Grammatical tone in Izon at the syntax/phonology interface

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Grammatical Tone (GT)

• Consider the Central Igbo data
  ◦ /LL/ /àgbà/ ‘jaw’
  ◦ /LL/ /èŋwè/ ‘monkey’

• Two nouns in an associative construction appear with a high tone on N1
• àgbà + èŋwè = [ àgbá èŋwè ] ‘monkey jaw’
GT at the interfaces

• GT is ripe for interface study where Phonology, Morphology, Syntax, and Semantics all meet

• However, in general interface studies are disconnected
  ◦ **Syntax**
    ◦ Minimalism/Generative syntax
  ◦ **Morphosyntax:**
    ◦ Distributed Morphology (DM)
  ◦ **Morpho-phonology:**
    ◦ Stratal OT/Cophonology Theory/Indexed Constraints/Output-Output Correspondence
  ◦ **Prosodic hierarchy:**
    ◦ Match Theory
  ◦ **Intonation/information structure:**
    [see Büring 2013 for extensive references]

• Leaves practicing ‘interface-ists’ wondering how to fit it all together [e.g. Scheer 2011]
Morpho-syntactically restricted phonology

• Grammatical tone is one of several phenomena which display **morpho-syntactically restricted phonology**

• The application of some process P depends on both phonological information in its relevant environment, and morphological/syntactic information
  
  ◦ E.g. Class I and class II suffixes in English
  
  **párent**  **parént-al**  **párent-ing**
Prosodic overwriting

• In a specific morpho-syntactic environment, underlying prosody is overwritten, e.g. Izon

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Noun</th>
<th>Tone patterns in isolation</th>
</tr>
</thead>
</table>
Izon language

• Fieldwork on Izon supports a restrictive theory of prosodic overwriting

• Cross-linguistically, *whether* an environment shows prosodic overwriting is to a large extent synchronically arbitrary

• However, *when* morpho-syntactically conditioned prosodic overwriting is found, the *scope* of process is determined by morphosyntax
“Dominant tone asymmetry”

• Prosodic overwriting
  ◦ The trigger **must** be higher than the target (K→H)
  ◦ The target **cannot** be higher than the trigger (H-/-→K)

Road map

• Part 1) The phenomenon: Grammatical Tone
• Part 2) A case study from Izon
• Part 3) Discussion of contributions to interface studies
Part 1) The phenomenon: Grammatical Tone (GT)
Map of tonal languages [WALS – Maddieson 2013]
Tonological processes

/ máyọmí rà wé /
má yọ mí rà wé → [máyọmǐ râ wě]

H L H L H
‘Mayomi bought books’

Towards a larger typology of GT

• Recent years have seen a surge of individual in-depth descriptive works on GT, e.g.:

• Dogon family

• Gur family
  ° [Hyman & Olawsky 2004, Roberts 2016]

• Bantu family
  ° [Odden & Bickmore 2014, Marlo et al. 2015]

• Ijoid family

• Chadic family
  ° [Schuh 2017, a.o.; numerous Hausa]

• Nilotic family
  ° [Andersen 1995, Trommer 2011]

• Oto-Manguean family

• Urarina language of South America
  ° [Olawsky 2006]

• Japonic lects
  ° [Kubozono 2016, Kubozono & Giriko 2018]

• ...among many others
Towards a larger typology of GT

• Contributions of (grammatical) tone to linguistic inquiry outside of phonology are not apparent, e.g. across morphological theories of different stripes
  ◦ [Paradigm Function Morphology - Stump 2001; Distributed Morphology - Halle & Marantz 1993; Construction Morphology - Booij 2010a,b]

• GT has long been ignored in morphology textbooks...

• ...and only marginally discussed in morphology handbooks and overviews
  ◦ [Spencer & Zwicky 1998, Hippisley & Stump 2017]

• Limited discussion of GT even in books dedicated to tone
  ◦ [Fromkin 1978, Chen 2000, Yip 2002, Wee forthcoming; an exception is Palancar & Leonard 2016]
Towards a larger typology of GT

• tonal morpheme

• tonal affix/affixal tone
  ° [Yip 2002:115]

• tonal particle
  ° [Yip 2002:114]

• tonal suprafixed
  ° [Remijsen 2010: 289-290]

• tonal overlay
  ° [McPherson & Heath 2016]

• inflectional tone
  ° [Palancar & Leonard 2016]

• replacive tone
  ° [Welmers 1973:132-133]

• meaningful tone
  ° [Ratliff 2010]

• morphological tone
  ° [Palancar 2016; Zimmermann 2016]

• morphosyntactic tone
  ° [Palancar 2016:113]

• melodic tone
  ° [Odden & Bickmore 2014]

• floating tone
  ° [Voorhoeve 1971; Hyman & Tadadjeu 1976]

• phrasal grammatical tone
  ° [McPherson & Heath 2016]

• grammatical use of tone
  ° [Ladefoged & Johnson 2011]

• morphological use of tone
  ° [Gussenhoven 2004:46]

• syntactic use of tone
  ° [Gussenhoven 2004:46]

• tonosyntax
  ° [Heath & McPherson 2013]

• construction tonology
  ° [Harry & Hyman 2014]

• melody replacement
  ° [Rodewald 1989]

• construction-specific tonology
  ° [Yip 2002:107]

• compacité tonale
  ° [Green 2018]

• tone perturbation
  ° [Pike 1948:25; Mak 1950]

• tone change (Chinese: bianyin; cf. biandiao ‘tone sandhi’)
  ° [Chen 2000:30-31]

• semantic-tonal process
  ° [Kam 1980]
What is grammatical tone then?

• **Grammatical tone (GT):** a tonological operation which is (1) not general across the phonological (i.e. tonological) grammar, and (2a) is restricted to the context of a specific morpheme or construction, or (2b) a natural class of morphemes or constructions
  ◦ (i.e. *grammatically conditioned* tone addition, deletion, replacement, shifting, assimilation, dissimilation, etc.)
  ◦ [See also Hyman 2016]
Our dichotomy of focus:
Two types of grammatical tone

• 1) Concatenative Grammatical Tone: grammatical tone is *added to* (concatenated to) the input tones

• 2) Replacive Grammatical Tone: grammatical tone *overwrites* (replaces) the input tones
Our dichotomy of focus: Two types of grammatical tone

- Two types of grammatical tone (GT) schematized below
- **Concatenative**
  \[ T + \Rightarrow T \]
  \[ \tau \Rightarrow \tau \]
- **Replacive (overwriting)**
  \[ T + \Rightarrow T \]
  \[ \tau \Rightarrow \tau \]
Replacive vs. Concatenative GT: Co-occurrence in same language, Kalabari

<table>
<thead>
<tr>
<th>Replacive tone with / mí ⓕⓎ / ‘this’ (neut.)</th>
<th>Concatenative tone with / ⓐⓡ / IMPERATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>/HH/</td>
<td>/námá/</td>
</tr>
<tr>
<td>/LL/</td>
<td>/pùlò/</td>
</tr>
<tr>
<td>/HL/</td>
<td>/bèlè/</td>
</tr>
<tr>
<td>/LH/</td>
<td>/gàrí/</td>
</tr>
<tr>
<td>/H'H/</td>
<td>/bá'rá/</td>
</tr>
<tr>
<td>[Kalabari language – Harry &amp; Hyman 2014; personal fieldnotes]</td>
<td></td>
</tr>
<tr>
<td>/H'H/</td>
<td>/ɔ'ló/</td>
</tr>
</tbody>
</table>
Dominance effects

• **Dominant**: complete overwriting of the lexical prosodic properties of the stem

• **Dominance effects** often invoked in accentual systems outside of Indo-European
  ◦ [Numerous languages surveyed in Alderete 2001a, 2001b]

• Other languages (both stress and tone based)
  ◦ Japanese [Poser 1984, Kawahara 2015]
  ◦ Moses-Columbia Salish [Czaykowska-Higgins 1993]
  ◦ Hausa (Chadic) [Inkelas 1998]
  ◦ Tommo So (Dogon) [McPherson 2013, 2014:61fn3, McPherson & Heath 2016]
  ◦ Ese Ejja (Tacanan) [Rolle 2017, 2018, Rolle & Vuillermet 2019]
  ◦ Xârâcùù (Oceanic) [Rivierre 1978]
**Anatomy of GT** [Kalabari - Harry & Hyman 2014]

<table>
<thead>
<tr>
<th>Target: noun</th>
<th>Trigger: demonstrative mí</th>
<th>Tune: ⃝⃝</th>
</tr>
</thead>
<tbody>
<tr>
<td>(the undergoer of the tonological process)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tuning Pattern</th>
<th>Word</th>
<th>GT with / mí ⃝⃝ / ‘this’ (neut.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH/</td>
<td>/námá/</td>
<td>‘meat’  \mí nàmá\</td>
</tr>
<tr>
<td>LL/</td>
<td>/pùlò/</td>
<td>‘oil’  \mí pùlò\</td>
</tr>
<tr>
<td>HL/</td>
<td>/bélè/</td>
<td>‘light’  \mí bèlé\</td>
</tr>
<tr>
<td>LH/</td>
<td>/gàrí/</td>
<td>‘garri’  \mí gàrí\</td>
</tr>
<tr>
<td>H'H/</td>
<td>/bá’rá/</td>
<td>‘hand’  \mí bàrá\</td>
</tr>
</tbody>
</table>
‘Problems’ for a theory of Replacive GT
[i.e. challenges – Trommer 2011]

- **Kalabari**
  [Harry & Hyman 2014]

\[ / \text{wá}^*�ी / \text{H}^*\text{H} \]
\[ [ \text{wá}rì ] \text{ ‘house’} \]
\[ / \text{a}mḕè / \text{OHL} \]
\[ [ \text{àmḕè} ] \text{ ‘plural’} \]

- **/ námá /HH**

\[ [ \text{námá} ] \text{ ‘animal’} \text{ ‘animal house’} \]
\[ \text{námá wárì} \]
\[ \text{PL: ‘animal houses’} \]

**Erasure problem**

\[ \text{H}^*\text{H} \]
\[ a. [ \text{wá}^*rì ] \]

**Origin problem**

\[ \text{H} \]
\[ \text{H} \]
\[ \text{L} \]
\[ \text{L} \]
\[ \text{HL} \]
\[ b. [ \text{námá wárì àmḕè} ] \]

**Scope problem**
‘Problems’ for a theory of Replacive GT
[i.e. challenges – Trommer 2011]

• **Erasure problem** – how are the underlying tones of the target deleted (i.e. go unrealized – N1 /H∗H/ at left in a.) in context of the trigger (to the right, in b.)

• **Origin problem** – where does the grammatical tune [HL] come from (to right, in b.)? E.g. from constraint ranking, floating tones in input, simple allomorphy, etc.

• **Scope problem** - why does the [HL] grammatical tune target N2, and not the other morphemes N1 and the plural marker

---

**Erasure problem**

```
a. [wá́rí]
```

**Origin problem**

```
b. [námá wá́rì àmẹ́ẹ́]
```

**Scope problem**
Part 2) The scope problem: A case study from Izon (Nigeria)
The scope problem and dominance

• Two theories posited around the same time:
  
• **Stem scope:** the scope of morphologically conditioned phonology is the stem formed by the word-formation construction in question
The scope problem and dominance

Figure 5: Morpho-phonological tree (Hausa - Inkelas 1998)

Dominant GT in Hausa

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Type</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dom</td>
<td>/ [kárântá]  -⁰{ií} /</td>
<td>\kàráncíí \</td>
</tr>
<tr>
<td>2</td>
<td>Non-dom</td>
<td>/ má- [káràncí] /</td>
<td>\mákàrâncíí \</td>
</tr>
<tr>
<td>3</td>
<td>Dom</td>
<td>/ [mákàrâncíí] -⁰{iyáá}</td>
<td>\mákàrâncííiyáá \</td>
</tr>
<tr>
<td>4</td>
<td>Non-dom</td>
<td>/ [mákàrâncííyáá] -¹{r} /</td>
<td>\mákàrâncííyár \</td>
</tr>
</tbody>
</table>
The scope problem and dominance

• 2) Alderete’s (1999, 2001a, 2001b) ‘Transderivational Antifaithfulness’ to capture lexical accent dominance
  ◦ A central thesis: affixes can be dominant over roots but *roots cannot be dominant over affixes*
  ◦ [“I know of no language with roots which idiosyncratically cause the deletion of an accent of a neighboring affix” Alderete 1999:141]

• ‘Strict Base Mutation’: “alternations triggered by morphophonological operations are found exclusively in the stem (simplex or complex) which serves as the base of a morphological process”

• Both models establish an asymmetry: morphologically inner elements cannot be dominant over morphologically outer elements

• [also Hyman 2011, 2016, 2018, Harry & Hyman 2014]
GT word-level scope = C-Command

[McPherson 2014, McPherson & Heath 2016]

◦ / γάμμα + γέμ + νό /
  γάμμα  γέμ  νό
  cat  black  this
N  Adj  Dem

‘this black cat’

[Tommo So – McPherson & Heath 2016]

• Constraint $X^1$ DEM: assess a violation for every word c-commanded by the demonstrative that is not included in its $\{L_{TONE}\}$ domain
Izon language

• Izon language [ijc]
  ◦ Ijoid language of southern Nigeria (Niger Delta)
  ◦ Endangered despite high population numbers (500,000?)


• All previous tonal work in Ijoid languages shows several cases of replacive and concatenative GT
Izon language
Izon language

• All data here is from Gbarain Dialect collected in Port Harcourt, Nigeria (2017)

• Special fieldwork situation:
  ◦ Urban setting (major Nigerian city)
  ◦ Multi-ethnic population with widespread daily multilingualism
  ◦ Working in depth with one primary consultant
Izon language (w/ Jumbo Gift)
Izon language

- Highly **analytic** - very little (segmental) morphology
- Strongly head-final
- Fairly strict word order: [S O V TAM]

<table>
<thead>
<tr>
<th>Word order</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[RC N]</td>
<td>[S adjunct O V ]</td>
</tr>
<tr>
<td>[Gen N]</td>
<td>[ManAdv VP]</td>
</tr>
<tr>
<td>[Dem N]</td>
<td>[VP Tns/Asp/Pol]</td>
</tr>
<tr>
<td>[Adj N]</td>
<td>[Pred Comp]</td>
</tr>
<tr>
<td>[Num N]</td>
<td>[Clause Ques]</td>
</tr>
<tr>
<td>[N Quant₁]</td>
<td>[N Adposition ]</td>
</tr>
<tr>
<td>[N Def]</td>
<td>[V1 V2]</td>
</tr>
</tbody>
</table>
Basics of Iazon tone

• Iazon has two basic tonemes:
  ◦ /H/ 〈á〉 vs. /L/ 〈à〉

• Lexical tone distinctions
  ◦ [LR] 〈àŋgǎ] <ànggǎ>  ‘egg’
  ◦ [LH] 〈àŋgá] <ànggá>  ‘side’
  ◦ [LLF] 〈àŋgòlô] <ànggòlô>  ‘lizard’
  ◦ [HLL] 〈ánjìsì] <ángìsì>  ‘handkerchief’ (<Eng.>)
In addition to lexical tone, most words fall into three classes depending on how they affect their surrounding words:

- **A**: the LH
- **B**: the H
- **C**: the (default) L

<table>
<thead>
<tr>
<th>Tone class</th>
<th>Noun example</th>
<th>kpo ‘also’</th>
<th>kumọ ‘only’</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (LH class)</td>
<td>[bùrù] ‘yam’</td>
<td>bùrùₐkpó</td>
<td>bùrùₐkumọ</td>
</tr>
<tr>
<td>B (H class)</td>
<td>[námá] ‘meat’</td>
<td>námáₐkpó</td>
<td>námáₐkumọ</td>
</tr>
<tr>
<td>C (default L class)</td>
<td>[òpóriópọ] ‘pig’</td>
<td>ọpóriópọₐkpọ</td>
<td>ọpóriópọₐkumọ</td>
</tr>
</tbody>
</table>
Prosodic overwriting via replacive GT in Izon

• Modifier + noun \(\rightarrow\) underlying tones of N are replaced

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Noun</th>
<th>Tone patterns in isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[bùrû] ‘yam’</td>
<td>[nàmá] ‘meat’</td>
</tr>
<tr>
<td></td>
<td>[wàrì] ‘house’</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>èbìₐ ‘good’</td>
<td>èbìₐ [L] bùrû [LH]</td>
</tr>
<tr>
<td>B</td>
<td>èndìₐ ‘that’</td>
<td>èndìₐ [L] bùrû [HH]</td>
</tr>
<tr>
<td>C</td>
<td>káláₐ ‘small’</td>
<td>káláₐ [H] bùrû [LL]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>èbìₐ [L] nàmá [LH]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>èndìₐ [L] nàmá [HH]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>káláₐ [H] wàrì [HH]</td>
</tr>
</tbody>
</table>

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35
Prosodic overwriting via replacive GT in Izon

- Pre-modifiers always overwrite tone of N
  - Adj + N
  - Dem + N
  - Poss + N
  - Num/Quant + N
  - RC + N
Prosodic overwriting via replacive GT in Izon

- **Mod [N]** ← Mod overwrites N
- **Mod-1 [Mod-2 [N]]** ← Mod-1 overwrites N and Mod-2
  - A LH / ìnèₐ táràₐ̀ dìbàₐ bùrụₐ / [ìnè tàrà dìbá bùrú] my three big yam  (20170809:160)
  - B H / mààₐ àpùₐ bùrụₐ / [màà ̀ àpú bùrú] two big yam  (20170711:24)
  - C L / béisₐ mààₐ bùrụₐ / [béis màà bùrù] these two yam  (20170711:23)
Prosodic overwriting via replacive GT in Izon

- Mod [N] $\leftarrow$ Mod overwrites N
- Mod-1 [Mod-2 [N] ] $\leftarrow$ Mod-1 overwrites N and Mod-2

**Key generalization**: the outermost pre-modifier scopes over all inner constituents
Cf. no prosodic overwriting from or onto post-nominal modifiers

• [N] Mod $\leftrightarrow$ No overwriting
• [Mod-1 [N] ] Mod-2 $\leftrightarrow$ Mod-1 overwrites only N

<table>
<thead>
<tr>
<th></th>
<th>1- / Ø /</th>
<th>2 - / \text{L}_W/</th>
<th>3 - / \text{L}_S/</th>
<th>4 - / \text{H L}/</th>
</tr>
</thead>
<tbody>
<tr>
<td>kpọ</td>
<td>‘also’</td>
<td>bì</td>
<td>DEF</td>
<td>bèì</td>
</tr>
<tr>
<td>kẹ</td>
<td>‘particular, instead’</td>
<td>mọ</td>
<td>DEF.PL</td>
<td>sẹ</td>
</tr>
<tr>
<td>qọmọ</td>
<td>INDEF.PL</td>
<td></td>
<td></td>
<td>mọ sẹ</td>
</tr>
<tr>
<td>kụmọ</td>
<td>‘only’</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cf. no prosodic overwriting from or onto post-nominal modifiers

<table>
<thead>
<tr>
<th>Nouns with post-nominal modifier 2 / L_w /</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A ‘the LH’</td>
<td>bì DEF ‘the’</td>
<td>bì \</td>
<td>‘the yam’</td>
</tr>
<tr>
<td>B ‘the H’</td>
<td>\bùrù_A</td>
<td>bì \</td>
<td>‘the meat’</td>
</tr>
<tr>
<td>C ‘the default L’</td>
<td>\òpòríòpò_C</td>
<td>bì \</td>
<td>‘the pig’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nouns with post-nominal modifier 3 / L_s /</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A ‘the LH’</td>
<td>bì DEF ‘the’</td>
<td>bì \</td>
<td>‘the yam’</td>
</tr>
<tr>
<td>B ‘the H’</td>
<td>\bùrù_A</td>
<td>bì \</td>
<td>‘some particular yam’</td>
</tr>
<tr>
<td>C ‘the default L’</td>
<td>\òpòríòpò_C</td>
<td>bì \</td>
<td>‘some particular meat’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nouns with post-nominal modifier 4 / H_L /</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A ‘the LH’</td>
<td>mọ sẹ ‘all the’</td>
<td>mọ sẹ \</td>
<td>‘all the yams’</td>
</tr>
<tr>
<td>B ‘the H’</td>
<td>\bùrù_A</td>
<td>mọ sẹ \</td>
<td>‘all the meat’</td>
</tr>
<tr>
<td>C ‘the default L’</td>
<td>\òpòríòpò_C</td>
<td>mọ sẹ \</td>
<td>‘all the pigs’</td>
</tr>
</tbody>
</table>
If post-nominal modifier is toneless, it can readily accepts noun’s tones

<table>
<thead>
<tr>
<th>Tone class</th>
<th>Noun example</th>
<th>( kpò ) ‘also’</th>
<th>( kùmò ) ‘only’</th>
</tr>
</thead>
<tbody>
<tr>
<td>A the LH class</td>
<td>[bùrù]</td>
<td>bùrù(A) ( kpò )</td>
<td>bùrù(A) ( kùmò )</td>
</tr>
<tr>
<td>B the H class</td>
<td>[námá]</td>
<td>námá(B) ( kpò )</td>
<td>námá(B) ( kùmò )</td>
</tr>
<tr>
<td>C the default L class</td>
<td>[òpòríòpò]</td>
<td>òpòríòpò(C) ( kpò )</td>
<td>òpòríòpò(C) ( kùmò )</td>
</tr>
</tbody>
</table>

**Key generalization:** [N] Mod structure
- N can spread tone only if Mod has no underlying tone
- It cannot *overwrite* Mod tone (i.e. no replacive tone)
Cf. no prosodic overwriting from or onto post-nominal modifiers

<table>
<thead>
<tr>
<th>L</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ \</td>
<td></td>
</tr>
<tr>
<td>inè_A</td>
<td>H</td>
</tr>
<tr>
<td>my</td>
<td>H</td>
</tr>
<tr>
<td>Poss</td>
<td>H</td>
</tr>
<tr>
<td>‘my stories’</td>
<td>(20170809:159)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L</th>
<th>H</th>
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</thead>
<tbody>
<tr>
<td>/ \</td>
<td></td>
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<tr>
<td>wó_B</td>
<td>H</td>
</tr>
<tr>
<td>our</td>
<td>H</td>
</tr>
<tr>
<td>Poss</td>
<td>H</td>
</tr>
<tr>
<td>‘our pigs’</td>
<td>(20170711:20)</td>
</tr>
</tbody>
</table>

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<th>L</th>
<th>H</th>
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<tbody>
<tr>
<td>/ \</td>
<td></td>
</tr>
<tr>
<td>mò_1</td>
<td>L</td>
</tr>
<tr>
<td>DEF.PL</td>
<td>L</td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>
Parallels at clause-level

• [Subject] [Adjunct] [Object] [Verb] [TAM clitic]
  ◦ Subject & Adjunct – are not triggers or targets of replacive GT
  ◦ Object assigns tone to verb (it loses its tones)
Parallels at clause-level

• [Object][Verb] - Object overwrites verb
  ◦ A LH / bùrùₐ / fé / → bùrù fé ‘buy a yam’
  ◦ B H / námáₐ / fé / → námá fé ‘buy meat’
  ◦ C L / òróₐ / fé / → òró fé ‘buy a mat’
Parallels at clause-level

• [Verb][TAM clitic] – Verb tone can fall on TAM if TAM is toneless

- **A LH** / bélé́ òwè́ [b̀lè] mi / => ...bélé́ mí  ‘This man dived in’
- **B H** / ébì fú̀rú [f̀̀rú] mi / => ...fú̀rú mí  ‘Ebi stole’
- **C L** / ébì b̀̀nù̀ [b̀̀nù̀] mi / => ...b̀̀nù̀ mí  ‘Ebi slept’

- **A LH** / fà̄kʊ̄mọ́ / => fà̄ kʊ́mọ́ !  ‘Don’t get lost!’
- **B H** / mú̀kʊ̄mọ́ / => mú̀ kʊ́mọ́ !  ‘Don’t go!’
- **C L** / gbé̄kʊ̄mọ́ / => gbé̄ kʊ́mọ́ !  ‘Don’t pay!’
## Parallels at clause-level

V can affect TAM but it cannot overwrite it

<table>
<thead>
<tr>
<th></th>
<th>LH</th>
<th>/ béí òwèì</th>
<th>bilè&lt;sub&gt;A&lt;/sub&gt; yengí /</th>
<th>→</th>
<th>...bilè yèngí</th>
<th>‘This man is diving in’</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>H</td>
<td></td>
<td>mú&lt;sub&gt;B&lt;/sub&gt; yengí /</td>
<td>→</td>
<td>...mú yèngí [yèngí]</td>
<td>‘...is going’</td>
</tr>
<tr>
<td>B</td>
<td>L</td>
<td></td>
<td>gbé&lt;sub&gt;C&lt;/sub&gt; yengí /</td>
<td>→</td>
<td>...gbé yèngí</td>
<td>‘...is paying’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>LH</th>
<th>/ béí òwèì</th>
<th>bangí&lt;sub&gt;A&lt;/sub&gt; ngîngí /</th>
<th>→</th>
<th>...bang ngîngí</th>
<th>‘...will run’</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>H</td>
<td></td>
<td>mú&lt;sub&gt;B&lt;/sub&gt; ngîngí /</td>
<td>→</td>
<td>...mú ngîngí</td>
<td>‘...will go’</td>
</tr>
<tr>
<td>B</td>
<td>L</td>
<td></td>
<td>gbé&lt;sub&gt;C&lt;/sub&gt; ngîngí /</td>
<td>→</td>
<td>...gbé ngîngí</td>
<td>‘...will pay’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>LH</th>
<th>/ béí òwèì</th>
<th>bangí&lt;sub&gt;A&lt;/sub&gt; timí /</th>
<th>→</th>
<th>...bang timí</th>
<th>‘...was running’</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>H</td>
<td></td>
<td>mú&lt;sub&gt;B&lt;/sub&gt; timí /</td>
<td>→</td>
<td>...mú timí</td>
<td>‘...was going’</td>
</tr>
<tr>
<td>B</td>
<td>L</td>
<td></td>
<td>gbé&lt;sub&gt;C&lt;/sub&gt; timí /</td>
<td>→</td>
<td>...gbé timí</td>
<td>‘...was paying’</td>
</tr>
</tbody>
</table>
Dominant tone asymmetry

• Supports previous statements on Dominance [above]
  ◦ Always ‘inward’ (e.g. affix to root), can never be ‘outward’ (root to affix)

• We can call this ‘dominant tone asymmetry’, supported by the typology in Rolle (2018)
Dominant tone asymmetry

- Within a multi-morphemic constituent in a GT construction, a Dominant trigger (e.g. replacive/overwriting) is morphologically outward compared to the target
  - E.g. the trigger is a dependent and the target is a lexical head (+ inner dependents) OR the trigger is an affix and the target is a stem (+ inner affixes) ⇐ Thus, parallel between word and phrase-level
  - No such restriction occurs with concatenative/non-dominant tone

<table>
<thead>
<tr>
<th>Trigger → Target</th>
<th>GT type</th>
<th>Non-dominant (e.g. simple docking)</th>
<th>Dominant (e.g. replacive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammatical/Dependent → Lexical head</td>
<td></td>
<td>✓ Yes</td>
<td>✓ Yes</td>
</tr>
<tr>
<td>Lexical head → Grammatical/Dependent</td>
<td></td>
<td>✓ Yes</td>
<td>* No</td>
</tr>
</tbody>
</table>

Comparing dominant vs. non-dominant GT
Grammatical tone patterns are restricted by hierarchical structure

- **Concatenative**
  - The trigger can be higher than the target (K → H)
  - OR
  - The target can be higher than the trigger (H → K)

- **Replacive**
  - The trigger *must* be higher than the target (K → H)
  - The target *cannot* be higher than the trigger (H → K)
Dominant Tone Asymmetry – **Object → Verb**

- **[Object][Verb] - Object overwrites verb**
  - A LH / bùrùₐ / fé / → bùrù fẹ́ ‘buy a yam’
  - B H / námáₜ / fé / → námá fẹ́ ‘buy meat’
  - C L / òróₜ / fé / → òró fẹ́ ‘buy a mat’

- **Cross-modular argumentation**: Izon are located in a higher specifier position, an ‘outward’ position compared to the head
  - [Adopted independently in Izon with syntactic argumentation – Carstens 2002]

- **Generalizations of phrase-level GT (Harry & Hyman 2014:680-681)**
  - Modifier/specifier targets the head of an NP/VP
  - Object targets the head of a VP
No outward dominance: **Verb ➔ Object** overwriting predicted to not exist

<table>
<thead>
<tr>
<th>Verb</th>
<th>Obj</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>/L/ kùs ‘buy’</td>
<td>/HL/ plantains</td>
<td>LL màkùs</td>
<td>LL bikòn</td>
<td>LL màkùs</td>
<td>LL màkùs</td>
<td>LL màkùs</td>
</tr>
<tr>
<td>/H/ dʒí ‘eat’</td>
<td>/LH/ grass</td>
<td>LL màkùs</td>
<td>LH bilók</td>
<td>LH màkùs</td>
<td>LH màkùs</td>
<td>LL màkùs</td>
</tr>
<tr>
<td></td>
<td>/LHH/ squirrel</td>
<td>LH màkùs</td>
<td>LH bitétám</td>
<td>LH màkùs</td>
<td>LH èsíŋgi</td>
<td>LL màkùs</td>
</tr>
<tr>
<td></td>
<td>/LHL/ cats</td>
<td>LH màkùs</td>
<td>LH bitétám</td>
<td>LH èsíŋgi</td>
<td>LH òfùmbí</td>
<td>LL màkùs</td>
</tr>
<tr>
<td></td>
<td>/LLH/ orange</td>
<td>LH màdʒí</td>
<td>LH bikòn</td>
<td>LH màdʒí</td>
<td>LH màdʒí</td>
<td>LL màdʒí</td>
</tr>
</tbody>
</table>

**Non-dominant** Verb-Object tone agreement in Bulu (Bantu)

[Clem 2014:10 supported by Yukawa 1992; see Rolle (2018) dissertation for translations]
Outward direction: Dominant Tone
Asymmetry – Verb ➔ Object

<table>
<thead>
<tr>
<th>Verb</th>
<th>Object Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>/HL/</td>
</tr>
<tr>
<td>V O</td>
<td>V O</td>
</tr>
<tr>
<td>/L/</td>
<td>LL</td>
</tr>
<tr>
<td>/H/</td>
<td>LH</td>
</tr>
</tbody>
</table>

• Fake Bulu (not real language): Non-attested, hypothetical verb dominance over object
A strong prediction for morpho-syntactically determined phonological scope

- **Phonological scope:**
  - Spec > Head > Comp

- **More technical sense:**
  - An exponent mapped from a specifier position will take phonological scope over an exponent mapped from a head position
Part 3) Discussion
Returning to our ‘problems’ for a theory of GT

- Lexical: /wáɁrī/ \( H^\downarrow H \) [wárī] ‘house’  
  [Kalabari – Harry & Hyman 2014]

Erasure problem

\[
\begin{array}{c}
\text{H}^\downarrow \text{H} \\
\text{H}^\downarrow \text{H}
\end{array}
\]

\[\text{a. } [\text{wárī}]\]

Origin problem

\[
\begin{array}{c}
\text{H}^\downarrow \text{L} \\
\text{H}^\downarrow \text{L}
\end{array}
\]

\[\text{b. } [\text{námá wárí àméè}]\]

Scope problem
Returning to our ‘problems’ for a theory of GT

• The scope of replacive GT (i.e. the target whose tones are overwritten) is restricted by morphosyntactic position.
Parallelism above and below the word

- This supports previous research of replacive tone below the word (Inkelas 1998) and above the word (Harry & Hyman 2014, McPherson 2014, McPherson & Heath 2016), i.e. phrase level
- Both are subject to the same restriction:
  \[
  \text{if } x[y] \quad \text{then} \quad \text{only } x \text{ can overwrite } y
  \]
Cyclicity in phonology (Sundanese)

• /-aR- + moekyn / [mãrõēkyn]

Inkelas (2014:197)
- “Since the infix contains a consonant ([l] or [r]) that ordinarily blocks nasal harmony, the only way to account for nasal vowels following the infix is to assume that nasal harmony applies both on the root cycle and on the infixation cycle”

<table>
<thead>
<tr>
<th></th>
<th>Cyclic</th>
<th>Noncyclic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input to Cycle 1</td>
<td>/moekyn/</td>
<td>/m-aR-oekyn/</td>
</tr>
<tr>
<td>Nasal Harmony</td>
<td>[mõēkyn]</td>
<td>[mãroekyn]</td>
</tr>
<tr>
<td>Input to Cycle 2</td>
<td>[m-aR-õēkyn]</td>
<td></td>
</tr>
<tr>
<td>Nasal Harmony</td>
<td>[mãrõēkyn]</td>
<td>[mãroekyn]</td>
</tr>
<tr>
<td>Output</td>
<td>[mãrõēkyn]</td>
<td>[mãroekyn]</td>
</tr>
</tbody>
</table>
Support for phrase-level cyclicity

\[A \text{ LH } / \text{ inè}_A \text{ tárà}_B \text{ dîbà}_A \text{ bùrũ}_A / [\text{inè tárà dîbà bùrũ}]\]

my three big yam

(20170809:160)
Cyclic architecture prevents outward dominance

• In a context \( x[y] \)
• If only \( x \) can control the phonological grammar of the sequence \( x[y] \), but \( y \) can never control it
• Because \( y \) can only affect a previous cycle, and
• If prosodic overwriting is attributed to a phonological grammar triggered by \( x \) in a configuration \( x[y] \)
• Then \( y \) can never trigger overwriting on \( x \)
  ◦ e.g. an inner root onto an outer affix
• Thus the Dominant Tone Asymmetry (at all levels) is expected
Support for phrase-level cyclicity

H

<table>
<thead>
<tr>
<th>wó_B</th>
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<tbody>
<tr>
<td>our</td>
</tr>
<tr>
<td>Poss</td>
</tr>
<tr>
<td>‘our pigs’</td>
</tr>
</tbody>
</table>

L

<table>
<thead>
<tr>
<th>ópóriópó</th>
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</thead>
<tbody>
<tr>
<td>pig</td>
</tr>
<tr>
<td>[N]</td>
</tr>
<tr>
<td>(\text{scope})</td>
</tr>
<tr>
<td>(20170711:20)</td>
</tr>
</tbody>
</table>

\(\text{CoP-Det}\)

\{\text{NOUN}\} \{\text{DETERMINER}\}
Cross-modular cyclicity across levels

• Cyclicity across modules

• Syntax
  ◦ Syntactic structure built up cyclically via Merge, proceeds bottom-up/inside-out

• Morphology
  ◦ [Carstairs 1987, Bobaljik 2000, Embick 2010]

• (Morpho)-Phonology
  ◦ Ample evidence for cyclicity (or at least cyclic effects), catalogued in detail in Inkelas (2014:189-241)

• ‘Obligatory inheritance’ of a previous cycle, i.e. that ‘later evaluations [are forced] to inherit the results of earlier ones’ Steriade (2012:4)
Contribution to interface studies

• From perspective of grammatical tone, no distinction between lexical and ‘post-lexical’ phonology
  ◦ Both demonstrate cyclic application with parallel restrictions

• Supports a Non-Lexicalist view of the interface [e.g. Distributed Morphology]
  ◦ Both ‘words’ and ‘phases’ are built by syntax, which is then shipped to the interfaces (in this case, phonology)
  ◦ There is no separate module where ‘words’ are built subject to distinct phonological principles [cf. Lexical Phonology and Morphology – Kiparsky 1982]

• Complementary argumentation from phonology: Nearly all arguments against Lexicalism come from morphosyntax
  [Marantz 1997, Siddiqi 2014, Bruening 2018a, 2018b]
<table>
<thead>
<tr>
<th>#</th>
<th>Model</th>
<th>My abbreviation</th>
<th>Representative reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cophonology-scope with Matrix-Basemap Correspondence</td>
<td>CoP-MxBm</td>
<td>[This study]</td>
</tr>
<tr>
<td>2</td>
<td>Construction tonology w/ e-command scope</td>
<td>Construction-T</td>
<td>[McPherson 2014, McPherson &amp; Heath 2016]</td>
</tr>
<tr>
<td>3</td>
<td>Cophonology Theory with markedness constraints</td>
<td>Marked-CPT</td>
<td>[Inkelas 1998]</td>
</tr>
<tr>
<td>4</td>
<td>Antifaitfulness via transderivational correspondence</td>
<td>Antifait</td>
<td>[Alderete 2001a, 2001b]</td>
</tr>
<tr>
<td>5</td>
<td>Lexical MaxEnt with regularization (and scaling)</td>
<td>Regularization</td>
<td>[Gouskova &amp; Linzen 2015]</td>
</tr>
<tr>
<td>7</td>
<td>Colored containment via circumfixal floating tones</td>
<td>Circumfixal-CC</td>
<td>[Trommer 2011]</td>
</tr>
<tr>
<td>8</td>
<td>Faithfulness to morphological class (Headmost Wins, Root » Affix)</td>
<td>M-Faith</td>
<td>[McCarthy &amp; Prince 1995, Revithiadou 1999]</td>
</tr>
<tr>
<td>9</td>
<td>Tonal strength</td>
<td>T-Strength</td>
<td>[Vaxman 2016a, 2016b, Kushnir 2018]</td>
</tr>
</tbody>
</table>
Models with intrinsic scope ensure the Dominant GT Asymmetry

<table>
<thead>
<tr>
<th>Model</th>
<th>Ensures dominant GT asymmetry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[AFFIX-ROOT]</td>
</tr>
<tr>
<td>a. CoP-MxBm</td>
<td>✓ Yes</td>
</tr>
<tr>
<td>b. Marked-CPT</td>
<td>✓ Yes</td>
</tr>
<tr>
<td>c. Construction-T</td>
<td>✓ Yes</td>
</tr>
<tr>
<td>d. Antifait</td>
<td>✓ Yes</td>
</tr>
<tr>
<td>e. T-Allomorphy</td>
<td>✗ No</td>
</tr>
<tr>
<td>f. Circumfixal-CC</td>
<td>✗ No</td>
</tr>
<tr>
<td>g. T-Strength</td>
<td>✗ No</td>
</tr>
<tr>
<td>h. Diacritic-Del</td>
<td>✗ No</td>
</tr>
<tr>
<td>i. M-Faith</td>
<td>✗ No</td>
</tr>
<tr>
<td>j. Regularization</td>
<td>✗ No</td>
</tr>
</tbody>
</table>

Comparison of models with respect to dominant GT asymmetry
Model without intrinsic scope: Circumfixal-CC [Trommer 2011]

□ CONTINUITYT (Trommer 2011:126)
Assign * to every tone $T_1$ which linearly intervenes between two tones $T_2$, $T_3$ in $P$ such that $\text{Color}(T_2) = \text{Color}(T_3) \neq \text{Color}(T_1)$

Dominant asymmetry not ensured by Circumfixal-CC (in hypothetical Kalabari-Prime)
Underlying / mí $^{\text{\text{a}}\text{a}}$ $^{-\text{\text{a}}}$ $^{\text{\text{a}}}$ / ‘this’ + / námá / ‘meat’

In context: $H^{\text{\text{a}}}$ $^{\text{\text{a}}}$ $\text{HH}^{\text{\text{a}}}$
/ mí námá / $\Rightarrow$ \mí námá \ ‘this meat’

Underlying / mí / ‘this’ + / $^{\text{\text{a}}\text{a}}$ $^{-\text{\text{a}}}$ námá / ‘meat’

In context: $^{\text{\text{a}}}$ $H^{\text{\text{a}}}$ $\text{HH}$
/ mí námá / $\Rightarrow$ \mí námá \ ‘this meat’
Architecture of grammar

• Y-Model of grammar (or ‘T-model’)

  - Syntactic derivation

  - Spell-out

• Phonetic Form (PF) [≈ Phonology]  Logical Form (LF) [≈ Semantics]
Morpho-syntactic module maps to morpho-phonological module via spell-out

- Input /S/ (‘syntactic image’) $\rightarrow$ Output \( \underline{\mathcal{Z}} \) (‘phonological image’) [Rolle 2018]
### Spell-out involves the ‘actuation of phonology’

<table>
<thead>
<tr>
<th>Spell-out operation</th>
<th>Provides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spell-out operation</td>
<td>Provides</td>
</tr>
<tr>
<td>Vocabulary insertion</td>
<td>Phonological substance (primitives)</td>
</tr>
<tr>
<td>Linearization</td>
<td>Phonological precedence</td>
</tr>
<tr>
<td>Prosodification</td>
<td>Phonological constituency</td>
</tr>
<tr>
<td>Hierarchy exchange</td>
<td>Scope of phonological operations</td>
</tr>
</tbody>
</table>

- Provides phonological substance (primitives) such as phonemes, tonemes, autosegments, etc.
- Provides phonological precedence (basic morph order)
- Provides phonological constituency (metrical structure, prosodic words, prosodic phrases, etc.)
- Provides scope of phonological operations (scope/order of the application of phonological rules)
Legacy of C-Command at PF is phonological scope

• ‘Hierarchy exchange’ preserves the inside-out derivational history of syntactic Merge in phonology
• The real legacy of c-command is not linearization *per se* (Kayne 1994) but rather is delimiting the scope of morphosyntactically-triggered phonological operations such as grammatical tone (supporting McPherson & Heath 2016, a.o.)
• [Note, however, that what I am proposing is an indirect mode of the interface, not a direct model as in McPherson; ask me, there are several arguments]
Acknowledgments

• Sharon Inkelas and Larry Hyman
• Peter Jenks and Darya Kavitskaya
• Laura McPherson
• Myriam Lapierre
• Kalabari collaborators Otelemate Harry and Jackreece Charles
• Department of Linguistics, University of Buffalo (and colloquium organizers Jeff Good and Christian DiCanio)
• UC Berkeley Oswalt grant (2017) to travel to Nigeria
References

• References largely found within my dissertation:
  ◦ https://escholarship.org/uc/item/9v01c4vr
Further commitments and predictions

• Simultaneous Insertion
  Commitment 1 – Within a spell-out domain, all morphemes are replaced by vocabulary items simultaneously
  Prediction 1 - Outward-looking phonologically conditioned allomorphy (PCA) should in principle be allowed and empirically attested

• Opacity Restrictions
  Commitment 2 – Within a spell-out domain, all morphological operations take place simultaneously in parallel
  Prediction 2 - Opacity is an artefact of cyclicity, and thus should be limited to (i) the syntactic module, (ii) the phonological module, or (iii) inter-cyclic spell-out domains (e.g. phases)
  There should be no opacity between morphological operations which take place during a given instance of spell-out
Further commitments and predictions

• Syntax Insensitivity

Commitment 3 – Post-spell-out, there is no sensitivity to any aspect of the syntax, e.g. syntactic features, labels, positions (e.g. spec vs. comp), constituents (i.e. trees), relations (e.g. c-command), operational histories (e.g. moved elements)

[this follows Module Encapsulation, as above]

Prediction 3 – No aspect of phonology (its primitives and operations) is sensitive to syntactic information, only to that which is ‘translated’ at spell-out

[this should hold for later modules, too – e.g. a Phonetics module cannot refer to syntactic information]
Lexicalist hypothesis

• Come under attack from a number of angles

• Siddiqi (2010:526):
  ◦ “However, the word is a linguistic unit that is notoriously difficult to define specifically or technically. Ignoring any orthographic definition, three possible definitions spring to mind: (i) syntactic, (ii) semantic, and (iii) phonological. Unfortunately, these three different definitions of the word seldom overlap perfectly.”

• “morphological structure shows that it contains a basic hierarchal structure that is very similar to syntactic structure which provides the basis for Baker’s (1985, 1988) Mirror Principle.”

• Siddiqi 2014 for overview; Bruening 2018
Against direct c-command

• / ọs’h nám’h wárh/ → ọs’h nám’h wárh
  snail meat house  ‘a snail-meat house’

• [ snail [ meat house ]_TARGET ] → Grammatical tone
• [ [ snail meat ] house ] → Semantics

Figure 12: CoP-scope with modified modifiers
Contradicting root faithfulness

• Notable aspect of this asymmetry:
  ◦ Lexical heads do not neutralize tonal contrast on outer affixes/modifiers
  ◦ The opposite is frequently encountered
  ◦ I.e. properties of the affix survive but phonological properties of the root do not

• This contradicts the oft-cited preference for root faithfulness over affix faithfulness [McCarthy & Prince 1995; Beckman 1998; Ussishkin & Wedel 2002; Krämer 2006; Urbanczyk 2011; Hall et al. 2016, a.o.]

• ROOTFAITH » AFFIXFAITH is proposed as a universal meta-constraint by McCarthy & Prince (1995), often cited in root/affix phonological asymmetries
  ◦ Cf. others have shown the shortcomings of this as a meta-constraint and point to cases where AFFIXFAITH ranks over ROOTFAITH [Hargus & Beavert 2004]

• However, we would still expect symmetry with dominant/replacive GT, contrary-to-fact
Contradicting root faithfulness

- **Hypothesis:** the functional load of lexical (i.e. underlying tone) is extremely low (crudely, very few tonal minimal pairs)
  - Little information is lost if tone is completely wiped out/replaced
  - [Hall et al 2016; Rolle, Shih, Inkelas 2018]

- If true, communication-based bias preserves and enhances grammatical exponence along ‘underutilized’ phonological dimensions - e.g. dominant/replacive tone - when lexical contrast would not be significantly compromised
  - Builds off of Hall et al.’s 2016 functionalist *Message Oriented Phonology* program, compatible with formalist OT implementation

- *Remains to be properly tested...*
Origin problem ➔ floating tonemes

• Both Replacive/Dominant and Concatenative/Non-dominant

\[
\begin{align*}
\text{Dominant} & \quad / \text{jimínáá} + -^{1}\text{úú} / \rightarrow \text{jimínúú} \\
\text{Non-dominant} & \quad / \text{jàákíí} + -^{1}\text{n} / \rightarrow \text{jàákíí}-\text{n}
\end{align*}
\]

\[\text{[jimínúú]} \quad \text{‘ostriches’} \\
\text{[jàákíí]} \quad \text{‘the donkey’} \\
\text{[Hausa - Newman 1986:252,257]}\]
Counter-examples to ‘no outward dominance’ – Shanghai Wu

Apparent outward dominance – Verb over object
/sã\^{55}/ + /fɔŋ\^{53}/ \rightarrow \ sã\^{55}\text{-fɔŋ}\^{31}\text{\ }
‘hurt’ ‘wind’
‘to catch a cold’
/paŋ\^{MH} \text{ngo}^{LH} \text{yiq}\^{H} \ pæŋ^{MH} \text{si}^{HL}/ \rightarrow \ paŋ^{M} \text{ngo}^{H} \text{yiq}^{O} \ pæŋ^{O} \text{si}^{HL}\
give me one CLASSIFIER book
‘give me a book’


Metrical analysis of apparent outward dominance:

\[
\begin{array}{cccc}
\text{x} & \text{\text{x}} \\
/paŋ^{MH} \text{ngo}^{LH} \text{yiq}^{H} \ pæŋ^{MH} \text{si}^{HL}/ & \rightarrow & \left( \begin{array}{c}
\text{x} \\
\text{\text{x}}
\end{array} \right) \\
\left( \begin{array}{ccc}
\text{paŋ}^{M} \text{ngo}^{H} \text{yiq}^{O} \ pæŋ^{O} \text{si}^{HL}\end{array} \right) & \text{\text{x}} & \\
\text{\text{\text{\text{\text{'give me a book'}}}}}
\end{array}
\]

[Shanghai Wu – Chen 2000:313]
### Counter-examples to ‘no outward dominance’ – Shanghai Wu

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Apparent</th>
<th>True</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Trigger:</td>
<td><em>Not</em> specific to a natural class of triggers</td>
<td>Specific to a natural class of triggers</td>
</tr>
<tr>
<td>b. Position of prominence:</td>
<td>The trigger is in a position of metrical prominence (e.g. stressed) and the target is not</td>
<td>The trigger is <em>not</em> necessarily in a position of prominence</td>
</tr>
<tr>
<td>c. Domain of tonological operation:</td>
<td>The domain of the operation is a phonological constituent (e.g. prosodic foot, word, phrase, etc.)</td>
<td>The domain of the operation is <em>not</em> necessarily a phonological constituent</td>
</tr>
<tr>
<td>d. Phonological size of trigger/target:</td>
<td>The phonological size of the trigger or target affects the application of the operation (e.g. syllabicity)</td>
<td>The phonological size of the trigger or target does <em>not</em> affect the application</td>
</tr>
<tr>
<td>e. Floating tones &amp; self-docking:</td>
<td>Does <em>not</em> lend itself to an analysis with floating tones; self-docking is expected</td>
<td>Lends itself to floating tones; self-docking is <em>not</em> expected</td>
</tr>
</tbody>
</table>

Table 15: Apparent versus true outward dominance
<table>
<thead>
<tr>
<th>Noun</th>
<th>Adjective</th>
<th>1 /M/ (n=2)</th>
<th>2 /L/ (n=1)</th>
<th>3 /H/ (n=5)</th>
<th>4 /H^⊕/ (n=5)</th>
<th>5 /HM^⊕/₁ (n=6)</th>
<th>6 /HM^⊕/₂ (n=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /H/</td>
<td>yíʔé ‘fish’</td>
<td>H # M-M</td>
<td>H # L-H</td>
<td>H # *H-H</td>
<td>H # H-L</td>
<td>H # HM-L</td>
<td>H # HM-L</td>
</tr>
<tr>
<td>/M/</td>
<td>gbăă ‘stick’</td>
<td>M # M-M</td>
<td>MH # L-H</td>
<td>M # H-H</td>
<td>M # H-L</td>
<td>M # HM-L</td>
<td>M # HM-L</td>
</tr>
<tr>
<td>/L₁</td>
<td>jùʔh à ‘wrap’</td>
<td>L # M-M</td>
<td>LH # L-H</td>
<td>L # H-H</td>
<td>L # H-L</td>
<td>L # HM-L</td>
<td>L # HM-L</td>
</tr>
<tr>
<td>b. /L₂</td>
<td>miʔin ‘person’</td>
<td>L # L-H</td>
<td>L # L-H</td>
<td>L # H-H</td>
<td>L # H-L</td>
<td>L # HM-L</td>
<td>L # HM-L</td>
</tr>
<tr>
<td>c. /H^⊕/</td>
<td>kpèsé ‘chewstick’</td>
<td>H # L-L</td>
<td>H # L-H</td>
<td>H # L-H</td>
<td>H # L-H</td>
<td>H # L-H</td>
<td>H # HM-L</td>
</tr>
<tr>
<td>/HM^⊕/</td>
<td>kùrù ‘boat’</td>
<td>HH # L-L</td>
<td>HH # L-H</td>
<td>HH # L-H</td>
<td>HH # L-H</td>
<td>HH # L-H</td>
<td>HH # HM-L</td>
</tr>
<tr>
<td>/LH^⊕/</td>
<td>tòfá ‘brick’</td>
<td>LH # L-L</td>
<td>LH # L-H</td>
<td>LH # L-H</td>
<td>LH # L-H</td>
<td>LH # L-H</td>
<td>LH # HM-L</td>
</tr>
<tr>
<td>/MH^⊕/</td>
<td>mòtò ‘motorcycle’</td>
<td>MH # L-L</td>
<td>MH # L-H</td>
<td>MH # L-H</td>
<td>MH # L-H</td>
<td>MH # L-H</td>
<td>MH # HM-L</td>
</tr>
</tbody>
</table>

Table 17: Outward dominance - Floating tones on nouns overriding adjectives in Jalkunan