventional underlying representation (Borowsky 1986) and lexical strata in phonology and morphology (Kiparsky 1982). However, none of those studies provides a satisfactory analysis (Kang 1998).

When previous scholars have applied lexical phonology and morphology approach (Siegel 1974, Kiparsky 1982), the analysis of nasal final prefixes has been explained as assimilation of final nasal and the occurrence of degemination in level 1. These two phonological processes do not occur in level 2. The following are relevant examples, which are claimed to be in level 1:

4.

1)	a.	in + duce	i[n]duce
	b.	in + probable	i[m]probable
	c.	in + crease	i[ŋ]crease
2)	a.	in + radiant	i[ ]radiant → irradiant
	b.	in + legible	i[ ]legible → illegible
	c.	in + mature	i[ ]mature → immature
	d.	in + numerable	i[ ]numerable → innumerable

As we can see in the above examples, 4(1) is the place where the phonological process of nasal assimilation occurs, i.e. in level 1. As we can see from the data, the nasal segment in the prefix /in+/ assimilates to the place of articulation with the following consonant. For example, the nasal segment /in+/ assimilates to the place of articulation, i.e. bilabial with the initial consonant of the base. The prefix /in+/ is realised as [im] when it is attached to a word which begins with /p/ as in 'probable'. As well as nasal assimilation, level 1 is also the place where degemination occurs.

In level 2, on the other hand, there is neither nasal assimilation nor degemination, as occurs in level 1. As we can see in the following examples, the prefix /un+/ remains as [un]. No alternation segment occurs when /un+/ is attached to any type of base. In other words, the nasal segment in the prefix /un+/ does not have to assimilate to the place of articulation with the consonant it follows. For example, the alveolar nasal in /un+/ does not alternate to a velar nasal [uŋ] when it is attached to a base which begins with a velar consonant [g], as in

/un+governable/ → [ungovernable], and not *[uŋgovernable]. Let us observe other examples of this:

5.

a.	un+traditional	u[n]traditional
	un+bind	u[n]bind
	un+governable	u[n]governable
b.	un+retractable	u[n]retractable
	un+manageable	u[n]manageable
	un+natural	u[n]natural

According to Kang (1998), the lexical phonology and morphology analysis proposed above seems appropriate to account for the data presented in (4) and (5). But if we take a closer look, the analysis poses a problem when accounting for another nasal final prefix in English, i.e. /en-/. Before we discuss what the problem is, let us first consider the following data for nasal final prefix /en-/

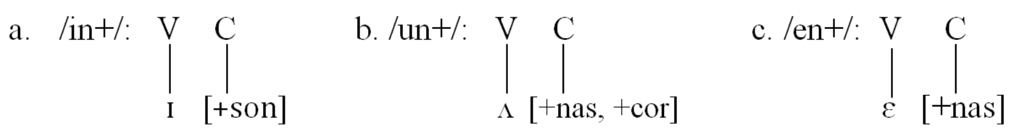
6.

a.	en+tangle	e[n]tangle
	en+broil	e[m]broil
	en+glacial	e[ŋ]glacial
b.	en+rich	e[n]rich
	en+lighten	e[n]lighten
	en+mesh	e[n]mesh
	en+noble	e[n]noble

As shown in the data above, the nasal segment in the prefix /en+/ undergoes assimilation as well, as in (4) whereby the nasal segment is homorganic to the following obstruent. It is observed that, when a nasal segment is followed by a sonorant, the assimilation and degemination as presented in (4) do not occur in this case. In other words, the two phonological processes are only applied to an obstruent following a nasal segment, and not to a sonorant. A question that arises here is at what level are those two phonological processes supposed to be, in level 1 or level 2? As proposed by previous scholars, assimilation and degemination are placed in level 1, where the prefix /in+/ is. This means that the prefix /en+/ should also be in level 1, as level 2 is not the place where those phonological processes occur. If this is the case, the analysis would have difficulty in accounting for the data in 6(b), as the sonorant following the nasal segment does not undergo total assimilation and degemination.

To overcome this problem, Borowsky (1986) proposed a different analysis, which is not related to the level ordering that Siegel (1974), Kiparsky (1982) and others have done. Borowsky claims that those prefixes, /in+/, /un+/ and /en+/, have three different underlying representations, as illustrated below:

7.



Borowsky’s analysis however poses a number of problems, particularly with relation to the theoretical matters. First, according to Kang (1998), Borowsky (1998) has to posit the three different underlying representations to represent one. Besides that, Kang states that the same phoneme /n/ in the analysis is unconvincing. The analysis done by Borowsky thus cannot adequately explain the three final nasal prefixes in English.

This comparative study on Malay and English nasal final prefixes is based on secondary data from previous studies. In order to analyse nasal final prefixes in both Malay and English, data from Syed Jaafar (2010) and Kang (1998) are used, respectively.

THEORETICAL FRAMEWORK: OPTIMALITY THEORY

Optimality theory (henceforth OT) was put forward by Prince and Smolensky (1993) as a general approach to modelling human linguistic knowledge (Prince and Smolensky 2004, McCarthy 2008). There are five basic tenets of OT, which can be summarized as follows (McCarthy & Prince 1994, p. 335):

Five basic tenets of OT

1)	Universality	UG provides a set of constraints that are both universal and universally present in all grammars.
2)	Violability	Constraints are violable, but only minimally so.
3)	Ranking	The constraint of Con is ranked on a language-particular basis. The notion of minimal violation is defined in terms of this ranking. A grammar is a ranking of the constraint set.
4)	Inclusiveness	The constraints hierarchy evaluates a set of candidates that are admitted by very general considerations of structural well-formedness.
5)	Parallelism	The best satisfaction of the constraints hierarchy is calculated over the whole hierarchy and the whole candidate set. There is no serial derivation.

In OT, the actual output of the underlying form is selected from a large set of potential surface forms called candidates. The selection of candidates is based on well-formedness constraint-system evaluation. As stated in McCarthy and Prince (1993, 1994), the representational structure of a grammar in OT can be summarised as follows:

GEN (in) = {cand 1, cand 2, … .}
EVAL ({cand 1, cand 2, … .})

The function of GEN (short for generator), is to generate a large set of possible candidates (surface representation) from each input (underlying representation). The function of EVAL (short for evaluator) is to evaluate the well-formedness of the possible candidates generated. The candidate which best satisfies, or minimally violates, the constraints in a hierarchy is termed the optimal or most harmonic output, and constitutes the actual surface form in the language.

Disagreement between [cand.1] and [cand.2] in the constraint hierarchy is resolved by ranking the constraints in a strict dominance hierarchy (Prince and Smolensky, 1993). For example, [cand1] satisfies A and violates B, while [cand2] satisfies B and violates A. Since [cand1] is, by assumption, the actual output, this suggests that constraint A must dominate B in the hierarchy of the language grammar. In OT, the constraint ranking is represented in the form of a constraint tableau, as illustrated in (8). There are some useful conventions to be found in the constraint tableau. Constraints in OT are represented from left to right, where the leftmost side is the highest-ranking constraint. Potential candidates are listed in vertical order. Violation of a constraint is marked by ‘*’, while constraint satisfaction is unmarked. The violation of a constraint which is accompanied by an exclamation mark, ‘!’, indicates a fatal violation. The optimal output is shown by a pointing finger ‘‘☞’’.

8. /Input/ → [cand1], A >> B

/Input/	A	B
a. ‘☞’ [cand1]		*
b. [cand2]	*!	

In the above tableau, the suboptimal candidate (b) is ruled out as it fatally violates A. Candidate (a), which violates the lower-ranking constraint B, is the optimal output. The violation of B, however, is not significant since the winner has already been determined. In OT, the remaining lower-ranking constraint becomes irrelevant once a winner emerges. The violation of constraints after that does not affect its grammaticality.

In (9), both candidates satisfy the highest-ranking constraint equally in the tableau. The satisfaction of constraint A cannot contribute to a decision to determine the winner between them. In this situation, the decision is made by consulting the next constraint, B. Since candidate (b) violates B, then candidate (a) emerges as the optimal output as this candidate does not violate B.

9.

/Input/	A	B
a‘☞’[cand1]		
b. [cand2]		*!

Besides the ways illustrated in (8) and (9), there are other ways in which candidates can interact, particularly when they are in a tie situation. In such a situation, where both candidates pass or fail the highest-ranked constraint equally, the next constraint in the hierarchy can help to facilitate continuity of the evaluation.

10.

/Input/	A	B
a. ‘☞’ [cand1]	*	
b. [cand2]	*	*!

In (10), where the violation of A by both candidates cannot determine the optimal output, the evaluation passes to the next constraint, B. Candidate 10(b) violates B while candidate 10(a) does not, thus candidate 10(a) is the optimal output.

The above tableau shows a single violation of one candidate. Next, it can be seen that, as well as a single violation, multiple violations of a candidate are likely to occur in a grammar and this situation must also be considered. The following tableau shows how multiple violations are represented.

11. Multiple violations: A >> B

/Input/	A	B
a.‘☞’ [cand1]		*
b. [cand2]		**!*

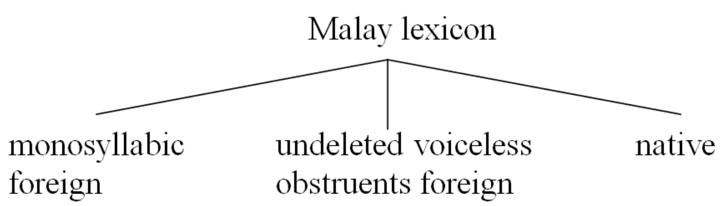
In OT, if a constraint is violated or satisfied equally by two candidates or more, the evaluation continues by consulting the next constraint in the hierarchy. As in the above tableau, both candidates, (a) and (b), satisfy A. The evaluation goes next to B to determine the optimal output. In the above, it can be seen that both candidates violate B. However, the candidates violate B unequally, as candidate (a) violates B less than candidate (b). Therefore, candidate (a) is more harmonic than candidate (b), according to the evaluation of minimal violation, thus candidate (a) is the optimal output. As noted in McCarthy and Prince (1993, p. 88), constraint violations are not counted, but are merely a comparison of more versus less, thus it is a matter of ordering and not quantifying (Prince & Smolensky 1993).

DISCUSSION

MALAY NASAL FINAL PREFIXES

Malay is one of the languages that disfavour nasal and voiceless obstruent clusters in the surface representation. As has been widely claimed by previous Malay scholars (Hassan 1974, Omar 1986, Karim et al. 1994, Karim 1995), nasal substitution is therefore applied to break up the clusters. Syed Jaafar (2010), however, argues that nasal substitution is not entirely applied in the language to avoid clusters. Based on corpus data obtained from the DBP-UKM (Dewan Bahasa dan Pustaka – Universiti Kebangsaan Malaysia) database, she claims that Malay has two subsystems: (1) allowing nasal and voiceless obstruent clusters which occur in native words, and (2) disallowing nasal and voiceless obstruent clusters, as occurs in non-native words. Observations from the data show that nasal substitution, which is claimed by previous Malay scholars as the regular process in Malay, only applies when the roots are native words. In contrast, nasal substitution is blocked when the roots are non-native words. This phenomenon of nasal substitution, which occurs in Malay nasal final prefixes, has been resolved by partitioning the Malay lexicon into three different strata: (1) monosyllabic foreign, (2) undeleted foreign and (3) native, as shown below:

FIGURE 1. The three strata of Malay lexicon (Syed Jaafar 2010).



In what follows, we are going to discuss the process whereby nasal final prefixes attach to the three lexical strata in Malay, i.e. monosyllabic foreign, undeleted foreign and native, as illustrated above. The discussion begins with monosyllabic foreign, followed by undeleted foreign, and ends with native. We will see then that each lexical stratum proposed above has its own constraint ranking.

MONOSYLLABIC, FOREIGN

Before we proceed with the discussion, let us observe the following examples.

12. Data for Malay monosyllabic foreign lexicon (from Syed Jaafar, 2010)

a) məŋ-ə-**cam**
ACT.PRF-STEMEX-recognise
'to recognise'

(b) məŋ-ə-**cap**
ACT.PRF-STEMEX-stamp
'to stamp'

c) məŋ-ə-**sah**
ACT.PRF-STEMEX-validate
'to validate'

d) məŋ-ə-**kod**
ACT.PRF-STEMEX-code
'to code'

e)	məŋ-ə-**bom** ACT.PRF-STEMEX-bomb ‘to bomb’	**f)**	pəŋ-ə-**bom**-an ACT.PRF-STEMEX-bomb-NOM.SUF ‘bombing’

The descriptive generalisations can be summarised as follows: (1) two prefixes end with nasal segments, i.e. /məŋ+/ and /pəŋ+/, which can be attached to monosyllabic roots, (2) schwa is epenthesized between monosyllabic roots and the nasal final prefixes, /məŋ+/ and /pəŋ+/, (3) the nasal segment in the prefix then alternates to a velar nasal [ŋ] after the process of epenthesis occurs.

As we see in the above examples, by no means is schwa epenthesized between the nasal segment and the voiceless obstruent initial root to break up the clusters. The following uniform constraint ranking optimizes the schwa epenthesis output as the optimal candidate:[ii]

13. PROSODIC STEM >> NAS ASSIMILATION, *NC̥ >> UNIFORMITY >> DEP-IO

/məŋ$_1$+p$_2$am/	PrStem	NAS ASS	*NC̥	UNI	DEP-IO
a. məm$_{12}$am				*!	
b. məm$_1$p$_2$am			*!		
c. məŋ$_1$p$_2$am		*!			
d.‘☞’mə.ŋ$_1$ə.p$_2$am					*

UNDELETED VOICELESS OBSTRUENTS, FOREIGN

To begin with, I lay out some relevant examples illustrating how nasal and voiceless obstruent clusters surface in this stratum. It is observed that the data below are grouped into two, i.e. borrowed phonemes and consonant cluster initial roots.

14.

(a) Borrowed phonemes

i)	/məŋ-ʃarat-kan/ ACT.PRF-condition-CAUS.SUF ‘to cause to condition for’	[mən-ʃarat-kan]
ii)	/məŋ-fokus/ ACT.PRF-focus ‘to focus’	[məm-fokus]
v)	/məŋ-fasakh/ ACT.PRF-divorce ‘to annul a marriage’	[məm-fasakh]
vi)	/məŋ-ʃukur-i/ ACT.PRF-gratitude-LOC.SUF ‘to cause to be grateful’	[mən-ʃukur-i]
vii)	/məŋ-xatan/ ACT.PRF-circumcision ‘to circumcise’	[məŋ-xatan]

(b) Consonant cluster initial root

i)	/məŋ-promosi/ ACT.PRF-promotion ‘to promote’	[məm-promosi]
ii)	/məŋ-kritik/ ACT.PRF-critic ‘to criticise’	[məŋ-kritik]
iii)	/məŋ-protes/ ACT.PRF-protest ‘to protest’	[məm-protes]
iv)	/məŋ-proses/ ACT.PRF-process ‘to process’	[məm-proses]
v)	/məŋ-transformasi/ ACT.PRF-transformation ‘to transform’	[mən-transformasi]

The descriptive generalisations, that are observed in the above examples, can be summarised as follows: (1) the voiceless obstruents remain undeleted although nasal segments precede them; (2) the nasal segments in the prefixes are homorganic to the following initial consonants of the roots.

Why are the two groups of data said to be foreign words? The first group is called borrowed phonemes because the initial consonants of the roots were originally borrowed consonants. Malay has 16 underlying consonants: /p, b, t, d, k, g, ʧ, ʤ, s, h, m, n, ɲ, ŋ, l and r/, and six vowels: /i, u, e, o, ə and a/ (Ahmad, 2005: 16). As far as the underlying consonants are concerned, it is apparent that every word in 14(a) consists of non-underlying Malay consonants. For example, consonants /f/, /ʃ/ and /x/, in 14 a(ii), (vi) and (vii) respectively, are not underlying Malay consonants. Thus they are all borrowed words.

The data in the second group, i.e. consonant clusters, are also borrowed words. Malay disfavours consonant clusters in its surface representation. As we see, the roots contain more than one segment, i.e. consonant clusters *[CCV.], in the onset position. In earlier studies of Malay phonology, such as Hassan (1974), Maris (1980) and Onn (1980), they discussed the basic syllable structure of Malay as being (C)V(C). The roots do not however undergo any phonological process, i.e. vowel epenthesis or consonant deletion, to break up the clusters. The data in (14) present a different phonological pattern of non-native words in the language compared to the monosyllabic foreign. The hierarchical ranking for this type of data is therefore different from the sublexicon of monosyllabic foreign. The new constraint ranking to account for the sublexicon of undeleted foreign is: PrStem >> NAS ASS >> DEP-IO >> UNIFORMITY>> *NÇ̥, as demonstrated in the following tableau:

15.

/məŋ$_1$+p$_2$roses/	PrStem	NAS ASS	DEP-IO	UNIFORMITY	*NÇ̥
a. məm$_{12}$ro.ses				*!	
b‘☞’məm$_1$p$_2$roses					*
c. məŋ$_1$p$_2$roses		*!			
d. məŋ$_1$əp$_2$roses			*!		
/məŋ$_1$+t$_2$auhid/					
e. mən$_{12}$auhid				*!	
f. ‘☞’mən$_1$t$_2$auhid					*
g. məŋ$_1$t$_2$auhid		*!			
h. məŋ$_1$ət$_2$auhid			*!		

NATIVE

In this section, the relevant examples of the native sub-lexicon are considered. As the language disfavours nasal and voiceless obstruent clusters emerging in the surface representation, so the clusters have regularly been resolved by nasal substitution, as presented in the data below:

16.

(a) **Nasal and voiceless obstruent clusters**

(i)	/məŋ-temu-i/ ACT.PRF-meet-LOC.SUF ‘to cause to meet’	[mə-nemui]
(ii)	/məŋ-potong/ ACT.PRF-cut ‘to cut’	[mə-motoŋ]
(iii)	/məŋ-kuat-kan/ ACT.PRF-strong-CAUS.SUF ‘to cause to strengthen for’	[mə-ŋuwat-kan]

(iv)	/pəŋ-pindah-an/ NOM.PRF-migrate-NOM.SUF 'migration'	[pə-mindah-an]
(v)	/məŋ-kunjuŋ-i/ ACT.PRF-visit-LOC.SUF 'to cause to visit'	[mə-ŋundʒung-i]

I now establish the following tableau to analyse the above data for native. Observe that the markedness constraint, *NÇ̥, is ranked above the faithfulness constraint UNIFORMITY: *NÇ̥ >> UNIFORMITY. This schema ranking rules out candidates with a sequence of nasal and voiceless obstruents.

/məŋ$_1$+t$_2$olaʔ/	PrStem	NAS ASS	*NÇ̥	DEP-IO	UNIFORMITY
a. '☞' mən$_{12}$olaʔ					*
b. mən$_1$t$_2$olaʔ			*!		
c. məŋ$_1$t$_2$olaʔ		*!			
d. məŋ$_1$ət$_2$olaʔ				*!	

ENGLISH NASAL FINAL PREFIXES

We now come to discuss how the process of nasal final prefixes, i.e. /in+/, /un+/ and /en+/, functions in English. The discussion of those prefixes is based on Kang's analysis. Kang (1998) analysed the three nasal final prefixes, /in+/, /un+/ and /en+/, by employing the theoretical framework of Optimality Theory. In the analysis, he claims that the constraint named UNIFORM EXPONENCE (henceforth UE) plays a crucial role in accounting for the prefixes. This constraint can formally be defined as follows:

17. UNIFORM EXPONENCE (Kenstowicz 1995)
    Minimise the differences in the realisation of a lexical item (morpheme, stem, affix, word)

The above constraint requires that a lexical item must be uniformly realised in the output. According to Kang, different effects are derived depending on where UE is ranked in the constraint ranking.

To account for the prefix /in+/, Kang considered three more relevant constraints. The constraints are: Nasal^{Place}, IDENT-IO (Place) and MAX-IO. These three constraints are defined as follows:

18. Nasal^{Place}
    Nasals must share place features with the following consonants.

19. IDENT-IO (Place)
    Correspondents segments have identical values for the feature Place.

20. MAX-IO (McCarthy and Prince, 1995)
    Segment of the input has a correspondent in the output.

Putting all four constraints together, I present the following tableau, as established by Kang (1998), to analyse the prefix /in+/:

21.

/in+press/	$Nasal^{Place}$	MAX-IO	UE-/in+/	IDENT-IO (Place)
a. inpress	*!			
b. ☞impress			*	
c. ipress		*!		

The above tableau shows that candidate (b) is the optimal output for the given constraint ranking. Candidate (b) violates the UE constraint as the prefix /in+/ becomes [im]. The violation of UE however is not significant as the other two candidates, (a) and (c), have already been ruled out. Since all the lexical items in candidate (a) have no differences from the input, they do not violate UE, but this candidate however violates the highest constraint, $Nasal^{Place}$, as the nasal segment [n] in the prefix does not have the same place of articulation with the following consonant. Candidate (a) is thus ruled out. The deletion of the nasal segment in the prefix causes candidate (c) to violate the faithfulness constraint, MAX-IO. The remaining candidate, i.e. (b), is therefore chosen as the optimal output.

To account for the prefix /in+/ with sonorant initial bases, Kang established the following tableau with two new constraints, i.e. *[+nas][+son], and NoGeminate constraints were added to the ranking:

22.

/in+reverent/	*[+nas][+son]	NoGeminate	MAX-IO	UE-/in/
a. inreverent	*!			
b. ☞ireverent			*	
c. irreverent		*!		

In contrast to the analysis above, the faithfulness constraint UE for prefix /un+/ is highly ranked in the ranking to ensure that the output derived must be the same as in the input. In the following tableau, UE-/un/ is ranked higher in the ranking, because any words combine with the prefix /un+/, and so the prefix surfaces as [un] consistently. To see how it plays its role in the ranking, let us observe the following tableau:

23.

/un+bind/	UE-/un/	$Nasal^{Place}$	*[+nas][+son]	NoGem	MAX-IO	UE-/in/	IDENT-IO(Place)
a. ☞unbind		*					
b. umbind	*!						*
/un+retractable/							
a. ☞unretractable			*				
b. uretractable	*!				*		
c. urretractable	*!			*			*

Now we see how prefix /en+/ is analysed in the constraint ranking.

24.

/en+broil/	UE-/un/	$Nasal^{Place}$	UE-/en/	*[+nas][+son]	NoGem	MAX-IO	UE-/in/	IDENT-IO(Place)
a. ☞embroil			*					*
b. enbroil		*!						
/un+rich/								
a. ☞enrich				*				
b. erich			*!			*		
c. errich			*!		*			

A COMPARATIVE ANALYSIS OF MALAY AND ENGLISH

The above discussion presents the analyses of Malay and English nasal final prefixes done by Syed Jaafar (2010) and Kang (1998), respectively. We are now going to compare nasal final prefixes in the two languages, i.e. in what sense they are similar to and differ from each other.

The process of nasal final prefixes in Malay is somewhat different from the one in English as Malay is a language that disfavours nasal and voiceless obstruent clusters emerging in the surface representation. The clusters therefore undergo some repair strategies such as nasal substitution, vowel epenthesis and nasal assimilation. As was presented, these strategies depend much on which strata the words are grouped in. If the words are grouped in native, the strategy is nasal substitution. Vowel epenthesis is applied as the strategy to avoid the clusters if the words are grouped in monosyllabic foreign. Nasal assimilation would be the strategy for words in the undeleted voiceless obstruent foreign group. Obedience to the phonological requirement, i.e. no nasal and voiceless obstruent clusters in the surface representation, fully depends on where the markedness constraint *NÇ̥ is ranked in the hierarchy. As Malay disfavours the occurrence of nasal and voiceless obstruent clusters, *NÇ̥ is ranked higher in the ranking of native words are to ensure no nasal and voiceless obstruent clusters in the output.

Similar to Malay, the optimal output derived from English nasal final prefixes also depends on a constraint, which plays a significant role in the hierarchy. In Malay, the crucial constraint is *NÇ̥, a markedness constraint. In contrast to Malay, a faithfulness constraint, Uniform Exponence (UE), is the important constraint. It also depends on where the faithfulness constraint is ranked. If UE is ranked higher in the ranking, then the output must be as faithful as possible to the input. As was presented in tableau (24), UE-/en/ is ranked higher in the ranking. Candidate (a) is therefore chosen as the optimal output as it obeys UE-/en/, whereas candidates (b) and (c) violate UE-/en/ since they are not faithful to the input /en+rich/. Besides the selection of the output depending greatly on a particular constraint, both languages have proposed pretty much the same analysis to solve the case that involves prefix-final nasal. As was discussed above, several constraint rankings have been proposed in both Malay and English. The consequence of how the constraints are ranked affects the output derived. Apart from that, the phonological system of English is the same as that of Malay, whereby a nasal segment occupying the coda position of a syllable must be homorganic to the following consonant, which occupies the onset position of the syllable. In

Malay, a nasal segment in the coda position of a syllable is always homorganic to the following consonant, e.g. /məŋ+proses/ → [mə**mp**roses] and /məŋ+tauhid/ → [mə**nt**auhid]. The homorganic nasal occurs in English, e.g. /en+broil/ → [e**mb**roil], /in+press/ → [i**mp**ress] and /in+duce/ → [i**nd**uce]. This phonological requirement is however not fully obeyed in English nasal final prefixes, as there are words in which the nasal segment in prefixes does not assimilate to the place of articulation with the following consonant. This can be seen in words like /un+governable/ → [u**ng**overnable] → *[uŋgovernable], /un+manageable/ → [u**nm**anageable] → *[ummanageable], and /un+bind/ → [u**nb**ind] → *[umbind].

Besides the similarities mentioned above, there are differences between the two languages. In Malay, output is derived from the difference in constraint rankings in which the roots are categorised, according to the etymology of words. To put it in another way, words are categorised in a particular group according to their being native or non-native words. As proposed in the lexical strata analysis, each stratum has different constraint rankings, i.e. the lexical strata have a set of the same constraints but they are differently ranked. The difference in constraint rankings is due to the words, i.e. native vs. non-native, thus they cannot have the same phonological processes as imposed on native words. In contrast to Malay, the output for nasal final prefixes in English is derived from one constraint ranking only, with the same set of constraints. What makes the difference in the analysis of English is the constraint, i.e. UE has three different versions. Each prefix has its own version of UE, i.e. UE-/in/, UE-/un/ and UE-/en/. The output of prefixes is determined by the ranking where the versions of UE are ranked in the hierarchy. Besides, the process of prefixation to nasal final prefixes in English reveals that the language does permit nasal and voiceless obstruent clusters to emerge in the surface representation. The language does not impose a strict requirement on the phonological requirement, i.e. nasal and voiceless obstruent clusters are not allowed to surface for phonetic and phonological reasons. Therefore, we see such output as /un+traditional/ → [untraditional], /en+tangle/ → [entangle] and /in+probable/ → [improbable] in English.

CONCLUSION

The discussion above presents a comparative study of nasal final prefixes in Malay and English. It is apparent that neither Malay nor English strictly obeys a phonological requirement, i.e. no nasal or voiceless obstruent clusters in the surface representation. As presented above, the occurrence of clusters is due to obedience to the Uniform Exponence constraint, as highlighted in English; meanwhile in Malay, the phonological requirement not to have a sequence of nasal and voiceless obstruents in the surface representation is determined by which strata words belong to.

FOOTNOTES

1 English also has the same voiceless plosives like Malay i.e. /p, t, k/ (Shahidi & Rahim 2011: 24)
2 See Syed Jaafar (2010) for a detailed discussion of the constraints used in the analysis.

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