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), Om (1980), Zahariani (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
ii. maN + pareksa*: maŋ.rek.sa, *mam.pə.... ‘examine’, v.t.
iv. maN + kə + muka + kan*: maŋ.go.mu.ka.kan, *mam.kə...
   ‘reveal’, v.t.

(1b) No Fusion
i. maN + pər + lAdaŋam + kan*: mam.pər.ta.δam.δam.kan ‘sharpen’, v.t.
   *mam.δor.ta.δam.δam.kan
ii. maN + polbagaj + kan*: mam.pol.ba.gaj.kan, *mam.δil.ba.gaj.kan
   ‘diversify’, v.t.
vii. tilam kətjil: tilam kətjil, *tila gətjil ‘small mattress’ (noun phr.)

xii. maN + rαwat: mən. tʃip.ə, *mə.ʃp.ta ‘create’, v.t.

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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 (Delikan 2002).

1 Prosodic word structure
As per Delikan 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 (Delikan 1999 and forward).

(2) 
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                  Wd'
                 / \ 
               Wd'  Wd
              /   \   
            Wd  Wd  | 
          /     \     \ 
         ft  FT  FT  FT
       / \ \ \ \ 
      σ σ σ σ σ σ
    mən tarba lek kan na
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‘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 (Delikan 2002: Ch3). It is corroborated further by the distribution of other segmental processes besides fusion (such as nasal assimilation, sonorant deletion, and gemination) (Delikan 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 + tədʒam + kan [[[məm.pər] (ta.dʒam)] (kan)] ‘sharpen’, v.t. *[[[məmər] (ta.dʒam)] (kan)]

Assuming the prosodic structure the current analysis imposes on such forms, as depicted in (3), Delikan 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).

\[(4a)\] \[\text{məN} + \text{kə} + \text{muka} + \text{kan} \quad \text{[(mə.ɡə) (mu.ka)(kan)]} \quad \text{‘reveal’, v.t.}\]
\[^{*}[\text{(məɡ, kə) (mu.ka)(kan)}]\]

\[(4b)\] \[\text{pəN} + \text{sə} + \text{ragam} + \text{an} \quad \text{[(pə,nə)(ra.gam)](man)]} \quad \text{‘homogenization’, n.}\]
\[^{*}[\text{(pə.nə)(ra.gam)](man)}\]

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).

\[(5)\] \[\text{pəN} + \text{pər} + \text{alat} + \text{an} \quad \text{[(pə.mə) (ra.lat)](tan)]} \quad \text{‘employing as a tool’, n.}\]
\[^{*}[\text{(pə.mə, pə) (ra.lat)](tan)}\]

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.

\[(6a)\] \[\text{məN} + \text{poreksa} \quad \text{[(mə.mə) (rek.za)]} \quad \text{‘examine’, v.t.}\]
\[^{*}[\text{(mə.mə, pə) (rek.za)}]\]

\[(6b)\] \[\text{məN} + \text{palbagaj} + \text{kan} \quad \text{[(mə.məl) (ba.gaj)] (kan)]} \quad \text{‘diversify’, v.t.}\]
\[^{*}[\text{(mə.məl) (ba.gaj)] (kan)}]\]

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.

\[\text{pəN} + \text{pər} + \text{oleh (+ an) pə.mə.ro.leh.han} \quad \text{‘acquisition’, n.}\]
\[\text{Output: Ca.Ca.CV(C).CV(C)}\]

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

\[\text{məN} + \text{kə} + \text{buni} + \text{an} \quad \text{mə.ɡə.bu.mi.kan} \quad \text{‘bury’, v.t.}\]
\[\text{Output: Ca.Ca.CV(C).CV(C)}\]
(7c) Fusion occurs between an N-final prefix and a trisyllabic root with an open first syllable.

\[ \text{mən + pərentah} \quad \text{mə.̄mə.ren.tah} \]
\[ \text{Output: Cɑ.Cɑ.CV(C).CV(C)} \]
\[ '\text{rule', v.t.} \]

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

\[ \text{pən + tərdʒəmah} \quad \text{pə.nər.dʒə.mah} \]
\[ \text{Output: Cɑ.Cɑ.C.CV(C).CV(C)} \]
\[ *\text{pə.nər.dʒə.mah} \]
\[ *\text{Cɑ.Cɑ.C.CV(C).CV(C)} \]
\[ '\text{interpreter', n.} \]

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

\[ \text{mən + tər + bəlek (+ kan)} \]
\[ \text{mə.nər.ba.lek... Output: Cɑ.Cɑ.C.CV(C).CV(C)} \]
\[ *\text{mə.nər.ba.lek..} \]
\[ *\text{Cɑ.Cɑ.C.CV(C).CV(C)} \]
\[ '\text{overturn', v.t.} \]

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) \[ [(\text{Cɑ.Cɑ.C})(\text{CV(C).CV(C)})] \quad (\text{No fusion}) \]
\[ *[\text{(Cɑ.Cɑ.C)(CV(C).CV(C))}] \quad (\text{Ungrammatical fusion}) \]

(8b) \[ [(\text{Cɑ.Cɑ})(\text{CV(C).CV(C)})] \quad (\text{Fusion result}) \]

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 ‘schwa-syllables’ (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: /məmərekəsə/ (memereksa, ‘examine, v.t.’), /məpəlirukan/ (mengelirukan, discommodulate, v.t.), /məmərosəs/ (memeroses, ‘process’, v.t.), /məmərandʒət/ (memeranjat, , shock, v.t.), /məpəlimotkan/ (menyelimutkan ‘cover (as with a blanket’, v.t.), /məpəliskeyd/ (menyelidik, ‘investigate, v.t.’).

2 Further examples are /pəntərdʒəmah/ (penterjemah, interpreter, n.), /məmpələbagai(kan)/ (mempelbagaikan, ‘create variety’, v.t.), and /məmpərdana(kan)/ (memperdanakan, give primacy, v.t.).