There are no "Glides" in Malay: An Optimality Theoretic Account

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1.0 Introduction

As is well-known, the sonority hierarchy plays a major role in determining the nucleus and margins of the syllable. Vowels are more sonorous than consonants, and therefore they make more harmonic nuclei and less harmonic margins. Within the vowels, the high vocoids are less sonorous than the non-high ones. Thus, in accordance with the Sonority Sequencing Generalisation[1] (or *Sonority Sequencing Principle*) (Selkirk 1984:116), the high vowels can qualify as margins in the pre-, post- and intervocalic environments.

In the literature, high vowels occurring in the margins are commonly referred to as 'glides', and generally being classified as [-syllabic, -consonantal] segments in SPE (Chomsky & Halle 1968). There are however strong objections against the use of the SPE feature [± syllabic] for representing syllabicity. Syllabicity alternations have been examined in numerous languages, and for the most part appear to be predictable and non-distinctive (Blevins 1995:221). Syllabicity has been established to be a consequence of both segmental substance and relational adjacency. Thus, most phonological theories accept that syllable structures are not present in the lexicon, and are generated in the course of phonological derivation. In compliance with this assumption, a specification [± syllabic] becomes meaningless and therefore should be discarded. An obvious consequence of the ban on [± syllabic] is that there is no such thing as 'glides', if by 'glide' is meant a [-syllabic] high vowel (Roca 1997).

In the spirit of Roca (1997), I crucially claim that there are no such segments as 'glides' in Malay, as there are no phonological grounds for establishing them. This contradicts

the previous view about 'glides', which are regarded as members of the underlying inventory of contrasting phonological segments in the language (Abdullah 1974, Yunus 1980, Farid 1980, Teoh 1994)[2]. I suggest that there is no difference in phonological substance between 'glides' and high vowels, the distinction between the two arising exclusively from their respective syllabification.

In this paper, I attempt to show that the emergence of the so-called 'glides' in Malay is due to the syllabification of high vowels in the syllable margins. The present analysis is couched in the constraint-based approach of Optimality Theory (henceforth OT) (Prince & Smolensky 1993, McCarthy & Prince 1993a).

This paper is organised as follows. Section 2.0 displays some relevant examples illustrating surface syllabification of high vowels. Section 3.0 offers an OT account on the emergence of the so-called 'glides'.

2.0 Data: Surface Syllabification of High Vowels

For the purposes of this paper, I primarily examine syllabification of high vowels within morphemes[3]. To begin with, I lay out some of relevant examples illustrating surface syllabification of high vowels in three different positions, namely prevocalic, intervocalic and postvocalic, as listed in (1) below. For convenience, the occurrence of high vowels /i, u/ in margin positions is conventionally transcribed as [y, w].

1. Surface syllabification of high vowels morpheme-internally[4]
   a. Prevocalic position - .HV(C).

[wa.ɲi̯.]	'fragrance'
[ya.ken.]	'to convince'
[yu.ran.]	'fee'
[waŋ.]	'money'
[kah.wen.]	'to marry'
[daʔ.wat.]	'ink'
[kas.wi.]	'a kind of cake'

b. Intervocalic position - CV.HV(C).

(i)	[le.wat.]	'late'
	[la.wan.]	'enemy'
	[wa.yaŋ.]	'movie'
	[la.yu.]	'to wither'
	[ku.yu.]	'half closed eye'
	[se.wə.]	'rent'
(ii)	[bu.wah.]	'fruit'
	[ku.weh.]	'cake'
	[si.yap.]	'complete'
	[ku.wi.n̄i.]	'a kind of mango'
	[pi.yu.taŋ.]	'loan'
	[bi.ya.sə.]	'usual'
	[mə̃ŋ.ku.waŋ.]	'screw-pine'

c. Postvocalic position - CVH.

[pi.saw.]	'knife'
[gu.raw.]	'to joke'
[pa.kay.]	'to wear'
[pan.day.]	'clever'
[sə.poj.]	'blowing softly'
[do.doy.]	'lullaby'
[taw.lan.]	'friend, comrade'
[hay.ran.]	'surprised, wonderment'

The descriptive generalisations that are observed in (1) can be summarised as follows: (i) in morphemes with sequences of three vowels, the intervocalic high vowel is always parsed in the onset (1b) and (ii) in morphemes with sequences of two vowels, the high vowel is parsed tautosyllabically either in the coda (1c) or in the onset (1a), depending on whether it occurs in postvocalic or prevocalic position.

3.0 The Syllabification of High Vowels

It is apparent that heterosyllabic parsing of vowel sequences within a morpheme is disfavoured in the language. Underlying clusters with prevocalic, postvocalic and intervocalic high vowels cannot be syllabified heterosyllabically. For instance, underlying /HV, /VH/ or /VHV/ (i.e. V stands for vowel and H for high vowel) cannot be parsed as [H.V], [V.H] or [V.H.V]. The optimal way of resolving a hiatus is by syllabification that is by parsing the high vowels in the margin.

Within the OT framework, the process of syllabification is a matter of choosing the optimal output from among the possible analyses rather than algorithmic structure building (Prince & Smolensky 1993:15). Syllable structure is generated under Optimality Theory in the same way as any other grammatical property by the function GEN, which produces a set of candidates with various possibilities of syllable parsing from each unsyllabified input. These possible candidates are then evaluated in parallel by the function EVAL based on a language particular constraint hierarchy. As expected, a candidate that minimally violates the constraints in the hierarchy is termed optimal and pronounced as the true output.

The process of syllabification is primarily an interaction of the faithfulness constraints and the syllable structure constraints. The relevant formal constraints that belong to these two families are as follows:

2. Faithfulness constraints (McCarthy & Prince 1995)

   MAX-IO - every segment in the input must have a correspondent in the output

   DEP-IO - every segment in the output must have a correspondent in the input

3. Syllable structure constraints (Prince & Smolensky 1993)

   ONSET - Syllables must have onsets

*COMPLEX - No more than one segment may associate to any one syllabic constituent (i.e onset, nucleus, coda)
*M/V - Vowels may not associate to margin nodes (onset and coda)

The prohibition of heterosyllabic parsing of vowel sequences suggests that Malay generally requires that every surface syllable must have an onset. This implies that ONSET is highly ranked in this language. For the case under discussion, the optimal way of avoiding ONSET violation is by parsing the high vowels to the margins. We shall examine each of these syllable parsing in turn, and, for convenience, we begin with the postvocalic distribution, followed by the intervocalic and the prevocalic environments.

3.1 Postvocalic High Vowel: Tautosyllabic Parsing in the Coda

As shown in (1c), a postvocalic high vowel is parsed tautosyllabically in the coda, giving rise to a falling diphthong. It has long been claimed that Malay has three diphthongs, namely /ai/, /au/ and /oi/ (Za'ba 1964, Abdullah 1974, Asmah 1975, Yunus 1980, Farid 1980, Nik Safiah 1989).

As mentioned, underlying vowel sequences within morphemes cannot be parsed heterosyllabically, since it yields an onsetless syllable, an instance violation of ONSET. Generally, in order to eschew the ONSET violation, the hiatus can be resolved by two common strategies, namely underparsing (i.e. V-deletion) and overparsing (i.e. C-epenthesis).

Overparsing is visibly active in Malay, in particular at the affix boundaries (i.e. /di+asah/ → [diʔasah] 'to sharpen (passive)', /mula+i/ → [mulaʔi] 'to begin'). An epenthetic glottal stop emerges as a hiatus breaker in those environments. The satisfaction of ONSET by overparsing compels a violation of DEP-IO which militates against segmental epenthesis. The

crucial ranking that can be established here is that DEP-IO must be dominated by ONSET.

Underparsing is a mirror image of overparsing which involves segmental deletion of underlying forms. The consequence of underparsing is a violation of MAX-IO which requires that all the input segments must appear on the surface. Given the facts of Malay, MAX-IO is unviolated, therefore undominated in the constraint hierarchy.

Although Glottal Epenthesis is visibly active in the language, it is not permitted within the root domain. In this particular case, the most harmonic way of avoiding the ONSET violation is by parsing the postvocalic high vowel tautosyllabically with the preceding vowel, and a falling diphthong surfaces. This option survives MAX-IO, ONSET and DEP-IO, at the expense of violating the syllable structure constraint *M/V which prohibits vowels be associated to margin nodes (onset and coda).

It is apparent that not any vowel in Malay can be parsed in the syllable margin, but only the high vowels. This behaviour is quite common cross-linguistically. Under the OT framework, this generalisation is captured by a set of micro constraints of *M/V family which are determined by the sonority hierarchy such as *M/i,u , *M/e,o , *M/a and *M/ə (cf. Prince& Smolensky 1993, Kenstowicz 1994c). These constraints are distinct, therefore separately rankable in the hierarchy.

I crucially assume that the sonority hierarchy in Malay does not distinguish between mid and low vowels (cf. Selkirk 1984). Hence, the only distinction is that the high vowels are less sonorous than the non-high ones. Thus, the relevant constraints at play here are *M/H and *M/NH, as formally defined below.

4. a. *M/H - High vowels may not associate to Margin nodes (Onset and Coda).
   b. *M/NH - Non-high vowels may not associate to Margin nodes (Onset and Coda).

Unlike *M/H, the syllable structure constraint *M/NH is unviolated, therefore undominated in the constraint hierarchy. In order for tautosyllabification to be optimal, *M/H must be ranked below DEP-IO in the hierarchy.

Another possible alternative that must be considered is by parsing both vowels in the nucleus, creating clusters in that syllabic constituent. This vacuously satisfies *M/H, since the vowel does not occur in the margin node. This satisfaction of *M/H, however, compels a serious violation of the syllable structure constraint, *COMPLEX, which disallows the association of more than one segment to any one syllabic constituent (i.e. onset, nucleus, coda). Similarly to MAX-IO, *COMPLEX is an unviolated constraint, therefore cannot be dominated in the ranking hierarchy. Putting all the constraints together, the relevant ranking that can be established here is as follows: MAX-IO, *COMPLEX >> ONSET >> DEP-IO >> *M/H. The syllable boundary is indicated by a period '.' in the tableau.

5. Tautosyllabic parsing in the rhyme.

/hairan/	*COMPLEX	MAX-IO	ONSET	DEP-IO	*M/H
a. ha.i.ran			*!		
b. ☞hay.ran					*
c. ha.ran		*!			
d. ha.yran	*!				
e. ha.ʔi.ran				*!	

As can be seen, the tautosyllabified candidate (5b) spares ONSET at the expense of violating the syllable structure constraint *M/H. This violation, however, is insignificant, because *M/H is lower ranked in the hierarchy.

3.2 Intervocalic High Vowel: Tautosyllabic Parsing and Ambiskeletal Parsing

In morphemes with sequences of three vowels, the intervocalic high vowel is always associated to the onset node. This yields another type of tautosyllabic syllable. Similarly to the postvocalic case mentioned above, this is a strategy to eschew the ONSET violation. Under the same hierarchical ranking as established in (5), the grammar predicts that a candidate with a marginal parsing of the high vowel emerges as the most harmonic output, as illustrated in the following tableau.

6. Tautosyllabic parsing of intervocalic high vowel in the onset.

/leuat/	*COMPLEX	MAX-IO	ONSET	DEP-IO	*M/H
a. le.u.at.			**!		
b. ☞ le.wat.					*
c. lat.		**!			
d. leu.at.	*!		*		
e. lwat.	*!	*			*
f. le.ʔu.ʔat.				**!	

Most of the previous works regard the occurrence of [y] and [w] in these environments as part of the lexical representations (Yunus 1980, Farid 1980, Abdullah 1974). For instance, forms such as /leuat/, /lauan/, /laiu/ and /kuiu/ are represented as /lewat/, /lawan/, /layu/ and /kuyu/. This representation suggests that Malay essentially has the so-called 'glides' in its phonemic inventory. This analysis misses an important generalisation about the fact that the occurrence of 'glides' in this language is highly predictable.

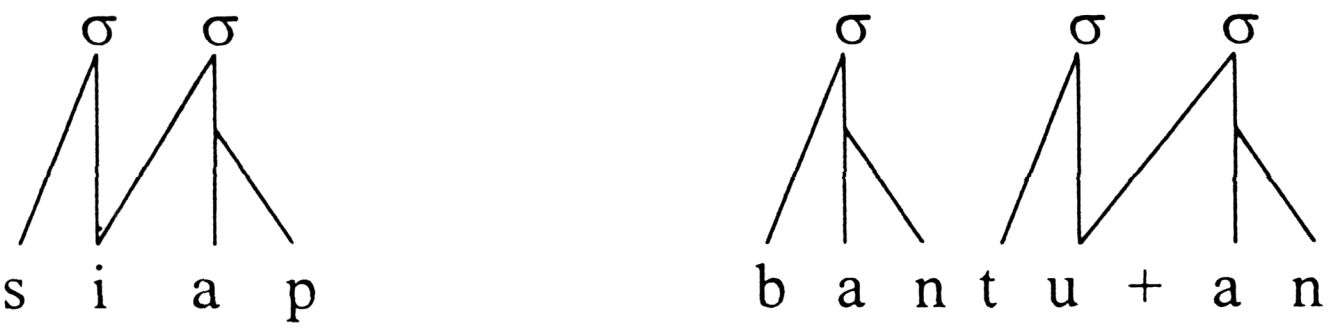
In my analysis, the emergence of [y, w] in this environment is a consequence of parsing the high vowel to the marginal onset tautosyllablically with the following vowel. It is clear that the structural motivation underlies this syllabification is to break up the hiatus. Although there are many plausible

candidates, they fare no better against the tautosyllabic candidate (6b).

As far as the underling form is concerned, it is apparent that morphemes such as in (7bii) must consist of sequences of two vowels instead of three, since a sequence of two identical vowels is ruled out by the Obligatory Contour Principle (OCP). Thus, the underlying representation of a form such as [kuwini] is /kuini/, not /kuuini/. In previous analyses the occurrence of surface 'glides' in (1bii) is treated as an epenthetic segment, derived by the so-called Glide Insertion rule (cf. Abdullah 1974, Farid 1980, Zaharani 1993, Teoh 1994).

Within the framework of OT, the occurrence of margin high vowel (i.e.'glides') in the hiatal environment in (1bii) is interpreted as a consequence of syllable parsing. In McCarthy & Prince (1993b) analysis of Malay/Indonesian, this phenomenon is explained as the result of parsing the high vowel ambisyllabically that is as the nucleus of one syllable and as the onset of the following one. It is crucial to note that the epenthetic segments [y, w] are not derived by default, but from the input high vowels. Therefore, the faithfulness constraint FILL (DEP-IO in our analysis) is not violated here (Rosenthall 1994)[5] . Ambisyllabification is represented, as in (7).

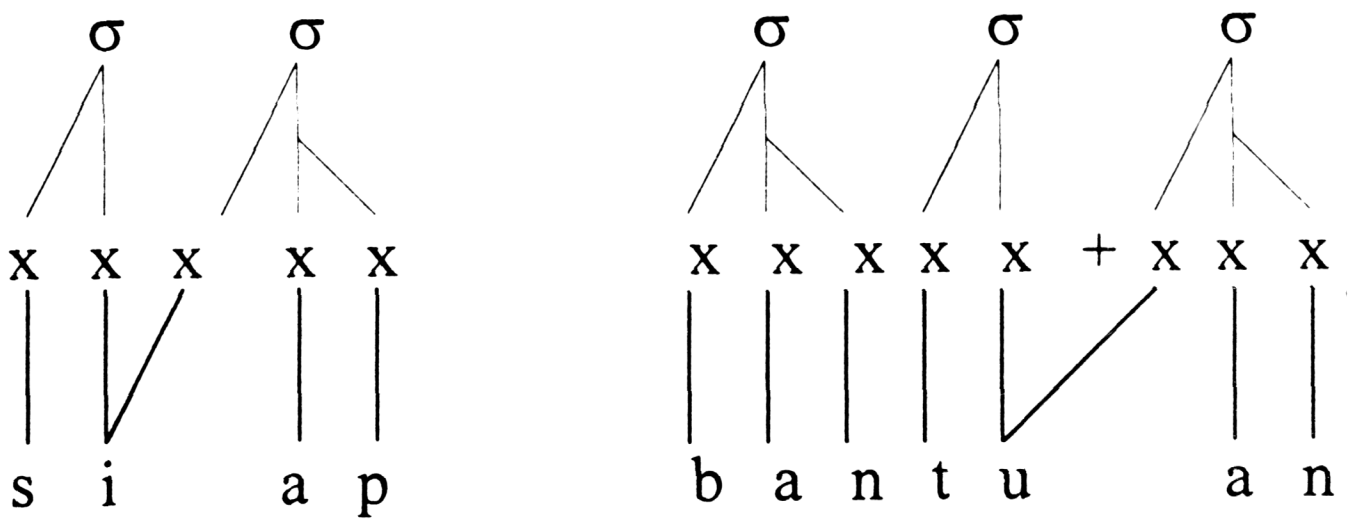
7.



[siyap] 'complete' [bantuwan] 'aid'

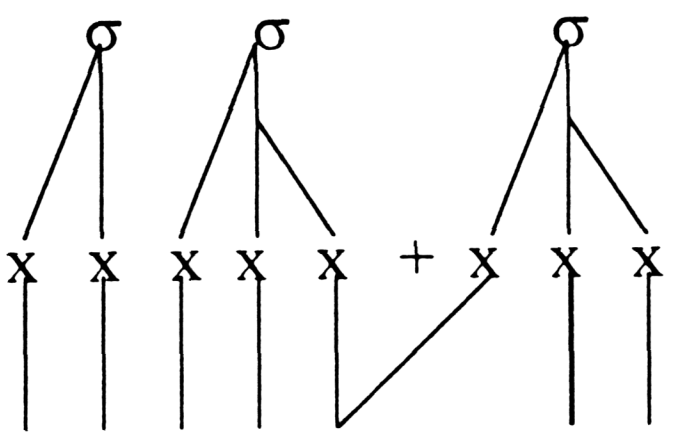
Contrary to McCarthy & Prince (1993b), I shall construe the structure in (7) as an ambiskeletal[6] parsing, that is, the high vowel is parsed to two X-skeletal (timing units) (Levin 1985), which are then immediately dominated by two successive syllables. The first X-slot is associated to the nucleus, while the second X is associated to the following onset. Ambiskeletal parsing is now illustrated in (8).

8.



The representations in (8) are closely identical to those for a geminate consonant in (9). The significant difference between (8) and (9) is that in the former the first of the Xs is associated to a nucleus, while in the latter it is parsed to a coda. In short, ambiskeletal parsing gives rise to two types of geminate, namely V-geminate[7] (8) and C-geminate (9).

9.

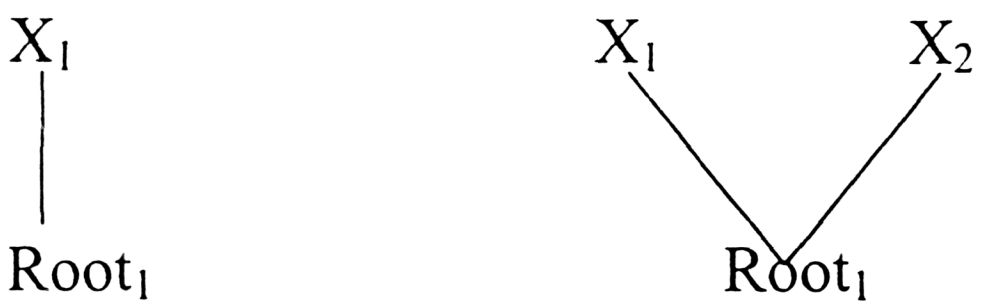


[tulessan] 'writing'

It has long been observed that a geminate commonly involves as a single melodic element behaving as equivalent to sequences of two segments for various processes. Segment length in a geminate is generally represented in a skeletal framework as mapping of a single set of features to two skeletal positions. By contrast, in a moraic framework it is represented as features mapped to a mora.

In a Correspondence Theoretic approach (McCarthy & Prince 1995), an ambiskeletal parsing in a geminate is interpreted as a one-to two mapping from the input to the output; two output segments stand in correspondence with a single input segment. The relation between the input and the output in ambiskeletal structure is illustrated below.

10. Input Output



As can be seen in (16), both the output segments X_1 (i.e. [i, u]) and X_2 (i.e.[y, w]) have an input correspondence, that is, the root node /$Root_1$/ (i.e. /i, u/). By definition, therefore, the output segment X_2 is not epenthetic, and thus it satisfies DEP-IO, which demands that every segment of the output have a correspondent in the input. This interpretation is compatible with the notion of ambisyllablic parsing proposed in the standard Optimality Theory (McCarthy & Prince 1993, Rosenthall 1994, Lamontagne & Rice 1995).

However, it must be noted that there is a crucial difference between a geminate and ambisyllabicity. The doubly-linked structure in a geminate, which denotes a long segment, generally tends to resist separation by rules of epenthesis, and fails to undergo phonological rules whose structural descriptions are satisfied by only one part of the geminate structure - properties referred to as integrity and inalterability respectively (cf. Kenstowicz and Pyle 1973, Hayes 1986). For instance, a rule of schwa-insertion in the Ait Segrouchen dialect of Berber fails to apply to a geminate that has been created by a rule of assimilation (Guerssel 1978). Also in Tigrinya, a Semitic language, a geminate *k* derived by assimilation fails to undergo a rule of spirantization (changing it to *x*), a rule that applies to both *k* and *q* when they are preceded by a vowel (Steriade 1982).

The doubly-linked structure in ambisyllabicity, on the other hand, involves a short single segment, which commonly triggers certain phonological alternations. For example, English *t* is flapped in practically all American dialects in words like *city*, *sitting*, or *sitter*, but not in *sister*, *settee*, or *sit*. According to Kahn (1976), the condition for flapping is, the ambisyllabicity of the *t* in *city*, etc. In German, an underlying

fricative /ç/ surfaces as [x] in words such as *rauchen* 'smoke', or *knochig* 'boney', but not in *Frauchen* 'mistress (of an animal), little woman' or *Masochist* 'masochist'. Merchant (1994) accounts for this alternation as the result of ambisyllabicity of the /ç/ in *rauchen*, or *knochig*.

Observe that the representation in (10) involves multiple correspondences. Under Correspondence Theory, a formal constraint that is violated here is INTEGRITY which is defined in McCarthy & Prince (1995b) as follows[8]:

11. INTEGRITY - No element of the input has multiple correspondents in the output.

In principle, an ambiskeletal parsing does not involve multiple segment correspondents. What actually happens here is that there is a single input segment associated to two X-timing units. In accord with this interpretation, a more appropriate constraint that is applicable here is INTEGRITY-X, which is part of the INTEGRITY constraint family.

12. INTEGRITY-X - No element of the input has multiple X correspondents in the output.

The correspondence constraint (12) militates against structure with multiple association. This rules out ambiskeletal parsing in V-geminate (8) and C-geminate (9).

The preference of ambiskeletal parsing over Glottal Epenthesis suggests that INTEGRITY-X must be ranked lower than DEP-IO, so that the latter can be ruled out in the competition. Note that an ambiskeletal parsing also violates *M/H, since it involves an association of high vowels to the syllable margin. Under such condition, INTEGRITY-X and *M/H do not need to be crucially ranked: no matter how they are ordered, a candidate violating INTEGRITY-X can never emerge as the winner. Putting all the relevant constraints in (5) together with (12), I establish the following part of the

constraint hierarchy: COMPLEX, MAX-IO >> ONSET >> DEP-IO >> INTEGRITY-X, *M/H.

13. Ambiskeletal parsing of high vowel.

/kuini/	*COMPLEX	MAX-IO	ONSET	DEP-IO	INTEGRITY-X	*M/H
a. ku.i.ni			*!			
b. ☞ku.wi.ni					*	*
c. kwi.ni	*!					*
d. ku.ni		*!				
e. ku.ʔi.ni				*!		

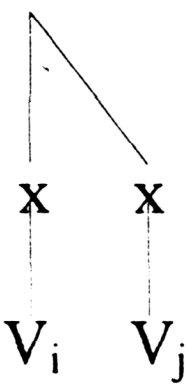
Observe that there is a significant difference between an intervocalic segment [w] in candidate (13b) and a glottal stop in candidate (13e). The latter is an epenthetic element without any input correspondent, and therefore it fatally incurs a violation of DEP-IO, which militates against C-epenthesis. The failed candidate (13c) syllabifies the first high vowel tautosyllabically in the onset, creating clusters [kw] in the onset node, a fatal violation of *COMPLEX. Candidate (13b) emerges as the victor as it minimally violates only the lower ranked constraints INTEGRITY-X and *M/H.

Considering the available constraints in (13), another potential candidate *[kuy.ni] can be generated by parsing the high vowel /i/ tautosyllabically with the first syllable. This candidate seems to be more harmonic than (13b), as it passes INTEGRITY-X and minimally violates the lowest constraint *M/H. Since *[kuy.ni] is not the actual output, it must be ruled out by some other constraints. Surely, this particular constraint must be ranked higher than INTEGRITY-X in the hierarchy.

It is apparent that not any vowel sequence in Malay can be syllabified tautosyllabically, but only sequences that begin with non-high vowels followed by a high vowel. To exclude tautosyllabic sequences of high + high vowels or non-high + non-high vowels, a sonority constraint called SONFALL (Sonority Fall) is imposed requiring that a diphthong must have

a decrease in sonority (cf. Rosenthall 1994). In other words, the sonority of the first vowel must be greater than the sonority of the second vowel.

14. SONFALL *σ



$son_i < son_j$

According to the Sonority Sequencing Generalisation (Selkirk 1984), the sonority profile of the syllable must slope down from the peak to the syllable margin. The constraint SONFALL is in conformity with this general requirement. We crucially assume that the sonority hierarchy in Malay does not distinguish between mid and low vowels (cf. Selkirk 1984). Hence, the only distinction is that high vowels are less sonorous than non-high vowels. Following this assumption, SONFALL rules out tautosyllabic sequences like [uj], [iw], [a̯e] and [a̯o].

Considering all the relevant constraints mentioned thus far, we establish the following part of the constraint hierarchy: MAX-IO, *COMPLEX, SONFALL >> ONSET >> DEP-IO >> INTEGRITY-X, *M/H.

15. Ambiskeletal parsing of high vowel.

/kuini/	*COMPLEX, MAX-IO, SONFALL	ONSET	DEP-IO	INTEGRITY-X	*M/H
a. ku.i.ni		*!			
b. ☞ ku.wi.ni				*	*
c. kwi.ni	*COMP *!				*
d. kuy.ni	SONFAL *!				*
e. ku.ni	MAX-IO *!				
f. ku.ʔi.ni			*!		

3.3 Prevocalic High vowel: Tautosyllabic Parsing in the Onset

As in the two previous cases, the phonological motivation that triggers the parsing of prevocalic high vowels in the onset is to avoid a hiatus (1a). This type of parsing occurs in two environments, namely, in root medial and root initial positions.

Most of the previous works regard the occurrence of [y] and [w] in these environments as part of the lexical representations (Yunus 1980, Farid 1980, Abdullah 1974). For instance, forms such as /uaŋi/, /iuran/ and /kahuen/ are represented as /waŋi/, /yuran/ and /kahwen/. This representation suggests that Malay essentially has so-called 'glides' in its phonemic inventory. As mentioned, this analysis misses an important generalisation about the fact that the occurrence of 'glides' in this language is predictable and non-distinctive.

In my analysis, the emergence of [y, w] in this environment is a consequence of parsing the high vowel in the onset tautosyllablically with the following vowel. It is indisputably accepted that the structural motivation for this syllabification is to avoid a hiatus. Although there are many plausible candidates, they fare no better against the tautosyllabic candidate. In the table below, I list down some of the possible candidates for /kahuen/ 'to marry' and the constraints they potentially violate.

16.

Candidates	Constraints Violated
a. *[ka.huen.]	*COMPLEX, SONFALL
b. *[ka.hwen]	*COMPLEX, *M/H
c. *[ka.hen]	MAX-IO
d. *[ka.hu.en]	ONSET
e. *[ka.hu.ʔen]	DEP-IO
f. *[ka.hu.wen]	INTEGRITY-X, *M/H
g. ☞[kah.wen]	*M/H

As established before, *COMPLEX and MAX-IO are undominated constraints, and therefore can never be violated.

This rules out candidates (16a), (16b) and (16c). Violating the higher ranked ONSET and DEP-IO are also fatal, and these eliminate (16d) and (16e). The competition is now between candidates (16f) and (16g). The former satisfies ONSET at the expense of violating INTEGRITY-X, whereas the latter does not incur such violation. The violation of *M/H by both candidates is irrelevant as it does not conflict with INTEGRITY-X. The following tableau clarifies the argument we just made.

17. Tautosyllabic parsing of prevocalic high vowel in the onset.

/kahuen/	*COMPLEX MAX-IO, SONFALL	ONSET	DEP-IO	INTEGRITY-X	*M/H
a. ka.hu͡en	*COMPL*! SONFAL *!				
b. ka.hwen	COMPL *!				*
c. ka.hen	MAX-IO *!				
d. ka.hu.en		*!			
e. ka.hu.ʔen			*!		
f. ka.hu.wen				*!	*
g.☞kah.wen					*

4.0 Conclusion

In the rule-based analysis (Durand 1987, Teoh 1994) where syllabification rules apply in stages, the syllabification of high vowel to the margin is governed by an additional resyllabification rule which reassociates the nucleic high vowel to a non-nucleic position. In the prosodic phonology point of view, this additional converting rule is not phonologically motivated because the melodic segment, in this case the high vowel, has already been licensed, therefore, it is not independently required by the syllabification algorithm.

The parallelist Optimality Theory does not need any additional modification rules. The syllabification of high vowel - (i) tautosyllabic parsing in the coda, (ii) tautosyllabic parsing

in the onset, and (iii) ambiskeletal parsing - is determined exclusively by the structural well-formedness of the syllable structure. Although structurally distinct, they are uniquely controlled and governed by the same language specific constraint hierarchy. The choice of each strategy as the optimal product is a consequence of best satisfying this constraint hierarchy.

Notes

[1] The Sonority Sequencing Generalisation states that "In any syllable, there is a segment constituting a sonority peak that is preceded and/or followed by a sequence of segments with progressively decreasing sonority values" (Selkirk 1984:116).

[2] Although Teoh (1994:29) does put forward an assumption that the high vowels and glides do not differ in their feature structure and the distinction between them can be determined by the syllable structure, all these segments are still represented as underlying phonemes in his analysis.

[3] Cross-boundary syllabification, namely across suffix and prefix boundaries, will not be explored in the present discussion.

[4] Vowels immediately preceded by nasal consonants are always nasalized in Malay. Nasality spreads progressively until it is blocked by an oral consonant. For the purposes of the present discussion, Vowel Nasalization will be overlooked.

[5] It must be noted that the outputs in (13) are not completely faithful. They only spare a DEP-IO^{SEGMENT} violation but crucially violates DEP-IO^{X}, since there is a new X-slot in the output representation.

[6] I am grateful to Iggy Roca for suggesting this term to me.

[7] There are cases where the high vowel is associated to the coda and onset simultaneously, creating a true V-geminate (e.g., /pakai+an/ 'cloth → [pakayyan]).

[8] Lamontagne & Rice (1995) propose a correspondence constraint called *MULTIPLE CORRESPONDENCE (*MC) to account for a similar phenomenon.

References

Abdullah Hassan. 1974. *The Morphology of Malay*. Kuala Lumpur: Dewan Bahasa dan Pustaka.

Blevins, Juliette. 1995. The syllable in phonological theory. In John A. Goldsmith, ed., *The Handbook of Phonological Theory*. Oxford: Basil Blackwell.

Durand, Jacques. 1987. On the phonological status of glides: The evidence from Malay. In John Anderson and Jacques Durand, eds., *Explorations in Dependency Phonology*. Dordrecht: Foris.

Farid M. Onn. 1980. *Aspects of Malay Phonology and Morphology: A Generative Approach.* Bangi: Universiti Kebangsaan Malaysia.

Guerssel, Mohamed. 1978. A condition on assimilation rules. *Linguistic Analysis* 4: 225–54.

Kenstowicz, Michael. 1994. *Sonority-driven stress*. Ms. MIT.

Kenstowicz, Michael, and Charles Pyle. 1973. On the phonological integrity of geminate clusters. In Michael Kenstowicz and Charles Kisseberth, eds., *Issues in Phonological Theory*. The Hague: Mouton.

Lamontagne, Greg, and Keren Rice. 1995. A correspondence account of coalescence. In Jill N. Beckman, Laura Walsh Dickey, and Suzanne Urbanczyk, eds., *University of Massachusetts Occasional Papers in Linguistics 18: Papers in Optimality Theory*. Amherst, MA: Graduate Linguistic Student Association.

McCarthy, John J., and Alan M. Prince. 1993a. *Prosodic Morphology 1: Constraint Interaction and Satisfaction*. Ms., University of Massachusetts, Amherst, and Rutgers University, New Brunswick. [To appear Cambridge, MA: MIT Press.]

———. 1993b. Generalized alignment. In Geert Booij and Jaap van Marle, eds., *Yearbook of Morphology 1993*. Dordrecht: Kluwer. Pp. 79–153.

———. 1995b. Faithfulness and reduplicative identity. In Jill N. Beckman, Laura Walsh Dickey, and Suzanne Urbanczyk, eds., *University of Massachusetts Occasional Papers in*

Linguistics 18: Papers in Optimality Theory. Amherst, MA: Graduate Linguistic Student Association.

Merchant, Jason. 1994. German fricative assimilation, ambisyllabicity, and noncrisp alignment. In Jason Merchant, Jaye Padgett, and Rachel Walker, eds., *Phonology at Santa Cruz: Volume 3*. Santa Cruz: University of California, Santa Cruz.

Prince, Alan M., and Paul Smolensky. 1993. *Optimality Theory: Constraint Interaction in Generative Grammar*. Ms., Rutgers University, New Brunswick, and University of Colorado, Boulder. [To appear, Cambridge, MA: MIT Press.]

Roca, Iggy. 1994. *Generative Phonology*. London: Routledge.

———. 1997. There are no "glides', at least in Spanish: An optimality account. *Probus* 9:233–65.

Rosenthall, Samuel. 1994. *Vowel/Glide Alternation in a Theory of Constraint Interaction*. Ph.D. dissertation, University of Massachusetts, Amherst.

Selkirk, Elisabeth. 1982. Syllables. In H. van der Hulst and N. Smith, eds., *The Structure of Phonological Representation, vol. 2*. Dordrecht: Foris. Pp. 337–83.

———. 1984. On the major class features and syllable. In Mark Aronoff and Richard T. Oerhle, eds., *Language Sound Structure*. Cambridge, MA: MIT Press.

Teoh, Boon Seong. 1994. *The Sound System of Malay Revisited*. Kuala Lumpur: Dewan Bahasa dan Pustaka.

Yunus Maris. 1980 [1966]. *The Malay Sound System*. Kuala Lumpur: Fajar Bakti.

Zaharani Ahmad. 1998. *Phonology and Morphology Interface in Malay: An Optimality Theoretic Account*. Ph.D. dissertation, University of Essex.

Zainal Abidin Ahmad (Za'ba). 1964. *Pelita Bahasa Melayu Penggal I: Permulaan Nahu Melayu*. Kuala Lumpur: Dewan Bahasa dan Pustaka.