“Bipartite morphemes, grammatical tone, and restrictions on exponent shape”

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(1) **FEED-FORWARD MODULAR ARCHITECTURE:** Requires translation between *syntactic module* and *phonological module* (they speak different ‘languages’)

(2) **EXPONENTENCE:** Pairing syntactic-semantic features with phonological exponents

- [S-features] ↔ [Exponent]
- [+PL] ↔ /-z/

(3) **EXPONENT** (∼ ‘recurrent partial’, ‘morph’): Non-decomposable morphological primitive, made of phonological vocabulary (e.g. segments, tones, signs, etc.)

(4) **BIPARTITE MORPHEMES**

- **Discontinuity:** Single linguistic category expressed discontinuously, /æ...β/
- **Non-compositionality:** Meaning not composed of that meaning corresponding to /æ/ plus that meaning corresponding to /β/

(5) **CIRCUMFIXES:** E.g. German [deu] participle *ge-googel-t* ‘(have/be) googled’

- “A circumfix is a good example of a bipartite morpheme, a single realization of a feature or bundle of features or of a derivational category”
- Are circumfixes a single exponentence rule or two separate exponentence rules?

(6) **Discontinuous morphemes** (in Athabaskan), **Splitting verbs** (in West Africa), **Infix-inducing verbs** (in Lakhota), “Synaffixes” (combinations of morphs)

(7) **GRAMMATICAL TONE (GT)**: Kisi [kss] sentential negation

- à dàtá yá lé
  - you condemn/NEG me NEG ‘you didn’t condemn me’

(8) **A RESTRICTION ON EXPONENT SHAPE:** Our central theoretical pursuit today

- All phonological material of an exponent must be strictly local, i.e. there is a single association/precedence path without any ‘gapped’ structure
- Entails bipartite morphemes (e.g. circumfixes, or GT) consist either of (i) multiple morphologically separate exponents, or (ii) covert local structure

(9) **Roadmap**

- §1 A restrictive theory of exponent shape
- §2 Assessing grammatical tone
- §3 Repercussions of the proposal
- §4 Summary
1 A RESTRICTIVE THEORY OF EXPONENT SHAPE

1.1 Tonal exponents

(10) AUTOSEGMENTAL STRUCTURE: Representation as a 3D object, where tones and segments exist on parallel tiers, connected via association lines

(11) PARITY OF EXPONENCE PRINCIPLE: All grammatical meanings can be expressed by segmental exponents, tonal exponents, or their combination

(12) Eton [eto]: béŋ à ñgòb
only LINK shoes
‘only shoes’

(13) Kunama [kun]: ítā ūdā → ítà ūdā
house LINK door
‘house’s door’
1.2 A restrictive theory of exponent shape

A restrictive theory can be stated in terms of PRECEDENCE

- **Direct precedence**: All roots nodes of an exponent have a precedence relation with all other root nodes on the same tier (i.e. no gapped structures)
- **Indirect precedence**: All roots nodes have an (indirect) precedence relation with all other root nodes on a different tier (i.e. no unassociated nodes)

If we obey precedence, certain exponent shapes become **impossible**
1.3 What are the predictions?

(19) If apparent bipartite morphemes actually constitute two separate exponence rules, what are the predictions (i.e. how to tell the difference)?

(20) If separate rules – [F] ↔ /æ/ & [F] ↔ /β/ (Cf. single rule [F] ↔ /æ...β/)

- [1] Appearance: The conditions governing the (non-)appearance of one co-exponent (æ) never affect that of the other co-exponent (β)
- [2] Allomorphy: Suppletive allomorphy that is triggered by or targets one of the co-exponents (æ) does not necessarily reference or affect the other (β)
- [3] Derivedness: When the co-exponents (æ and β) are incidentally local, they act as a derived environment w.r.t. morpho-phonological processes
- [4] Minimality: If there is minimality-based faithfulness (e.g. don’t delete vowel of 1σ ‘morphemes’), co-exponents (æ and β) are evaluated separately

1.4 A useful starting point: Two morphological patterns of circumfixation

(21) DISJOINT CIRCUMFIXATION (the expected type)

- The components of the circumfix act independently from one another with respect to their morphological distribution, patterns, forms, etc.

(22) German participle marking ge-...-t, e.g. used in past (perfect), passives

- googeln → ge-google-t [gə-gugəlt] ‘(have/be) googled’

(23) Quirk 1: Irregular suffixal allomorph

- geben → ge-geb-en [gə-geb-en] ‘(have/be) given’

(24) Quirk 2: Prefix ge- can only appear before stress

- antworten → ge-antwort-et [gə-ʔantvɔrt-ət] ‘(have/be) answered’
- probieren → probier-t [prɔbik-t] ‘(have/be) tried/tasted’
- Cf. *ge-probier-t *[gə-prɔbik-t] ~ *[gə-prɔbik-t]

(25) “As far as (morpho-)phonology proper is involved, there is no evidence whatsoever for the link between the affixes.” (Drijkoningen 1999:78)

(26) Shape of suffix never determines whether prefix appears

- sprech-en → ge-sproch-en [gə-sprɔk-ən] ‘(have/be) spoken’
- No verb with irregular form akin to *sproch-en without ge-

(27) Presence or absence of prefix never determines shape of suffix

- ver-sprech-en → ver-sproch-en [fé-r-prɔk-ən] ‘(have/be) promised’
- No verb which reverts to default in absence of ge-, e.g. *ver-sprech-t
(28) Cf. CONJOINT CIRCUMFIXATION (the unexpected type)
   • The components act as a single unit co-dependent upon each other with 
     respect to morphological distribution, patterns, forms, etc.
(29) German Ge-...-e deverbal nominalization for repeated action (pejorative)
   • brüll- ‘roar, shout’ → Ge-brüll-e [ɡə-ˈbryl-ə] ‘shouting’
   • Hört doch endlich mit eurem sinnlosen Gebrüllle auf!
     ‘Stop with your pointless shouting!’
(30) Without initial stress, forms are ungrammatical/questionable/odd
   • telefonier-[ˈteləfoːniər]- ‘telephone (v.)’ → ˈGe-tefonier-e ~ ˈTelefonier-e
(31) In general, speakers do not accept forms which contain only suffix
   • telefonier-[ˈteləfoːniər]- ‘telephone (v.)’
(32) Typologically: Disjoint circumfixation common, conjoint circumfixation rare

2 ASSESSING GRAMMATICAL TONE

(33) When exponence involves grammatical tone in a bipartite construction, does it:
   • Behave like disjoint circumfixation (in line with our thesis), or
   • Behave like conjoint circumfixation (against our thesis)?

2.1 Data point 1: Appearance

(34) Appearance: The conditions governing the appearance or non-appearance of
   one co-exponent (α) never affect that of the other co-exponent (β)
(35) Tonal circumfixes in Liko [lìk]²³
   • Adjectives are derived from verbs by circumfix ₋...₃ around verb stem
   • H-toned verb root: búng- ‘lose’
     mú-bókù mú-ɓúng-à-₃ → múbókù múɓúngò
     3-quierer 3-DER-lose-FV-DER ‘a lost quiver’
   • L-toned verb root: bàk- ‘carve’
     dàgá-tù tì-ɓàk-à-₃ → dàgáti tìɓàkā
     13.arrow-13 13-DER-carve-FV-DER ‘carved arrows’
(36) However, while non-derived adjectives do not occur with ₋-, all do end in H
   • -kúɗù ‘short’
   • -kédé ‘small’
   • -kóngù ‘tall, high’
   • -kúkúkù ‘short’ (PL)
   • -kékké ‘small’ (PL)
   • -dìngì ‘big’
   • -lìlà ‘too well-done’
   • -nďà ‘long’
   • -tì ‘heavy’
   • -bìsì ‘raw, new’
(37) We therefore can assume suffixal floating -₃ portion is present here
(38) Supports treating the two components as separate exponence rules

<table>
<thead>
<tr>
<th>Exponent rule 1</th>
<th>Exponent rule 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(derived Adj)</td>
<td>(derived &amp; non-derived Adj)</td>
</tr>
<tr>
<td>[ADJ, (F)] ↔ ⊥</td>
<td>[ADJ] ↔ -hiro</td>
</tr>
</tbody>
</table>

(39) What would a canonical counter-example look like?
- In the relevant contexts, one of the floating tones could never appear without the other (i.e. complete co-variation of the two components)

2.2 Data point 2: Grammatical tone (GT) suppletive allomorphy

(40) Allomorphy: Suppletive allomorphy that is triggered by or targets one co-exponent (æ) does not necessarily reference or affect the other (β)

(41) Brief study from Cilungu [mgr] grammatical tone

(42) First, our baseline: GT without suppletive allomorphy
- Far Past Tense (T): A prefix a- plus a (non-local) GT hiro
  - yá-a-sukilil-a
    - 3P-T-accompany-FV T
    - ‘they have already accompanied’
  - tú-a-sópolol-a
    - 1P-T-untie-FV T
    - ‘they have already untied’
  - u-a-yá-sukilil-il-e
    - 3S-T-3P-accompany-ASP-FV T
    - ‘he/she accompanied them’

(43) Now, our focus: GT with suppletive allomorphy
- Recent Past Tense (T): A prefix á- plus a (non-local) GT hiro ∼ Ø
- Whether word-final GT surfaces depends on word-initial tone (boxed)
  - yá-a-sukilil-a
    - 3P-T-accompany-FV T
    - ‘they have just accompanied’
  - u-a-sukilil-a
    - 3S-T-accompany-FV T
    - ‘he/she has just accompanied’
  - yá-a-sópolol-a
    - 3P-T-untie-FV T
    - ‘they have just untied’
  - u-a-sópolol-a
    - 3S-T-untie-FV T
    - ‘he/she has just untied’

(44) Cilungu generalization: hiro appears only when initial subject marker (SM) is high

(45) Larger point: Tonal allomorphy does not affect segmental co-exponents

\[ [T:RECENT] \leftrightarrow \{ á- \} \quad \& \quad [T:RECENT] \leftrightarrow \{ hiro / [H -] \} \]
What would a canonical counter-example look like?
- Tonal allomorphy has a long-distance effect on segmental prefix: absence of $\text{H}^F$ would cause absence of á- prefix (again, complete co-variation)

2.3 Data point 3: Derived environment effects

Derivedness: When the co-exponents ($\text{ae}$ and $\beta$) are incidentally local, they act as a derived environment with respect to morpho-phonological processes.

Argument involves DERIVED ENVIRONMENT EFFECTS (DEEs): Phonological processes that apply across but not within ‘morphemes’

Korean palatalization
- Non-derived: /mati/ ‘knot’ → [madi] *[madʒi]

Formalized as a constraint ALTERNATION (van Oostendorp 2007)
- “if an association line links two elements of colour $\alpha$” (i.e. same morphemic index), then “the line should also have colour $\alpha$” (i.e. not be epenthetic)
- In short, do not create new associations with structure of the same color

| Derived: | $h_a \ æ_a \ t_b \ o_b \ t_b \ i_c$ | $h_a \ æ_a \ d_b \ o_b \ dʒ_b \ i_c$ | [HIGH]$_c$
|----------------|----------------------|---------------------|---------------------|
| Non-derived: | $m_d \ a_d \ t_d \ i_d$ | $*$ $m_d \ a_d \ dʒ_d \ i_d$ | [HIGH]$_d$

Local floating tone: Tone docks to vowel adjacent to accompanying segments

Southeastern Nochixtlán Mixtec [mxy]
- βeʔē jājān → [βeʔē jājān] ‘the coyote’s house’
- nāʔãH jājān → [nāʔã jājān] ‘the coyote’s front paw’

What happens in isolation? → Complete neutralization
- βeʔē → [βeʔē] ‘house’
- nāʔãH → [nāʔã] ‘hand’ *[nāʔã] ~ *[nāʔã]

Local floating tone here cannot ‘self-associate’ (typologically, very common)

The ban on self-association as a DEE:

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- 7 -
(55) Cf. bipartite morpheme with grammatical tone in Idakho [ida]30

- The (right-oriented) IMPERFECTIVE suffix -aang is co-expressed with a (left-oriented) floating tone ݘ2, which docks to 2nd mora of stem

- a-(reeβ-レスト-ang-a) → a-(reéβ-aang-a) 3S-ask-ASP-ASP-FV 's/he asks' [ărēβąångą]

- a-(kalushits-レスト-ang-a) → a-(kalúshits-aang-a) 3S-return-ASP-ASP-FV 's/he returns' [akášúshícåångå]

- a-(sebulukhanyiny-レスト-ang-a) → a-(sebúlukhanyiny-aang-a) 3S-scatter-ASP-ASP-FV 's/he is scattering' [asèbúlúkáñinyàångå]

(56) When –aang itself is incidentally in 2nd mora position, ‘self-association’ found

- a-(lekh-レスト-ang-a) → a-(lekh-áng-a) 3S-leave-ASP-ASP-FV 's/he leaves' [ałèkháångå]

(57) If the two constitute separate exponents (w/ distinct morphological ‘colors’/ ‘indices’), correctly predicts not subject to self-association bans – Cf. (53)

<table>
<thead>
<tr>
<th>レスト</th>
<th>レスト</th>
</tr>
</thead>
<tbody>
<tr>
<td>a_g</td>
<td>l_h</td>
</tr>
<tr>
<td>e_h</td>
<td>kh_h</td>
</tr>
<tr>
<td>a_j</td>
<td>a_j</td>
</tr>
<tr>
<td>ng_j</td>
<td>a_k</td>
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<tr>
<td>a_g</td>
<td>l_h</td>
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<tr>
<td>e_h</td>
<td>kh_h</td>
</tr>
<tr>
<td>á_j</td>
<td>a_j</td>
</tr>
<tr>
<td>ng_j</td>
<td>a_k</td>
</tr>
</tbody>
</table>

(58) What would a canonical counter-example look like?

- Non-local floating tone would never associate to sponsoring affix, resulting in ineffability or in exceptional association to another position (i.e. not 2nd)

2.4 Prediction: A primary two-way split with floating tone

<table>
<thead>
<tr>
<th>Two exponents: Vi + レスト</th>
<th>Single exponent: Vi レスト</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Idakho type)</td>
<td>(S. N. Mixtec type)</td>
</tr>
<tr>
<td>a. Locality</td>
<td>Floating tone レスト can appear non-local to Vi Floating tone レスト appears on segments adjacent to Vi</td>
</tr>
<tr>
<td>b. Derivedness</td>
<td>No prohibition on self-association (i.e. レスト---Vi okay) Avoid self-association (i.e. ban on レスト--Vi)</td>
</tr>
<tr>
<td>c. Appearance</td>
<td>Appearance/non-appearance of one should not affect the other Appearance/non-appearance should always affect both Vi and レスト</td>
</tr>
<tr>
<td>d. Allomorphy</td>
<td>Allomorphy involving one should not affect the other Allomorphy should always involve both Vi and レスト</td>
</tr>
</tbody>
</table>
Repercussions of the Proposal

(59) Repercussion 1: Must reinterpret bipartites without non-contiguous exponence

<table>
<thead>
<tr>
<th>Contiguous exponence</th>
<th>[F] ↔ CVC-</th>
<th>[F] ↔ Ḣﯓ-</th>
<th>[F] ↔ CṼמזג</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-contiguous exponence</td>
<td>[F] ↔ CV-…-C</td>
<td>[F] ↔ Ḣmodifiers-…- begged</td>
<td>[F] ↔ CV-…- begged</td>
</tr>
<tr>
<td>Multiple exponence (reinforcing)</td>
<td>[F] ↔ CV-</td>
<td>[F] ↔ Ḣmodifiers-</td>
<td>[F] ↔ CV-</td>
</tr>
<tr>
<td>Multiple exponence (overlapping)</td>
<td>[F,G] ↔ CV-</td>
<td>[F,G] ↔ Ḣmodifiers-</td>
<td>[F,G] ↔ CV-</td>
</tr>
</tbody>
</table>

(60) Requires the incorporation of grammatical tone into relevant theory

- Partially Superfluous Extended Exponence Generalization: More general co-exponent appears inside more specific one (Grofulović & Müller 2023 [under review])
- Nanosyntactic theories w/o multiple exponence entirely (Caha 2023 [forthcoming])
- Theories of the reinforcing type of multiple exponence?

(61) Repercussion 2: Circumfixation cannot account for TONAL OVERWRITING

(62) Example: LH overwriting in the Hausa imperative [hau]

- H kwááná → LH [kwààná] ‘spend the night’
- HL tááʃi → LH [tààʃí] ‘get up’
- LHL súnkújà → LH [sünkùjà] ‘bend down’
- HHL kàrànttáá → LH [kàrànttáá] ‘read’ etc.

(63) Trommer (2022): Overwriting = circumfixation plus constraint CONTIGUITY

- LH overwriting consists of –prefix and -suffix which have same morphological identity, i.e. same morphological ‘color’ or ‘index’ – (50)
- All components of an exponent (here, the –prefix and -suffix) want to be adjacent, which is achieved if we delete the intervening lexical tones of the stem

(64) This is an impossible move under our approach, because the two tones of the ‘circumfix’ never have the same morphological color/index
4 SUMMARY

(65) Bipartite morphemes: Linguistic category expressed by discontinuous /æ...β/

(66) Our focus was bipartite circumfixes and bipartite grammatical tone
- 1) CV-...-C
- 2) Ḵereço-...-ᵢiembre
- 3) CV-...-ᵢiembre

(67) In response, argued for a restriction on exponent shape
- All phonological material of an exponent must be strictly local, i.e. there is a single association/precedence path without any ‘gapped’ structure

(68) Bipartite morphemes as separate rules – [F] ↔ /æ/ & [F,(G)] ↔ /β/
- (Cf. single rule [F] ↔ /æ...β/)

(69) Three predictions of the separate rules approach (largely borne out):
- Appearance: The conditions governing the (non-)appearance of one co-exponent (æ) never affect that of the other co-exponent (β)
- Allomorphy: Suppletive allomorphy that is triggered by or targets one of the co-exponents (æ) does not necessarily reference or affect the other (β)
- Derivedness: When the co-exponents (æ and β) are incidentally local, they act as a derived environment w.r.t. morpho-phonological processes

(70) Take away: Supports the independence of tonal and segmental exponence
- On the Oto-Manguean family of Mexico: “a verb may simultaneously belong to various inflectional classes: one for its endings, another for its stem changes and a third for its tonal changes” (Palancar 2016:112, underlining mine)

5 REFERENCES

(71) As a [list] or [bibtex], or email me: rolle@leibniz-zas.de
“[T]he translational process cannot take place in either morpho-syntax or phonology: the Translator's Office has access to the structure and the labels of both sides” – Scheer 2011:352

Especially in Distributed Morphology, e.g. Embick 2015, *inter alia*


Harris 2017:17, citing Kuryłowicz 1966 [1945-1949]; Marušič 2003 on non-compositionality


Harris 2017:19, my underline


Bauer 1988, Hall 2000

Kisi example: Childs 1995:49; For extensive references on grammatical tone, see Lionnet, McPherson, & Rolle 2023 (introduction to special issue of *Phonology*)

Hyman 2011; “[T]onal morphology... exhibits essentially the same range of morphological properties as in all of segmental morphology” – Hyman & Leben 2000:588


< èndị́ ‘that’ + b 우리나라 ‘that’ + bùrà[óln] ‘yam’ – Rolle 2021

< [a:33-gu35] – Alderete, Chan, & Tanaka 2022

Precedence plays major role in some theory, e.g. see Papillon 2020 and references therein

One could state that each co-exponent has its own SUBCATEGORIZATION FRAME (Kalin & Rolle 2022)


Data is from de Wit 2015:162-163,219

Data is from Bickmore 2007, Rolle & Bickmore 2022

The idiosyncrasy of this allomorphy is discussed in detail in Rolle & Bickmore 2022. Briefly, the same grammatical tone allomorphy always appears with Recent Past prefix á-, which appears in several related tense designations (e.g. the ‘Yesterday Past’, the ‘Yesterday Past Progressive’, the ‘Recent Past Progressive’, and the ‘Recent Perfect’). At the same time, this grammatical tone allomorphy appears only in the context of the Recent Past prefix á-; other comparable tense/aspect/mood (TAM) contexts (with other morphology) show no grammatical tone allomorphy. In other words, the alternation is not phonologically general. Importantly, for our argument, other TAM contexts in Cilungu which show grammatical tone allomorphy also
show the morphological independence of tonal and segmental components (e.g. the plain ‘Perfect’ with a suffix –il, and the ‘Subjunctive’/‘Imperative’).

26 This is informally called ‘first-last tone harmony’ in the Bantu literature – See Rolle & Bickmore 2022 and Hyman & Nyamwaro 2023 for details and references

27 Korean data: van Oostendorp 2007, citing Iverson 1993, Polgárdi 1998, Rhee 2002; for DEEs generally, see Inkelas 2014, Chong 2019, inter alia

28 Data is from McKendry 2013:136-137

29 Self-association bans are prevalent in literature, e.g. Myers & Carleton’s 1996 *DOMAIN, Revithiadou 1999:75-80, Wolf’s 2007 no ‘tautomorphemic docking’ constraint, Trommer’s 2011 ‘incest taboo problem’, McPherson’s 2014:89 parameterization of ‘self-control’, inter alia. As Trommer 2022 summarizes, “floating features show a strong tendency to associate to segmental material which is not part of the same morpheme”.

30 Idakho data: Ebarb 2014:144,161,322

31 Terminology based on Harris 2017


34 Trommer (2022)’s original definition of CONTIGUITY-τ: “For every pair of melodically adjacent tones (τ₁,τ₂), Count a violation for every phonetic tone τ that intervenes between τ₁ and τ₂ (where two tones are melodically adjacent iff they are of the same type T (e.g. both H, or both L) and no other tone of type T intervenes between them)”