

Cyclicity and stress

The **phonological cycle** (Chomsky et al. 1956 et seq.) claims phonology applies to successive nested constituents, and predicts sensitivity to relative scope of prefixes and suffixes, i.e., that processes can distinguish the following two cases:

[Prefix [[...] Lower Suffix]] [[Prefix [...]] Higher Suffix] Trigger Non-trigger

Typological claim: stress patterns can be sensitive to relative scope, but do not show the kinds of interactions predicted by the phonological cycle

Theoretical claim: the typological gap is accounted for if phonology has access to only finite-state computations (Kaplan and Kaye 1994), and phonological processes to only **subsequential** computations (Chandlee 2014).

Chamorro stress: height- but not content-sensitive

The phonological cycle is a natural way to describe prefix-suffix interactions that are sensitive to the **relative height** of the affixes, as in Chamorro (Chung 1983):

Primary stress in Chamorro

Default penultimate kitan **→ kí**tan

Lexically marked accent on leftmost prefix gets primary stress $[mi [mantika]] \rightarrow mi mantika$

Default stress if an accented prefix is outscoped by a suffix $[[\underline{mi} [\underline{mantika}]] \tilde{n}a] \rightarrow mimantika$ $[\acute{a} [[kwentus] i]] \rightarrow \acute{a}$ kwentusi

Chung's cyclic analysis of Chamorro stress

exical acc	ent marked with +, prima	ary stress marked with '
UR	[[mi+ [mantika]] ña]	[æ+ [[kwentus] i]]
Cycle 0	[[mi ₊ [mantika]] ña] [[mi ₊ [man tí ka]] ña]	[æ ₊ [[kwentus] i]] [æ ₊ [[kwén tus] i]]
Cycle 1	[[mi+ man tí ka] ña] [[mí + mantika] ña]	[æ ₊ [kwén tus i]] [æ ₊ [kwen tú s i]]
Cycle 2	[mí + mantika ña] [mi+ manti ká ña]	[æ ₊ kwen tú s i] [æ ₊ kwentus i]
	mimanti ká ña	æ kwentusi

References: Chandlee, J. (2014). Strictly Local Phonological Processes. Chomsky, N., Halle, M., and Lukoff, F. (1956). On accent and juncture in English. Chung, S. (1983). Transderivational relationships in Chamorro phonology. Crook, H. (1999). The Phonology and Morphology of Nez Perce Stress. Kaplan, R. and Kay, M. (1994). Regular models of phonological rule systems.

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The full paper is available online, and can be found at: http://ling.umd.edu/~ewand/cyclic_stress_121314.pdf

Comments and questions welcome.

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Finite state computability of Chamorro stress



Nez Perce stress: content- but not height-sensitive

Some prefix-suffix interactions do **not** require height to be compared:

Primary stress in Nez Perce verbs (Crook 1999)

Default penultimate piskis → **pís**kis

Rightmost (non-final) accented root or suffix syllable [[[páay] núu] saaqa] → pay**nó**osaqa

Leftmost accented prefix syllable [[sepée [siléew [cúukwe]]] cee] \rightarrow sepéesileewcuukwece

Accented suffixes always win [[hii [nées [sepée [[páay] núu]]]] cee] \rightarrow hinasapapay**nó**oca

The placement of stress in Nez Perce verbs is symmetrically sensitive to content (lexical accent) but can be analyzed **without reference to relative height**.

A typological gap?

The phonological cycle predicts patterns that combines the morphological sensitivities of Nez Perce and Chamorro:

> Winner by Height, If Special (WHIS) Underlying accents compete symmetrically (Nez Perce) Winner is the outermost (Chamorro)

[[tú be] sa] [[tú be] tá] [rú [be tá]]

UR	[[tu+ [be]] sa]	[[tu+ [be]] ta+]	[ru ₊ [[be] ta ₊]]
Cycle 1	[[tu ₊ be] sa]	[[tu ₊ be] ta ₊]	[ru ₊ [be ta ₊]]
	[[tú + be] sa]	[[tú + be] ta ₊]	[ru ₊ [be tá₊]]
Cycle 2	[tú + be sa]	[tú + be ta+]	[ru+ be tá+]
	[tú + be sa]	[tu+ be tá +]	[rú+ be ta+]
	tú besa	tube tá	rú beta

Yet WHIS seems to be a typological gap: we suggest it is impossible for phonological patterns to compare **both height and symmetric content.**

Eliminating cyclicity: A reanalysis of Chamorro stress



\rightarrow	túbesa
\rightarrow	tube tá
\rightarrow	rú beta

Two assumptions allow for a **local environment** for accented prefix stress:

Binary branching: [Prefix [...]], [[...] Suffix] allowed, but ***[Prefix [...] Suffix] No vacuous cycles:** Null morphemes are not passed to the phonology: *[[...]]

The leftmost accented prefix gets primary stress except in the environment: X [[Y — Z

No finite state analysis of WHIS

There is a finite state computation for a set if and only if prefixes of the elements can be partitioned by their grammatical completions. Without finitely many equivalence classes of prefixes, the set has no finite state computation.

The need to match constituent boundaries means that WHIS is not finite state: Truncated IO correspondence string Set of completions

Subsequentiality and morphological sensitivity

Strong locality conditions hold on phonological triggers. Attested triggers have been claimed to have **subsequential computations** (Chandlee 2014).

This rules out combining symmetrical content sensitivity with height sensitivity even when there is no need to track unbounded constituency.

Accented prefixes win if the outermost accented suffix is not rightmost

Because two affixes at an arbitrary distance depend on each other as triggers, **G-WHIS is not subsequential**. G-WHIS also appears to be **unattested**.

Conclusions

If phonology is sensitive to unbounded morphological structure, the structure it sees is likely **not true constituency.** Patterns needing it (WHIS) appear **unattested.**

Alternatively, if morphological sensitivity is **depth limited**, (Stratal OT), constituency may be used, subject to the same locality restrictions found in harmony systems (subsequentiality).

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	···· + ····] ···· ···] ···· + ···· ···] ···] ··· + ···

Gentler Winner by Height, If Special (G-WHIS)

Winner is usually the outermost accented suffix (WHIS)

 $[[tú be] tá] \rightarrow tubettá$ [rú [be tá]] \rightarrow rúbeta

[[[tú be] tá] to] \rightarrow túbetato [[rú [be tá]] to] $\rightarrow rú$ betato