

# Overlapping phonological domains in Indonesian

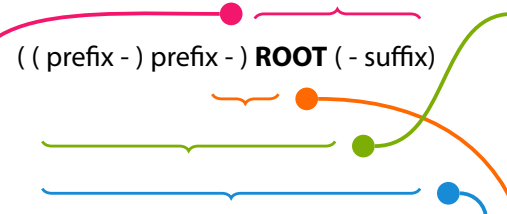
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## Overview

- In Standard Indonesian (SI; Lapoliwa 1981; Cohn 1989), suffixes seem 'closer' than prefixes to lexical roots for some phonological processes but for others, this relation is reversed.
- I argue that this kind of mismatch requires two types of conditioning in phonology: representational (i.e. through reference to prosodic units) and procedural (i.e. through cyclic derivation), as originally proposed by Booij & Rubach (1984).
- I propose an account of the SI data couched in Stratal Optimality Theory, in which some processes are restricted to earlier derivational strata (encompassing roots and prefixes), while others to the prosodic word domain (encompassing roots and suffixes).

(1) Domains of application of phonological processes in Indonesian



## Stress assignment

Normally, in SI the penultimate syllable is stressed. Stress may be placed both on lexical morphemes and on suffixes (L81: 33; C89: 169; S10: 11).

- (2) *Penultimate stress in Standard Indonesian* (C89: 176, 182, 193)
- |                  |                    |              |           |
|------------------|--------------------|--------------|-----------|
| [ˈtʃari]         | 'to look for' (PV) | [ˈmasaʔ]     | 'to cook' |
| [məntʃaˈrikan]   | 'to look for' (AV) | [maˈsakan]   | 'food'    |
| [məntʃariˈkanpa] | 'to look for it'   | [masaˈkanku] | 'my food' |

Prefixes are never stressed.

- (3) *No stress on prefixes* (L81: 128; C89: 182)
- |                      |               |                        |                 |
|----------------------|---------------|------------------------|-----------------|
| [ˈtɪk]               | 'to type'     | [ˈtʃat]                | 'to print'      |
| [diˈtɪk] (*[ˈditik]) | 'to be typed' | [diˈtʃat] (*[ˈditʃat]) | 'to be printed' |

## Other processes

Other processes that apply in the root+suffix domain are k-glottalisation ([ˈmasaʔ] 'to cook' vs. [maˈsakan] 'food'; C89: 193) and closed syllable vowel laxing ([ˈminum] 'to drink' vs. [miˈnuman] 'drink'; L81: 115).

## Hiatus resolution

Within morphemes (4a) and at root-suffix boundaries (4b), vowel sequences in which the first vowel is high tend to be broken up by a glide (L81: 121).

- (4) *Glide insertion* (L81: 91, 121; C89: 192; C&McC98: 45)
- a. [ˈdiam] ~ [ˈdijam] 'quiet'      [buat] ~ [ˈbuwat] 'to do'
- [tiup] ~ [ˈtjup] 'a blow'      [uaŋ] ~ [ˈuwaŋ] 'money'
- b. [ˈhari] 'day'      [ˈburu] 'to hunt' cf. [ˈminum] 'to drink'
- [haˈrijan] 'daily'      [buˈruwan] 'prey'      [miˈnuman] 'drink'

Elsewhere, including prefix-root boundaries (5a) and root-reduplicant boundaries (5b), a glottal stop is used to break up the hiatus.

- (5) *Glottal stop insertion* (C89: 192)
- a. [məŋaˈɖəri] 'to teach'      [diʔaˈɖəri] 'to be taught'
- [ˈindah] 'beautiful'      [kəʔinˈdahan] 'beauty'
- b. [ˈapi] 'fire'      [apiʔapi] 'matches'
- [ˈumbi] 'tuber'      [umbiʔumˈbijan] 'all kinds of tubers'

## Nasal place assimilation and nasal substitution

Within morphemes (6a) and across prefix-root (6b) and prefix-prefix (6c) boundaries, nasals agree in terms of place of articulation with the following stop or affricate (L81: 60).

- (6) *Nasal place assimilation* (L81: 32, 60, 72; S&S10: 129, 251–252, 263)
- a. [ˈambɪl] 'to take'      [ˈindah] 'beautiful'      [ˈɖaŋɖɛi] 'promise'      [ˈtiŋgi] 'tall'
- [ˈpɪmpɪn] 'to lead'      [ˈgantɪ] 'to change'      [ˈkɪŋtʃɪ] 'key'      [ˈmuŋkɪn] 'possible'
- \*[mɪd,mt,mɖ,mʃ,mk,mŋ,nb,np,nɖ,nʃ,ng,nk,nb,np,nd,nt,nŋ,nk,nb,nɖ,nʃ]
- b. [əˈmas] 'gold'      [ˈɖuwal] 'to sell' (PV)
- [məŋəˈmas] 'to become golden'      [məŋˈɖuwal] 'to sell' (AV)
- [bəˈsar] 'big'      [ˈduwa] 'two'
- [məmbəˈsar] 'to become big'      [mənˈduwa] 'to be ambiguous'
- c. [pərbəˈsaran] 'magnification'      [pərbəˈduwa] 'half'
- [məmpərbəˈsar] 'to enlarge'      [məmpərbəˈduwa] 'to halve'

Across the prefix-root boundary, nasal substitution applies instead when the root-initial segment is voiceless (Pater 2001: 171).

- (7) *Nasal substitution* (L81: 106–107; S&S10: 1005–1006)
- [ˈpilih] 'to choose' (PV)      [ˈsapu] 'broom'      [ˈkunɪŋ] 'yellow'
- [məˈmilih] 'to choose' (AV)      [məˈŋapu] 'to sweep'      [məˈnunɪŋ] 'to become yellow'

Both processes fail to apply between two suffixes (8a), across the root-suffix boundary (8b), and between a root and a reduplicant (8c) (L81: 104).

- (8) *No nasal assimilation or nasal substitution* (L81: 36, 104, 106; S&S10: 74, 109, 769, 818; MB)
- a. [maˈsakan] 'food' ([ˈmasak] 'to eat')      [pɪˈlihan] 'choice' ([ˈpilih] 'to choose')
- [masaˈkanku] 'my food'      [pɪliˈhanku] 'my choice'
- b. [ˈbagan] 'sketch'      [rəˈkan] 'associate'
- [məbaˈgankan] 'to sketch'      [rəˈkanku] 'my associate'
- c. [məmbəˈkenkan] 'to make well-known'      [tərbətɔŋ] 'cut into pieces'
- [məmbəkənbəˈkenkan] 'to make more well-known'      [tərbətɔŋˈpɔtɔŋ] 'cut into small pieces'

## Vowel epenthesis

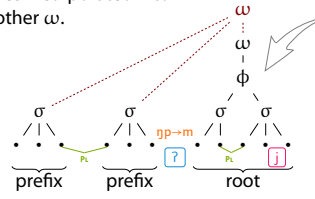
Another process that ignores suffixes is optional vowel epenthesis repairing subminimal roots: [məmˈbom] ~ [məŋəˈbom] 'to bomb'; [pəmbəˈboman] ~ [pəŋəˈboman] 'bombing' (Kao 2015).

## Assumptions and derivation

- Stratal OT (Kiparsky 2000, 2015; Bermúdez-Otero 2011, 2012, 2018): ordered strata with potentially different constraint ranking. The output of one level of evaluation serves as input to the following level.
- Three strata below the sentence level (*Stratal Preprocessing Hypothesis*; Trommer 2011: 75).
- Prosodic structure for SI words adopted from Cohn (1989): suffixes incorporated into the leftmost prosodic word ( $\omega$ ); prefixes adjoined higher, to another  $\omega$ .
- Weighted, rather than ranked, constraints.

### STRATUM 2: Prefixes and roots put together

- Adjoin prefixes to a higher  $\omega$ -node:  $w(O-ANCHOR-\sigma(\omega,L)) > w(FtBIN), w(*\omega)$
- Hiatus resolution:  $w(*VV) > w(CRISPEGE(\omega)) > w(*V_V/iar)$
- Nasal place assimilation:  $w(SHARE(PL)_{NC}) > w(IDENT(PL))$
- Nasal substitution:  $w(CE(\omega)) + w(NC) > w(UNIFORMITY) > w(CE(\omega)), w(NC)$
- Vowel epenthesis:  $w(FtBIN) + w(CE(\omega))/w(UNIFORMITY) > w(DEP(SEG)) > w(FtBIN), w(CE(\omega)), w(UNIFORMITY)$



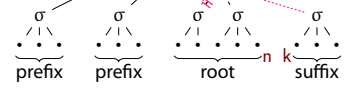
### STRATUM 1: 'Morpheme preprocessing'

- Build prosodic structure: up to  $\omega$  over lexical morphemes, up to  $\sigma$  over prefixes.
- $w(ALIGN-L/R[RT,\omega]) > w(*\omega)$
- $w(HD(\omega)) > w(FtBIN), w(*\phi)$

- (9) *ALIGN-L(Rt, $\omega$ )* (McC&P93, Trommer 2001: 64)
- "Assign \* for every lexical root whose left edge does not coincide with the left edge of a  $\omega$ ."

### STRATUM 3: Suffixes added

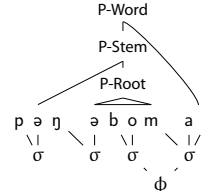
- Adjust prosodic structure:  $ALIGN-R(\omega,\phi); w(FtBIN) > w(EXHAUSTIVITY)$
- No nasal assimilation:  $w(IDENT(PL)) > w(SHARE(PL)_{NC})$
- (Stem) reduplication



## Comparison with alternative approaches

### EXCLUSIVELY PROSODIC CONDITIONING WITH EXPANDED PROSODIC HIERARCHY

- (Inkelas 1989; Downing 1999, 2006; Kao 2015)
- Nasal assimilation prohibited across the right edge of the P-Root.
- Separate metrical hierarchy governs stress.
- ? The lack of vowel epenthesis with [tər-], [bər-] and no prefix (e.g. [bərˈcat] 'painted' vs. [məŋəˈcat] 'to paint'; S&S10: 185) is unexplained.
- ? So is resyllabification with epenthetic but not underlying vowels: [məŋəʔɛkŋəʔɛk] ('to check'; S10: 18) vs. [məŋəndapənˈdap] ('to stalk' S&S10: 268).



### EXCLUSIVELY PROCEDURAL CONDITIONING

- (Scheer 2012, Newell 2018; for glide vs. ʔ-insertion, see e.g. Rubach 2000, C&McC98: 105–106)
- ? Ordering paradox: prefixes should not be available when glide insertion applies but suffixes should; the reverse holds for nasal assimilation.

### LEXICALLY AND MORPHOLOGICALLY INDEXED CONSTRAINTS (Pater 2000, 2007, 2010)

- Glide insertion as the default hiatus resolution strategy; prefixes and reduplicants as exceptional non-undergoers: \*MULTLINK-V<sub>PREF</sub>, \*MULTLINK-V<sub>RED</sub> (glottal-stop insertion as 'last resort')
- Suffixes and reduplicants as exceptional non-triggers of nasal assimilation: \*MULTLINK-PL<sub>SUF</sub>, \*MULTLINK-V<sub>RED</sub> (nasal assimilation *within* reduplicants – B-R correspondence?)
- [məŋ] and [pəŋ] as exceptional triggers of nasal substitution: NC<sub>məŋ</sub>, NC<sub>pəŋ</sub>; [pəŋ] as an exceptional non-undergoer: UNIFORMITY<sub>pəŋ</sub> (this predicts a different repair in /məŋ + pəŋ/?)
- ? Prefixes as exceptional non-undergoers of stress assignment: \*STRESS<sub>PREF</sub>?
- ? Unexplained: vowel epenthesis insensitive to the presence of suffixes

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## Abbreviations

AV	Active Voice	C89	Cohn (1989)	MB	Mike Berger (personal communication)
PV	Patient Voice	C&McC98	Cohn & McCarthy (1998)	McC&P93	McCarthy & Prince (1993)
SI	Standard Indonesian	L81	Lapoliwa (1981)	S10	Sneddon et al. (2010)
				S&S10	Stevens & Schmidgall-Tellings (2010)