

Outermost wins and the theory of nonconcatenative morphology

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1 Introduction

An influential approach to nonconcatenative morphology adopts a concatenative structure with floating content (e.g. Lieber 1980 et seq.), like **a floating low tone** for Ateso past tense:

- (1) é-mòŋ-i
2SG-CRY-IMPF
'You were crying.'
(Barasa 2017:190)
- (2) *Concatenative structure for (1):*
é-mòŋ-i + L

Two problems:

1. Concatenation often i) doesn't naturally derive overwriting or ii) generalizations about how competition between replacive morphemes is resolved
2. Not all morpheme-specific morphology obviously reduces to floating content (e.g. shortening, infixation, phrasal overlays)

⇒ Much work on replacive morphology puts significant morphological information into the phonological grammar (e.g. Inkelas 1990; McPherson 2014; Rolle 2018; Sande et al. 2020)

1.1 Outermost wins in Dinka

- ▷ A recurring pattern in many systems of replacive morphology is that the **demands of the outermost morpheme win out** (Inkelas 1998; Alderete 2001; Rolle 2018)
- ▷ Dinka has a rich system of nonconcatenative morphology in which morphological categories **compete for realization within a monosyllabic root**:

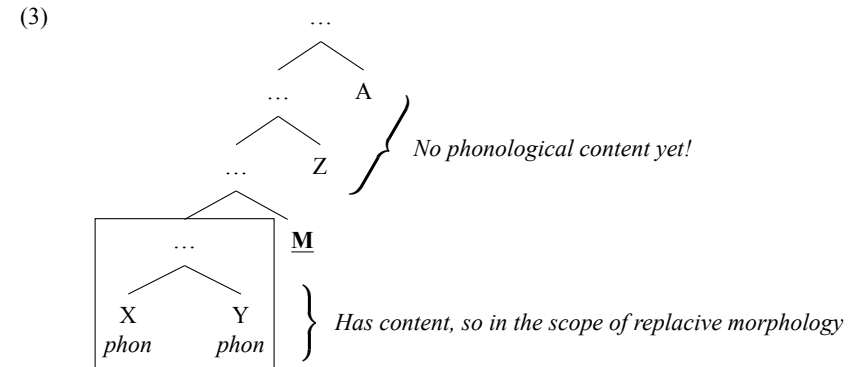
Table 1. Verbal paradigm of *m̄iit* 'pull'.

	Transitive	CF	CP	APPL	AP
NF	m̄iit	m̄j̄eet	m̄j̄eet	m̄j̄eet	m̄j̄iit
1SG	m̄j̄eet	m̄j̄eet	m̄j̄eet	m̄j̄eet	m̄j̄eet
2SG	m̄iit	m̄j̄eet-é	m̄j̄iit	m̄j̄eet-é	m̄j̄eet-é
3SG	m̄iit	m̄iit	m̄j̄iit	m̄j̄iit	m̄j̄iit
...	...	...	...	...	...

⇒ Many morphemes realized in the same position via similar processes!

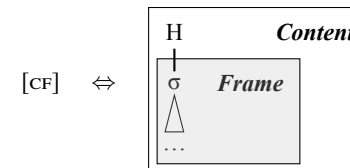
How is competition resolved in Dinka?

- ▷ Order of morphophonology mirrors syntax: the **outermost morpheme applies last**:
 - In replacive tone
 - In vowel quality changes
 - In shortening/lengthening
- ▷ I propose to derive outermost wins from the **bottom-up nature of Vocabulary Insertion** (Bobaljik 2000; Embick 2010; see also Kalin and Weisser 2022)
- ▷ If a replacive morpheme M is associated with phonological content when inserted, only lower material will be in its scope:



- ▷ I treat replacive morphology as a kind of **prosodic subcategorization**, in which vocabulary items may pre-specify linking of content to a specific “pivot”:

- (4) *Vocabulary Item for replacive tone morpheme:*



- ▷ I suggest that such subcategorization frames may be privileged by faithfulness constraints specific to them (Rolle and Lionnet 2019)
- ▷ Adopting aspects of Lexical Phonology (Pesetsky 1979; Monahan 1982; Kiparsky 1982), I propose that **each instance of Vocabulary Insertion triggers application of the phonological grammar**, taking as its input any previous output and the outermost Vocabulary Item.

2 Nonconcatenative morphology in Dinka

2.1 A monosyllabic template

- ▷ Dinka (Western Nilotic, South Sudan) has a complex system of nonconcatenative morphology (Andersen 1992, 1993, 2017; Blum 2023), in which a large number of morphological categories are marked within a monosyllabic root.

- ▷ Dinka roots are generally **monosyllabic with an obligatory onset and coda**:

(5)	Noun	Meaning	Verb	Meaning
a.	jòom	‘wind’	e. máaan	‘hate.NF’
b.	kít	‘color’	f. kóoot	‘care.for.NF’
c.	pj̥e̯en	‘viper’	g. kw̥a̯aɽ	‘wrap.NF’
d.	gw̥e̯el	‘collar bone’	h. t̥e̯et	‘pick.NF’

(Luanyjang)

- ▷ Andersen (1993:2) and Remijsen and Manyang (2009:114) give the template in (6):¹

(6)	Surface template for Dinka nouns and verbs:
	C (w) (j) V (V) (V) C

- ▷ Dinka vowels display a **ternary contrast in length** (Remijsen and Gilley 2008):

(7)	Short		Long		Overlong	
	láj	‘berries’	láj	‘berry’	láj	‘servant’
	kít	‘color’	kít	‘colors’	kít	‘cloth bag’

- ▷ Most Dinka dialects distinguish **three or four tones**, high /*́*/, low /*̀*/, falling /*̎*/, and sometimes also rising /*̋*/.
- ▷ Vowels show a binary contrast between **modal/creaky voice (unmarked) and breathy voice** /*̤*/, in all vowels except *u*:

(8)	Unmarked		Breathy	
	jáak	‘pelican’	j̤áal	‘visitor, guest’
	gw̥éɽ	‘Nile perch’	gw̥éɽ	‘bead’
	ɲé̤é̤e̤	‘k.o. gazelle’	nw̥é̤é̤e̤	‘Nuer’
	kiiir	‘big river’	k̤iiir	‘thorny k.o. tree’
	tóoc	‘swamp’	t̤óoɽ	‘pot’
	rw̥òɽɲ	‘stone of fruit’	rw̥òɽɲ	‘year’
			w̥úuk	‘wing’

¹The *underlying* form of roots is more restricted and maximally permits a long vowel and one glide (Andersen 1993, 2014; Ladd and Blum 2021).

2.2 Verbal paradigms in Dinka

- ▷ I’ll focus here on verbal paradigms within the Agar dialect, described in detail in work by Torben Andersen (Andersen 1989, 1992, 1993, 2017).
- ▷ Table 2 provides an illustrative paradigm, for the verb *m̥iit* ‘pull’.

Table 2. Verbal paradigm of *m̥iit* ‘pull’ (Andersen 1992, 1993).

	Transitive	CF	CP	APPL	APPL.AP	AP
PASS	m̥iit	m̥iit-è	m̥iit-è	m̥iit-è	m̥iit-è	—
PASS.OBLV	m̥iit-è	m̥iit-è	m̥iit-è	m̥iit-è	m̥iit-è	m̥iit-è
SV	m̥iit	m̥iit	m̥iit	m̥iit	m̥iit	m̥iit
OV	m̥iit	m̥iit	m̥iit	m̥iit	m̥iit	m̥iit
1SG	m̥j̥e̯eet	m̥j̥e̯eet	m̥j̥e̯eet	m̥j̥e̯et	m̥j̥e̯eet	m̥j̥e̯eet
2SG	m̥iit	m̥j̥e̯eet-é	m̥iit	m̥j̥e̯et-é	m̥j̥e̯eet-é	m̥j̥e̯eet-é
3SG	m̥iit	m̥iit	m̥iit	m̥iit	m̥iit	m̥iit
1PL	m̥iit-k̤ú	m̥iit-k̤ú	m̥iit-k̤ú	m̥iit-k̤ú	m̥iit-k̤ú	m̥iit-k̤ú
2PL	m̥j̥e̯et-k̤á	m̥j̥e̯eet-k̤á	m̥j̥e̯eet-k̤á	m̥j̥e̯et-k̤á	m̥j̥e̯eet-k̤á	m̥j̥e̯et-k̤á
3PL	m̥iit-k̤é	m̥iit-k̤é	m̥iit-k̤é	m̥iit-k̤é	m̥iit-k̤é	m̥iit-k̤é
NF	m̥iit	m̥j̥e̯eet	m̥j̥e̯eet	m̥j̥e̯et	m̥j̥e̯eet	m̥iit

This paradigm is laid out according to a division of morphological categories into two types:

1. Inflectional morphology, or *outer morphology* (Van Urk 2025), in rows:
Passive, Voice morphology (extraction marking), subject agreement, (non-finite)
2. Derivational morphology, or *inner morphology* (Van Urk 2025) in columns:
Centrifugal, centripetal, applicative, antipassive, ...

Inflectional morphology is higher than derivational morphology

- ▷ Trommer (2011, 2022) and Van Urk (2025) argue that inflectional morphology is **always higher** than derivational morphology.
- ▷ A simple diagnostic for height comes from the position of verbal morphology. Both types of morphology appear on **finite verbs**:

- (9) *Applicative and OV morphology on finite verb:*
- W̥e̯ɲ à-m̥iit d̤òk mòc n̤e̯ jw̥j̥e̯en
 cow D-pull._[APPL.OV] boy man P rope
 ‘The cow, the boy is pulling for the man with the rope.’
 (Agar Dinka; Andersen 1992:7)

- ▷ But in auxiliary+verb constructions, **inflection is on the auxiliary**, while **derivational tones remain on the verb**:

(10) *Applicative morphology on the verb, OV on auxiliary:*

Mariaal à-cè **bji** d̥aŋ-dè mèt̚ **t̥aat** tiik.
 Marial D-NEG FUT. **OV** boy-3s child beat. **APPL**.NF woman
 ‘Marial’s boy will not beat the child for the woman tomorrow.’
 (Agar Dinka; Andersen 1992:7)

- ▷ This correlation holds for (almost) all inflectional and derivational morphology.²

⇒ *Inflectional morphology is syntactically higher than derivational morphology.*

3 Outermost wins in Dinka morphology

- ▷ Dinka nonconcatenative morphemes are associated with a variety of effects:
- Replacive tone
 - Vowel fronting and vowel lowering
 - Lengthening or shortening
- ▷ For all three effects, the demands of the **outermost morpheme win out**

3.1 Inflectional tone overwrites derivational tone

- ▷ Many morphological categories are associated with **grammatical tone**. Since Dinka has a limited inventory of tones, the distribution of tones across the verbal paradigm is complex.
- ▷ The basic pattern is in Table 3, building on Trommer (2011, 2022):

Table 3. Grammatical tone for one transitive root class CVVC.

	Transitive	Centrifugal	Centripetal	Applicative antipassive
SV	L	H	L	F
1/3SG	L	H	L	F
1/2/3PL	L	H	L	F
NF	F	H	L	F
OV	H	H	H	H
2SG	L	L	H	L
PASS	H	F	F	F
PASS.OBLV	F	F	F	F

(In **bold**: categories that are independently irregular)

²The only exception is the non-finite, which Van Urk (2025) argues is generated in the same domain as derivational morphemes for this reason.

Following Trommer, I divide morphological categories into three classes:

- ▷ **“Weak” inflectional tones** (SV, 1/3SG, 1/2/3PL, NF), **not boxed**: These inflectional categories do not contribute grammatical tone.
- ▷ **Derivational tones** (transitive, CF, CP, APPL), **in vertical box**: These categories contribute a replacive tone, which overwrites any lexical tone.
- ▷ **“Strong” inflectional tones** (OV, 2SG, PASS), **in horizontal box**: These inflectional categories contribute a replacive tone and overwrite derivational tones.

Key generalization: The outermost replacive tone wins.
 (Inkelas 1998; Alderete 2001; Rolle 2018)

- ▷ What tone wins out is **not phonologically predictable**: all three tones can be overwritten and all three tones can overwrite all of the other tones.
- ▷ Similar patterns occur in the four-tone dialect Bor South, as documented by Blum (2023), which also has a rising tone.

3.2 Outermost wins in fronting and lowering

Almost all morphological categories in Dinka are associated with **vowel fronting** or **vowel lowering**, a system of “vowel grades” (Andersen 1993). Table 4 shows how the root vowel is affected:

Table 4. Agar Dinka vowel grades (Andersen 1993, 2017).

	Creaky					Breathy				
Root vowel	i	e	a	ɔ	o	i	e	a	ɔ	o
Fronting	i	e	ɛ	ɔ	o	i	e	ɛ	ɔ	o
(Grade 2)										
Lowering	jɛ	ɛ	a	a	wɔ	jɛ	ɛ	a	a	wɔ
(Grade 3)										

- ▷ **Vowel fronting** fronts the low central vowel *a* (and sometimes *ɔ*)
- ▷ **Vowel lowering** triggers a step of lowering in all vowels except *a* and also breaking of peripheral vowels

⇒ Both inflection and derivation may be associated with vowel fronting and lowering.

What happens when fronting and lowering categories compete?

Answer: *The outermost category wins!*

Lowering over fronting → lowering

- ▷ The 1SG and 2PL are inflectional morphemes that trigger vowel lowering (or Grade 3):

(11) *1SG and 2PL trigger vowel lowering:*

Root	1SG (lowering)	2PL (lowering)	Meaning
wēc	wēc	wēc-kā	‘kick’
bār	bār	bār-kā	‘take along’
miit	mjēet	mjēet-kā	‘pull’

(Agar; Andersen 1993:28; Andersen 2017:12–13)

- ▷ When we combine these with derivational morphemes that trigger *vowel fronting* (e.g. the centripetal), **the higher morpheme wins** and vowel lowering is observed:

(12) *Inflectional vowel lowering wins over derivational vowel fronting:*

Root	Centripetal (fronting)	1SG centripetal (lowering wins)	2PL centripetal (lowering wins)	Meaning
wēc	wēc	wēc	wēc-kā	‘kick’
bār	bār	bār	bār-ka	‘take along’
miit	mjiit	mjēet	mjēet-ka	‘pull’

(Agar; Andersen 1992:28, Andersen 2017:12–13)

Note: The centripetal is still expounded, since it triggers a shift to breathy voice and contributes a low tone.

Does vowel fronting apply prior to vowel lowering?

- ▷ Some root vowels undergo additional changes when the target of fronting and a shift to breathy voice (Andersen 2017:sec. 4), such as:
 - *ɔ* raises to *o*, with deletion of preceding *w* glide
 - *a* after *w* raises to *e*
- ▷ Such effects allow us to demonstrate that **fronting does apply**, and can alter the input to lowering:

(13) *Vowel lowering applies after vowel fronting:*

Root	Centripetal (fronting+raising)	NF centripetal (lowering wins, raising retained)	Meaning
bwōɔɔ	bōoɔ	bōɔɔ	‘follow’

(Agar; Andersen 2017:27–28)

(14) *Vowel lowering applies after vowel fronting:*

Root	Antipassive (fronting+raising)	1SG antipassive (lowering wins, raising retained)	Meaning
wāak	wēk	wēk	‘rinse’

(Agar; Andersen 2017:28–29)

Fronting over lowering → fronting

- ▷ A few derivational morphemes trigger vowel lowering, including the middle and reciprocal (Andersen 2025).
- ▷ If combined with an inflectional morpheme that triggers vowel fronting, **vowel fronting wins out** (Andersen 2025:sec. 8.3):³

(15) *Inflectional vowel fronting wins over derivational vowel lowering:*

Root	Middle (lowering)	3SG middle (fronting wins)	Meaning
pwōoc	pāaac	pēēec	‘wake up’

(Agar; Andersen 2025:55)

⇒ In Dinka vowel quality changes, the **outermost morpheme wins**.

3.3 Outermost wins in shortening and lengthening

- ▷ Most inflection/derivation triggers **one step of lengthening**, from short to long or long to overlong
- ▷ The antipassive (in one verb class) triggers shortening (16). But this is undone by higher derivation or inflection:

(16) *Antipassive shortening undone by higher morphemes:*

Root	Antipassive	1SG Antip.	Meaning
lōok	lōk	lōok	‘wash’
kōom	kōm	kāam	‘thresh’

(Agar; Andersen 2017:19)

- ▷ As in vowel fronting or lowering, such facts show that the inner morpheme applies before the outer one (Layering in the sense of Inkelas 1990).

⇒ The **outermost morpheme wins** in shortening/lengthening.

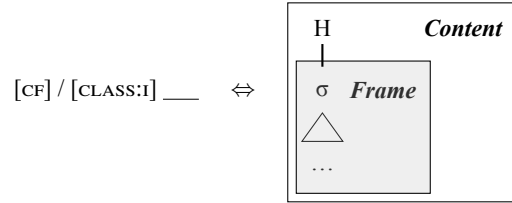
³Andersen (2025) only provides the example of an inflected middle in (14), in which the relationship between the transitive root and the middle is a bit irregular. But the description of inflection makes clear that vowel fronting is observed in such forms. Conveniently, this form demonstrates that the vowel lowering associated with the middle does apply prior to fronting.

4 A cyclic theory of nonconcatenative morphology

Why does the outermost replacive tone win?

- ▷ I'll present a model that derives outermost wins from *strict cyclicity*, the bottom-up nature of Vocabulary Insertion in Distributed Morphology (Bobaljik 2000; Embick 2010).
- ▷ I treat replacive morphology as **prosodic subcategorization** (Paster 2006; Rolle and Lionnet 2019): replacive morphemes anchor floating content to a *prominent pivot*, much like an infix:

(17) *Vocabulary Item for replacive tone morpheme:*



- ▷ I adopt a family of faithfulness constraints, **Vocabulary Item (VI) constraints**, favoring information in VIs. The ranking VI-FAITH >> FAITH generates replacive morphology.
- ▷ I propose that each step of Vocabulary Insertion triggers application of the phonological grammar (Monahan 1982; Kiparsky 1982), evaluating the outermost Vocabulary Item.

4.1 Subcategorization in vocabulary entries

- ▷ Much work acknowledges the need for **prosodic subcategorization** in lexical entries (Lieber 1980; Inkelas 1990; Paster 2006; Bennett et al. 2018).
- ▷ Infixes, for example, select for a particular pivot across languages:

Table 5. Infixation pivots across languages.

Edge pivots		Prominence pivots
First C	(Last C)	Stressed foot
First V	Last V	Stressed syllable
(First syllable)	Last syllable	Stressed V

(Yu 2007:67)

- ▷ Morphs may come with a **subcategorization frame**, which specifies where it ought to be positioned (Yu 2003, 2007; Paster 2006; Bye and Svenonius 2012; Kalin 2022).
- ▷ Note that infix position cannot be reduced to global phonology or allomorph selection:
 - Infixation need not be phonologically optimizing (Yu 2003, 2007)
 - An infix can be the elsewhere morph, alternating with a contextually restricted affix (Kalin and Rolle 2024)

Subcategorization is not allomorph selection

- ▷ Prosodic subcategorization as **distinct from conditions on allomorph selection** (see also Clem et al. 2020 and Kalin and Rolle 2024)
- ▷ Allomorph selection may also reference phonological context (Lieber 1980; Paster 2006), such as the selection of ergative case suffix in Kuku Yalanji:

(18) *Ergative -bu after vowels, -dV elsewhere:*

Ergative	Meaning
jna- bu	'foot'
kulji- bu	'stone'
jalun- du	'sea'
bayil- da	'freshwater perch'

(Kuku Yalanji; Patz 2002:46)

- ▷ In contrast, subcategorization **affects changes in the base**, such as through repositioning or changes in prosodic structure (Yu 2003, 2007; Bennett et al. 2018; Clem et al. 2020).

A two-stage model: Dinka antipassive

- ▷ I illustrate this kind of model with the Dinka antipassive, which **requires shortening of the base** in one of the conjugation classes for long roots:

(19) *Antipassive triggers shortening with Class I, but not Class II, long roots:*

Root	SV Antipassive	Meaning	
gùt	gùut	'stab'	Short roots
nàj	nâaj	'plait'	
lòk	lòk	'wash'	Class I
kòm	kòm	'thresh'	
miit	mìit	'pull'	Class II
tjéc	tjéc	'ask'	

We can think of this effect as a **two-stage process** (see also Kalin and Rolle 2024):

1. **Allomorph selection:** selection of an antipassive allomorph based on morphosyntactic features (a [CLASS:I] feature) and a phonological property (a CVVC root)
2. **Prosodic subcategorization:** a requirement associated with this morph that the base is CVC, triggering shortening

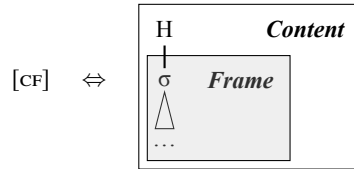
See Kalin (2022) and Kalin and Rolle (2024) on this logic for cases of infixation.

4.2 Tonal overlays as subcategorization

How are tonal overlays associated with morphs?

- ▷ I follow Rolle (2018) in treating tonal overlays as **floating tones** that are part of the content of individual morphs.
- ▷ But I treat the requirement to overlay tones as a kind of **prosodic subcategorization**: a subcategorization frame may require anchoring of tones to a pivot.⁴
- ▷ A replacive morpheme, like the Dinka centrifugal, has a vocabulary entry like (20),⁵ anchoring its tone to the final syllable.

(20) *Vocabulary Item for replacive tone morpheme:*



- ▷ A replacive tone morpheme like the centrifugal is then not so different from an infix, which can also be anchored to a prominent syllable (see Table 5).

4.3 The Erasure Problem and VI constraints

Erasure Problem (Trommer 2011:13–14): Why does replacive material win out over the phonological material of the base?

- ▷ This is a tricky problem, because roots are privileged domains for phonological content otherwise (e.g. Zoll 1998; Walker 2011). A variety of existing approaches:
 - Incomplete/floating morphemes are favored representationally (*FLOAT, containment)
 - There are constraints favoring morphological contrast (REALIZE MORPHEME, anti-faithfulness)
 - Correspondence to a **phantom basemap**: the result of overlaying a floating tone onto an abstract toneless base

⁴Rolle and Lionnet (2019) refer to this kind of extension of subcategorization frames as “phantom structure”, but I will use the term “subcategorization frame” to emphasize that this is not a novel type of structure.

⁵Note that which tone the centrifugal contributes depends on conjugation class, which I abstract away from here. In addition, I actually analyze these tones as the realization of a thematic morpheme, since the same allomorphy pattern surfaces in the applicative and some irregular forms of the basic transitive.

- ▷ I pursue a different intuition here, building on Rolle and Lionnet (2019): **information in vocabulary entries is privileged**.
- ▷ I propose a family of constraints favoring vocabulary entries (Rolle and Lionnet 2019), **Vocabulary Item (VI) constraints**.⁶ Overwriting results from VI-FAITH >> FAITH.

Example: Replacive tone in Dinka

- ▷ Consider the H tone contributed by the centrifugal. I posit a VI constraint favoring tonal associations in vocabulary entries (adapted from Rolle and Lionnet 2019:5):

(21) VI-IDENT(Tone): Corresponding tonal bearing units in the vocabulary entry and the output have identical tonal associations.

- ▷ When the centrifugal combines with the root, the ranking VI-IDENT(Tone) over a general faithfulness constraints ensures that the high tone associated with the centrifugal wins:

(22) **Tableau for CF of *miit* ‘pull’.**

Input: [miit] + VI(CF)	VI-IDENT (Tone)	IDENT (Tone)	MAX (Tone)
a. $\begin{array}{c} H \\ \\ \sigma \\ \triangle \\ \text{miit} \end{array}$		*	*
b. $\begin{array}{c} L \\ \\ \sigma \\ \triangle \\ \text{miit} \end{array}$	*!		*
c. $\begin{array}{c} HL \\ \\ \sigma \\ \triangle \\ \text{miit} \end{array}$	*!	**	

- I use VI(CF) as a shorthand for the vocabulary entry in (20) and I ignore the lengthening effect also associated with the centrifugal
- VI-IDENT(Tone) requires identical associations, not just preservation of a link and so penalizes tonal concatenation in candidate c
- Only the VI associated with CF is visible (see below), not the VI of the root

⁶I depart here again from Rolle and Lionnet’s (2019) terminology, who call these phantom structure constraints, to emphasize the fact that such constraints are not really novel.

4.4 Bottom-up cyclicity and outermost wins

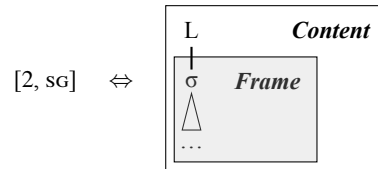
Why does the outermost replacive morpheme win?

- ▷ I propose to derive outermost wins from the **bottom-up nature of Vocabulary Insertion** (Bobaljik 2000; Embick 2010; see also Kalin and Weisser 2022)
- ▷ I adopt a model with the following ingredients, essentially resurrecting aspects of Lexical Phonology (Pesetsky 1979; Monahan 1982; Kiparsky 1982):
 1. Vocabulary Insertion applies bottom-up (Bobaljik 2000; Embick 2010)
 2. Each instance of Vocabulary Insertion triggers the application of the phonological grammar (*Strict Cyclicity*)
 3. The input to this phonological grammar is the previous output (if there is one) and a vocabulary entry, but information in vocabulary entries is not retained in the output (the *Bracket Erasure Condition*)

Overwriting by the outermost

- ▷ When the centrifugal combines with a tonal inflectional category, the inflectional tone wins. To see how, suppose we add the 2sg, which contributes a L tone:

(23) *Vocabulary Item for 2SG:*



- ▷ Insertion of this vocabulary entry generates another application of the phonological grammar, taking as its input the output of the tableau in (22) as well as the entry in (23):

(24) **Tableau for 2SG CF of *mīt* ‘pull’.**

Input: [mīit] + VI(2sg)	VI-IDENT (Tone)	MAX (Tone)
a.		*
b.	*!	*
c.	*!	

Note: The 2sg also triggers vowel lowering, which I abstract away from here.

⇒ The same constraint ranking now generates **overwriting by the 2SG tone**. The centrifugal tone is no longer privileged by VI-IDENT(Tone), because its vocabulary entry is not part of the input.

Extending this approach

- ▷ Derivations preserve outcome of previous cycles of concatenation, but favor **outermost vocabulary entry**
- ▷ Fronting/lowering patterns follow from VI constraints for [+front] and [+low,-ATR] (see Van Urk and Chong 2025 for a specific proposal compatible with this idea)
- ▷ Shortening/lengthening interactions derive from the idea that one of the antipassive morphs selects for a CVC base
- ▷ This approach can deliver Rolle’s (2018) four types of grammatical tone:
 1. Replacive-dominant: Outermost wins, as in Dinka, because of VI-FAITH >> FAITH
 2. Subtractive-dominant: Outermost wins, but subcategorizes for a *toneless* base
 3. Neutral GT: Concatenation, the result of MAX(Tone) >> VI-FAITH; FAITH
 4. Recessive tone in culminative systems: Replacive tone surfaces only on toneless base, because of CULMINATIVITY >> MAX(Tone) >> FAITH >> VI-FAITH

But much to be worked out!

Conclusion

Outermost wins in Dinka:

- ▷ Dinka nonconcatenative morphology offers strong evidence for a **cyclic theory of morphology** (Inkelas 1990; Bobaljik 2000; Alderete 2001)
- ▷ Across a range of nonconcatenative effects, the **outermost morpheme applies last**:
 - In replacive tone
 - In vowel quality changes
 - In shortening/lengthening
- ▷ I developed a new perspective on dominance effects, in which each step of Vocabulary Insertion triggers the phonological grammar (Pesetsky 1979; Monahan 1982; Kiparsky 1982; Inkelas 1990), and replacive morphology is a type of **prosodic subcategorization**
- ▷ This approach maintains a standard Distributed Morphology architecture and avoids enriching the phonological grammar with morphosyntactic information (Bermúdez-Otero 2012)

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