"Cyclic" Ordering without Cyclic Derivation:

CONTIGUITY-BD and Affix Order Alternations in Chichewa (Bantu)

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1. INTRODUCTION

- Most contemporary theories derive morpheme order through some version of **cyclic concatenation**.

(1) Cyclic Concatenation: [[[ROOT]X]Y] $\xrightarrow{\text{Step 1}}$ [[*Root-X*]Y] $\xrightarrow{\text{Step 2}}$ [*Root-X-Y*]

- **Claim:** Cyclic concatenation is not a sufficient model of morpheme order.
- **Evidence:** Two asymmetries involving variation relating to Chichewa's "CARP template" (Hyman 2003).

⋆ For each pattern, one or both variants cannot be derived using cyclic concatenation.

→ **Proposal:** Morpheme order calculated in parallel by *constraint interaction* involving violable Base-Derivative (BD) Faithfulness constraints (Benua 1997), esp. CONTIGUITY-BD (McCarthy & Prince 1995).

- The analysis also may let us make a testable *prediction* about the relative frequency of variants.

2. CARP TEMPLATE AND ASYMMETRIC COMPOSITIONALITY

- Bantu "verbal extensions" prefer an arbitrarily specified order (2) (Hyman & Mchombo 1992, Hyman 2003):

(2) **"CARP Template":** [ROOT <] CAUSATIVE < APPLICATIVE < RECIPROCAL < PASSIVE

- Chichewa allows both syntactic/semantic combinations of Causative and Reciprocal (Hyman 2003:247ff.).
  - Both surface with the **cyclic order** (3a,b) (cf. Baker 1985's "Mirror Principle").
  - If the **cyclic order** *violates CARP* (3b), that structure can also surface in the **CARP order** (3c).

(3) a. Reciprocalized Causative (**cyclic order** = **CARP order**)

[[[$\sqrt{\text{TIE}}$]CAUS]REC] $\xrightarrow{\text{Step 1}}$ [[*mang-its*]REC] $\xrightarrow{\text{Step 2}}$ [*mang-its-an*] ('X_i cause e.o.$_i$ to tie Y')

b. Causativized Reciprocal (**cyclic order**)

[[[$\sqrt{\text{TIE}}$]REC]CAUS] $\xrightarrow{\text{Step 1}}$ [[*mang-an*]CAUS] $\xrightarrow{\text{Step 2}}$ [*mang-an-its*] ('X cause Y_i to tie e.o.$_i$')

c. Causativized Reciprocal (**anti-cyclic CARP order**): [*mang-its-an*] ('X cause Y_i to tie e.o.$_i$')

- Hyman (2003) calls this "asymmetric compositionality".
  ↪ The **anti-cyclic CARP order** (3c) **cannot be derived through cyclic concatenation**.

3. PROPOSAL: ORDER THROUGH BASE-DERIV. CORRESPONDENCE

⋆ **Order is derived in parallel via constraint interaction.**

1. **Cyclic order** via Base-Derivative faithfulness (Benua 1997) [CNTG-BD ≫ CAUS-REC]
   - CNTG-BD (4) prefers the order of the base. (*Base = morphosyntactic subconstituent of derivative*)
2. **CARP order** via "bigram morphotactic constraints" (Ryan 2010) [CAUS-REC ≫ CNTG-BD]
   - CAUS-REC (5) prefers implementation of the template.

(4) **CNTG-BD:** One * for each pair of adjacent base segments that aren't adjacent in the derivative.

(5) **CAUS-REC:** One * if exponents of Caus and Rec are present but not in that order.

- Variable ranking between CNTG-BD and CAUS-REC derives asymmetric compositionality:

(6)

CNTG-BD ≫ CAUS-REC

[[[Rt]C]R]

BASE: [[Rt]Caus] / INPUT: [[[Rt]Caus]Rec]	CNTG-BD	CAUS-REC
a. ☞ *Rt-Caus-Rec* (3a)		
b. *Rt-Rec-Caus*	*!	*

[[[Rt]R]C]

BASE: [[Rt]Rec] / INPUT: [[[Rt]Rec]Caus]	CNTG-BD	CAUS-REC
a. *Rt-Caus-Rec*	*!	
b. ☞ *Rt-Rec-Caus* (3b)		*

CAUS-REC ≫ CNTG-BD

[[[Rt]C]R]

BASE: [[Rt]Caus] / INPUT: [[[Rt]Caus]Rec]	CAUS-REC	CNTG-BD
a. ☞ *Rt-Caus-Rec* (3a)		
b. *Rt-Rec-Caus*	*!	*

[[[Rt]R]C]

BASE: [[Rt]Rec] / INPUT: [[[Rt]Rec]Caus]	CAUS-REC	CNTG-BD
a. ☞ *Rt-Caus-Rec* (3c)		*
b. *Rt-Rec-Caus*	*!	

→This model allows for variation *and* non-cyclic ordering, because the drive for "cyclicity" (CNTG-BD) is **violable**. Not replicable with cyclic concatenation.

4. ASYMMETRIC SUFFIX DOUBLING

- Both structural combinations of Applicative and Reciprocal require the **CARP order** (7, 8a).
- Just in case the **cyclic order** would violate CARP (8b), a **doubling order** (8c) is permitted.

(7) Reciprocalized Applicative: [[[$\sqrt{\text{TIE}}$]APPL]REC] 'tie for each other'

[*mang-il-an-*] (**CARP order** = **cyclic order**)

(8) Applicativized Reciprocal: [[[$\sqrt{\text{TIE}}$]REC]APPL] 'tie each other for'

a. [*mang-il-an*] ✓ **CARP order**
b. *[*mang-an-il*] ✗ **Cyclic order**
c. [*mang-an-il-an*] ✓ **Doubling order** (*Root-Rec-Appl-Rec*)

(Hyman & Mchombo 1992:351ff., Hyman 2003:253ff.)

Doubling in (8c) is driven by CNTG-BD.

- APPL-REC (9) (undominated) eliminates the **cyclic order** (12b).
- Variable ranking btw. CNTG-BD (4) and INTEGRITY-IO (10) ("*Don't double!*") derives variability:
  - INTEG-IO ≫ CNTG-BD: **CARP order** (12a); CNTG-BD ≫ INTEG-IO: **Doubling order** (12d)

(9) **APPL-REC:** One * if exponents of Appl and Rec are present but not in that order.

(10) **INTEG-IO:** One * for each input segment with multiple output correspondents.

(11)

BASE: [[Rt]Appl] / INPUT: [[[Rt]Appl]Rec] (7)	A-R	INTG	CNTG
a. ☞ *Rt-Appl-Rec*			
b. *Rt-Rec-Appl*	*!		*
c. *Rt-Appl-Rec-Appl*		*!	
d. *Rt-Rec-Appl-Rec*		*!	*!

(12)

BASE: [[Rt]Rec] / INPUT: [[[Rt]Rec]Appl] (8)	A-R	INTG	CNTG
a. ☞ *Rt-Appl-Rec* (8a)			*
b. *Rt-Rec-Appl* ~~(8b)~~	*!		
c. *Rt-Appl-Rec-Appl*		*!	*!
d. ☞ *Rt-Rec-Appl-Rec* (8c)		*	

5. FREQUENCY OF VARIANTS

Consequence of analysis:

1. CAUS-REC ~ CNTG-BD
2. CNTG-BD ~ INTEG-IO

↪ CAUS-REC ~ INTEG-IO

Incorrect prediction:

- Causativized Reciprocal (3b/c) should permit suffix doubling output **Rt-Rec-Caus-Rec*.

Potential solution:

- Frequencies aren't 50/50.
- Analysis using MaxEnt HG.

→ Reverse engineer frequencies?

6. CONCLUSION

- These interactions demonstrate that cyclic concatenation is not a sufficient model of morpheme order.
- Parallel model using violable constraints — CNTG-BD, INTEG-IO, and bigrams — generates principled deviations from cyclic ordering while still generating the cyclic order under just the right circumstances.
- It allows for an analysis of variation that may reverse engineer testable predictions about frequency.

A handout with references and additional material is available at: https://www.samzukoff.com/amp2023poster