The scope of dominant grammatical tone in Izon

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Izon language

• The Izon language (southern Nigeria) supports a restrictive theory of **Grammatical Tone** at the syntax/phonology interface

• In Izon, when one morpheme triggers systematically tonal overwriting, the **scope** of this process is determined by morphosyntax
• The Dominant Tone Asymmetry
  ◦ The trigger **must** be higher than the target (K → H)
  ◦ The target **cannot** be higher than the trigger (H-/-→K)

• Supports previous research on prosodic overwriting generally (stress/accent/tone)
Road map

• Part 1) **Dominant Grammatical Tone**: The phenomenon in its theoretical setting
• Part 2) **Findings** from a case study on Izon grammatical tone
• Part 3) **Contributions** to phonology interface studies
Part 1
Dominant Grammatical Tone: The phenomenon in its theoretical setting
Grammatically-conditioned phonology

• The application of some phonological process P depends on both phonological information in its relevant environment, and morphological/syntactic information.

• Neutrally, ‘grammatically-conditioned’ refers to phonology triggered either by:
  ◦ (i) a morphological context (e.g. correlation with a specific bound morpheme, and/or environment within a complex word), or
  ◦ (ii) a syntactic context (e.g. correlation with a specific free morpheme, and/or environment within a complex phrase).
Grammatical tone definition

• **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]

• Crucially, this definition allows all so-called ‘floating tones’ to be treated as grammatical tone
Anatomy of GT

• Rolle (2018) classifies several components:
  ◦ **Trigger**: the morpheme, constituent, or construction which *covaries* with the tonological operation and therefore by hypothesis *licenses* it
  ◦ **Target**: the morpheme or constituent affected by the tonological operation, which is therefore by hypothesis *the intended undergoer*
  ◦ **Tune (or grammatical tune)**: the tone sequence (or set of tone sequences) which covaries with the trigger and is exhibited on the target
Anatomy of GT

• Kalabari (Ijoid: Nigeria - Harry & Hyman 2014)

• /mí L>H / H L>H ‘this’ + /námá/ HH ‘meat’

\[ \text{[mí námá]} \quad \text{‘this meat’} \]

• Target: **noun** (the undergoer of the tonological process)

• Trigger: **demonstrative** mí /H/ ‘this’ (the conditioner of the process)

• Tune: **L>H** (tone on the target that covaries with the trigger)
Two types of grammatical tone

1) Dominant GT
- grammatical tone overwrites (replaces) the input tones; *not* attributed to general phonological markedness
  - [‘Replacive’ in Africanist literature from Welmers 1973]

2) Non-dominant GT
- grammatical tone is added to (concatenated to) the input tones without replacing input tones
## Dominant tone vs. Non-dominant tone in Kalabari (Ijoid: Nigeria)

<table>
<thead>
<tr>
<th>Dominant tone with / mí ₋郝 / ‘this’ (neut.)</th>
<th>Non-dominant tone with / 郝郝 / IMPERATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>/HH/</td>
<td>/H/</td>
</tr>
<tr>
<td>/námá/</td>
<td>/só/</td>
</tr>
<tr>
<td>‘meat’</td>
<td>‘go’</td>
</tr>
<tr>
<td>\mí námá\ ‘this meat’</td>
<td>\só\ ‘go!’</td>
</tr>
<tr>
<td>/LL/</td>
<td>/L/</td>
</tr>
<tr>
<td>/pùlò/</td>
<td>/sò/</td>
</tr>
<tr>
<td>‘oil’</td>
<td>‘cook’</td>
</tr>
<tr>
<td>\mí pùló\ ‘this oil’</td>
<td>\sò\ ‘cook!’</td>
</tr>
<tr>
<td>/HL/</td>
<td>/HH/</td>
</tr>
<tr>
<td>/bélè/</td>
<td>/kúró/</td>
</tr>
<tr>
<td>‘light’</td>
<td>‘fall’</td>
</tr>
<tr>
<td>\mí bèlé\ ‘this light’</td>
<td>\kúró\ ‘fall!’</td>
</tr>
<tr>
<td>/LH/</td>
<td>/LL/</td>
</tr>
<tr>
<td>/gàrí/</td>
<td>/lègì/</td>
</tr>
<tr>
<td>‘garri’</td>
<td>‘sit down’</td>
</tr>
<tr>
<td>\mí gàrí\ ‘this garri’</td>
<td>\lègì\ ‘sit down!’</td>
</tr>
<tr>
<td>/H&gt;H/</td>
<td>/LH/</td>
</tr>
<tr>
<td>/bá† rá/</td>
<td>/dùkó/</td>
</tr>
<tr>
<td>‘hand’</td>
<td>‘tell, talk’</td>
</tr>
<tr>
<td>\mí bárá\ ‘this hand’</td>
<td>\dùkó\ ‘tell (it)!’</td>
</tr>
<tr>
<td>[Kalabari language – Harry &amp; Hyman 2014; my personal fieldnotes]</td>
<td>[Kalabari language – Harry &amp; Hyman 2014; my personal fieldnotes]</td>
</tr>
</tbody>
</table>
Dominance effects

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

- Stems from Indo-European accent studies

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

• Kalabari
  [Harry & Hyman 2014]
  / wáˇrí / H+H
  [ wárī ] ‘house’
  / améè / ØHL
  [ àmēè ] ‘plural’

• / námá / H H
  námá wárì
  [ námá ] ‘animal’
  námá wárì àmēè
  ‘animal house’
  ‘animal houses’

  Erasure problem
  Origin problem

  Scope problem
‘Problems’ for a theory of Dominant 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 \( \text{H/L} \) tune come from (to right, in b.); E.g. from constraint ranking, floating tones in input, simple allomorphy, etc.
- **Scope problem** - why does the \( \text{H/L} \) grammatical tune target N2, and not the other morphemes N1 and the plural marker (or others before and after them)

---

**Erasure problem**

\[ \begin{array}{c}
\text{H•H} \\
\text{[ wá·rí ]}
\end{array} \]

**Origin problem**

\[ \begin{array}{c}
\text{H} \\
\text{[ námá wářì àmëë ]}
\end{array} \]
The Scope Problem & Directionality

• **Guiding questions**: with Dominant GT, what are the directionality relations between the trigger and the target

• **Linear directionality**:  
  ◦ Rightward: $L \rightarrow R$  
  ◦ Leftward: $R \rightarrow L$

• **Hierarchical directionality**:  
  ◦ Inward: $[x[y]] \rightarrow x \rightarrow y$  
  ◦ Outward: $[x][y] \rightarrow x \rightarrow y$
Cophonologies (Inkelas 1998)

• Two theories posited around the same time:
  • 1) Inkelas’ (1996, 1998, later Inkelas & Zoll 2007): **Cophonology analysis** of Hausa grammatical tone as ‘dominance’
  • **Stem scope**: the scope of morphologically conditioned phonology is the stem formed by the word-formation construction in question
Cophonologies (Inkelas 1998)

• **Hausa** language (Chadic: Nigeria/Niger)
  ◦ Dominant affix (first example)
  ◦ Non-dominant affix (second example)

\[
\begin{align*}
/ jìmìnáá + \text{-úú} / & \rightarrow jìmìn - úú & [jìmìnúú] & \text{‘ostriches’} \\
/ jààkíí + \text{-n} / & \rightarrow jààkíí - n & [jààkín] & \text{‘the donkey’}
\end{align*}
\]
Cophonologies (Inkelas 1998)

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

Dominant GT in Hausa

Cycle 1  Dom  / [kárántá] – dingá /  →  \kàràn\ncí\n
Cycle 2  Non-dom  / má- [kàrànci] /  →  \màkàrà\ncí\n
Cycle 3  Dom  / [mákàràncí] – dingá  →  \màkàrà\ncí\nyáá\n
Cycle 4  Non-dom  / [mákàràncíyáá] – dingá  →  \màkàrà\ncí\nyáá\n

‘Strict base mutation’ (Alderete 2001a,b)

2) Alderete’s (1999, 2001a, 2001b) ‘Transderivational Antifaithfulness’ – posited to capture lexical accent dominance
- **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
Parallels at the phrase level

• In recent years studies on tone have revealed clear parallels in phrase-level phonology
  ◦ E.g. Tommo So (Dogon - McPherson 2014, McPherson & Heath 2016)
  ◦ Kalabari (Ijoid - Harry & Hyman 2014)

• The same dominance asymmetry: morphologically inner elements (such as lexical heads or inner modifiers) are never dominant over outer modifiers
GT word-level scope = C-Command

[McPherson 2014, McPherson & Heath 2016]

◦ /gámmá + gém + nó /
  gàmmà gèm nó
cat black this
N Adj Dem
‘this black cat’

[Tommo So – McPherson & Heath 2016]

• Constraint X¹ DEM: assess a violation for every word c-commanded by the demonstrative that is not included in its \{L\_TONE\} domain
Null Hypothesis: Dominant tone asymmetry [Rolle 2018]

<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>✓ Yes</td>
<td>✓ Yes</td>
<td></td>
</tr>
<tr>
<td>Lexical head → Grammatical/Dependent</td>
<td>✓ Yes</td>
<td>* No</td>
<td></td>
</tr>
</tbody>
</table>

Comparing dominant vs. non-dominant GT
Part 2

Findings from a case study on Izon grammatical tone
Izon language

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

• All previous tonal work in Ijoid languages shows several cases of dominant GT

Izon language
Izon language

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

• Special fieldwork situation:
  ◦ Urban setting (major city)
  ◦ Multi-ethnic population with widespread daily multilingualism
  ◦ Working in depth with one primary consultant, Jumbo Gift
Basics of Izon tone: **Contrasts**

- Izon has two basic tonemes:
  - /H/ <á> vs. /L/ <à>

- Lexical tone distinctions
  - [LR] [àŋgǎ] ‘egg’
  - [LH] [àŋgá] ‘side’
  - [LLF] [àŋgòlô] ‘lizard’
  - [HLL] [áŋìsì] ‘handkerchief’ (<Eng.>)
Basics of Izon tone: **Tonal groups**

- In addition to lexical tone, most morphemes fall into three classes depending on how they affect their surroundings (i.e. they form **tonal groups**):
  - A: assigns LH on target
  - B: assigns H on target
  - C: assigns L on target

<table>
<thead>
<tr>
<th>Tone class</th>
<th>Noun example</th>
<th>‘only’ example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A the LH class</td>
<td>[bùrù]</td>
<td>kùmò</td>
</tr>
<tr>
<td>B the H class</td>
<td>[námá]</td>
<td>bùrù_A kùmò</td>
</tr>
<tr>
<td>C the default L class</td>
<td>[òpòriópò]</td>
<td>námá_B kùmò</td>
</tr>
</tbody>
</table>

- Default: [default]
Morphosyntax

- 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 [V] ]</td>
</tr>
<tr>
<td>[ Dem [N] ]</td>
<td>[ [V] Tns/Asp/Pol ]</td>
</tr>
<tr>
<td>[ Adj [N] ]</td>
<td>[ Pred C ]</td>
</tr>
<tr>
<td>[ Num [N] ]</td>
<td>[ Clause Q ]</td>
</tr>
<tr>
<td>[ [N] Def ]</td>
<td>[ V₁ V₂ ]</td>
</tr>
</tbody>
</table>
Central focus

• In which contexts are these assigned tones dominant, i.e. when do they override the tones of the target and assign the grammatical tune?
NP supports Dominant Tone Asymmetry:
Dependent (trigger) $\rightarrow$ Lexical head (target)

- **Condition 1:** $[\text{Modifier XP } [\text{N}]]$
- Pre-modifiers always overwrite tone of N
  - Adj + N
  - Dem + N
  - Poss + N
  - Num/Quant + N
  - RC + N
NP supports Dominant Tone Asymmetry: Dependent (trigger) $\rightarrow$ Lexical head (target)

- **Condition 1:** $[\text{Modifier XP [N]}] \rightarrow$ tones of N replaced

<table>
<thead>
<tr>
<th>Tone class</th>
<th>Modifier</th>
<th>Noun</th>
<th>Tone patterns in isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>èbìₐ ‘good’</td>
<td>[èbìₐ] [L]</td>
<td>[èbìₐ] [L]</td>
</tr>
<tr>
<td>B</td>
<td>èndì₈ ‘that’</td>
<td>[èndì₈] [L]</td>
<td>[èndì₈] [L]</td>
</tr>
<tr>
<td>C</td>
<td>kálá₈ ‘small’</td>
<td>[kálá₈] [H]</td>
<td>[kálá₈] [H]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>[bùrū] ‘yam’</th>
<th>[námá] ‘meat’</th>
<th>[wáři] ‘house’</th>
</tr>
</thead>
<tbody>
<tr>
<td>kálá₈</td>
<td>bùrū [H LL]</td>
<td>kálá₈ [H LL]</td>
<td>kálá₈ [H LL]</td>
</tr>
<tr>
<td></td>
<td>[námá] [L HH]</td>
<td>[námá] [L HH]</td>
<td>[námá] [L HH]</td>
</tr>
<tr>
<td></td>
<td>[wáři] [L HH]</td>
<td>[wáři] [L HH]</td>
<td>[wáři] [L HH]</td>
</tr>
</tbody>
</table>
NP supports Dominant Tone Asymmetry: Dependent (trigger) → Lexical head (target)

• Condition 2: 
  \[ \text{Mod-XP}_1 \ [ \text{Mod-XP}_2 \ [N] \ ] \ ] \quad \textbf{Outermost Wins}

• Tones of both inner Mod XP and N are replaced
  ◦ A LH / \text{ìnè}_A \ tárá_B \ dìbà_A \ bùrū_A / my three big yam \ [\text{ìnè tărà díbá bùrú}]
    (20170809:160)
  ◦ B H / \text{màà}_B \ opù_A \ bùrū_A / two big yam \ [\text{màà òpú bùrú}]
    (20170711:24)
  ◦ C L / \text{béí}_C \ màà_B \ bùrū_A / these two yam \ [\text{béí màà bùrú}]
    (20170711:23)
NP supports Dominant Tone Asymmetry:
Lexical Head (trigger) $\rightarrow$ Dependent (target)

- **Condition 3:** $[\ [N] \ D/Q \ ]$
- Post-nominal **determiners** and quantifiers
- Four underlying tonal values

<table>
<thead>
<tr>
<th>1- / Ø /</th>
<th>2- / L_W /</th>
<th>3- / L_S /</th>
<th>4- / H L /</th>
</tr>
</thead>
<tbody>
<tr>
<td>kpọ \ ‘also’</td>
<td>bì \ DEF</td>
<td>bèi \ ‘some particular’</td>
<td>mó sè \ ‘all the’</td>
</tr>
<tr>
<td>kị \ ‘particular, instead’</td>
<td>mò \ DEF.PL</td>
<td>sè \ ‘all’</td>
<td></td>
</tr>
<tr>
<td>qọmọ \ INDEF.PL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kùmọ \ ‘only’</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NP supports Dominant Tone Asymmetry: Lexical Head (trigger) \(\rightarrow\) Dependent (target)

• Condition 3a: \([ [N] D/Q \text{ (toneless) } ]\)

• If D/Q is toneless, N assigns tune to it

<table>
<thead>
<tr>
<th>Tone class</th>
<th>Noun example</th>
<th>kpó ‘also’</th>
<th>kumó ‘only’</th>
</tr>
</thead>
<tbody>
<tr>
<td>A the LH class</td>
<td>[bùrù]</td>
<td>bùrù_A kpó</td>
<td>bùrù_A kumó</td>
</tr>
<tr>
<td>B the H class</td>
<td>[námá]</td>
<td>námá_B kpó</td>
<td>námá_B kumó</td>
</tr>
<tr>
<td>C the default L class</td>
<td>[òpóriópò]</td>
<td>òpóriópò_C kpó</td>
<td>òpóriópò_C kumó</td>
</tr>
</tbody>
</table>
NP supports Dominant Tone Asymmetry:
Lexical Head (trigger) $\rightarrow$ Dependent (target)

• Condition 3b: $[ [N] D/Q_{(tone)} ]$

• If D/Q has inherent tone, N tune does not overwrite it

Nouns with post-nominal modifier 2 / $L_w/$

<table>
<thead>
<tr>
<th></th>
<th>‘the LH’</th>
<th>‘the yam’</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$b\tilde{i}$</td>
<td>$b\tilde{i}$</td>
</tr>
<tr>
<td>B</td>
<td>$b\tilde{i}$</td>
<td>‘the meat’</td>
</tr>
<tr>
<td>C</td>
<td>$b\tilde{i}$</td>
<td>‘the pig’</td>
</tr>
</tbody>
</table>

\[ \text{\textbackslash b\textsubscript{\textit{ur\textsubscript{\textmu}}} \quad \text{\textbackslash n\textsubscript{\textit{am\textmu}}} \quad \text{\textbackslash o\textsubscript{\textit{por\textsubscript{\textbackslash i\textsubscript{\textbackslash o\textsubscript{\textbackslash p\textsubscript{\textbackslash o}}}}}} \quad} \]
NP supports Dominant Tone Asymmetry: Lexical Head (trigger) → Dependent (target)

• Condition 3b: [ [N] D/Q (tone) ]

• If D/Q has inherent tone, N tune does not overwrite it

Nouns with post-nominal modifier 3 / L₅ /

A  ‘the LH’    \ bǔrūₐ
B  ‘the H’     \ nāmāₐ
C  ‘the default L’ \ opotiópòₖ

Nouns with post-nominal modifier 4 / H L /

A  ‘the LH’    \ bǔrùₐ
B  ‘the H’     \ nāmāₐ
C  ‘the default L’ \ opotiópòₖ

\textit{bei} ‘some of’
\begin{align*}
\text{bēi} & \backslash & \text{‘some particular yam’} \\
\text{bēi} & \backslash & \text{‘some particular meat’} \\
\text{bēi} & \backslash & \text{‘some particular pig’} \\
\end{align*}

\textit{mọ sẹ} ‘all the’
\begin{align*}
\text{mọ sẹ} & \backslash & \text{‘all the yams’} \\
\text{mọ sẹ} & \backslash & \text{‘all the meat’} \\
\text{mọ sẹ} & \backslash & \text{‘all the pigs’} \\
\end{align*}
NP supports Dominant Tone Asymmetry: Dependent (trigger) $\rightarrow$ Head+ (target)

- **Condition 4:** $\{ \ [ \text{Mod-XP}_1 \ [N] \ ] \ D/Q \ \}$
  - N is always targeted
  - If D/Q does not have inherent tone, the modifier assigns it a grammatical tune
  - If D/Q has inherent tone, N does not assign tune to it
NP supports Dominant Tone Asymmetry: Dependent (trigger) \(\rightarrow\) Head+ (target)

- **Condition 4:** \{ [ Mod-XP₁ [N] ] D/Q \}

- **Toneless D**

  \[
  \begin{align*}
  &/\text{ìnè}_A \underset{\text{L}/\text{H}}{\rightarrow} \text{ègbèrì} \quad \text{òmọ}/ \quad \text{my \ story INDEF.PL} \\
  \end{align*}
  \]

  \[
  \begin{align*}
  &\left[ \text{ìnè ègbèrì ómọ́} \right] \quad \text{‘my stories’}
  \end{align*}
  \]

- **L-toned D**

  \[
  \begin{align*}
  &/\text{wó}_B \quad \text{òpóríópò} \quad \text{mò}/ \quad \text{our \ pig \ DEF.PL} \\
  \end{align*}
  \]

  \[
  \begin{align*}
  &\left[ \text{wó ópóríópó mò} \right] \quad \text{‘our pigs’}
  \end{align*}
  \]

[20170809:159] [20170711:20]
NP supports Dominant Tone Asymmetry:

Dependent (trigger) $\rightarrow$ Head+ (target)

**Toneless**

L / | H

inèA

my story

[L [N D ]scope]

ègbéribò

[INDEF.PL]

‘my stories’ (20170809:159)

**L-toned**

H |

wòB

our pig

[L [N ]scope]

ópóripó

DEF.PL

‘our pigs’ (20170711:20)
Parallels at verb-phrase/clause-level

- [Subject] [Adjunct] [Object] [Verb] [TAM clitic]

• Dominance:
  ◦ Objects are triggers
  ◦ Verbs are targets

• Non-dominance:
  ◦ Toneless TAM clitics can take grammatical tune,
  ◦ But TAM clitics with tone are not overwritten

• Subjects & Adjuncts – are not triggers nor targets of Dominant GT
VP supports Dominant Tone Asymmetry: Object (trigger) → Verb head (target)

• **Condition 1:** $N_{obj} \ [V]$

Object overwrites verb

/ ____ $f_{\cdot}B$ /

- A LH / búrù$_A$ $f$ / $\rightarrow$ búrù $f$ ‘buy a yam’
- B H / námá$_B$ $f$ / $\rightarrow$ námá $f$ ‘buy meat’
- C L / òró$_C$ $f$ / $\rightarrow$ òró $f$ ‘buy a mat’
VP supports Dominant Tone Asymmetry: Object (trigger) → Verb head (target)

• **Condition 2:** Mod-XP$_1$ [N$_{obj}$] V

• Modifier overwrites both object noun and verb

<table>
<thead>
<tr>
<th>A</th>
<th>LH</th>
<th>àò̀pù$_A$</th>
<th>ìbù́rù</th>
<th>ìgbò́rò /</th>
<th>‘plant (a) ___ yam’</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>H</td>
<td>è̀ndì$_B$</td>
<td>ìbù́rù</td>
<td>ìgbò́rò /</td>
<td>è̀ndì$_B$ bù́rù́ gbò́rò</td>
</tr>
<tr>
<td>C</td>
<td>L</td>
<td>kálá$_C$</td>
<td>ìbù́rù</td>
<td>ìgbò́rò /</td>
<td>kálá$_C$ bù́rù́ gbò́rò</td>
</tr>
</tbody>
</table>
VP supports Dominant Tone Asymmetry: Object (trigger) $\rightarrow$ Verb head (target)

• **Condition 3:** $[N_{obj}]$ D/Q V

• Noun can affect D/Q, but cannot overwrite verb
  - A LH / bùrùₐ bì fè / $\rightarrow$ bùrù bì fè ‘buy the yam’
  - B H / námáₐ bì fè / $\rightarrow$ námá bì fè ‘buy the meat’
  - C L / òróₐ bì fè / $\rightarrow$ òró bì fè ‘buy the mat’

• L on verb is either from default, or is the L tone associated with bì

• **Point:** the grammatical tune cannot assign to Verb, because there is something structurally higher (D/Q) intervening
VP supports Dominant Tone Asymmetry: Object (trigger) ➔ Verb head (target)

• **Dominant** – all targets inward
  - A LH
    - L [òpù bùrù gbóró] ‘plant a big yam’

• **Non-dominant** – immediate target is not inward
  - A LH
    - L [bùrù bí fẹ] ‘buy the yam’
Objects in Spec,vP

- If the object is thought of as merged in the specifier of vP, then the object [DP] can be understood as outward and the verbal [Root+v₀] as inward.


VP supports Dominant Tone Asymmetry: Verb (trigger) → TAM (target)

**Condition 4: [V] TAM**

<table>
<thead>
<tr>
<th>Toneless</th>
<th>Inherent tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>mị₁</td>
<td>yèngí₂</td>
</tr>
<tr>
<td>ụ₁</td>
<td>nimí₃</td>
</tr>
<tr>
<td>a₁</td>
<td>ngìngí₄</td>
</tr>
<tr>
<td>kụmọ₁</td>
<td>tímí₅</td>
</tr>
<tr>
<td>Ø</td>
<td>L₇ H</td>
</tr>
<tr>
<td>L₇ H</td>
<td>Ø H</td>
</tr>
<tr>
<td>L₅ H</td>
<td>H H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRFV</th>
<th>PERF</th>
<th>NEG</th>
<th>NEG.OPT</th>
<th>CONT</th>
<th>IPFV</th>
<th>FUT2</th>
<th>PST.CONT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
VP supports Dominant Tone Asymmetry: Verb (trigger) $\rightarrow$ TAM (target)

- **Condition 4a:** $[V] \text{TAM}$ (toneless)
- If TAM is toneless, V assigns tune to it

- A LH / $\text{fà}_{A} \text{kụmọ}$ / $\rightarrow$ fà kụmọ! ‘Don’t get lost!’
- B H / $\text{mú}_{B} \text{kụmọ}$ / $\rightarrow$ mú kụmọ! ‘Don’t go!’
- C L / $\text{gbé}_{C} \text{kụmọ}$ / $\rightarrow$ gbé kụmọ! ‘Don’t pay!’
VP supports Dominant Tone Asymmetry: Verb (trigger) → TAM (target)

- **Condition 4b: [V] TAM** (tone)

- If TAM has inherent tone, V tune does not overwrite it (although it does affect it)
  
  - **A** LH / béí òwèì **bàngìₐ** tímí / → ...bàng **tìmí** ‘...was running’
  - **B** H / ... **mú₇** tímí / → ...mú **tímí** ‘...was going’
  - **C** L / ... **gbé₇** tímí / → ...**gbé** **tìmí** ‘...was paying’
VP supports Dominant Tone Asymmetry:

**Verb (trigger) → TAM (target)**

<table>
<thead>
<tr>
<th></th>
<th>LH / béí owèi</th>
<th>Verb (trigger)</th>
<th>TAM (target)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>bilè_A yengí /</td>
<td>...bilè yèngí</td>
<td>‘This man is diving in’</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>mú_B yengí /</td>
<td>...mú yèngí [yèngí]</td>
<td>‘...is going’</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>gbé_C yengí /</td>
<td>...gbé yèngí</td>
<td>‘...is paying’</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>LH / béí owèi</th>
<th>Verb (trigger)</th>
<th>TAM (target)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>bang!_A ngîngí /</td>
<td>...bang ngîngí</td>
<td>‘...will run’</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>mú_B ngîngí /</td>
<td>...mú ngîngí</td>
<td>‘...will go’</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>gbé_C ngîngí /</td>
<td>...gbé ngîngí</td>
<td>‘...will pay’</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>LH / béí owèi</th>
<th>Verb (trigger)</th>
<th>TAM (target)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>bang!_A timí /</td>
<td>...bang timí</td>
<td>‘...was running’</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>mú_B timí /</td>
<td>...mú timí</td>
<td>‘...was going’</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>gbé_C timí /</td>
<td>...gbé timí</td>
<td>‘...was paying’</td>
<td></td>
</tr>
</tbody>
</table>
Parallels between VP and NP

V can affect TAM but it cannot overwrite it

• Condition 4: [V] TAM
  ◦ If TAM is toneless, V assigns tune to it
  ◦ If TAM has inherent tone, V tune does not overwrite it (although it does affect it)

• Parallel statements made in NPs:
  ◦ “Condition 3: [ [N] D/Q (toneless) ]
  ◦ If D/Q is toneless, N assigns tune to it
  ◦ If D/Q has inherent tone, N tune does not overwrite it ”
XP (NP/VP) summary

• Generalizations of Izon
  ◦ 1) Dominance inward only: grammatical tune is only overwriting/replacive if it is assigned from an outer morpheme to an inner morpheme
  ◦ 2) Outermost wins: the outermost pre-modifier scopes over all inner constituents
  ◦ 3) Rightward only: grammatical tune is only assigned L to R

• Dominance
  ◦ Y [X] ← Outer Y overwrites inner X

• Non-dominance
  ◦ [X] Z ← Inner X does not overwrite Z
  ◦ [ Y [X] ] Z ← Inner Y does not overwrite Z
Part 3
Contributions of Izon GT to phonology interface studies
[1] Inside-out asymmetries

• Provides further support for inside-out asymmetry effects

• Allomorphy

• Realizational exponentence
  ◦ [Standard DM, e.g. Embick 2010, 2015]

• Recursive Merge in syntax
[2] Dominant tone asymmetry

• In particular, it supports previous statements on Dominance
  ◦ 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)
Legacy of C-Command at PF is operation scope, e.g. stem-scope/strict base mutation

• 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]

• ‘Hierarchy exchange’ at spell-out preserves the inside-out derivational history of syntactic Merge in phonology

• **Phonological scope:**
  ◦ Specifier > Head > Complement

• **More technical sense:**
  ◦ An exponent corresponding to a morpheme in a specifier position will take phonological scope over an exponent corresponding to a morpheme in a head position
[5] Predicts no outward dominance: \textbf{Verb} \rightarrow 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/ bikòn</td>
<td>LL</td>
<td>L</td>
<td>LL</td>
<td>LL</td>
<td>LL</td>
</tr>
<tr>
<td></td>
<td>plantains</td>
<td>màkùs</td>
<td>bikòn</td>
<td>màkùs</td>
<td>màkùs</td>
<td>màkùs</td>
</tr>
<tr>
<td>/H/ dʒí ‘eat’</td>
<td>/HL/ bikòn</td>
<td>LH</td>
<td>H</td>
<td>HL</td>
<td>HL</td>
<td>HL</td>
</tr>
<tr>
<td></td>
<td>plantains</td>
<td>jádʒí</td>
<td>bikòn</td>
<td>jádʒí</td>
<td>jádʒí</td>
<td>jádʒí</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]
[5] No outward dominance: Verb ➔ Object

<table>
<thead>
<tr>
<th>Verb</th>
<th>/HL/</th>
<th>/LH/</th>
<th>/LHH/</th>
<th>/LHL/</th>
<th>/LLH/</th>
</tr>
</thead>
<tbody>
<tr>
<td>/L/</td>
<td>LL</td>
<td>LL</td>
<td>LL</td>
<td>LL</td>
<td>LL</td>
</tr>
<tr>
<td>/H/</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
</tr>
</tbody>
</table>

• Fake Bulu (not real language): Non-attested, hypothetical verb dominance over object
Acknowledgments

• At Berkeley: Sharon Inkelas, Larry Hyman, Myriam Lapierre, Peter Jenks, Darya Kavitskaya
• At Princeton: Florian Lionnet, Laura Kalin, Byron Ahn, Sam Zukoff
• Laura McPherson, Lee Bickmore
• Izon collaborator Jumbo Gift
• Feedback from the audience at the LSA 2019
• Feedback from Department of Linguistics, University of Buffalo (especially colloquium organizers Jeff Good and Christian DiCanio)
• Feedback from Institute of Linguistics, University of Minnesota
• UC Berkeley Oswalt grant (2017) to travel to Nigeria
References

• References largely found within my dissertation:
  ◦ https://escholarship.org/uc/item/9v01c4vr
Counter-examples to ‘no outward dominance’ – Shanghai Wu

Apparent outward dominance – Verb over object

/sãŋ³³/ + /foŋ⁵³/ \ sãŋ³³-foŋ⁵³ \ ‘hurt’ ‘wind’ → ‘to catch a cold’

/paq⁵⁰ MH ngo⁴⁴ LH yiq²¹ H pəŋ⁴⁴ MH si⁴⁴ HL / \ paq⁵⁰ MH ngo⁴⁴ H yiq⁲¹ O pəŋ⁴⁴ O si⁴⁴ HL / ‘give me one CLASSIFIER book’


Metrical analysis of apparent outward dominance:

\[ \begin{align*}
& x_MH \\
/ paq⁵⁰ MH ngo⁴⁴ LH yiq²¹ H pəŋ⁴⁴ MH si⁴⁴ HL / \rightarrow \ ( x_ \quad x_ ) \langle x_ \rangle \langle \langle x_ \rangle \rangle \\
& \text{‘give me a book’} \\
\end{align*} \]

[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 necessarily</em> 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 necessarily</em> 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><em>Does 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(^\oplus) / (n=5)</th>
<th>5 /HM(^\oplus)/1 / (n=6)</th>
<th>6 /HM(^\oplus)/2 / (n=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. /H/</td>
<td>yi?é ‘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>gbää ‘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>/L(_1)</td>
<td>nù?u ‘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. /L(_2)</td>
<td>mi?i ‘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(^\oplus)/</td>
<td>kpésé ‘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(^\oplus)/</td>
<td>kúrú ‘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(^\oplus)/</td>
<td>tòfà ‘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(^\oplus)/</td>
<td>mötó ‘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

64
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/Dominant 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...