Exceptional non-triggers are weak: An argument for Gradient Symbolic Representations

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Main Claim: The assumption of Gradient Symbolic Representations (=GSR; Smolensky and Goldrick, 2016; Rosen, 2016) can predict that elements behave exceptional in the phonology. In this talk, I argue for a modified GSR system where gradiently active phonological elements can exist in both input and output. This assumption derives patterns of exceptional non-triggers that are illustrated with a case study from the tonal phonology of Molinos Mixtec where elements are exceptional non-triggers for different phonological processes.

Exceptional non-triggering H-tones in Molinos Mixtec: San Pedro Molinos Mixtec (=MM) is an Otomanguean language (Hunter and Pike, 1969) with three tone levels (H=á, M=ā, L=à) and no contour tones. Three lexical classes of morphemes can be distinguished: A-morphemes do not trigger any change on a following morpheme (unmarked, 1a), B-morphemes trigger an additional H-tone on the following morpheme (1b), and B'-morphemes optionally trigger an additional H-tone on the following morpheme (1c). This distinction into different classes is not only crucial for determining the tone melody of a following morpheme but also for the realization of an additional H-tone triggered by a preceding B/B'-morpheme: The additional H of a B-morpheme is realized on the initial TBU of an A-morpheme (1b) or a B'-morpheme (1d) but on both TBU's of a B-morpheme that ends in an M-tone (1e). The same holds for the additional H-tone of a B'-morpheme in those forms where it is optionally realized (1c,f,g). A B-morpheme hence triggers spreading of the additional H-tone of a preceding B-/B'-morpheme.

1)	M1	M2	Combination		Tone: Underlying and surface
a.	ʔùʃì	rīŋkī	ʔùʃì rīŋkī	'ten mice'	LL+MM→LL MM
b.	síví^{B}	tèē	síví téē	'name of the men'	HH^{H}+LM→HH HM
c.	hìkī$^{B'}$	tèē	hìkī téē ∼ tèē	'the man's fist'	LM$^{H'}$+LM→LM HM∼LM
d.	síví^{B}	ʧi̱ʔi̱$^{B'}$	síví ʧíʔi̱	'name of the skunk'	HH^{H}+LM$^{H'}$→HH HM
e.	síví^{B}	sùʧī^{B}	síví súʧí	'name of the child'	HH^{H}+LM^{H}→HH HH
f.	ʧi̱ʔi̱$^{B'}$	kāā^{B}	ʧi̱ʔi̱ káá ∼ kāā	'the skunk will eat (it)'	LM$^{H'}$+MM^{H}→LM HH∼MM
g.	hìkī$^{B'}$	ʧi̱ʔi̱$^{B'}$	hìkī ʧíʔi̱ ∼ ʧi̱ʔi̱	'the skunk's paw'	LM$^{H'}$+LM$^{H'}$→LM HM∼LM

A standard autosegmental analysis for the B/B'-morphemes would be that they end in a floating H that docks to the TBU of a following morpheme. This, however, does not yet explain the contrast between B and B': The floating H of a B-morpheme always overwrites a following tone and always triggers spreading of a preceding floating H whereas the floating H of a B'-morpheme only optionally overwrites a following tone and never triggers H-spreading. This asymmetry is summarized below where the circled H marks the floating tones preceding and following a morpheme with tones LM and the floating H of B-morphemes are given in boldface. The optionality after B'-morphemes is analysed here as two coexisting grammars G1 and G2.

			G1	G2
Ⓗ	LM		HM	
(H)	LM		HM	LM
Ⓗ	LM	Ⓗ	HH	
(H)	LM	(H)	HM	LM
(H)	LM	Ⓗ	HH	LM
Ⓗ	LM	(H)	HM	

For one, this pattern strengthens the arguments that exceptional non-triggers exist (e.g. Smith, 2017). On the other hand, it is highly interesting for theoretical accounts to exceptionality since the floating H's in MM behave differently for two phonological processes. Under an account based on lexically indexed constraints (e.g. Alderete, 2001; Pater, 2009; Finley, 2009), the markedness constraints triggering association of floating H's and H-spreading would exist in two versions: one general one and a higher-ranked one indexed to the B-morphemes. However, that these two independent constraints are indexed to exactly the same class of exceptional morphemes is a mere coincidence under this account. In contrast, I argue that the different behaviour of B- and B'-morphemes simply follows from a representational difference between these two morpheme types.

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 the original proposal, all output elements have the full activity 1: underlying activities hence only have a consequence for evaluating faithfulness constraints. In contrast, it is argued here that elements may retain their (weak) activity in phonological output structures, termed 'Gradient Symbolic Representations in the Output' (=GSRO). The evaluation of markedness constraints can hence be influenced by different activities as well: they are violated/satisfied to a lesser degree if their context is met by weakly active elements. If, for example, a markedness constraint *M is violated by an element /$M_{0.7}$/ that has an activity smaller than 1, *M is only violated by this number. The harmony evaluation in GSRO is formally modeled inside Harmonic Grammar where constraints are weighted, not ranked (Legendre et al., 1990). The exceptional non-triggers in MM exemplify an exceptionality pattern that is only possible in GSRO and not under the original GSR system. In GSRO, they can follow since weak outout elements violate a markedness constraint to a lesser degree and hence do not trigger a repair that is obligatory for fully active elements.

Analysis: I argue that the B-morphemes in MM end in a floating H that is fully active whereas B'-morphemes end in a floating H that is only partially active, represented as the numerical activity 0.5. This weak activity is retained in the output and the weakly active $H_{0.5}$ tones are hence not as bad a problem for *FLOAT penalizing tones that are not associated to a TBU and for *MH penalizing a marked sequence of M followed by H. The latter is assumed to be the trigger for the additional spreading of H's on morphemes that end in M and a floating H: such a sequence is marked but can only be repaired in the context of a preceding floating H since all other repairs (e.g. deletion and insertion of a tone) are excluded by high-weighted constraints. Tableaux T1 and T2 show the contrast between partially and fully active H's for H-spreading. In T1, a fully active floating H follows M and a full violation of *MH arises that has to be repaired via H-spreading (T1-b). In T2, though. The floating H following M is only partially active and *MH is only violated by -0.5. The combined weight of the faithfulness constraints preventing tone spreading is now larger than the weight of *MH and no spreading is triggered. The tableaux also show the different violations of *FLOAT induced by a fully (-1) and a partially active H (-0.5) which predict that only the former always has to associate to a following morpheme. The optionality for the partially active $H_{0.5}$ tones is modeled as the coexistence of two related grammars that are derived by re-weighting a single constraint, namely *FLOAT: A weight of 24 predicts G2 (T1+T2) where B'-morphemes do not trigger H-association whereas a weight of 48 predicts G1 where B'-morphemes cause an additional H (whereas the weight of all other constraints remains identical for G1 and G2). Crucially enough, B'-morphemes never trigger H-spreading; neither in G1 nor in G2.

T1: Spreading triggered by H (G2)

	*MH 24	*F 24	MX 12	DA 10	
a. $H_1\ L_1\ M_1\ H_1$ (σ σ)	-1	-2			-72
b. $H_1\ M_1\ H_1$ (σ σ)	-1	-1	-1	-1	-70
☞ c. $H_1\ H_1$ (σ σ)		-1	-2	-2	-68

T2: No spreading triggered by $H_{0.5}$ (G2)

	*MH 24	*F 24	MX 12	DA 10	
a. $H_1\ L_1\ M_1\ H_{0.5}$ (σ σ)	-0.5	-1.5			-48
☞ b. $H_1\ M_1\ H_{0.5}$ (σ σ)	-0.5	-0.5	-1	-1	-46
c. $H_1\ H_{0.5}$ (σ σ)		-0.5	-2	-2	-56

(*F=*FLOATTONE; MX=MAX-TONE; DA=DEP-ASSOCIATIONLINE)