Strength as an alternative to cycles

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Main Claim

- the complex system of morphologically determined stress in Moses Columbian Salish follows in a **cyclic account** (Czaykowska-Higgins, 1985, 1993*a*,*b*)

- the pattern can also be analyzed in an account that is based on **grades of activity** of underlying phonological elements

→ cyclic reapplication of stress assignment = **competition** between elements of different strengths

→ cyclic vs. representational account?

1. Moses Columbian Salish Stress

2. A cyclic account

3. An Account based on Gradient Activity

4. Summary

Moses Columbian Salish Stress

Moses Columbian Salish

(Kinkade, 1982; Czaykowska-Higgins, 1985, 1993*a*,*b*, 2011; Willett, 2003)

- a **single main-stressed** syllable in every word
- the default-stress position is the **rightmost** syllable, e.g. for stems in isolation (1-a+b)
- **prefixes are never stressed**; even if they contain the only full V (1-c)

(1) *Default stress (Czaykowska-Higgins, 1993*a*, 205+225)*

a. hananík
'jackrabbit'

b. q'aláx̣
'fence'

c. niʔwəpwə́pəlqs
niʔ-wp∼wp=lqs
Loc-Red-hair=nose
'hair in nose'

Morphologically determined stress in MCS

- hierarchy of stress-preference based on a two-way-distinction of stems and suffixes into:
  - dominant 'D' and recessive 'R' suffixes
  - strong 'S' and weak 'W' stems
    (weak stems=underlyingly vowel-less ➙ predictable vowel epenthesis)

➙ **D-Sfx ≫ S-stem ≫ R-Sfx ≫ W-stem**

- (very similar systems in all Interior Salishan languages (except Lillooet): morphologically determined stress system (Idsardi, 1991; Czaykowska-Higgins and Kinkade, 1998))

Morphologically determined stress in MCS

(2)

a. ncəkcəkqínn (W-**D**)
n-ck∼ck=qin-n-t-ø-n
Loc-Red∼hit=Top-Ctr-Tr-3.O-1Sg.S
'I hammered it repeatedly' (215)

b. cɬaw'jíknəx^{w} (W-**D**-R)
ʔac-ɬw'j=ikn-mix
Stat-make=back-Ipfv
'he's making a bowl' (215)

c. sq'ij'míx (W-**R**)
s-q'j'=mix
Nmlz-write=people
'school children' (216)

(stem=underlined)

Further distinction for stems: Extrametricality

- E-stems assign **extrametricality** to the immediately following syllable:
  - SE/WE-stems are stressed when followed by one D-suffix
  - they loose their stress when followed by more than two D-suffixes or a consonantal suffix and a D-suffix

(3)

a. japk^{w}ánksn (**SE**-D)
jap-k^{w}an=akst-n-t-ø-n
Loc-grab=hand-CTRL-TR-3.O-1SG.S
'I grab so. by the hand' (229)

b. kɬk^{w}ncnáksn (SE-D-**D**)
kɬ-k^{w}an=cin=akst-n-t-ø-n
Loc-grab=mouth=hand-CTRL-TR-3.O-1SG.S
'I grab so. by wrist' (231)

c. txatmásq'ṭ (SE-C-**D**)
t-xat-m=asq'ṭ
Loc-raise-MIDDL=day
'sky'

Morphologically determined stress: Summary

(4) *Hierarchy of stress preferences*

→ **D-Sfx ≫ S-stem ≫ R-Sfx ≫ W-stem**

(5) *Stress generalizations (Czaykowska-Higgins, 1993a, 235)*

	S	W	SE	WE
a.	**S**-R(-R)	W(-R)-**R**	**SE**-R(-R)	**WE**-R
b.	S-**D**	W-**D**	**SE**-D	**WE**-D
c.	S-D(-D)-**D**	W-D(-D)-**D**	SE-D(-D)-**D**	WE-D(-D)-**D**
d.	S-**D**-R(-R)	W-**D**-R(-R)	**SE**-D-R(-R)	

Conflicting directionality

- if a word **contains only epenthetic vowels, the leftmost is stressed**
- (not uncommon in Interior Salishan; cf. a similar pattern in Thompson River Salish (Thompson and Thompson, 1992; Coelho, 2002))

(6) *Leftmost stress in epenthesis-only words*

a. sq’íj’q’ijs (**W**-R)
s-q’j-q’j-s
Nmlz-write-characteristics-Poss
‘his/its/her writing’ (222)

b. k’ə́məlqstxən (**W**-R-R)
k’m=lqst=xn
surface.of=shin=leg
‘lower leg’ (222)

Summary: The challenges

1. morphological stress system with **preference hierarchy**:
   D-suffixes ≫ S-stems ≫ R-suffixes ≫ W-stems

2. **extrametricality** effect for E-stems: immediately following D-suffix is always unstressed

3. **conflicting directionality**: leftmost V stressed if only epenthetic V's present

A cyclic account

General Logic

- Czaykowska-Higgins (1993*a*): MCS stress follows best in a cyclic account inside the metrical framework of Halle and Vergnaud (1987*a*,*b*) (=prominence (*) assigned on different levels: most *'s=main stress)

- crucial contrast: **cyclic (=D) vs. non-cyclic (=R) suffixes**
  - D-suffixes trigger cyclic stress deletion and (re)assignment of rightmost stress
  - R-suffixes don't trigger stress deletion

Cyclic D-suffixes: Re-assignment of stress

(7)

	$p'iq_S$-cin_D	$p'iq_S$-cin_D-cut_D	
Cycle 1	p'iq	p'iq	
Stress A: Right	p'iq	p'iq	
Cycle 2	$+cin_D$	$+cin_D$	
Stress Erasure	piq-cin	piq-cin	→ *(Re)assignment of stress*
Stress A: Right	p'iq-cin	p'iq-cin	
Cycle 3		$+cut_D$	
Stress Erasure		piq-cin-cut	→ *(Re)assignment of stress*
Stress A: Right		p'iq-cin-cut	
Noncyclic			
Stress A: Right	n/a	n/a	
Stress B: Left	p'iq-cin	p'iq-cin-cut	

(All following derivations are simplified: prefixes ignored/some suffixes not segmented)

Non-cyclic R-suffixes: No stress deletion

(8)

	p'iq-cin$_D$-cut$_D$-mix$_R$	patiχ^w-min$_R$	
Cycle 1	p'iq	patiχ^w	
Stress A: Right	p'iq	patiχ^w	
Cycle 2	+cin$_D$		
Stress Erasure	piq-cin-		
Stress A: Right	p'iq-cin		
Cycle 3	+cut$_D$		
Stress Erasure	piq-cin-cut		
Stress A: Right	p'iq-cin-cut		
Noncyclic	+mix$_R$	+min$_R$	
Stress A: Right	p'iq-cin-cut-mix	patiχ^w-min	→ *No stress deletion*
Stress B: Left	p'iq-cin-cut-mix	patiχ^w-min	

Conflicting directionality? Epenthesis comes too late

- if no underlying vowel is present: no stress can be assigned in cyclic phonology since **there are no stressable elements**
- **vowel insertion (VI) applies non-cyclically before leftmost word stress rule** (=stress A) but after rightmost stress rule (=stress B)

(9)

	ʔħʷʔ	
Cycle 1	ʔħʷʔ	
Stress A: Right	n/a	
Noncyclic		
Stress A: Right	n/a	
Vowel Epenthesis	ʔəħʷa ʔ	→ *V-epenthesis after Stress A: Right*
Stress B: Left	*** ʔəħʷa*ʔ	

Extrametricality

- stems can **assign extrametricality to an adjacent** suffix

(10) Extrametricality

$[\text{Root}]_{[+\text{Extr}]}$ - Suffix $\rightarrow$ $[\text{Root}]_{[+\text{Extr}]}$ - $\overset{<*>}{<\text{Suffix}>}$

Strong stem and extrametricality

(11)

	$x^{w}ir_{SE}$-$akst_{D}$	$x^{w}ir_{SE}$-$akst_{D}$-$atk^{w}{}_{D}$	
Cycle 1	$x^{w}ir$	$x^{w}ir$	
Stress A: Right	$x^{w}\overset{*}{\underset{*}{i}}r$	$x^{w}\overset{*}{\underset{*}{i}}r$	
Cycle 2	+akst	+akst	
Stress Erasure	$x^{w}\overset{*}{i}r$-akst	$x^{w}\overset{*}{i}r$-akst	
EM	$x^{w}\overset{*}{i}r$-$\overset{<*>}{a}kst$	$x^{w}\overset{*}{i}r$-$\overset{<*>}{a}kst$	➙ *Adj.Sfx invisible for stress*
Stress A: Right	$\overset{*}{\underset{*}{x^{w}i}}r$-$\overset{<*>}{a}kst$	$\overset{*}{\underset{*}{x^{w}i}}r$-$\overset{<*>}{a}kst$	
Cycle 3		+atk^{w}	
Stress Erasure		$x^{w}\overset{*}{i}r$-$akst\overset{*}{}$-atk	➙ *2nd D-Sxf. deletes stress*
EM		n/a	
Stress A: Right		$x^{w}\overset{*}{i}r$-$akst\overset{*}{}\overset{*}{\underset{*}{}}$-atk	
Noncyclic			
Stress A: Right	$\overset{*}{\underset{*}{x^{w}i}}r$-$\overset{<*>}{a}kst$	$x^{w}\overset{*}{i}r$-$a\overset{*}{}kst\overset{*}{\underset{*}{}}$-atk	
Stress B: Left	$\overset{*}{\underset{*}{\overset{*}{\underset{*}{x^{w}i}}}}r$-$\overset{<*>}{a}kst$	$x^{w}\overset{*}{i}r$-$a\overset{*}{}kst\overset{*}{\underset{*}{}}$-atk	

Account in Czaykowska-Higgins (1993*a*): Summary of assumptions

1. suffixes are **cyclic or not**
2. different stress rules assigning **left- or rightmost** stress
3. **extrametricality** can be assigned to adjacent morphemes

An Account based on Gradient Activity

Background: Gradient Symbolic Representations

(Smolensky and Goldrick, 2016; Rosen, 2016; Faust and Smolensky, 2017; Zimmermann, 2017)

- phonological elements can have different **degrees of presence in an underlying representation**, expressed as numerical activities
  (departure adopted here: elements can be weakly active in the output)
- computation: **Harmonic Grammar** (Legendre et al., 1990; Potts et al., 2010)
- any **change in activity is a faithfulness violation**

(12) *Toy example: Weak activation and HG constraint evaluation*

$p_1a_1k_{0.6}t_1$	Dep 3	*CC]$_\sigma$ 2	Max 1	
a. $p_1a_1k_{0.6}$			-1	-1
☞ b. $p_1a_1t_1$			-0.6	-0.6
c. $p_1a_1k_{0.6}t_1ə_1$	-1			-3
d. $p_1a_1k_{0.6}t_1$		-0.6		-1.2

The analysis in a nutshell: Competition

- morphemes have **no or underlying feet of different strengths**: competion about φ-realization and most active one wins
- only difference between strong and weak stems: former has an underlying vowel, avoiding violations of (13-b)

(13) *Representations*

Fully active φ: SE/WE		*Weaker φ: D*	*Weakest φ: S*	*No φ: R/W*	
φ_1	φ_1	$\varphi_{0.8}$	$\varphi_{0.6}$		
SE	WE	D	S	R	W

(14) a. MAX-φ:
Assign a violation mark for every input φ without an output correspondent.

b. *ə́:
Assign a violation mark for every main-stressed colourless V.

The analysis in a nutshell: Gang effect

- apparent extrametricality is a **gang-effect** in HG: There is a preference for stems to be stressed but stress can't be too far away from the right edge (=seperated from the right edge by more than one morpheme)

(15) a. $\varphi > \Sigma$:
Assign a violation mark for every main-stressed vowel that is not preceded and followed by stem-segments.

b. RM_{COL}:
Assign a violation mark for every morphemic colour α that intervenes between the right word edge and the stressed vowel that is not of morphemic colour α.

The analysis in a nutshell: Morphological affiliation

- apparent conflicting directionality follows from **contrast between coloured/epenthetic material**: There is a preference for stems to be stressed and RM_V does not count epenthetic vowels

(16) RM_V:
Assign a violation mark for every non-epenthetic vowel that intervenes between the right word edge and a stressed vowel.

SE and R: Realization of the only underlying φ

(17)

φ1 SE R	Max-φ 100	φ >Σ 30	RM_V 30	RM_{Col} 12	*ə́ 5	Dep-φ 5	
☞ a. φ1 SE R				-1			-12
b. φ1 SE R	-1	-1			-1	-1	-140

(epenthetic=grey background)

W, D, and R: Realization of the only underlying φ

(18)

W D R (φ0.8)	Max-φ 100	φ >Σ 30	RM_V 30	RM_{Col} 12	*ə́ 5	Dep-φ 5	
a. W D R (φ1)	-1.6		-1	-2	-1	-1	-224
☞ b. W D R (φ0.8)		-1		-1			-42
c. W D R (φ1)	-0.8	-1			-1	-1	-120

WE and D: Preservation of φ with highest activity

(19)

φ1 φ0.8 WE D	Max-φ 100	φ >Σ 30	RM_V 30	RM_{Col} 12	*ə́ 5	Dep-φ 5	
☞ a. φ1 WE D	-0.8		-1	-1	-1		-127
b. φ0.8 WE D	-1	-1					-130

Apparent extrametricality

- a gang effect arises if more than one D-suffix follows an E-stem:
  - in principle, φ >Σ and Max-φ prefer realization of **stress on an E-stem** over realization on a D-suffix (20-a)
  - if more than one D-suffix follows, however, RM_{COL} **and** RM_V **gang up: the stress would be too far away from the right edge** and realization of stress on the suffix becomes optimal (20-b)

(20) *Threshold effect for E-stems: A gang effect*

	…has a higher weight than…			
a.	0.2 x Max-φ + φ >Σ	≫	RM_{COL} + RM_V	(21)
b.	2 x RM_{COL} + (2 x) RM_V	≫	0.2 x Max-φ + φ >Σ	(22), (23)

SE and D: Preservation of φ with highest activity

(21)

φ1 φ0.8 SE D	Max-φ 100	φ >Σ 30	RM_V 30	RM_{Col} 12	*ə́ 5	Dep-φ 5	
☞ a. φ1 SE D	-0.8		-1	-1			-122
b. φ0.8 SE D	-1	-1					-130

SE and multiple D's: RM_{CoL} and RM_{V} gang up against Max-φ and φ >Σ

(22)

φ1 φ0.8 φ0.8 SE D D	Max-φ 100	φ >Σ 30	RM_{V} 30	RM_{CoL} 12	*ə́ 5	Dep-φ 5	
a. φ1 SE D D	-1.6		-2	-2			-244
b. φ0.8 SE D D	-1.8	-1	-1	-1			-252
☞ c. φ0.8 SE D D	-1.8	-1					-210

SE and D and an intervening unstressed suffix: Stress on D

(23)

φ_1 SE C $\varphi_{0.8}$ D xat m asq't	MAX-φ 100	φ >Σ 30	RM_V 30	RM_{COL} 12	*ə́ 5	DEP-φ 5	
a. φ_1 SE C D xat m asq't	-0.8		-1	-2			-134
☞ b. $\varphi_{0.8}$ SE C D xat m asq't	-1	-1					-130

Conflicting directionality

- in the absence of underlying stress, **default rightmost stress** is predicted (24-a)
- if there are no underlying vowels, leftmost stress on the stem is predicted since φ >Σ prefers leftmost stress and **no violations of** RM_V **are induced by potentially following epenthetic vowels** (24-b)

(24) *'Conflicting Directionality' = the invisibility of epenthetic vowels*

…has a higher weight than…				
a.	RM_{CoL} + RM_V + *ə́	≫	φ >Σ	
b.	φ >Σ	≫	2 x RM_{CoL}	(25)

W and R: no underlying vowels

(25)

k'm lqst xn W R R	Max-φ 100	φ >Σ 30	RM_V 30	RM_{Col} 12	*ə́ 5	Dep-φ 5	
☞ a. φ1 k' ə m ə lqst x ə n W R R				-2	-1	-1	-34
b. φ1 k' ə m ə lqst x ə n W R R			-1		-1	-1	-40

Summary

Summary

- the morphological stress system in MCS follows in an account that is based on **grades of activity** of underlying phonological elements

→ a representational reanalysis of apparent cyclic effects is possible based on true **competition** in a parallel model:

  - To which degree is such an account generalizable?
  - Is the independent evidence for GSR convincing and the reanalysis hence desirable?

- strengthens the claim for GSR which so far has been argued to account for exceptional/morpheme-specific segmental effects (Smolensky and Goldrick, 2016; Rosen, 2016; Faust and Smolensky, 2017) – true competition is straightforwardly expected

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