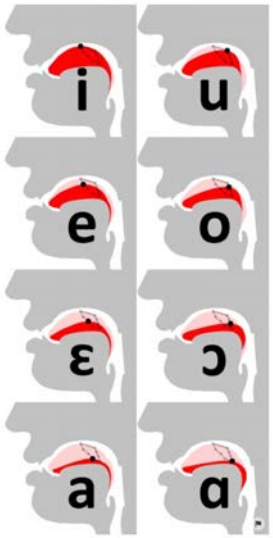



# 24.901/931, 2026
# Introduction to Phonology

Lecture 24

# Last announcements

- Final will include ranking questions comparable to Quiz 2;
- And a data analysis problem.
- List of topics to review and the data to be sent out by 5/16.
- Course evals.

# Recap (i): Faith Base-Derivative (B-D)

- 2 phenomena show effects of Faithfulness of Ds to surface B:

(i) Surface B properties are preserved in the stem of productive Ds

a. Syllabic Cs: D *center-ing* [sɛntɻɪŋ]: cf. B *center* [sɛntɻ]

**IDENT [±SYLL] BD** >> *Ç >> IDENT [±STRESS] IO;

b. Stress: D *jettison-able* [ˈdʒɛɾɪsən-əbl̩] 10000; cf. B *jettison* [ˈdʒɛɾɪsən] 100

**IDENT [±STRESS] BD** >> *EXTLAPSER >> IDENT [±STRESS] IO

(ii) Preservation of ˈVs in truncated Ds.

a. *Elizabeth* [əˈlɪzəˌbɛθ] truncates to *Liz* or *Beth*, not **El* or **Zab* .

b. *MacKenzie* [məˈkɛnzi] 010 truncates to *Kenz-i* not **Mac*.

TEMPLATE (DIMIN) =1σ, **IDENT [±STRESS] BD** >> MAX SEGMENT BD

# Recap (ii): Morphology-Phonology interactions

- Templatic (aka *non-concatenative*) morphology:
  A D is generated by making B's shape fit a fixed shape (*template*).
- M.Hebrew denominal verbs. Template = $C_0iC_0CCeCC_0$. Base = noun

| B (Noun) | D (Verb) | gloss |
|---|---|---|
| telegraf | tilgref | (to) telegraph |
| nostalgia | nistelg | (be) nostalgic |
| faks | fikses | (to) fax |
| torpedo | tirped | (to) torpedo |

Faith B-D effect:
CC cluster in B preserved as CC cluster in D.
to**rp**edo → ti**rp**ed, *t**ri**ped
tele**gr**af → til**gr**ef, *til**g**e**r**f

Affix for a denominal verb in English: *-ize* (*custom-ize*)
'Affix' for a denominal verb in Hebrew: the shape $\mathbf{C_0iC_0CCeC}C_0$

# Reduplication and Faithfulness to SRs

Basic word (B): *abcd*
Reduplicant (RED): an affixal copy of B (+ reshaping B to fit a template)
Derived word created by reduplication:

- prefixed: ***abcd****-abcd*, ***ab****-abcd*, ***ad****-abcd*
- suffixed: *abcd-****cd***
- infixed: *ab-****b****-cd*

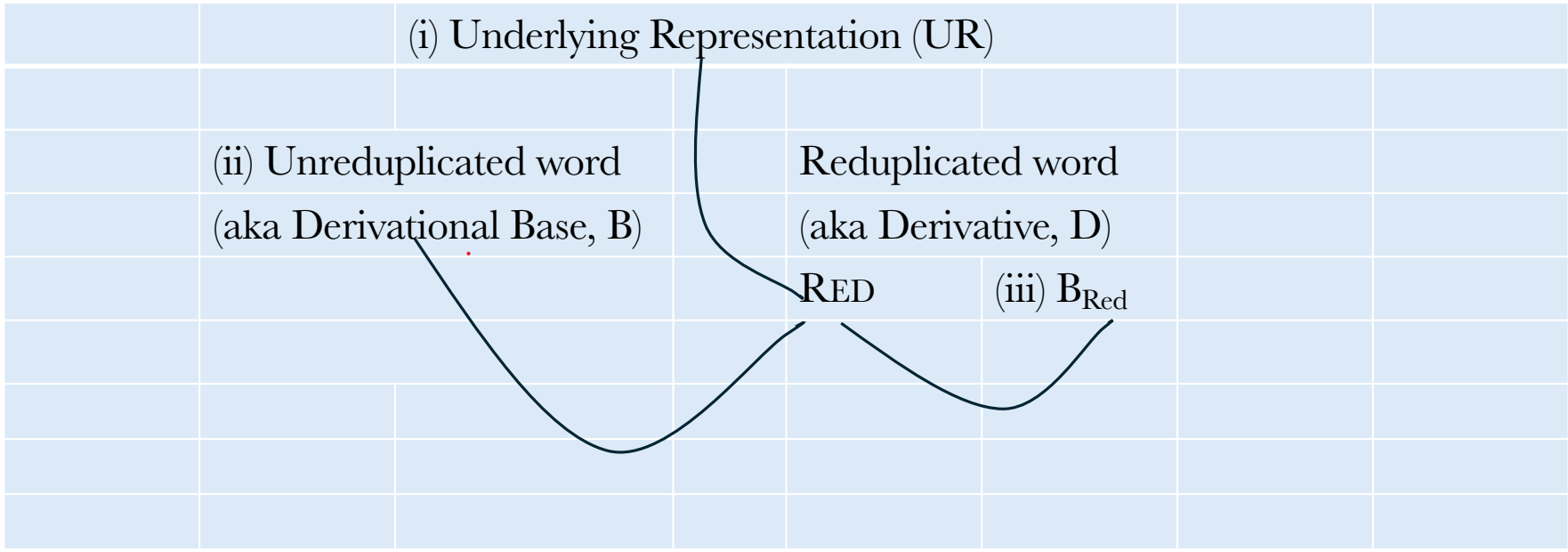
RED expresses most morpho-syntactic features:

- lexical category (N, V, Adj), number, tense, mood,…

# What reduplication teaches us

- RED can simultaneously have **multiple potential inputs**
  - (i) the B's UR
  - (ii) its Derivational Base (B)
  - (iii) its Reduplicating Base ($B_R$)
    - $B_R$ = the surface string in B that contains segments corresponding to those in RED
- Grammar seeks to both satisfy M and preserve similarity $B_{Red} \leftrightarrow$ RED, $B_{Red} \leftrightarrow B$
- Processes can overapply or underapply to preserve such identities
- Rule systems can't generate some identity patterns $B_{Red} \leftrightarrow$ RED
- A constraint-based system, with Faith Red-$B_R$ generates them all.

# 3 Inputs to RED



# Part 1: Copying mechanisms in reduplication

# Impoverished morphs as UR sources of RED
(Marantz 1982 LI)

- Some morphemes lack underlying segments

  i. They can be Ø (some English PT: hit/hit, etc.)

  ii. Or consist of tone, or another other feature (Hausa, Bantu, Niger-Congo, …)

  iii. Or just a fixed CV-shape imposed on existing stem (Arabic, Hebrew templates)
- Some of these morphemes express affixes by copying nearby strings.
- Without copy, they couldn't surface.

# Ilocano plurals, a Marantz 1981-style analysis

| | | | |
|---|---|---|---|
| kaldíŋ | kal-kaldíŋ | 'goat' | |
| púsa | pus-púsa | 'cat' | RED underlined |
| kláse | klas-kláse | 'class' | |
| róʔot | ro:-róʔot | 'litter' | (*roʔ-roʔot: *ʔC) |
| raʔót | ra:-raʔót | 'ambush' | |

Plural template: a heavy syllable ($\overline{\sigma}$), but no segments.

Marantz's RED algorithm applied to Ilocano
(i) Concatenate affix; here, $\overline{\sigma}$ ; (ii) Copy root segments
(iii) Associate empty $\overline{\sigma}$ to copied root segments, LR for prefix, RL for suffix.
(iv) Ensure template is maximally filled: *ro-róʔot

# Ilocano in OT: SR condition on prefix, instead of UR shape

| B: RED, kaldiŋ | RED = σ̄ | MAX SEG IO |
|---|---|---|
| ☞kal-kaldiŋ | | *** |
| kaldiŋ-kaldiŋ | *! | |

RED = σ̄
RED must be one heavy σ

| B: RED, daʔit | RED = σ̄ | *ʔC | I-CONTIG | MAX SEG IO | ID [±LONG] IO |
|---|---|---|---|---|---|
| ☞dad-daʔit [d:] | | | | *** | * |
| daʔ-daʔit | | *! | | ** | |
| da-daʔit | *! | | | *** | |
| dat[1]-daʔit[1] | | | *! | ** | |

Different dialects of Ilocano ensure heavy syllable prefix in different ways,:
some lengthen V some lengthen C

# Copying algorithm vs. Output conditions

- Marantz's algorithm ensures that *something* is copied
- It requires that *a contiguous string* be copied
- It ensures indirectly that *copied strings land next to source*:

  'associate LR if RED =prefix, RL otherwise'
- It explains why *ʔC leads to lengthening by using empty template slots:

  RED template is a heavy σ, = 2 X's in its rime.
- An OT analysis achieves same objectives, with fewer stipulations.
- The OT mechanics are all necessary aspects of Correspondence Theory, the component of OT dealing with Faithfulness constraints.

# E.g. independent need for I-CONTIGUITY

- MAX BD effects: copy the *maximum string* that fits into one syllable

| | |
|---|---|
| Herbert → Herb, Bert | *Her, Ber |
| David → Dave [deɪv] | *D[eɪ] |
| Maxwell → Max | *Mack |

- I-CONTIGUITY (BD) >> MAX BD: *but don't skip any segments*

| | |
|---|---|
| Diana → Di [daɪ] | *D[aɪn] |
| Stuart → Stu | *Stut |
| Howard → How(ie)_ | *Howd |

- Ilocano also ranks I-CONTIGUITY >> MAX BD
  That's why it's driven to lengthen V's or C's in *da:daʔit, dad:aʔit* instead of copying distant C.

# Copying algorithm vs. F constraints

- The clauses of Marantz's copying algorithm are non-negotiable
- While the OT F constraints are violable
- Contiguity Input-Output is undominated in Ilokano,
  but selectively violated in RED cases
- Constraints conflicting with and dominating I-Contiguity in parens

| | |
|---|---|
| Tagalog trabajo →ta-trabaho | (ANCHOR L, *COMPLEX) |
| Semai kmrʔɛ:c →kc̣-kmrʔɛ:c | (ANCHOR R; RED = MINOR σ) |
| Temiar kɔ̃w →kw̥-kɔ̃w | (ANCHOR R; RED = MINOR σ) |

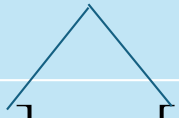
ANCHOR L/R: the leftmost/rightmost segment in $B_{Red}$ corresponds to the leftmost/rightmost in RED

# More detail on Semai and Temiar

- Semai:
    - i. kɔh → kḥ.kɔh ‘to be chopping off’
    - ii. ci:p → cp̣.ci:p ‘to be walking’
    - iii. kʉʔ → kʔ.kʉʔ ‘to be vomiting’
- Temiar:
    - i. kɔ:w → kw̥.kɔ:w ‘to be calling’
    - ii. ca:ʔ → cʔca:ʔ ‘to be eating’
    - iii. lug → lg̊.lug ‘to be laughing’

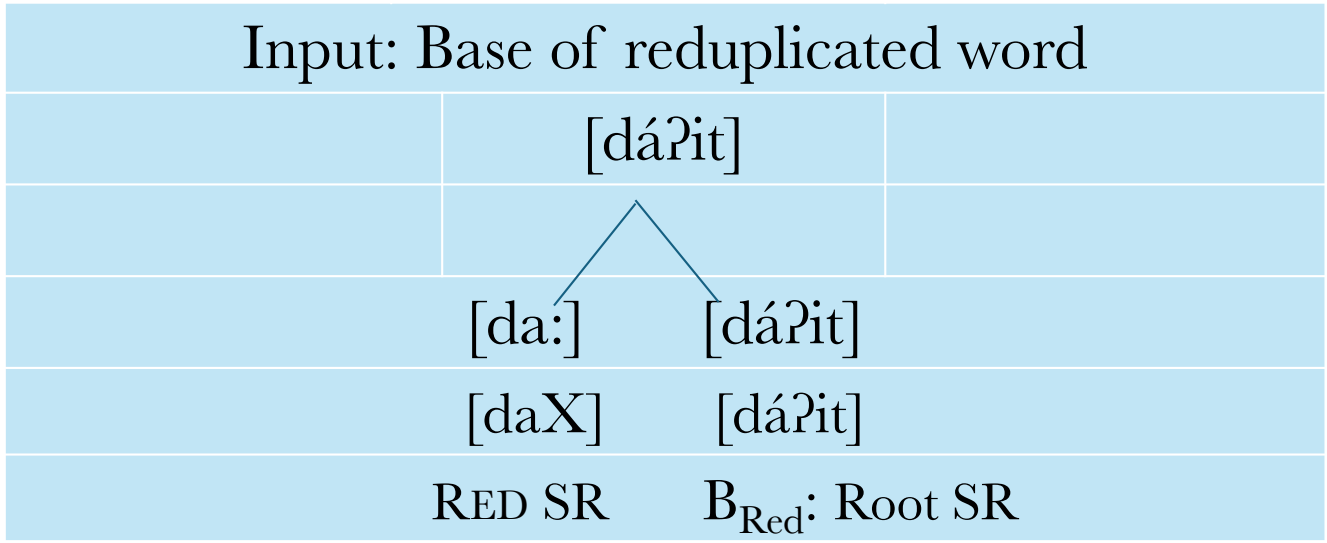
# Sources of RED and Faith evaluations

# Input and Output in RED

| Input: UR of root | | |
|---|---|---|
| | /daʔit/ | |
| |  | |
| [da:] | | [daʔit] |
| [daX] | | [daʔit] |
| RED SR | | $B_{RED}$ = Root SR |

RED and Root are evaluated by IO Faith relative to the same UR

# Input and Output in RED




or by BD Faith relative to the same B

# How much to copy: one view

1. RED copies enough to fill a specific prosodic unit:
   syllable (heavy or light), or a foot
   Diyari (Australian) *ŋápiri* 'father' *ŋápi-ŋàpiri* 'fathers'
   Template constraints like RED = 1σ, RED = 1 stress group
2. RED copies the smallest copied string satisfying M constraints on CVs
   Pima (Uto-Aztecan, Arizona)
   *má.vi̱ʟ 'lion' má-m.-vi̱ʟ* 'lions': *C:
   *hó.ɖai 'rock' hó-ho-ɖai* 'rocks': *hC

   Pima limits to the minimum any copied material:
   INTEGRITY: 1* for each UR seg, *with more than 1* SR correspondent

# Diyari and Pima REDs

| Diyari | ŋapiri, PLUR | RED =σ́σ | INTEGRITY |
|---|---|---|---|
| ☞a. | ŋ̲apiˌ-ŋapiri | | **** |
| b. | ŋ̲a-ŋapiri | *! | ** |

| Pima | mavit̪, PLUR | *C: | INTEGRITY |
|---|---|---|---|
| ☞a. | ma-m̲-vit̪ | | * |
| b. | m̲a-mavit̪ | | **! |
| c. | mav̲:it̪ | *! | |

Infixation in Pima could be due to the need to copy just 1 segment, +M

# How much to copy: a different view (Zukoff 2017)

RED always copies the smallest copied string satisfying all M F constraints

| Diyari | ŋapiri, PLUR | STRESS L | *CLASH | IDENTSTRESSBD | INTEGRITY |
|---|---|---|---|---|---|
| ☞a. | ŋ̲ápi-ŋàpiri | | | | **** |
| b. | ŋ̲a-ŋápiri | *! | | | ** |
| c. | ŋ̲à-ŋápiri | | *! | | ** |
| d. | ŋ̲á-ŋapìri | | | *!* | ** |

# Where to put RED

- Prefix: most data thus far
- Suffix: Dakota *yamní* 'is three' *yamni-<u>mni</u>* 'are three'
  Manam *salága* 'be long' *salaga-<u>lága</u>, malabóŋ* 'fox' *malaboŋ-<u>bóŋ</u>*
- Infix: Pangasinan *libro* *<u>li</u>-libro* 'book'
  *amigo* *a-<u>mi</u>-migo* 'friend'
- Use some form of ALIGN for prefix/suffix RED.

  ALIGN AFF E (gradient): one * for every segment intervening between edge E of AFF and edge E of Prosodic Word. (AFF can be RED)

  Non-gradient variant of this assigns one * for any intervening string (...)
- Use M or other F constraints >> O-CONTIGUITY for infixing RED.

# Manam suffix RED vs. Pima infix RED

| Manam | malaboŋ, NOM | ALIGN RED R, W, R | O-CONTIG |
|---|---|---|---|
| ☞a. | malaboŋ-boŋ | | |
| b. | mal-malaboŋ | *!(or more) | |

| Pima (i) | mavit̪, PLUR | ANCHOR L | INTEGRITY | O-CONTIG | ALIGN RED, L |
|---|---|---|---|---|---|
| ☞a. | ma-m-vit̪ | | * | * | ** |
| b. | ma-mavit̪ | | **! | | |
| c. | a-mavit̪ | *! | * | | |

| Pima (ii) | hódai, PLUR | ANCHOR L | INTEGRITY | O-CONTIG | ALIGN RED, L |
|---|---|---|---|---|---|
| ☞a. | hó-ho-d̪ai | | ** | * | |
| b. | ó-hod̪ai | *! | * | | |

CONTIGUITY (IO): One * for every pair xy in UR (or B), if x adjacent to y, xy have correspondents x'y' in O (or D) and x' is not contiguous to y'

ANCHOR (I-RED): One * for every RED whose left segment does not correspond to the left segment of the input

# The source of copied material in RED

a. Most common: a string adjacent to RED, and peripheral in the $\text{Base}_{\text{RED}}$

Dakota *gleshka-<u>shka</u>*

b. Sometimes: string closest to RED modulo other factors,

Sanskrit *<u>ti</u>-stambh-iṣ-a,* Pima *ma-<u>m</u>-viṭ,*

c. Once: both edges of Base or $\text{Base}_{\text{RED}}$

Ulu Muar Malay *kawan* 'friend' *<u>kaŋ</u>-kawan, diam* 'remains silent' *<u>din</u>-diam;*

d. A few times: a stressed syllable

Samoan *a-<u>lo</u>-lófa* 'love-X'

In general, case (a) is the default: what we get absent any reason to deviate from adjacency between $\text{Base}_{\text{RED}}$ and RED.

# Woleaian (Trukic, Austronesian, Yap, Micronesia)

| Basic word | Progressive aspect | Intransitive |
|---|---|---|
| kepate | kek-kepate | kepate-pate |
| metafe | mem-metafe | metafe-tafe |
| perase | | perase-rase |
| pirafe | pip-pirafe | |
| ɣeraɣe | kek-keraɣe | ɣeraɣe-raɣe |
| raŋe | ʧeʧ-ʧaŋe | raŋe- raŋe |

RED can be both prefixal and suffixal in Woleaian, depending on syntactic category expressed. But both RED strings must be adjacent to their source in the root.

**LOCALITY: One * for each segment separating a copied string from its correspondent.**

# Woleaian REDs at both ends of the word

| (i) | kepate, $RED_{INTRANS}$ | ALIGN $RED_{INTRANS}$, R, W, R | LOCALITY |
|---|---|---|---|
| ☞a. | kepate - pate | | |
| b. | kepate - kepa | | *!* (te) |
| c. | kepa-kepate | *!***** | |
| d. | pate-kepate | *!***** | ** (ke) |

| (ii) | kepate, $RED_{PROG}$ | ALIGN $RED_{PROG}$, L, W, L | LOCALITY |
|---|---|---|---|
| a. | kepate - pate | *!***** | |
| b. | kepate - kepa | *!***** | ** (te) |
| ☞c. | kepa-kepate | | |
| d. | pate-kepate | | *!* (ke) |

The shorter progressive RED – *kek-kepate* < *kep-kepate* – due to CVC template.

Without Locality, opposite-side candidates (b,d) must be excluded by separate ad-hoc rankings of Anchor

# Pangasinan infixing

- libro, li-libro
- amigo, a-mi-migo

| amigo | | LOCALITY | ONSET | ALIGN RED L | O-CONTIG |
|---|---|---|---|---|---|
| a. | a-amigo | | **! | | |
| ☞b. | a-mi-migo | | * | * | * |
| c. | ami-go-go | | * | **!* | * |
| d. | amigo-go | | * | **!*** | √ |
| e. | a-go-migo | *! | * | * | * |

# How much gets copied in partial RED

- RED is a simplified version of the copied string

  Sanskrit intensive *prath-* 'spread' *pa:-prath-* 'spread-INTENS'

  *sjand* 'scatter' *san-sjand* 'scatter-INTENS'

- RED is a version of the copied string with added segments/features

  Sanskrit intensive *kri:ɖ* - 'play' *ʧe:-kri:ɖ* - 'play-INTENS'

# 2 analyses of cluster simplification in RED

Sanskrit intensive *sjand* 'scatter' *san-sjand-* 'scatter-INTENS'

| | sjand-, INTENS. | $RED_{INT}$ = heavy σ | INTEGRITY | MAX IO |
|---|---|---|---|---|
| ☞a. | san-sjand- | | *** | |
| b. | sjand-sjand- | | ****!* | |
| c. | sa-sjand- | *! | ** | |

| | sjand-, INTENS. | $RED_{INT}$ = heavy σ | *COMPLEX | MAX I O |
|---|---|---|---|---|
| ☞a. | san-sjand- | | | ** |
| b. | sjand-sjand- | | *!* | |
| c. | sa-sjand- | *! | | *** |

MAX I RED: one * for each segment in UR (=I) that lacks a correspondent in RED

# Summary

- **Why copy anything?**

  RED is the SR realization of affix that lacks segments.

- **Why copy just a little bit? Why not everything, always?**

  Copying violates INTEGRITY. Best RED is shortest.

  All morphemes, including RED, may have conditions on their shape: 1σ, 1stress group

  These force extra ** of INTEGRITY.

  Other violations of INTEGRITY due to M constraints. Full copy: TBD

- **Where is** RED **located in relation to its source? Which part is copied?**

  Regular ALIGN RED L/R, WORD L/R constraints decide RED placement.

  Infix Red typically due to M constraints.

  RED is best located next to its source, where identity to it can be appreciated: LOCALITY.

# Mis-application of phonology in RED

- Wilbur (1976): Rules over/under-apply to keep RED identical to $B_{Red}$
- Similar to over/under-application of phonology in Derivatives

  **under-application**: M violated to keep B-D similar

  *opáque-ish-ness*: no stress on *–ish*, even though it's heavy,

  no shortening of VV [eɪ], as in Class 1 *op*[ǽ]*city*

  **over-application**: M violated to keep B-D similar

  *center-ing*: /r/→[ɽ] even though SSC would not be violated by cen[tr]ing

# Overapplication in reduplication

A process is expected to apply in the stem of a reduplicated word ($Base_R$)
But not in RED.
Instead it applies in both RED and $Base_{Red}$

Or, the process is expected to apply in RED.
But not in $Base_{Red}$
It applies in both.

# $B_{RED}$ forced to adjust to RED

- Guarijío (Uto-Aztecan; Caballero 2006)

| V | start V-ing |
|---|---|
| toní 'boil' | to-tó |
| sibá 'scratch' | si-sí |
| muhíba 'throw' | mu-mú |
| nogá 'move' | no-nó |
| suhkú 'scratch body' | su-sú |

An instance of *templatic copy-back*:
template forces RED to be short, then $B_{Red}$ compresses to match RED'S size

# Two analyses of Guarijío

| | toní, INCHOATIVE<br>B [toní] | MAX<br>$B_{RED}$-RED | TEMPLATE<br>RED = 1σ | MAX BD |
|---|---|---|---|---|
| a. | <u>toní</u>-toní | | *! | |
| b. | <u>to</u>-toní | *!* | | ** |
| ☞c. | <u>to</u>-tó | | | **, ** |

| | toní, INCHOATIVE<br>B [toní] | MAX<br>$B_{RED}$-RED | INTEGRITY | MAX BD |
|---|---|---|---|---|
| a. | <u>toní</u>-toní | | ***!* | |
| b. | <u>to</u>-toní | *!* | ** | ** |
| ☞c. | <u>to</u>-tó | | ** | **, ** |

Templatic alternative to INTEGRITY: RED = 1σ

Same conclusion: $B_{RED}$ is compressed to fit size of RED

# Paamese (Austronesian; Russell 1997, in Archangeli et al. ed. OT)

- Reduplication combines with vowel harmony, which misapplies
- RED = Prefix, as in 1st two forms

| Base | Reduplicated D | Gloss | |
|---|---|---|---|
| hi.te.a.li | hi.te-hi.te.a.li | laugh | |
| hu.la.i | hu.la-hu.la.i | spray | |
| mu.ni | mu.nu-mu.nu | drink | *munu-muni |
| u.hi | u.hu-u.hu | blow | *uhu-uhi |
| lu.hi | lu.hu-lu.hu | plant | *luhu-luhi |

Vowel Harmony = *i/_(C)u, abbrev. *i/_u

# An analysis of Paamese

| | /muni/<br>B [muni] | *i/_u | IDENT ROUND<br>$B_{RED}$-RED | IDENT ROUND<br>IO/BD |
|---|---|---|---|---|
| a. No harmony | muni -muni | *! | | |
| b. $B_{RED} \neq$ RED | munu -muni | | *! | * |
| ☞c. $B_{RED}$ copies RED | munu -munu | | | ** |

# A rule analysis of Paamese?

| **UR** | **muni** | | **UR** | **muni** |
|---|---|---|---|---|
| Vowel Harmony | - | | Reduplicate | muni-muni |
| Reduplicate | muni-muni | | Vowel Harmony | munu-muni |
| SR | *muni-muni | | SR | *munu-muni |

# Reduplication with re-copy

- In rule-terms this pattern can be described thusly:

(a) RED is created

(b) Rule applies between RED and the $B_{Red.}$ It changes $B_{Red}$

(c) Shape of RED is readjusted, to remain identical to changed $B_{Red}$

- Step (c) requires an Output-to-Output, RED-to-$B_{Red}$, identity condition.

# Woleaian gemination and stopping (<$C_iC_i$> = [$C_i$:])

| Transitive | | Intransitive | | |
|---|---|---|---|---|
| pileɣü-w | bundle it | ppileɣü | be bundled | |
| sawee-y | go along side | ssawe | go along side of [sic] | |
| taariŋa | be ripped | ttariŋa | to be ripped off | |
| tabee-y | follow it | ttabe | to follow | |
| ɣemate | touch | kkemate | be touched | [k:] |
| βüŋü-ti | fall on it | bbüŋü | fall on | [b:] |
| βuɣa | boil it | bbuɣa | boil | [b:] |
| raɣo-mi | hug it | ccaɣo | hug | [ʧ:] |
| ʃaɣee-y | chase it | ccaɣe | chase | [ʧ:] |

# Geminate constraints in Woleaian

- Geminate Cs can't be approximants
  *[+long, +son, +cont]: *β:, *r:, *l:

- Palatal geminates can't be [+cont]
  *[+long, -ant, +cont]: *ʃ:

- Velar geminates can't be voiced, must be stops
  *[+long, +voice, -ant]: *ɣ:

# Woleaian Progressive: a CVX RED

| Transitive | Progressive | [All $C_1C_1 = C_1$:] | |
|---|---|---|---|
| metafe | memmetafe | to become clear | |
| pirafe | pippirafe | to be stealing | |
| saʃee-y | sessaʃe < saC-saʃee- | to scrutinize | [aCa → eCa] |
| taɣee-y | tettaɣe < taC-taɣee- | to ride | [V:# →V#] |
| tela-ti | tettale < taC-tale- | to discuss | [aCa → eCa] |
| toro-fi | tottoro | to catch | |

RED= Heavy 1σ prefix,
- or "Keep Integrity violations to a minimum: geminate C"

# Woleaian Progressive: consequences of gemination

| Transitive | Progressive | | |
|---|---|---|---|
| • ɣematefa | kekkematefa | *ɣekkematefa | be explaining it |
| • ɣettape | kekkatepa | *ɣekkatepa | to be touching it |
| • lüwanee-y | nünnüwane | *lünnüwane | to think |
| • raŋe | ceccaŋe | *reccaŋe | apply powder |
| • ro-si | cocco | *rocco | to decorate |
| • ʃalü-w | ceccalü | *reccalü | to stick to |

*[+long, +son, +cont]: *r:, *l:
*[+long, -ant, +cont]: *ʃ:
*[+long, +voice, -ant]: *g:

| | /ɣetape/, Progressv Base: [ɣetape] | *ɣ: | ID VOICE $B_{RED}$-RED | IDENT VOICE IO/BD |
|---|---|---|---|---|
| a. No devoicing | ɣeɣ:etape | *! | | |
| b. $B_{RED}$ ≠ RED | ɣek:etape | | *! | * |
| ☞c. RED recopies altered $B_{RED}$ | kek:etape | | | ** |

# A rule analysis of Woleaian?

**Scenario 1**

| **UR** | **ɣetape** |
|---|---|
| Geminate Strengthening | - |
| Reduplicate | ɣeC-ɣetape |
| Geminate | ɣeɣ:etape |
| SR | *ɣeɣ:etape |

**Scenario 2**

| **UR** | **ɣetape** |
|---|---|
| Reduplicate | ɣeC-ɣetape |
| Geminate | ɣeɣ:etape |
| Geminate Strengthening | ɣek:etape |
| SR | *ɣek:etape |

Scenario 2 comes closer, but fails, because the rule-system offers no incentive to re-copy RED once it has been provided with segments. This problem stems from absence of BRed-Red Faith.

# Underapplication in reduplication

A process is expected to apply in just the $\text{Base}_R$
Or just in RED. Not in both.
It applies in neither

# Japanese mimetic reduplication (Ito & Mester 1996)

- Intervocalic g→ŋ (*VgV):
  *gai-koku* 'foreign country' vs. *koku-ŋai* < *koko-gai* 'abroad'
- ŋ does not occur initially: *[ŋ.
- Reduplicated g-initial words block g→ŋ
  *gara-gara, *gara-ŋara, *ŋara-ŋara* 'rattle'
- Not a simple case of BD Faith
  *gai* in *koku-ŋai* does undergo nasalization

| | INTENSIVE, gara | *[ŋ | IDENT[±NAS $B_R$-RED | *VgV | IDENT [±NAS] IO/BD |
|---|---|---|---|---|---|
| a. over-application | ŋara-ŋara | *! | | | ** |
| c. normal application | gara-ŋara | | *! | | * |
| d. under-application | ☞ gara-gara | | | * | |

# English ‘aggressive reduplication’

counts = adjusted Google hits, 1st item is standard; Zuraw Phonology 2002

- sherbert 12,000 sherbet 62,900 əərT-əəT -> əərT- əərT
- pompom 15,500 pompon 17,700 pɑm-pɑn -> pɑm-pɑm
- orangutang 6,130 orangutan 55,600 æŋ-æn -> æŋ - æŋ
- Okeefenokee 1,430 Okefenokee 17,400 okəə-oki -> oki-oki
- hari-kari 8,430 hara-kiri 11,100 ara-iri -> ari-ari
- smorgasborg 1,740 smorgasbord 71,500 ɔrg-ɔrd -> ɔrg - ɔrg
- sancrosanct 201 sacrosanct 39,500 æk-æŋk -> æŋk - æŋk
- perservere 8,040 persevere 172,000 əərF-əəF -> əərF - əərF
- Inuktituk 751 Inuktitut 23,500 ɪCʊk-ɪCʊt -> ɪCʊk -ɪCʊk
- Abu Dhabu/Abi Dhabi 126/67 Abu Dhabi 135,000 abu-abi -> abu-abu, abi-abi
- asterist/askerisk 57/110 asterisk 613,300 VsT-VsT -> Vsk-Vsk, Vst-Vst

Similarity triggers correspondence.
Correspondence requires identity.
Non-standard form enforces it.
It ranks:
Faith $B_{RED}R$ >> Faith IO

# Summary overall, and factorial typology

- All rankings of FAITH $B_{RED}$ RED relative to M and Faith I-O/BD are attested.
- Normal application: M >> FAITH IO/BD >> FAITH $B_{RED}$ RED
- Over-application: M, FAITH $B_{RED}$ RED >> FAITH IO/BD
- Under-application:

  {Other M, or Other CORR} FAITH $B_{RED}$ RED >> M >> FAITH IO
- Overapplication with recopy or copyback are rare, but clearly attested as well. They argue for FAITH $B_{RED}$ RED constraints.
- Simple overapplication is very common.
- Same factors in Agressive Reduplication
- Similar evaluations of syntagmatic identity in poetic rhyming

# Overall conclusion

- OT has two properties that come in handy in analyzing reduplication.

(1) General faithfulness component applicable to all relations, incl. RED-BRED
  - Over/under application data in reduplication needs that. (cf. slide 44)
  - Also Faith details in mapping the Base to RED:
    I-CONTIGUITY (to copy only adjacent segments: slide 11)
    INTEGRITY (to minimize copied segments: cf. slide 21)

(2) The one-step mapping from Input to Output.
  - That enforces parallel satisfaction of all conditions on RED-words:
    (i) copy $B_{Red}$, (ii) placement of RED (effects of Markedness and of Locality: slides 26; 27),
    (iii) the phonological consequences of making a copy (slides 34, 36, 43, 47)

The parallel computation aspect of OT seems to facilitate an analysis of reduplication.
We wouldn't expect this had grammatical computation been based on ordered rules.