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Not all morphology is item-based: Evidence from three tonal processes

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Item-and-arrangement vs. item-and-process morphology

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There is a long-standing debate in the phonological literature about whether phonological alternations specific to a morphosyntactic context should be analyzed as triggered by

a. an underlying phonological item (Bermúdez-Otero, 2012; Trommer and Zimmermann, 2014), or
b. a morpheme-specific rule or constraint (Hockett, 1954; Anderson, 1992; Sande, 2018)

Here I provide evidence from three grammatical tone processes that not all tonal morphology is item-based.

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- **Questions:**
  1. Can/should all morphemes be analyzed as underlying items?

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- **Questions:**
  1. Can/should all morphemes be analyzed as underlying items?
     - Answer: No.

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- **Questions:**
  1. Can/should all morphemes be analyzed as underlying items?
     - Answer: No.
  2. What types of evidence can tell us whether a morpheme is best analyzed as an item or not?

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- **Questions:**
  1. Can/should all morphemes be analyzed as underlying items?
     - Answer: No.
  2. What types of evidence can tell us whether a morpheme is best analyzed as an item or not?
     - Diagnostic list to be built over the course of this talk.

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- **Questions:**
  1. Can/should all morphemes be analyzed as underlying items?
     - Answer: No.
  2. What types of evidence can tell us whether a morpheme is best analyzed as an item or not?
     - Diagnostic list to be built over the course of this talk.
  3. If not all morphemes are items, then what are they?

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- **Questions:**
  1. Can/should all morphemes be analyzed as underlying items?
     - Answer: No.
  2. What types of evidence can tell us whether a morpheme is best analyzed as an item or not?
     - Diagnostic list to be built over the course of this talk.
  3. If not all morphemes are items, then what are they?
     - Answer: Morphemes, whether they have an underlying item-based component or not, can trigger cophonologies, which result in different phonological processes in different morphological contexts. I'll provide such an analysis using Cophonologies by Phase (CBP).

The phenomena

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Three primary case studies:

1. Tonal polarity in Kipsigis
2. Scalar tone shift in Guébie
3. Doubly conditioned tone in Amuzgo

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Tonal polarity in Kipsigis

Kipsigis language background

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- Kipsigis is a Kalenjin (Southern Nilotic) language spoken in Kenya.
- It is an understudied language but is widely spoken, with about two million speakers.
- The data presented here come from (Kouneli and Nie, To appear). They thank 12 Kipsigis speakers, two in the US and 10 in Kenya.

Tonal background

- There are two tone heights in Kipsigis: H and L.

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- There are two tone heights in Kipsigis: H and L.
- HL contours are attested on heavy syllables (long vowels or short vowel + sonorant coda).

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- There are two tone heights in Kipsigis: H and L.
- HL contours are attested on heavy syllables (long vowels or short vowel + sonorant coda).
- There is a regular process of LH tones associated with a single syllable flattening to H (there is no rising contour on the surface).

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- There are two tone heights in Kipsigis: H and L.
- HL contours are attested on heavy syllables (long vowels or short vowel + sonorant coda).
- There is a regular process of LH tones associated with a single syllable flattening to H (there is no rising contour on the surface).
- Two H tones associated to the same syllable surface as HL.
  - /sʊ̀gàr-ʊ̀-ík/ → sʊ̀gàrʊ́ːk (L.L-L-H → L.L.H, *L.L.LH); 'sugar'
  - /kó:k-wá-ít/ → kó:kwê:t (H-H-H → H.HL); 'village'

The nominative form of modifiers

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- The nominative form of a modifier surfaces with exactly opposite tones of the default form of that modifier: /H/ → [L] and vice versa.

	Oblique		Nominative		Gloss
a.	náːn	H	nàːn	L	MED.SG.DEM
b.	nì	L	ní	H	PROX.SG.DEM
c.	ɲùːn	L	ɲúːn	H	1SG.POSS
d.	áɲìn	H.L	àɲín	L.H	'tasty.SG'
e.	míntìlíːl	H.L.H	mìntílìːl	L.H.L	'sour.SG'
f.	míntìlíːl-èːn	H.L.H.L	mìntílìːl-éːn	L.H.L.H	'sour-PL'

Tonal polarity plus regular LH flattening

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When a HL contour undergoes tonal polarity, it surfaces as H, rather than LH.

- This is expected based on the language-wide ban on LH contours, which regularly flatten to H.
- Polarity applies: HL→LH
- And feeds flattening: LH→H

	Oblique		Nominative		Gloss
a.	kárâːrán	H.HL.H	kàráːràn	L.H.L	'beautiful.SG'
b.	tórôːr-èːn	H.HL.L	tòróːr-éːn	L.H.H	'tall-PL'

Kipsigis tonal polarity

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- The tonal change is the only marker of nominative on modifiers. There is no additional (segmental) change.
- Tonal polarity affects all tones in the modifier, not just one edge. It applies across-the-board.
- With the exception of six adjectives that obey a tonal sub-pattern (HL.L→L.H), all modifiers undergo tonal polarity in nominative contexts. These six adjectives are also exceptional in other ways, namely plural formation.

Item-and-process versus item-and-arrangement models

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- An item-and-arrangement approach to Kipsigis tonal polarity would assume that the process is triggered by the addition of some underlying phonological form, and any additional phonological changes are due to the regular phonology of the language.
- An item-and-process approach allows for morphemes to be associated with processes rather than underlying forms.

This section first considers and rules out an item-and-arrangement analysis of Kipsigis tonal polarity, then presents a possible item-and-process analysis set in Cophonologies by Phase.

Arguments against an item-based account

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Kouneli and Nie (To appear) make a number of arguments against an item-based account.

- Possible analysis: A floating tone or tonal feature at one edge of the nominative modifier has a cascading OCP effect, resulting in successive tonal changes.

Problem 1. If we assume a floating tone H or L, we would need it to have polarizing effects for nominative modifiers, but no where else. No other affixes specified as H or L in the language have a polarizing effect.

- (Recall that sequences of HH on a single syllable result in HL, not L or LL, which we would need for the polarity fact to come out right.)

Problem 2. We know that Kipsigis tolerates consecutive syllables with the same tone, even among nominative modifiers (recall tòróːr-éːn, L.H.H, 'tall-PL.NOM')

An second possible item-based account

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- Possible analysis: In an item-based account that assumes multiple allomorphs of the nominative morpheme (H, L), we could assume that a polar allomorph docks on every syllable.

Problem 1. We lose the generalization that this is a phonologically predictable process.

Problem 2. We complicate the lexicon (two suppletive allomorphs of this morpheme, as opposed to 1 or 0).

Problem 3. How to get an exponent of the nominative inserted multiple times on a single modifier?

Ruling out item-based accounts

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A typical argument in favor of item-and-arrangement accounts is that they are more restrictive than item-and-process accounts.

- Kouneli and Nie (To appear) show that an item-based account would require a constraint or set of morpheme-specific readjustment rules specific to that context.
- This would/could be equally as unrestrictive as an account without an underlying item.
- Thus, the restrictiveness argument cannot distinguish between the two approaches, and a process-based account is more economical than an item-based one.

Proposing a process-based account

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Based on the arguments presented here against an item-based account, I assume a process-based approach is optimal.

- Kouneli and Nie (To appear) do not adopt a specific item-and-process approach.
- Here, I adopt Cophonologies by Phase, which I will briefly introduce before fleshing out an analysis.

Preview of Cophonologies by Phase

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- CBP combines Distributed Morphology operations such as late insertion of vocabulary items with phonological evaluation via weighted constraints.

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- CBP combines Distributed Morphology operations such as late insertion of vocabulary items with phonological evaluation via weighted constraints.
- Crucially, CBP assumes an enriched notion of Vocabulary Items (lexical representations) (Sande and Jenks, 2018; Sande, 2019; Sande et al., 2020).

Vocabulary items

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(1) **Traditional DM vocabulary items** (Embick and Noyer, 2007, p. 298-299):

- [pl] $\longleftrightarrow$ z
- [pl] $\longleftrightarrow$ -en/$\{\sqrt{\text{OX}}, \ldots\}$
- [pl] $\longleftrightarrow$ $\varnothing$/$\{\sqrt{\text{MOOSE}}, \sqrt{\text{DEER}}, \ldots\}$

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- In CBP, each vocabulary item contains three phonological components:
  1. An underlying phonological representation, $\mathcal{F}$
  2. A prosodic subcategorization frame, $\mathcal{P}$
  3. **A constraint weight readjustment, $\mathcal{R}$**

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- In CBP, each vocabulary item contains three phonological components:
  1. An underlying phonological representation, $\mathcal{F}$
  2. A prosodic subcategorization frame, $\mathcal{P}$
  3. **A constraint weight readjustment, $\mathcal{R}$**
- Any of the three components can be null for a given morpheme.
  - A concatenative morpheme without a morpheme-specific process has only a specified $\mathcal{F}$.
  - A concatenative morpheme plus a morpheme-specific process has a specified $\mathcal{F}$ and $\mathcal{R}$.
  - A nonconcatenative morphological process has a specified $\mathcal{R}$, but no $\mathcal{F}$.

Phases

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- Morpheme-specific constraint weight adjustments apply only the the spell-out domain, or *syntactic phase* in which they are introduced.
- Since the phase-based spell-out of Cophonologies by Phase is not the main point of this talk, I leave out a full discussion of it here, though it is crucial to the assumptions of CBP, and specifically in accounting for both sub-word and cross-word phonology (Sande et al., 2020).

Faithfulness and anti-faithfulness constraints

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A constraint-based analysis of tonal polarity requires tonal faithfulness and anti-faithfulness constraints.

(2) ID-TONE: Assign one violation for each tone bearing unit whose tonal association differs between input and output.

(3) *ID-TONE: Assign one violation for each tone bearing unit whose tonal association does not differ between input and output.[1].

In the default grammar of the language, the ranking is ID-TONE: $\gg$ *ID-TONE, resulting in tonal faithfulness.

- For simplicity, in this talk I adopt ranked rather than weighted constraints.

[1] The (anti)faithfulness are not defined existentially, but gradiently. Multiple violations can be incurred by a single candidate (Mortensen, 2006), contra (Alderete, 2001)

Markedness constraints

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To account for the regular LH flattening process in Kipsigis, a markedness constraint is needed.

(4) *LH: Assign a violation for each sequence of LH within a syllable.

This constraint is ranked very high by default, as it is never violated. It must outrank Id-Tone in order for underlying LH sequences to surface as H: *LH ≫ Id-Tone ≫ *Id-Tone

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(5) $\sqrt{tall} \longleftrightarrow \begin{Bmatrix} \mathcal{F}: & \text{tórô:r} \\ \mathcal{P}: & \varnothing \\ \mathcal{R}: & \varnothing \end{Bmatrix}$

(6) $\text{PL} \longleftrightarrow \begin{Bmatrix} \mathcal{F}: & \text{è:n} \\ \mathcal{P}: & -X]_{\omega} \\ \mathcal{R}: & \varnothing \end{Bmatrix}$

(7) $\text{NOM}^2 \longleftrightarrow \begin{Bmatrix} \mathcal{F}: & \varnothing \\ \mathcal{P}: & \varnothing \\ \mathcal{R}: & \text{*ID-TONE} \gg \text{ID-TONE} \end{Bmatrix}$

(8) $\text{OBL} \longleftrightarrow \begin{Bmatrix} \mathcal{F}: & \varnothing \\ \mathcal{P}: & \varnothing \\ \mathcal{R}: & \varnothing \end{Bmatrix}$

[2]The nominative case marker on modifiers is almost certainly a type of nominal concord rather than an exponent of the nominative case morpheme itself, though I leave the specifics of the syntax for future work.

Tonal faithfulness in oblique contexts

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(9) Default ranking: *LH ≫ Id-Tone ≫ *Id-Tone

/tórôːr-èːn/	*LH	ID-Tone	*Id-Tone
a. ☞[tórôːrèːn]			****
b. [tòrǒːréːn]	*!	****	
c. [tòróːréːn]		*!*	*

Tonal antifaithfulness in nominative contexts

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(10) Nominative ranking: *LH ≫ *ID-TONE ≫ ID-TONE

/tórôːr-èːn/	*LH	*ID-TONE	ID-TONE
a. [tórôːrèːn]		**!**	
b. [tòrǒːréːn]	*!		****
c. ☞[tòróːréːn]		*	**

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- In both grammars, a LH contour is ruled out by the undominated *LH constraint.

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- In both grammars, a LH contour is ruled out by the undominated *LH constraint.
- In the default grammar, ID-TONE outranks antifaithfulness resulting in tonal faithfulness.

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- In both grammars, a LH contour is ruled out by the undominated *LH constraint.
- In the default grammar, ID-TONE outranks antifaithfulness resulting in tonal faithfulness.
- Within the spell-out domain containing the nominalizing agreement morpheme, tonal antifaithfulness outranks tonal faithfulness, resulting in polarity.

Consequences

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The articulated vocabulary items of Cophonologies by Phase allow for item-based morphemes, non-item-based morphology, and morphemes that both have a concatenative component and trigger a process. This seems to be the desired cross-linguistic result (Sande et al., 2020).

	+Phonological process	*–Phonological process*
+Affix	Morph. conditioned phon.	Regular affixation
–Affix	Process morphology	Zero affixation

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Scalar tone shift in Guébie

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- Guébie is a Kru language spoken in southwest Côte d'Ivoire.
- The data presented here comes from fieldwork on Guébie over the past 8+ years.
- For a full-fledged analysis of the pattern presented here, see Sande (2017, 2018); Sande et al. (2020).

Where is Guébie spoken?

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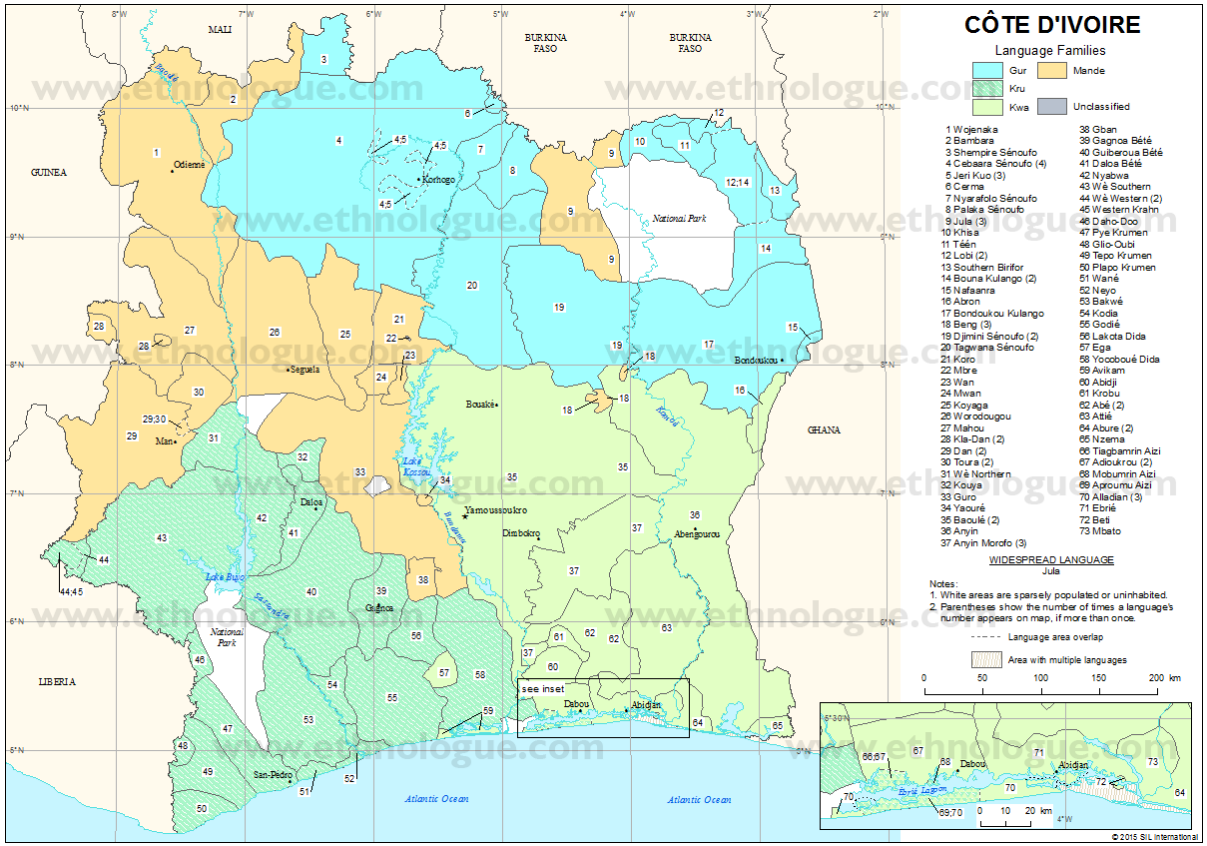

Gnagbodougnoa

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- Guébie has four contrastive tone heights labelled 1-4, where 4 is high.
- Clauses are SAuxOV or SVO.
- Nothing can intervene between Subject and Auxiliary in SAuxOV clauses, or between Subject and Verb in SVO clauses.
- There are many grammatical tone processes in the language.

Scalar tone shift in Guébie

- Tone marks the imperfective aspect in Guébie.

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Scalar tone shift in Guébie

- Tone marks the imperfective aspect in Guébie.
- A given verb shows the same tone melody in all contexts but the imperfective, (11) (Sande, 2017, 2018).

(11) a. *SAuxOV*

e^{4} ji^{3} $ɲa^{31}$ $\underline{li^{3}}$

1SG.NOM FUT coconuts eat

'I will eat a coconut.'

b. *Imperative*

$\underline{li^{3}}$

eat.IMP

'Eat!'

c. *Perfective*

e^{4} $\underline{li^{3}}$ $ɲa\text{-}ɓe^{3.1}$ $kubə^{3.1}$

1SG.NOM eat.PFV coconuts-SG yesterday

'I ate a coconut yesterday.' (syl_20131024)

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Tone on verbs lowers one step in the imperfective

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- All imperfective verbs surface in SVO contexts, where the tone on the verb is one step lower than in all other contexts.

(12) *Imperfective*

e^{4}	li^{2}	ɟa^{31}	koko$^{4.4}$
1SG.NOM	eat.IPFV	coconuts	every.day

'I eat coconuts everyday.' (syl_20131024)

Tone lowering summary

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- The first tone level of a verbal tone melody surfaces one step lower in imperfective contexts than other contexts.

(13)

Default tone	≫	**Imperfective tone**
4		3
3		2
2		1
1		1

Scalar shift for low-toned verbs

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- When the tone of a verb is already low we do not see lowering to super low (tone 0).

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- When the tone of a verb is already low we do not see lowering to super low (tone 0).
- But we also do not see neutralization between perfective and imperfective contexts.

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- When the tone of a verb is already low we do not see lowering to super low (tone 0).
- But we also do not see neutralization between perfective and imperfective contexts.
- Instead, the scalar tone shift affects the final tone of the **subject**.

Subject tone raising

(14)

a. ɛ^{3} ɓɔ^{1}
3SG.NOM wither.PFV
'It withered'

b. ɛ^{4} ɓɔ^{1}
3SG.NOM wither.IPFV
'It withers'

c. ɟaci$^{23.1}$ pa^{1}
Djatchi run.PFV
'Djatchi ran'

d. ɟaci$^{23.2}$ pa^{1}
Djatchi run.IPFV
'Djatchi runs' (oli_20160801)

pfv ipfv

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Super high tones

- Subject tone raising before low-toned verbs occurs even when the result is a super high tone.

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Super high tones

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- Subject tone raising before low-toned verbs occurs even when the result is a super high tone.

(15) a. $\underline{\text{e}^{4}}$ pa^{1}
1SG.NOM run.PFV
'I ran'

b. $\underline{\text{e}^{5}}$ pa^{1}
1SG.NOM run.IPFV
'I run' (syl_20140314)

- Super high tones are not found anywhere else in the language.

Subject raising

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	Default subject tone	≫	**Raised subject tone**
(16)	4		5
	3		4
	2		3
	1		2

Scalar tone shift summary

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- The first tone height of a verb surfaces one step lower in the imperfective than elsewhere, unless the verb is already low, in which case the final subject tone raises one step in the imperfective.

Item-and-arrangement or item-and-process?

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Like with Kipsigis tonal polarity, we can ask whether an item-and-arrangement analysis of Guébie scalar tone shift is possible.

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Like with Kipsigis tonal polarity, we can ask whether an item-and-arrangement analysis of Guébie scalar tone shift is possible.

- **Question:** What is the underlying phonological representation of the imperfective morpheme in Guébie?

Item-and-arrangement or item-and-process?

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Like with Kipsigis tonal polarity, we can ask whether an item-and-arrangement analysis of Guébie scalar tone shift is possible.

- **Question:** What is the underlying phonological representation of the imperfective morpheme in Guébie?
- **Short answer:** There isn't one.

Item-and-arrangement or item-and-process?

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Like with Kipsigis tonal polarity, we can ask whether an item-and-arrangement analysis of Guébie scalar tone shift is possible.

- **Question:** What is the underlying phonological representation of the imperfective morpheme in Guébie?
- **Short answer:** There isn't one.
- **Problem:** No matter what featural affix or floating tone we posit as the underlying representation of the imperfective morpheme, we must still state the following process in terms of rules or constraints (Sande, 2018):
  - The first tone of a verb lowers one step, unless it is already low, in which case the final tone of the subject raises one step.

Attempting a floating tone analysis

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- A reasonable candidate for the underlying form of the imperfective is a 41 floating tone.
- The low second portion could have a lowering effect, while the high initial portion could have a raising effect.
- We must still explain the following:
  - Why we get verb tone lowering in the default case.
  - Why the verb doesn't lower to super low.
  - When the subject raises.
  - Why 41 has a scalar effect in imperfective contexts, but not elsewhere.

Attempting a floating tone analysis

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- The low second portion could have a lowering effect, while the high initial portion could have a raising effect.
- We must still explain the following:
  - Why we get verb tone lowering in the default case.
  - Why the verb doesn't lower to super low.
  - When the subject raises.
  - Why 41 has a scalar effect in imperfective contexts, but not elsewhere.
- If the imperfective UR was any other tone, our constraints or rules would look the same as for the 41 analysis.
- **Problem:** No single UR better predicts when and where these scalar effects occur than any other UR.

Attempting a floating feature analysis

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Another possible UR for the imperfective morpheme is a tonal feature.

- Proposed features for 4-tone systems all share the property that tones 2 and 3 share no features in common.

Table: Proposed features for 4-tone systems

a.

Yip (1980); Pulleyblank (1986)	4	3	2	1
Upper	+	+	-	-
High/Raised	+	-	+	-

b.

Clements (1983); Snider (1999)	4	3	2	1
Feature 1	H	H	L	L
Feature 2	H	L	H	L

c.

Bao (1999)	4	3	2	1
Stiff	+	+	-	-
Slack	-	+	-	+

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- The problem with a feature-based account is that no single feature change can result in 4→3, 2→1, *and* 3→2.
- While the tone shifts from tone 4 to 3 and from 2 to 1 could involve a single featural change, that same featural change cannot on its own be responsible for the shift from 3 to 2, because tones 3 and 2 differ in *two* features.
- The failure of binary features to account for scalar phenomena in general has been understood since at least Contreras (1969). Also see Hyman (2010).

See Sande (2018), who rules out additional possible item-based accounts.

A process-based account

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Sande (2018) and Sande et al. (2020) propose process-based accounts of the Guébie scalar tone shift.

- Like for Kipsigis, this approach relies on an imperfective-specific cophonology that ranks a tonal antifaithfulness constraint above tonal identity, only in spell-out domains containing the imperfective morpheme.
- The result is scalar tone shift only in imperfective contexts, and not elsewhere. The phase-based nature of CBP ensures that subjects are present when the IPFV-specific constraint ranking is active.

Summary of analysis

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- The imperfective morpheme in Guébie has no segmental realization and cannot be analyzed as a concatenative tonal morpheme.
- Instead, it is associated with a morpheme-specific constraint ranking $\mathcal{R}$, which applies only in the spell-out domain containing the imperfective morpheme.

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Language background

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- San Pedros Amuzgo is an Otomanguean language spoken in Oaxaca, Mexico.
- The data presented here comes from speaker Fermín Tapia Garcia and are analyzed by Kim (2016, 2019); Sande (2020).

The basic pattern

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- There are eight contrastive tone melodies in Amuzgo: H, M, M+, L, L+, HM, HL, MH, where a + indicates a non-falling tone .
- Surface tone on verb stems in Amuzgo is jointly determined by the lexical class of a verb and the person and number features of the subject (Kim, 2016).

The basic pattern

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- There are eight contrastive tone melodies in Amuzgo: H, M, M+, L, L+, HM, HL, MH, where a + indicates a non-falling tone .
- Surface tone on verb stems in Amuzgo is jointly determined by the lexical class of a verb and the person and number features of the subject (Kim, 2016).
  - All eight possible melodies are attested in 3rd person singular forms of verbs (default tone).
  - The tone in first and second persons is not predictable given the 3rd person form, or vice versa (Kim, 2019).
  - There is no consistent type of tonal alternation (lowering, raising, etc.) associated with any person/number combination.

Verb tone paradigms

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Gloss	*1sg*	*2sg*	*3sg*
chew.CPL	hndɛ [L]	hndɛʔ [HM]	hndɛ [MH]
see.CPL	hnd^{i}ʔia [HM]	hnd^{i}iaʔ [L]	hnd^{i}iaʔ [MH]
hear.CPL	hnd^{i}i [HM]	hnd^{i}iʔ [HM]	hnd^{i}i [MH]
arrive.CPL	t^{i}hɛ [L]	t^{i}hɛʔ [L]	t^{i}hɛʔ [MH]
sing.INCPL	ma^{M}-ta [HM]	ma^{M}-taʔ [M]	ʔ^{H}-ta [M]
eavesdrop.INCPL	ma^{M}-nda [M]	ma^{M}-ndaʔ [M]	ʔ^{H}-nda [M]

- The underlying tone (3rd person) tone is overridden in first and second person contexts.
- Underlying tone is not enough to predict the surface tone in first and second persons; one needs to know which lexical class the verb belongs to.
- In sum, lexical class and subject features co-determine the surface tone of a verb in Amuzgo. When a causative morpheme intervenes, the default tone of a verb surfaces.

Ruling out an item-and-arrangement account

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A possible item-and-arrangement account would assume that there the underlying tones associated with default form of each verb interacts with the underlying tonal morphemes associated with each person/number of the subject.

- However, the tone in first and second persons is not predictable given the 3rd person form, or vice versa (Kim, 2019).
- So, we would need to assume that verbs with the same surface tone have different underlying tone melodies.
- Additionally, there is no consistent type of tonal alternation (lowering, raising, etc.) associated with any person/number combination.
- So the tonal representation of, say, the 1SG morpheme must be able to interact with a 35-toned verb to result in tone 1 ('chew') sometimes but tone 53 other times ('see').

Ruling out an item-and-arrangement account

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Additional challenges for an item-based account come from prefixed forms.

- The subject and verb are neither hierarchically nor (necessarily) linearly adjacent.
  - Incompletive and potential prefixes can intervene between subjects and verbs, but the tone of only the *verb root* is affected by the subject features.[3]
- In an autosegmental account, we would have to assume that the subject, which precedes verbal prefixes, has a floating tone that gets associated with the verb root while not interacting with the intervening prefix.
  - This would involve crossing association lines in autosegmental phonology, a structure that is typically not assumed to be possible (Goldsmith, 1976).

[3] Causative prefixes *do* block person/verb tone interactions. See (Kim and Sande, 2019) for a phase-based explanation.

Previous analyses

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- (Kim, 2016, 2019) argues that the tonal alternations cannot be due to a combination of underlying items, and must be the result of a cophonology sensitive to both lexical class and subject features.
- Sande (2020) integrates Kim's analysis into Cophonologies by Phase, where both the class-determining v head and the head associated with subject features are associated with morpheme-specific $\mathcal{R}$s. Only when both are present in the same spell-out domain do we see a tonal change.

Analyzing doubly morphologically conditioned phonology in Cophonologies by Phase

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- CBP predicts the existence of doubly morphologically conditioned phonology, as long as the triggering morphemes are introduced within the same phase.

Analyzing doubly morphologically conditioned phonology in Cophonologies by Phase

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- CBP predicts the existence of doubly morphologically conditioned phonology, as long as the triggering morphemes are introduced within the same phase.
- **Preview:**
  - Two morphemes within the same phase domain are independently associated with constraint reweightings that gang up to motivate a phonological process.
  - When one of the triggering morphemes is present without the other, or when a phase boundary intervenes, the process cannot apply.

Other cases of doubly morphologically conditioned phonology

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- **Ablaut in Siouan languages:** Vowel ablaut applies only for certain lexical items, and only in the presence of certain affixes (Rankin, 1995).
- **Full vowel harmony in Guébie:** Object enclitics trigger full vowel harmony on verbs and valency-changing affixes, only for a subset of roots (Sande, 2019).
- **Final lengthening in Sacapultec:** Final lengthening on nouns only applies for one class of lexical items, and only in possessive contexts (DuBois, 1981).

Doubly morphologically conditioned phonology

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- **Tonal overlays in Donno So:** Only when both a definite marker and numeral are present in a noun phrase, the phonological phrase containing [N Adj Num] surfaces with a LH tone melody (Heath, 2015).
- **Truncation in Panoan:** Truncation of a trisyllabic word to two syllables occurs for a subset of lexical items in accusative contexts, but not elsewhere (Clem, 2019).
- **Truncation in Ticuna:** Truncation of the final syllable of a demonstrative pronoun applies on in the environment of certain affixes (p.c. Amalia Skilton).

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Item vs. process debate

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Item-based accounts do not provide any additional insight into

a. Across-the-board tonal polarity (Kipsigis)
b. Scalar tone shifts (Guébie)
c. Doubly morphologically conditioned tonal inflection (Amuzgo)

Instead, allowing for cophonologies makes better predictions for the case studies presented here (Kouneli and Nie, To appear; Sande, 2018; Kim, 2019), and cross-linguistically (Sande et al., 2020; Sande, 2020).

Diagnosing item- versus process-morphology

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A morpheme may be best analyzed as involving a process if

a. It is realized inconsistently across contexts (tonal polarity, scalar tone shift, unpredictable inflectional tone).
b. There is no consistent featural change across realizations of the morpheme.
c. No single UR predicts the optimal output in all contexts.
d. If a new (type of) UR would need to be proposed specifically for this single morpheme.

Predictions of a CBP account are born out

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Vocabulary items in Cophonologies by Phase predict that a morpheme could be associated with an underlying item ($\mathcal{F}$), a morpheme-specific constraint ranking ($\mathcal{R}$), both, or neither.

- These predictions are born out:

	+Phonological process	*–Phonological process*
+Affix	Morph. conditioned phon.	Regular affixation
–Affix	Process morphology	Zero affixation

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By extending our notion of Vocabulary Items to include morpheme-specific constraint weight adjustments, morphemes can be associated with items or with processes. Sometimes a process-based account is preferable.

Thank you!

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