FEET AND FUSION: THE CASE OF MALAY

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0 Introduction: Background and Data

The complex data relating to fusion (or 'nasal substation') in Malay have long escaped unified analysis. Most past analyses assume that the crucial conditioning environment for the process is purely morphological. Thus, it is claimed that root-initial voiceless obstruents trigger fusion when preceded by nasal-final prefixes (Teoh (1994), Onn (1980), Zaharani (1998), and, on related data in Indonesian, Pater (1996)).

All analyses, however, suffer from incomplete coverage of the relevant data, numerous instances set aside as 'exceptions', if mentioned at all. In (1), which derives from Delilkan 1999, 2000, '•' denotes data previously considered exceptional. Data not hitherto discussed in connection with fusion are superscripted '$^{+}$'. Fusion occurs in all (1a) cases but is blocked throughout (1b). (Henceforth, x is root material, *x* the output of fusion, and '.' a syllable break.)

(1a) Fusion		
i. məŋ + pukol	**mə.***m***u.kol, *mə*m**.pu.kol	'hit', v.t.
ii. məN + pəreksa^{+}	**mə.*m*ə**.rek.sa, ***məm.pə**….	'examine', v.t.
iii. pəN + pər + alat + an•	**pə.*m*ə**.ra.lat.tan,***pəm.pə**…	'utilization', n.
iv. məN + kə + muka + kan•	**mə.*ŋ*ə.**mu.ka.kan,***məŋ.kə…**	'reveal', v.t.
(1b) No Fusion		
i. məN + pər + tadʒam + kan^{+}	məm.pər.ta.dʒam.kan ***mə.*m*ər.**ta.dʒam.kan	'sharpen', v.t.
ii. məN + pəlbagaj + kan•	məm.pəl.ba.gaj.kan ***m.*m*əl.**ba.gaj.kan	'diversify', v.t.
iii. məN + proses	məm.pro.ses, *mə***m**.pro.ses	'process', v.t.
iv. məN + pam•	mə.ŋə.pam, *mə.***m**am	'pump', v.t.
v. tanam + kan	tanam.kan, *ta.**na**.*ŋ*an	'plant', v.t.
vi. kan + kah• (suffixes)	kan.kah, ***...ka**. *ŋ*ah	trans/interr.
vii. tilam kətʃil	tilam kətʃil, *ti**la** *ŋ*ətʃil	'small mattress' (noun phr.)
viii. kampoŋ	kampoŋ, *ka.***m**oŋ	'village', n.
ix. təmpojan$^{\pm}$	təmpojjan, *tə.*m*oj.jan	'urn', n.
x. pəN + dapat	pən.dapat, *pə. ***n**a.pat	'opinion', n.
xi. mən + tʃipta•	mən. tʃip.ta, *mə.*ɲ*ip.ta	'create', v.t.
xii. məN + rawat	mə.ra.wat, *mə.***n**a.wat	'nurse/treat', v.t.

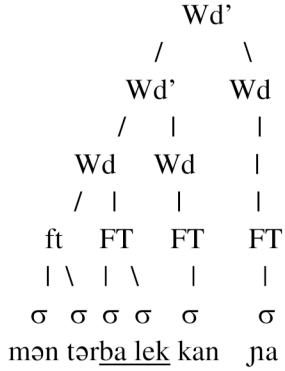
Shoichi Iwasaki, Andrew Simpson, Karen Adams & Paul Sidwell, eds. *SEALSXIII: papers from the 13th meeting of the Southeast Asian Linguistics Society (2003)*. Canberra, Pacific Linguistics, 2007, pp.25-41.

A complete analysis must clearly discriminate between these two sets of cases. My paper shows that, and how, prosodic structure crucially conditions fusion. This fact provides crucial support for seeing a unity between fusion and a range of other segmental processes (Delilkan 2002).

1 Prosodic word structure

As per Delilkan 1998, I first assume that the Malay prosodic word comprises prefix(es) and root, suffixes each projecting their own prosodic word domain, as depicted in (2), below. This differs from claims about prosodic words in Indonesian, a closely related language, to the effect that roots and suffixes together project a prosodic word (Cohn 1994). I assume further that Malay prosodic words are right-headed and that feet are trochaic, i.e., left-headed (Delilkan 1999 and forward).

(2)



'overturn it'

The novel prosodic structure that I propose is independently motivated via reference to stress facts, asymmetries in affix vowel inventories, and the correlation between root size and prefixation potential (Delilkan 2002: Ch3). It is corroborated further by the distribution of other segmental processes besides fusion (such as nasal assimilation, sonorant deletion, and gemination) (Delilkan 1999, and 2002: Ch 5).

2 Prosodic Location of Fusion

2.1 *Fusion and the Unmarked Dependent Foot*

2.1.1 Heterogeneous Facts between Prefixes

In traditional accounts, the failure of fusion between prefixes in forms such as those in (3) is cited as an exception to claims that fusion occurs at the prefix right edge (Onn 1980), since the juncture between prefixes is readily construed as the right edge of the first prefix.

(3) məN + pər + tadʒam + kan [[(məm.pər) (ta.dʒam)] (kan)] 'sharpen', v.t.
*[[(**mə.*m*ər)** (ta.dʒam)] (kan)]

Assuming the prosodic structure the current analysis imposes on such forms, as depicted in (3), Delilkan 1999 suggests instead that fusion occurs only between feet within a prosodic word, and is blocked between two prefixes because no foot boundary intervenes between them.

In the closing remarks of his ground-breaking Optimality theoretic account of the morphophonology of Malay, Zaharani (1998:271) observes that, contrary to such discussions about the juncture between prefixes, double prefixes *do* in fact exhibit fusion between them, but only when the second prefix is light, as in (4).

(4a) məN + kə + muka + kan [[(**mə.*ŋə***) (mu.ka)](kan)] 'reveal', v.t.
*[[(**məŋ.kə**) (mu.ka)](kan)]

(4b) pəN + sə + ragam + an [[(pə.ɲə)(ra.gam)](man)] 'homogenization', n.
***[**[(pən.sə)(ra.gam)](man)]

Zaharani then leaves this work 'for future OT analyses'. I hasten to add to this point that fusion will also occur between prefixes when the second prefix is closed if the root that follows begins with a vowel, as seen in (5).

(5) pəN + pər + alat + an [[(**pə.*m*ə**) (ra.lat)](tan)] 'employing as a tool', n.
*[[(**pəm.pə**) (ra.lat)](tan)]

Furthermore, the prefix-trisyllabic root juncture will at times permit fusion as well, as seen in (6a), blocking it at others, as shown in (6b). Heterogeneous fusion behavior is evidently even more widespread than Zaharani's observation suggests.

(6a) məN + pəreksa [(**mə.*m*ə**) (rek.sa)] 'examine', v.t.
*[(**məm.pə**) (reksa)]

(6b) məN + pəlbagaj + kan [[(məm.pəl) (ba.gaj)] (kan)] 'diversify', v.t.
*[[(**mə.*m*əl**) (ba.gaj)] (kan)]

Neither a foot juncture hypothesis nor reference to the prefix right edge as the conditioning environment of fusion will accommodate these facts. Clearly, a new account is required.

The relevant heterogeneous fusion facts are summarized in (7), for ease of reference. (As before, italics denote a fusion segment, and underlining indicates roots. Boldface marks the dependent foot. Output shapes refer to the prefix-root complex only, on the assumption that, together, they project a prosodic word that excludes suffixes.)

(7a) Fusion occurs between two prefixes when the second prefix is closed and the root vowel-initial.

pəN + pər + oleh (+ an) pə.*m*ə.ro.leh.han 'acquisition', n.
Output: **Cə.Cə.**CV(C).CV(C)

(7b) Fusion occurs between two prefixes when the second prefix is light and the root consonant-initial.

məN + kə + bumi + an mə.*ŋ*ə.bu.mi.kan 'bury', v.t.
Output: **Cə.Cə.**CV(C).CV(C)

(7c) Fusion occurs between an N-final prefix and a trisyllabic root with an open first syllable.

məN + pərentah	mə.*m*ə.ren.tah[1]	'rule', v.t.
Output:	**Cə.Cə.**CV(C).CV(C)	

(7d) Fusion is blocked between an N-final prefix and a trisyllabic root with a closed first syllable.

pən + tərdʒəmah	pən.tər.dʒə.mah	'interpreter', n.[2]
Output:	**CəC.CəC.**CV(C).CV(C)	
	*pə.*n*ər.dʒə.mah	
	***Cə.CəC .**CV(C).CV(C)	

(7e) Fusion is blocked between two prefixes if the second is closed and the root is consonant-initial.

məN + tər + balek (+ kan)		'overturn', v.t.
mən.tər.ba.lek…	Output: **CəC.CəC .**CV(C).CV(C)	
*mə.*n*ər.ba.lek..	***Cə.CəC** .CV(C).CV(C)	

For ease of reference, I repeat the output shapes of the prefix-root complex in (7d-e) and (7a-c) as (8a) and (8b), respectively.

(8a) [(**CəC.CəC**)(CV(C). CV(C))] (No fusion)
*[(**Cə.CəC**)(CV(C).CV(C))] (Ungrammatical fusion)

(8b) [(**Cə.Cə**) (CV(C).CV(C))] (Fusion result)

The shapes in (8) merit discussion and are the focus of the following section.

2.1.2 Fusion and the Prosodically Weak Domain of a Word

Based on the shapes in (8), past accounts of the locus of fusion can no longer be upheld. To begin elucidation of a new description of the location of fusion, I make the claims in (9).

(9a) CLAIM 1: The target dependent foot in Malay is composed of two open 'schwallables' (i.e., schwa-headed syllables, van der Hulst, p.c. 1999), i.e., light syllables.

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[1] Other examples are as follows: /mə*m*ərekса/ (*memereksa*, 'examine, v.t.), /mə*ŋ*əlirukan/ (*mengelirukan,* discombobulate, v.t.) /mə*m*əroses/ (*memeroses*, 'process', v.t.), /mə*m*ərandʒat/ (*memeranjat,* , shock, v.t.), /mə*ɲ*əlimotkan/ (*menyelimutkan* 'cover (as with a blanket', v.t.), /mə*ɲ*əlidek/ (*menyelidek*, 'investigate, v.t.).

[2] Further examples are /pəntərdʒəmah/ (*penterjemah*, interpreter, n.), /məmpəlbagai(kan)/ (*mempelbagaikan,* 'create variety', v.t.), and /məmpərdana(kan)/ (*memperdanakan,* give primacy, v.t.).

[[(**Cə.Cə**).CV(C).CV(C)][3]

(9b) CLAIM 2: The dependent foot in Malay may not, however, be light-heavy, shapewise.

*[(**Cə.CəC**)(CV(C).CV(C))]

According to Mascaro's (1976) Derived Environment Effect and Kiparsky's (1973) Revised Alternation Condition, processes fail to apply within a morpheme but apply at morphological junctures only if they produce more unmarked forms. I suggest that the salient dimension of markedness for fusion in Malay is prosodic. Thus fusion occurs within the prosodically weak domain of the word, i.e., the dependent foot, triggered by the need to achieve the target output prosodic shape in (9a). In short, I claim that fusion *should* occur in the prosodically weak domain because it leaves dependent foot syllables open. However, although (9a) shows the target shape for a dependent foot, fusion may not apply if, in the process of creating a light syllable in a dependent foot, the entire foot has the shape shown in (9b). The question that needs to be answered is why the dependent foot in (9b) is undesirable. It has one coda fewer than nonfusion produces, yet it is not the correct output. The restriction here relates to a further generalization about foot typology in the language. In the next section, I take a closer look at the relevant facts.

2.1.3 Foot Typology

I argue in Delilkan 2002: §3.1 that the default foot in Malay is a trochee. I claim also that a sequence of prefixes together projects a dependent foot that ultimately rests on two schwallables. Since the syllables in this foot are both schwa-headed, there is no qualitative difference in their nuclei that would signify 'trochaicness'. Consequently, acknowledgement of the trochaic foot form in the language is achieved between the two prefixes in question in the avoidance of a sequence that is light-heavy, a sequence that would be in direct contradiction with the requirement that a trochaic foot should be strong-weak. I refer here to Winstedt's (1927, cited in Hayes 1995b) claim that only an open schwallable in Malay counts as a light syllable.[4] Since I assume that two prefixes together project a foot, fusion between two closed schwa-headed prefixes followed by a C-initial root would produce a light-heavy foot (cf., (9b)), in direct conflict with the idea that, in a trochee, the first element is stronger than the second. (10) illustrates the undesirable foot shape in question. ('L' means 'light', 'H' 'heavy'.)

(10) *(Cə.CəC), or *(L-H)

By the restriction embodied in (10), fusion is blocked in (11). (Boldface marks the unacceptable foot.)

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[3] See Delilkan 2002: Appendix 3 for a list of trisyllabic roots (including fossilized reduplicants) that begin with schwallables.

[4] This explains why initial stress is possible in a disyllabic root that begins with a closed schwa-headed syllable, but is impossible if the first syllable were an open schwallable. (Winstedt 1927, cited in Hayes 1995b:263).

(11) məN + pər + (disyllabic C-initial root) [(məm. pər) (C…)]
[*(**mə. *m*ər**) (C…)]

In drawing the preceding conclusion, I rely on the claim that foot typologies across languages differ in terms of their definition of what counts as an acceptable foot for the language (Hayes (1995a)). Thus, some languages might require that well-formed trochaic feet be only precisely heavy-light, so that light-heavy, light-light and heavy-heavy are equally ill-formed feet. Less restrictive typologies may require only that trochaic feet *begin* with a heavy syllable, so that both heavy-heavy and heavy-light sequences are acceptable. Still others allow all sequences except one that is light-heavy, in direct contradiction of the classic heavy-light imbalance that makes a trochee. Such languages are termed "mismatch" languages (van der Hulst (1984)).

Malay shows evidence of being a mismatch language. The lack of fusion in (13) betrays the avoidance of a mismatch between the intrinsic relationship of the prefix syllables at the level of the syllable, on the one hand, and their extrinsic relationship as it relates to their shared existence in a foot, on the other. Consider (12), which shows all possible shapes of disyllabic dependent feet in Malay. ('L'denotes a light syllable, i.e., an open schwallable. 'H' denotes all other syllables.)

(12a)	√ (L - L)	[(sə.kə)(hən.dak)]	'possessing the same needs', adj.
		[(mə.*m*ə)(ro.leh)] (+fusion)	'acquire', v.t.
(12b)	√(H – L)	[(bər.kə)(hən.dak)][5]	'with intent', adj.
(12c)	√(H - H)	[(məm.pər)(tiŋ.gi)](kan)] (no fusion)	'raise', v.t.
(12d)	***(L - H)**	***[(mə.*m*ər)**(tiŋ.gi)](kan)] **(fusion blocked)**	

Only a pair of dependent foot syllables displaying an L-H pattern is undesirable (cf. the impossible (12d)).

2.1.4 Trisyllabic Roots : Fusing and Non-Fusing

The heterogeneous fusion behavior of prefixed trisyllabic roots can now be accounted for in like fashion. Assuming that doubly prefixed disyllabic roots and singly prefixed trisyllabic roots have the same prosodic structure, I now claim that the prefix /məN/ – and the first syllable of a trisyllabic root like *terjemah* ('translate',v.t.) would be a closed-closed sequence (cf. 13), making fusion as undesirable an option as it was in the double prefix case.

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[5] It ought to be noted that there are exceptions to the basic pattern of fusion occurring between prefixes if the second is open. For example, 'mengkebumikan', pronounced without fusion between the first two (schwa-headed prefix) syllables, is a variant of 'mengebumikan' (/məŋəbumikan/). Note, Mismatch restrictions would not block these forms, since Heavy-Light sequences do not violate the trochaic form of the language. What would be the dependent foot in the non-fusion pronunciation is not as light as it could be, though. Given the current proposal, this means that the form is marked because a coda that would normally be targeted for removal has been preserved instead. Forms like these are mentioned in grammar textbooks as highly marked exceptions, though, and a child is expected to learn them as such. I take the acknowledged exceptionality of such forms as indirect evidence of the 'rule' I have proposed about the undesirability of codas in dependent feet.

(13a)	pəN + tərdʒəmah	[(pən.tər)(dʒə.mah)] *[(pə.*n*ər)(dʒə.mah)]	‘translator, n.
(13b)	məN + pəlbagai(kan)	[[(məm.pəl)(ba.gai)](kan)] *[[*(mə.*m*əl)(ba.gai)](kan)]	‘diversify’, v.t.
(13c)	məN + pərdana +kan	[[(məm.pər)(da.na)](kan)] *[[*(mə.*m*ər)(da.na)](kan)]	‘give primacy’, v.t.

By contrast, in (14), fusion is permitted between a prefix and a trisyllabic root that begins with an open schwallable—a light syllable.

(14)	pəN + pəreksa + an	[[(**pə.*mə***)(reksa)(ʔan)] *[[(pəm.pə)(reksa)](ʔan)]	‘examination’, n.

The result in (14) thus patterns with the prefix pairs that are ‘closed-open’ (or ‘heavy-light’), i.e., those that do routinely permit fusion. The resulting foot in either case is ‘light-light’, a shape that presents no mismatch. Certainly, the resulting first foot is also desirable as a dependent foot, which I claim is unmarked if composed of light, /Cə/, syllables.[6]

It is worth noting, therefore, that the shape of the root involved is a critical factor in determining whether or not fusion will occur between two prefixes. A vowel-initial disyllabic root undoes the closed-closed shape in the dependent foot that blocks fusion. The final consonant of the second prefix is syllabified to provide an onset to the first syllable of the root, and the combination of fusion and this syllabification produces light syllables in the dependent foot. The relevant syllabification is shown in (15).

(15a)	məN + pər + oleh	[(mə.*m*ə)(roleh)] *[(məm.pə)(ro.leh)]	‘procure’, v.t.
(15b)	pəN + pər + alat + an	[[(pə*m*ə) (ra lat)][(tan)] *[[(pəm.pə)(ra.lat)][(tan)]]	‘using (as a tool)’, n.

This pattern is echoed in trisyllabic roots, including loanwords. The English word *program* is pronounced ‘[pərogram]’ in Malay, where schwa epenthesis eliminates a potential cluster in the first syllable.[7] When prefixed with /məN-/, the result is (16a), a form in which fusion has been permitted. (16b) shows the same result in the case of a native trisyllabic root.

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[6] I refer to Gafos (1996), who states that syllable weight is scalar, and that Cə is the lightest possible syllable in South East Asian languages.

[7] The fact that the second cluster in the word remains relates to the four- syllable maximum on the total number of syllables a prefix and root may together comprise. See Delilkan 2002: §3.1 for discussion of other evidence for this limit, which I take as evidence of prosodic word maximal binarity. Resolution of the *first* cluster in ‘program’ is, in turn, driven by the target shape I claim for dependent feet.

(16a) məN + pərogram + kan [[(mə.*m*ə)(ro.gram)](kan)] 'program', v.t.
*[[(məm.pə)(rogram)](kan)]

(16b) məN + səlimot [[(mə.*ɲ*ə)(li.mot)] (ti)] 'cover, as with blanket', v.t.
*[[(məɲ.sə)(li.mot)](ti)]

Mismatch restrictions will not block fusion between the first two syllables in (16a) and (16b), as no 'L-H' sequence would be produced by permitting it. Fusion is therefore free to occur in both cases.

The current analysis thus provides a single account for the two environments that display heterogeneous fusion behavior—the juncture between prefixes and that between a prefix and a tri-syllabic root. The restriction on foot shape is not at odds with the broader prosodic analysis of fusion offered thus far. Fusion occurs if it produces a dependent foot with unmarked (light) syllables, but only if 'Mismatch' restrictions at the level of the foot are not violated in the process. I turn to the next piece of evidence that supports the current prosodic account of the motivation for fusion.

2.2 *Fusion is Blocked by Clusters*

Cluster-initial loanword roots resist fusion with N-final prefixes. Consider (17). (I include the prosodic structure the current account assumes, to aid discussion of the ungrammatical forms.)

(17a) məN + proses [(məm)(proses)], *[(mə*m*)(ro.ses)][8] 'process', v.t.

(17b) məN + program [(məm)(program)], *[(mə*m*)(rogram)] 'program', v.t.

(17c) pəN + klorin+an [(pəŋ)(klorin)][(nan)], *[(pə*ŋ*)(lo.rin)](nan)] 'chlorination', n.

(17d) pəN + frasa +an [(pəm)(fra.sa)][(ʔan)], [(*pə*m*)(ra.sa)][(ʔan)] 'phrasing', n.

The lack of fusion in such cases could perhaps be given a functionalist explanation, as the way in which the language marks loanwords. The fact of nonfusion is, however, readily explained by referring to the restrictions seen to be active elsewhere in the language. The ungrammatical outputs in (17) would have unlicensed codas in their dependent feet, codas that violate Syllable Contact Law (Venneman 1988, Kaye 1990), by which an onset must be less sonorous than its preceding coda in order to license it. Thus, for instance, in the ungrammatical forms of (17a), (17b) and (17d), /m/ in the dependent foot coda is less sonorous than /r/ in the adjacent onset. Further, fusion in the ungrammatical cases does not even produce the open syllable in the dependent foot that I have argued the process always otherwise does. In every one of the ungrammatical cases in (17), the dependent foot has closed syllables, fusion notwithstanding. Recall that in my discussion of Mismatch effects, I claimed that fusion will occur in the dependent foot only if it will not produce a marked form. This would never be the case if fusion were the strategy adopted

[8] The lack of fusion here contrasts with the pronunciation variant of the loanword root that begins with a simple onset, *peroses* (/pəroses/). This form permits fusion when prefixed with /məN-/, resulting in /mə*m*əroses/.

in any of the forms in (17). Thus a section of the data relevant to fusion that has consistently been cited as exceptional in the literature finds explanation in the current account, by which markedness restrictions apply to dependent feet in Malay. Such feet are shown to be subject to coda licensing restrictions, too, the effects of which are seen in consideration of sonorant deletion facts in the language (cf. Delilkan 2002: Ch5).

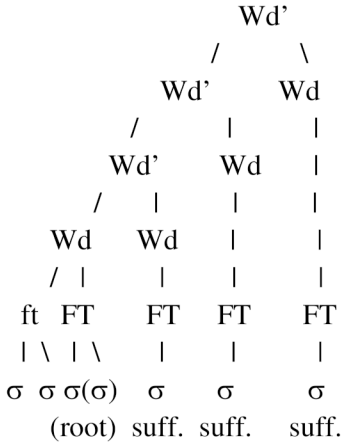
3 No Fusion in the Strong Domain: Head Feet and Closed Syllables

I have assumed thus far that fusion serves to produce open syllables in the dependent foot. This claim replaces the foot juncture hypothesis proposed in Delilkan 1999, but is not a sufficient description of the facts. Accordingly, I claim further that fusion is blocked between roots and suffixes, and between suffixes because in each of these cases, it would produce an open syllable in a head foot (Delilkan 2002: Ch2). Thus I assert that, unlike the case in the dependent foot, syllables in the head foot in Malay are unmarked when *closed.* (18) states this claim.

(18) CLAIM 3: Closed syllables are unmarked in head foot positions.

The claim in (18) relies on the assumptions about the prosodic structure of the language outlined in §2.0. By this structure, first posited and defended in Delilkan 1999, disyllabic roots and suffixes project head foot syllables. I repeat the relevant structure in (19). ('FT' denotes a head foot, 'ft' a dependent.)

(19)



Since head foot syllables correspond to the prosodically strong domain of a word, it can be assumed that they are prominent, where prominence is defined in terms of asymmetry (Liberman and Prince 1977). Thus, head foot syllables are prominent relative to dependent feet. If dependent feet are unmarked when light (where lightness in Malay corresponds to the combination of openness and schwa-headedness), it is reasonable to suppose that relative prominence is achieved in the head foot via syllables that are as *heavy* as possible.

Certainly, a manifestation of this prominence is the ability of head foot syllables to bear primary stress. If a head foot syllable must be able to bear primary stress, it is then also reasonable to assume that a closed syllable is a better vehicle for such stress than an open one. There is no lack of claims in literature to the effect that languages display a correlation between syllable weight and stress bearing ability (cf. Peak Prominence (Prince

and Smolensky 1993), Stress-to-Weight Principle ((Riad 1992), Myers (1987))). Thus I claim that head feet in Malay are ideally composed of the heaviest syllables possible in the language, closed syllables. Fusion is triggered in the dependent foot in Malay because it creates light dependent foot syllables. It is, however, blocked in head foot positions, because it produces open syllables in the strong domain, syllables that are marked for that domain. (20) shows the result of ungrammatical fusion in the relevant positions, boldface denoting the open syllable produced by fusion. For completeness, I include (in (20c) and (20d), respectively) a compound and noun phrase, each a sequence of two prosodic words.[9]

(20a)	di + rakam + kan	[[(di)(ra.kam)](kan)] *[[(di)(ra.**ka**)](*ŋ*an)]	‘recorded’, pass.
(20b)	di + rakam + kan + kah	..](kan)](kah)] *..](**ka**)](*ŋ*ah)]	‘recorded’, pass./interr.
(20c)	tulaŋ puteh	[(tu.laŋ)][(pu.teh)] *[(tu.**la**)][(*m*u.teh)]	‘white bone’ i.e.,’dead’
(20d)	tilam kətʃel	[(tilam)][(kətʃel)] *[(ti**la**)](*ɲ*ə.tʃel)]	‘small mattress’, n.

The prosodic analysis of fusion I have presented thus far accounts for all the environments discussed thus far. I have claimed that fusion occurs when it will produce unmarked prosodic structures----open syllables in a dependent foot. It is blocked when it produces prosodically marked structures---an open head foot syllable, or a dependent foot that violates Mismatch.

4 Monosyllabic Roots and Schwa Epenthesis—another failure of fusion?

4.1. *Consequence for Dependent Foot*

As shown in (21), monosyllabic roots do not permit fusion at their left edge when prefixed with an N-final prefix, not even when the root begins with a T (a voiceless obstruent).

(21)	məN + pam	məŋəpam,*məmam	‘pump’, v.t.

According to Pater (1996) vowel epenthesis is unattested as an NT avoidance strategy in any natural language that he has investigated. At first glance, the Malay data in (21) might be taken as evidence that epenthesis is an active strategy that eliminates an NT sequence. However, it should be noted that ND sequences are subject to the very same schwa epenthesis, as are N-sonorant and N-fricative sequences as shown in (22).

(22a)	məN + bom	məŋəbom, *məmbom	‘bomb’, v.t.
(22b)	məN + lap	məŋəlap, *məlap	‘wipe’, v.t.

[9] These last two forms were mentioned in Delilkan 2002: Ch 3, where I took the fact that two primary stresses attended each as evidence that each comprised a pair of prosodic words.

(22c) məN + waŋ məŋəwaŋ, *məwaŋ ‘finance’, v.t.

(22d) məN + had məŋəhad, *məŋhad (?) ‘restrict’, v.t.

It follows that the epenthesis in (22) is not just another case of avoiding an NT sequence. The fact of nonfusion in forms like (21), and the schwa epenthesis that unites the entire set of data in (21) and (22), relates directly to the length of the root. This descriptive point is well documented in the literature (see Teoh 1994, Farid 1980). I argue for an approach to this epenthesis that unites it with the main claims of this dissertation, focusing on the prosodic structures the process targets---disyllabic open-syllabled dependent feet.

In the case of monosyllabic roots that are N-finally prefixed, fusion does not occur, but then neither does sonorant-deletion, the process that would normally occur in the language, given prefixation of any other sonorant-initial root (Delilkan 2002: §5.1). Instead of either fusion or sonorant deletion, in both cases, schwa epenthesis occurs and a default velar place specification is inserted, just as in the case where an N-final prefix is followed by a vowel-initial root. Consider (23).

(23a) məN + pam məŋəpam i) *[(mə)(*m*am)](fusion) ‘pump’, v.t.
ii) *[(məm)(pam)] (NPA)

(23b) məN + lap məŋəlap i)*[(mə)(lap)] (sonorant del’n) ‘wipe’, v.t.
ii) *[(mən)(lap)] (NPA)

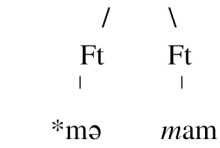
If the prefix and root are assumed to inhere in separate feet, the ungrammatical forms in (23aii) and (23bii) follow directly from the current claim that codas are dispreferred in dependent feet.One possible explanation is that Mismatch restrictions pertain to (23). It is possible, for instance, that the ungrammatical forms in (23ai) and (23bi) would be, both stresswise *and* shapewise, L-H feet, as indicated in (24).

(24a) *[(mə.ma∇m)] (24b) *[(mə.la∇p)]
*?(L H) *?(L H)

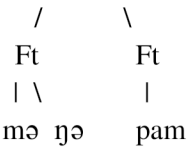
Delilkan 2002 argues (in chapter 3) for a *binary* word as the appropriate prosodic structure or prefixed monosyllabic roots, whether the prefixing involves an open or closed prefix. The arguments employed relate to foot level trochaic stress as well as word level iambic stress, and take into consideration the fact that a monosyllabic root itself meets word minimality requirements.

Assuming the correct prosodic structure for prefixed monosyllabic roots is a binary word, the contrast between grammatical and ungrammatical forms is seen in the prosodic structures in (25). Note that the ungrammaticality of (25ai) and (25bi) does require further explanation, since the language routinely produces right-headed words, and since by my current claims, a coda-less dependent foot is otherwise highly desirable, as my investigation thus far indicates.

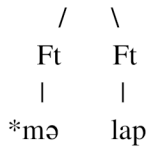
(25a-i)



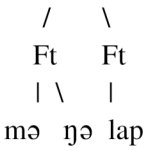
(25a-ii)



(25 b-i)



(25b-ii)



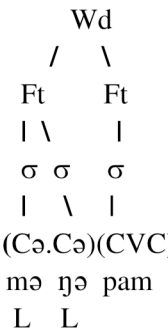
One option would be to say that the first foot in each of the ungrammatical forms in (25) is degenerate and therefore undesirable. If this argument is used, though, there would be no way to guarantee that, for example, it is not schwa epenthesis but fusion that occurs in /məN + pukol/, resulting in the grammatical /məmukol/ ('hit', v.t., from /məN/ + /pukol/) and which, by the current analysis would begin with a degenerate foot, as in (26), below.

(26) məN + pukol [(mə)(mukol)], *[(mə.ŋə)(pukol)] 'hit', v.t.

As mentioned earlier, it is clear that the length of the root must play a part in the explanation for the schwa epenthesis in (25). Accordingly, I propose that there are two motivations for schwa epenthesis, and that the confluence of these impulses in the precise environment relating to prefixed monosyllabic roots is what sanctions the epenthesis. Both reasons have a prosodic basis.

I propose that there is a tendency in the language to disprefer sequences of word-internal monosyllabic feet. This could be interpreted as a form of "anti-clash" or "lapse" avoidance (Kager (1999:175), Eisner (1997)). If this restriction holds, the schwa insertion at the point of clash, i.e., between the feet, becomes predictable. The fact that it is a schwa that is inserted is readily explained by referring to a further unity between this epenthetic vowel and the default glottal stop insertion that occurs to resolve a hiatus in derived environments in the language (Delilkan 2002: §5.2). Both are placeless, so that there is the minimal addition of featural material associated with their insertion. This epenthesis has the added advantage of creating not only an open syllable in the dependent foot of the word, but also the most unmarked foot possible in such a position. It is binary, it is very light/weak, and it avoids Mismatch, as (27) displays. ("L'' denotes a light syllable.)

(27) məŋəpam



Target Dep ft: (Cə.Cə)(CVC)
mə ŋə pam
L L

This account of epenthesis unites the non-fusion case with a non-deletion of a sonorant and avoids compelling schwa epenthesis between a single prefix and a disyllabic root. Epenthesis is permitted only because of a confluence of two impulses in the language -- a preference for open syllables in the dependent foot *and* an avoidance of lapse avoidance at the level of the word.[10] The potential of violating only one of these requirements is not sufficient to compel the epenthesis. Thus, epenthesis does not occur between a prefix and a disyllabic root since there is no lapse violation avoided by it. Between an open prefix and a monosyllabic root, schwa epenthesis could not be motivated by a need to produce an open syllable in a dependent foot since the prefix is not consonant-final (cf. (28).)

(28) di + <u>pam</u> [(di)(pam)], *[(di.ə)(pam)] 'pumped', v. pass.

In the ungrammatical form in (28), an undesirable hiatus would be produced in by such epenthesis. Hiatus avoidance is a priority in the language, as shall be seen in the facts of glide formation and glottal stop insertion (cf. Delilkan 2002:§5.2).[11]

4.2 *Head Feet or Elsewhere?*

The precise location of schwa epenthesis follows from the prosodic structure assumed for the relevant forms. If, as argued in Delilkan 2002: Ch 3, a schwa-headed prefix projects a degenerate foot, it is boosted by such epenthesis to form a more stable disyllabic foot. There would be little sense in the epenthesis occurring elsewhere in the word to achieve lapse avoidance. Any other position in the word would produce hiatuses (cf. (29a-b)), onsetless syllables (cf. (29a-c), or--perhaps worse still--open syllables in the head foot (cf. (29d)).

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[10] Van der Hulst (p.c. 2002) points out that the current analysis cannot, however, be extended to explain the fact that schwa epenthesis does not occur between an r-final prefix and a monosyllabic root. He suggests that the lack of epenthesis in such cases could be the fact that a liquid like /r/ is a less desirable onset than a nasal might be, since less sonorous segments make better onsets, where the current type of epenthesis casts the prefix-final segment as an onset. I propose the further possibility that prefix final /r/ is syllabic in such cases, so that a form like *berhad* ('limited', adj.), from bər + <u>had</u> , is realized as [(br) (had)]. In such a case, the dependent foot does not contain a closed syllable that epenthesis would 'open'. Recall also, that r-deletion is also common in rapid speech, so that [(bə)(had)] may be the output of prefixation, again with an open dependent foot syllable, and again irrelevant for epenthesis.

[11] In the case of glottal stop insertion, Delilkan 2002 (§5) shows that epenthesis is in fact quite clearly a costly move, reserved as a last resort to avoid hiatus.

(29) məN + pam [(məŋə)(pam)]
a. *[(mə.əŋ)(pam)] b. *[(məŋ)(pə.am)]
c. *[[(əməŋ)(pam)] d. *[(məŋ)(pamə)]

Apart from the schwa epenthesis facts of this section, the tendency in the language to favor schwallables at the left edge of a word is reflected in the fact that a large number of trisyllabic roots begin with schwallables, many of them open (cf., Delilkan 2002:App. 3). This pattern coheres with my general claims about prosody in the language. If trisyllabic roots permit single prefixation and if most prefixes are schwallables, this means that the first foot formed in such cases will be double schwa-headed---a relatively weak foot in the prosodically weak domain of the word.

A final fact relating to monosyllabic roots is that no epenthesis accompanies their suffixation. Thus, prefixed monosyllabic roots undergo schwa epenthesis whether or not a suffix is present, as in (30) (over). The facts in (30) could be taken as evidence that lapse restrictions are assessed only on the prefix-root combination, i.e. only within a prosodic word.

(30a-i) məN + waŋ məŋəwaŋ ‘provide financial support’, v.t.

(30a-ii) məN + waŋ+ kan məŋəwaŋkan ‘convert to cash’, v.t.

(30b-i) məN + tʃam məŋə tʃam ‘recognize’,v.t./invol.

(30b-ii) məN + tʃam+kan məŋətʃamkan ‘seek to identify’, v.t.

The suffix does not, for instance, combine with the monosyllabic root and thereby remove the lapse violation that an unepenthesized prefix-root sequence poses. However, a singly suffixed but unprefixed monosyllabic root undergoes no epenthesis either, as (31) shows. (I insert prosodic structure to aid discussion.) The lack of epenthesis in (31) directly supports my claim that head foot syllables are unmarked when closed, for in every case, ungrammatical epenthesis results in an open syllable in a head foot.

(31a) bom+kan [(bom)](kan)], *[(bo.mə)](kan)],*[(bom)](ka.nə)] ‘to bomb’

(31b) lap + ɲa [(lap)](ɲa)], *[(la. pə)](ɲa)], *[(lap)](ka.nə)] ‘wipe it’

My prosodic explanation for epenthesis over non-fusion and sonorant deletion in singly-prefixed monosyllabic roots thus coheres with the larger prosodic structure proposed in the current analysis.

5 Roots and Fusion

The fact that fusion is blocked within roots is the only evidence that morphology plays a role in the distribution of fusion in Malay. Fusion can thus be termed a ‘derived environment’ effect, per Mascaro (1976). Traditional analyses of fusion and more recent ones alike have claimed that the root-internal environment resists fusion (Teoh 1994, Farid 1980, and, on Indonesian, Pater 1996). What is of relevance to the current analysis, how-

ever, is the interaction between so-called 'Root Integrity', on the one hand, and the posited preference for dependent feet resting on open syllables, on the other.

For the interaction between these two forces, consider the facts in (32). Once again, I insert the relevant prosodic information.

(32) sə + umpama a) [(sə.ʔum) (pa.ma)] b) *[(sə.ʔu) (*m*a.ma)] 'likened to'

The fact that fusion is ungrammatical in (32b), even though a dependent foot resting on open syllables results from its application, shows that Root Integrity outweighs the prosodic drive to produce unmarked dependent feet.

6 Summary

In (33), I now recast the dataset with prosodic information superimposed**.**

(33a) Fusion and prosodic location

i.	məN + pukol	[(**mə**)(*m*u.kol)], *[(**məm**) (pu.kol)]
ii.	məN + pəreksa^{+}	[(**mə.*m*ə**) (rek.sa)], *[(**məm.pə**) (reksa)]
iii.	pəN + pər + alat + an•	[[(**pə.*m*ə**) (ra.lat)](tan)]
		*[[(**pəm.pə**) (ra.lat)](tan)]
iv.	məN + kə + muka + kan•	[[(**mə.*ŋ*ə**) (mu.ka)](kan)]
		*[[(**məŋ.kə**) (mu.ka)](kan)]

(33b) No Fusion, and concomitant prosodic information

i.	məN + pər + tadʒam + kan^{+}	[[(məm.pər) (ta.dʒam)] (kan)]
		*[[(**mə.*m*ər**) (ta.dʒam)] (kan)]
ii.	məN + pəlbagaj + kan•	[[(məm.pəl) (ba.gaj)] (kan)]
		*[[(**mə.*m*əl**) (ba.gaj)] (kan)]
iii.	məN + proses $^{+}$	[(məm) (pro.ses)] *[(mə***m***)(ro.ses)]
iv.	məN + pam•	[(mə.ŋə) (pam)], *[(mə) (***m***am)]
v.	tanam + kan	[[(ta.nam)](kan)], *[[(ta.**na**)] (*ŋ*an)]
vi.	kan + kah• (suffixes)	..] (kan)] (kah)] *...] (**ka**)] (*ŋ*ah)]
vii.	tilam kətʃel	[(ti.lam)] [(kə.tʃel)], [(ti.**la**)][*ŋ*ə.tʃel)]
viii.	kampoŋ	[(kam.poŋ)], *[(ka.***m***oŋ)]
ix.	təmpojan	[(təm)(poj.jan)], *[(**tə**)(*m*oj.jan)]
x.	pəN + dapat	[(pən) (da.pat)], *[(pə) (***n***a.pat)]
xi.	mən + tʃipta•	[(mən) (tʃip.ta)], *[(mə) (*ɲ*ip.ta)]
xii.	məN + rawat^{+}	[(mə) (ra.wat)], *[(mə)(***n***a.wat)]

From the body of data in (33a), it can be said that fusion produces open syllables in a dependent foot, whether it occurs between a prefix and a root or between prefixes. The fact that fusion is blocked between prefixes, in (33bi), and between a prefix and a trisyllabic root, in (33bii), even though in each case an open syllable is produced in the dependent foot as a result, in turn shows a further restriction on dependent feet. They may not begin with an open syllable and end in a closed one. I suggest such feet are undesirable be-

cause they respresent a 'Mismatch' (van der Hulst 1986) with the trochaic foot form of the language.

Further evidence that fusion aims at producing dependent feet resting on open syllables is seen indirectly in the fact that cluster-initial roots block fusion, as seen in (3biii). Fusion here would have failed to produce an open syllable in the dependent foot and is therefore not sanctioned. The ungrammatical output here also violates Syllable Contact Law, since the coda nasal resulting from fusion is followed by a more sonorous onset, the liquid /r/.) I have also maintained that fusion is blocked between roots and suffixes (as in (33bv)), between suffixes (as in (33bvi) and between roots (as in (33bvii)) because, in each case, the result of fusion would be a head foot open syllable.

As the last piece of evidence of the relationship between prosodic structure and fusion, the process is blocked in (33bvi), between a prefix and a monosyllabic root. I suggest that the language disfavors sequences of word-internal monosyllabic feet, the schwa epenthesis that does in fact obtain representing a strategy to avoid such a sequence. Unlike the epenthesis, fusion would have failed to produce a prosodically desirable dependent foot, and is therefore blocked. The fact that the epenthesis that does obtain occurs precisely where it does and not, for instance, at the right edge of the monosyllabic root, in turn provides support for my corollary claim that head foot syllables are ideally closed.

In (33bviii) and (33bix) is seen evidence that roots resist fusion, and that this resistance overrides the requirement that dependent feet have open syllables. The fact that (33bx) through (33bxii) do not permit fusion, on the other hand, relates to a broader claim I make in Delilkan 2002, that the featural information of input segments associated with head foot segments may not be obscured. It is beyond the scope of this paper to discuss these last three forms in detail, however. All other sections of the dataset in (33) do follow from the main tenets of this paper, that fusion is prosodically constrained, that dependent feet are ideally composed of open schwallables, and that head feet, by contrast, ideally rest on closed syllables.

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