Being (slightly) stronger: Lexical stress in Moses Columbian Salish

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Main Claim: The argument for Gradient Symbolic Representations (=GSR; Smolensky and Goldrick, 2016; Rosen, 2016) is strengthened with a case study from lexical stress in Moses Columbian Salish. It shows that the prediction of more than two contrasting grades of activity for phonological elements in one language correctly predicts complex competition-based stress systems. In addition, it is argued that such a representational account of exceptionality correctly predicts that exceptional elements can behave unexpectedly for more than one phonological process in a language.

Theoretical background: GSR states that phonological elements can have different degrees of presence in an underlying representation, expressed as numerical activities (Smolensky and Goldrick, 2016; Rosen, 2016; Faust and Smolensky, 2017). In most accounts that directly implement some concept of strength, the arguments usually rely on a binary division into strong and weak elements (Inkelas, 2015; Vaxman, 2016*a*,*b*; Sande, 2017): the case study here now adds evidence for true gradience in arguing that at least five different grades of activity exist for phonological elements in Moses Columbian Salish. The harmony evaluation in GSR is formally modeled inside Harmonic Grammar where constraints are weighted, not ranked (Legendre et al., 1990). This allows to directly implement cumulativity: an effect that also can be found in the case study of lexical stress in Moses Columbian Salish

Stress in Moses Columbian Salish: The position of main word stress in Moses Columbian Salish (=MCS; Czaykowska-Higgins, 1985, 1993*a*,*b*) is lexically determined and predictable from a preference hierarchy for stress on specific morpheme types and phonological markedness. The basic distinction of morphemes in MCS is a twofold distinction into strong 'S' and weak 'W' stems and dominant 'D' and recessive 'R' suffixes. A preference hierarchy D-suffix $\gg$ S-stem $\gg$ {R-suffix, W-stem} then predicts the basic position of main stress in MCS (1-a-e). When more than one morpheme of a type that is expected to be stressed is present in a word, a default preference for rightmost stress can be observed. In addition to those basic four morpheme types, there is a further distinction for stems into basic S and W and exceptional SE and WE that show an unexpected dispreference for adjacent stress: D-suffixes following an E-stem are unstressed if they are directly adjacent to the E-stem but get stressed if at least one other suffix-type intervenes. A final class of exceptional morphemes are some suffixes that behave like D-suffixes in most respects but do not loose their stress to an adjacent E-stem ('D*') and another class of suffixes that behave like R-suffixes in most respects but are always the stressed suffix if stress is predicted on an R-suffix, even if they are not the rightmost one. These additional facts are summarized in the full table in (1) and are evidence for the extended hierarchy of morpheme types **D*** $\gg$ **SE/WE** $\sim$ **D** $\gg$ **S** $\gg$ **R*** $\gg$ **{R, W}**. It is argued that a Harmonic Grammar account based on gradient representations not only predicts the intricate competition between (non)stress positions in MCS, it also straightforwardly accounts for the threshold effect observed for E-stems and D-suffixes.

Analysis for MCS stress: The analysis for this complex stress pattern in GSRO is based on different underlying degrees of stress for morphemes in MCS. The basic distinction is the one between underlyingly stressed and underlyingly unstressed ones, modeled here as the absence and presence of underlying prosodic feet that are protected by a faithfulness constraint MAX-Φ. In addition, underlying feet have different activity levels: whereas SE- and WE-stem have a fully active $\Phi 1$ in their representation, all other morpheme types except the R-suffixes and W-stems contain weakly active feet: from a near-fully active $\Phi_{0.9}$ for D*-suffixes to a very weakly active $\Phi_{0.4}$ for an R*-suffix (cf. the underlying representations (2)). Basic markedness constraints demanding a right-aligned default stress and stress on the stem (3) together with MAX-Φ then predict the stress system of MCS from these representations. Since only a single main-stressed syllable is possible per word, competition arises if more than one underlying foot is present. The high weight of MAX-Φ predicts that in most contexts, the foot with the highest activity wins (cf. (4)). Only the preference for rightmost stress can make realization of the strongest foot sub-optimal: Stress which is not too far away from the right edge is tolerated in order to realize the strongest foot but if too many suffixes intervene, stress is realized at the right edge instead. This is a classical gang-effect in Harmonic Grammar that directly implements the threshold effect observed for E-stems and D-suffixes.

(1) *Stress generalizations in MCS*

	S	W	SE	WE	
a.	**Ś**(-R)-R	W(-R)-**Ŕ**	**SÉ**(-R)-R	**WÉ**-R	(D, R)
b.	S-**Ď**	W-**Ď**	**SÉ**-D	**WÉ**-D	
c.	S-**Ď**-R(-R)	W-**Ď**-R(-R)	**SÉ**-D-R(-R)		
d.	S-D(-D)-**Ď**	W-D(-D)-**Ď**	SE-D(-D)-**Ď**	WE-D(-D)-**Ď**	
e.			SE-R-**Ď**		
f.	**Ś**-R*	W-**Ŕ***			(D, R, R*)
g.		W-**Ŕ***-R			
h.		W(-D)-**Ď**-R*	**SÉ**-D-R*(-R)		
i.		W-R*-**Ď**			
j.			SE-**Ď***	WE-**Ď***	(D, R, D*)
k.			SE-D-**Ď***		
l.	S-**Ď***-R				
m.			SE-**Ď***-R*		(D, R, D*, R*)

(main stress=boldface; light grey=asymmetry for E-stems and D-suffixes; dark grey=D* and R* behave differently from D and R)

(2) *Underlying representations*

Fully active Φ		← Weaker Φ →				No Φ	
SE/WE		D*	D	S	R*	R/W	
Φ_1	Φ_1	$\Phi_{0.9}$	$\Phi_{0.8}$	$\Phi_{0.6}$	$\Phi_{0.4}$		
SE	WE	D*	D	S	R*	R	W

(3) *Constraints*

a. $\acute{V}_{\text{STEM}}$: 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.

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

(4) *True competition*

$\Phi_{0.6}$ $\Phi_{0.9}$ $\Phi_{0.4}$ S D* R*	MAX-Φ 100	$\acute{V}_{\text{STEM}}$ 30	RM_{COL} 30	RM_{V} 16	DEP-Φ 5	
a. $\Phi_{0.4}$ S D* R*	-1.5	-1				-180
☞ b. $\Phi_{0.9}$ S D* R*	-1	-1	-1			-160
c. $\Phi_{0.6}$ S D* R*	-1.3		-2	-1		-206

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