"Cyclic" Ordering without Cyclic Derivation: Contiguity-BD and Affix Order Alternations in Chichewa (Bantu)

Introduction: Contemporary realizational theories of morphology (e.g. Distributed Morphology; Halle & Marantz 1993) typically derive morpheme order using cyclic concatenation, the cyclic merger of a root with the exponents of higher functional heads. This approach captures Baker's (1985) Mirror Principle (MP) generalization: *morphological derivations reflect syntactic derivations and vice versa.* As already recognized by Baker, however, templatic morphology — cases where the order of affixes is rigidly fixed according to some arbitrary sequence, not tied to the syntax in any obvious way — poses a challenge for the MP (pp. 401–402), and thus for cyclic concatenation as a model of morpheme ordering.

This paper advances an alternative to cyclic concatenation, centered on Contiguity–Base-Derivative [Cntg-BD] (McCarthy & Prince 1995; Benua 1997), a phonological faithfulness constraint demanding that elements which are adjacent in a morphological base remain adjacent in its morphological derivative. The argument comes from two types of asymmetries relating to templatic affix order in the Bantu language Chichewa (Hyman 2003, Mchombo 2004): "asymmetric compositionality", where template-conforming orders are semantically ambiguous but template-violating orders are not; and asymmetric suffix doubling, where a doubling variant is available for one structural configuration but not its reverse. Both patterns involve optionality, which cannot be recreated using cyclic concatenation. The solution lies in variable rankings involving Cntg-BD, which leads to violable cyclic ordering.

CARP Template and Asymmetric Compositionality: The two phenomena of interest arise from Bantu's "CARP template" (Hyman & Mchombo 1992:350, Hyman 2003:247): the suffixes Causative, Applicative, Reciprocal, and Passive are required or preferred to occur in that order. Ryan (2010) demonstrates that morphological templates of this sort can be derived using "bigram morphotactic constraints", output-oriented constraints penalizing divergence from a specified pair-wise order. Hyman (2003) shows that, in Chichewa (1) and other Bantu languages, certain affix combinations exhibit "asymmetric compositionality": CARP-obeying orders can have either scopal meaning (and thus structure) of the two affixal morphemes (1a), but anti-CARP orders have only the meaning correlated with scope via the MP (1b) (i.e. cyclic order). The order-structure pairs in (1.a.i) and (1.b.ii) can be derived through cyclic concatenation, **but the pair in (1.a.ii) cannot.**

(1) (Hyman 2003:247ff.)

a. CARP order	b. Anti-CARP order	
mang-its-an-	*mang-an-its-*	
tie-Caus-Rec-	tie-Rec-Caus-	*Structures*:
i. ✓ 'X_i cause e.o.$_i$ to tie Y'	i. ✗ 'X_i cause e.o.$_i$ to tie Y'	[[[Root]Caus]Rec]
ii. ✓ 'X cause Y_i to tie e.o.$_i$'	ii. ✓ 'X cause Y_i to tie e.o.$_i$'	[[[Root]Rec]Caus]

We need a model of morpheme ordering that can derive variable meaning for CARP orders without predicting it for anti-CARP orders. We can do this if order is determined in parallel *in the phonology* (cf. Zukoff 2023) via the interaction of violable constraints. Asymmetric compositionality can be derived via *variable ranking* (e.g. Anttila 1997) of two types of constraints: (i) a bigram constraint preferring the template, Caus-Rec; and (ii) Cntg-BD, preferring retention of the base's order. I take the base to be the output of the immediate morphosyntactic subconstituent, here: Root plus first functional head. (This may require reassessment of the "freestanding word" condition on basehood in BD-Correspondence.) This means that the base co-varies with the structure, crucially yielding different violation profiles for Cntg-BD. When Cntg-BD ranks higher (2, right), the cyclic order emerges, for both structures. However, since this is enforced by violable constraint, when Caus-Rec ranks

higher, both structures map to the CARP order (2, left). This leads to a non-cyclic output (1.a.ii) just in case the winning candidate violates CNTG-BD (2, lower left).

(2)

CAUS-REC ≫ CNTG-BD

[[[Rt]C]R]

BASE: [[Root]Caus] / INPUT: [[[Root]Caus]Rec]	CAUS-REC	CNTG-BD
a. ☞ *Root-Caus-Rec*		
b. *Root-Rec-Caus*	*!	*!

[[[Rt]R]C]

BASE: [[Root]Rec] / INPUT: [[[Root]Rec]Caus]	CAUS-REC	CNTG-BD
a. ☞ *Root-Caus-Rec*		*
b. *Root-Rec-Caus*	*!	

CNTG-BD ≫ CAUS-REC

[[[Rt]C]R]

BASE: [[Root]Caus] / INPUT: [[[Root]Caus]Rec]	CNTG-BD	CAUS-REC
a. ☞ *Root-Caus-Rec*		
b. *Root-Rec-Caus*	*!	*!

[[[Rt]R]C]

BASE: [[Root]Rec] / INPUT: [[[Root]Rec]Caus]	CNTG-BD	CAUS-REC
a. *Root-Caus-Rec*	*!	
b. ☞ *Root-Rec-Caus*		*

SUFFIX DOUBLING: The same model, supplemented with one IO-faithfulness constraint, can also derive asymmetric suffix doubling. In Chichewa, combinations of Applicative and Reciprocal are rigidly CARP-obeying: [[[Root]Rec]Appl] maps to the CARP order *Root-Appl-Rec-* (3.ii.a), never the cyclic, anti-CARP order *Root-Rec-Appl-* (3.ii.b). However, only this structure permits one other output: the doubling order in (3.ii.d) (Hyman 2003:253ff.).

(3)

Single exponents	**Structure:** i. [[[Root] Appl] Rec]	ii. [[[Root] Rec] Appl]
a. APPL-REC (CARP) *mang-il-an-*	✓ (Cyclic)	✓
b. REC-APPL *mang-an-il-*	✗	✗ (Cyclic)
Doubled exponents		
c. APPL-REC-APPL *mang-il-an-il-*	✗	✗
d. REC-APPL-REC *mang-an-il-an-*	✗	✓

An undominated bigram APPL-REC will always rule out the basic anti-CARP order (4/5b). All other orders satisfy this constraint, because they all have an *Appl-Rec* sequence. If, then, CNTG-BD is variably ranked with INTEGRITY–INPUT-OUTPUT [INTG-IO] (*'No splitting'*), we derive the distribution. There is no variation for [[[Root]Appl]Rec] (4), because both INTG-IO and CNTG-BD prefer leftmost *Appl* (4a). But for [[[Root]Rec]Appl] (5), these two constraints conflict, because CNTG-BD now prefers leftmost *Rec*. Variable ranking here derives the attested variation, between the CARP output (5a) and the doubling output (5d).

(4)

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

(5)

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

CONCLUSION: Chichewa demonstrates asymmetries in its realization of complex derivatives. Combinations of Causative and Reciprocal exhibit asymmetric compositionality, wherein one structure is variably realized by a non-cyclic order. Combinations of Applicative and Reciprocal exhibit asymmetric suffix doubling, wherein one structure is variably realized by two orders, neither of which is the simple cyclic order. These kinds of interactions demonstrate that cyclic concatenation is not a sufficient model of morpheme ordering. This paper shows that a model that derives order in the phonology using violable constraints — namely, bigram morphotactic constraints and CNTG-BD — can generate principled deviations from cyclic ordering while still generating the cyclic order under just the right circumstances.