Stronger and thus more beautiful: The phonological strength of templates

Main Claim: The coexistence of different morphological templates that reflect the same prosodic category but are phonologically different follows if prosodic nodes can have different phonological strength. This strength results in gradient constraint violations and the shape of a prosodic template with more activity is stronger restricted by markedness than one with weaker activity. This predicts an inventory of prosodic templates with implicational markedness differences for every language, borne out in the typology of morphologically distinct templates.

Morphologically distinct templates: Templatic requirements about the prosodic shape of (parts of) a word play an important role in the productive morphology of many languages. Whereas early work in Prosodic Morphology focussed on explicit prosodic specifications for different templates (e.g. McCarthy and Prince, 1986; Archangeli, 1991), the rise of OT (Prince and Smolensky, 1993/2002) allowed a new perspective: Inside a prosodic template, phonological markedness constraints are obeyed that can be violated outside of the template and unmarked structure thus emerges (McCarthy and Prince, 1994; Steriade, 1988; Downing, 2006; Urbanczyk, 2006). This perspective excludes morphologically distinct templates of the same prosodic category in a single language since every instance of the same prosodic node is expected to have the same unmarked shape. There are, however, many examples for languages where different morphological contexts make reference to templates of slightly different shapes. In German, for example, the distribution of many allomorphs follows from referring to different morphological foot templates (Féry, 1991; Wiese, 2000, 2001). The past participle prefix /gə–/, for example, has to be adjacent to a trochaic foot (1a-c). If the base does not start with the main-stressed syllable, a zero-allomorph surfaces instead (1d-f). The allomorphy between the nominalizers /–kʰaɪ̯t/ and /–haɪ̯t/ also makes reference to a foot template: The former only attaches to bases ending in a disyllabic trochee (2a-b), the latter appears elsewhere (2c-d).

(1) Past participle prefix /gə-/ (Wiese, 2001, §4.1.2)

a. gə–ˈzuːxt	‘searched’	gə–$(\text{ˈ}\sigma)_\varphi$	d. ʃmaˈʀɔtst	‘freeloaded’	*gə–$\sigma(\text{ˈ}\sigma)_\varphi$
b. gə–ˈʀeːdət	‘talked’	gə–$(\text{ˈ}\sigma\sigma)_\varphi$	e. tʀɔmˈpeːtət	‘trumpeted’	*gə–$\sigma(\text{ˈ}\sigma\sigma)_\varphi$
c. gə–ˈhaɪ̯ʀaːtət	‘married’	gə–$(\text{ˈ}\sigma\sigma)_\varphi\sigma$	f. dɪskuˈtiːʀt	‘discussed’	*gə–$\sigma\sigma(\text{ˈ}\sigma)_\varphi$

(2) Nominalizing suffixes (Wiese, 2001, §4.1.3)

a. ˈhøːflɪç–kʰaɪ̯t	‘courtesy’	$(\text{ˈ}\sigma\sigma)_\varphi$–kʰaɪ̯t	c. ˈʃøːn–haɪ̯t	‘beauty’	$(\text{ˈ}\sigma)_\varphi$–haɪ̯t
b. gəˈleːʀzam–kʰaɪ̯t	‘eruditeness’	$\sigma(\text{ˈ}\sigma\sigma)_\varphi$–kʰaɪ̯t	d. gəˈʃpant–haɪ̯t	‘tenseness’	σ $(\text{ˈ}\sigma)_\varphi$–haɪ̯t

Crucially, these two foot templates are marked to different degrees: The foot that must be adjacent to /gə–/ can be a mono- or disyllabic trochee but the foot of /–kʰaɪ̯t/ has to be disyllabic. With respect to foot binarity, the former template hence tolerates more marked structures, the latter is restricted to less markedness. Other examples for languages with morphologically distinct templates are Arabic (McCarthy and Prince, 1990; McCarthy, 1993) Chukchansi Yokuts (Guekguezian, 2017), or Southern Sierra Miwok (Broadbent, 1964).

Templates and Gradient Symbolic Representations: Under the assumption of Gradient Symbolic Representations, phonological elements can have different degrees of presence in underlying representations, expressed as numerical activities (Smolensky and Goldrick, 2016; Rosen, 2016). If these different activities can persist into the output (Zimmermann, 2018, to appear), different degrees of markedness for different morphological templates within a language fall out from the different activation of the prosodic nodes that results in gradient violations of markedness constraints. More concretely, an element X_1 with the default activation 1 violates *X by -1 whereas a weakly active element $X_{0.8}$ only induces -0.8 violations and a stronger $X_{1.3}$ even -1.3 violations of *X. In a Harmonic Grammar evaluation (Legendre et al., 1990), different degrees of markedness for the same phonological elements within a language are thus predicted. The different foot templates in German (1+2) fall out from the assumption that

the prefix /gə–/ contains an empty foot node with the activity of 1.5 that licenses the same range of mono- and disyllabic trochees that are attested in German for phonologically predictable feet (default strength=1). The allomorph /–kaɪ̯t/, on the other hand, contains a foot with the even higher activity of 2 and thus only tolerates less marked disyllabic feet. In the analysis in (3), the phonologically predictable suppletive allomorphy in (1+2) falls out from assuming that allomorphs are stored in a preference order and a violable constraint PRIORITY (=PRIO; Bonet, 2004; Bonet et al., 2007) ensures the preference for higher-ranked allomorphs. Both the preferred allomorphs /gə–/ and /–kaɪ̯t/ contain an additional floating foot in their underlying representation that must associate to the segmental material of their base (not to the affix-segments due to ALTERNATION (van Oostendorp, 2007, 2012) prohibiting new association of homomorphemic material) but may never shift the (lexical) stress of the base that was optimized in an earlier stratum (Kiparsky, 2011; Bermúdez-Otero, in preparation). One relevant markedness constraint restricting the shape of feet is FTBIN (Prince and Smolensky, 1993/2002) demanding that feet contain at least two syllables (under the assumption that German is not quantitative-sensitive (e.g. Eisenberg, 1991; Wiese, 2001) – the alternative view (e.g. Féry, 1998; Domahs, 2014) is in principle also compatible with the account). As can be seen in (3), the foot in the underlying representation of /gə–/ still tolerates to be monosyllabic (3i-a): 1.5 violations of FTBIN are not yet enough to override PRIO and justify realization of the dispreferred allomorph /–ø/ (3i-b). The foot in the underlying representation of /–kaɪ̯t/, however, has a higher activation and thus induces an even higher violation of FTBIN if it only dominates one syllable (3ii-a). Realization of the dispreferred allomorph (3ii-b) hence becomes optimal since the FTBIN violation is then only induced by a phonological default foot with the activity of 1. Gradient markedness violations of prosodic nodes can not only account for suppletive allomorphy as in German but also straightforwardly predicts that phonological processes apply to ensure a certain templatic shape. That, for example, the progressive in Chukchansi Yokuts (Guekguezian, 2017) demands an LL template, follows if this affixed foot has the stronger-than-default activity of 1.5 that triggers shortening of initial vowels to avoid *HL iambs but does not yet induce lengthening of the second vowel to create the most unmarked LH iamb. Such an LH template can be found in the gerund which is assumed to be an even stronger foot with activity 2 demanding even more unmarkedness.

(3) *Different feet in German*

	FTBIN 5	PRIO 4	
i. {gə ≫ø}+zu:x+t			
☞ a. gə zu:xt	-1.5		-7.5
b. ø zu:xt	-1	-1	-9
ii. ʃø:n+{ kaɪ̯t≫haɪ̯t}			
a. ʃø:n kaɪ̯t	-2		-10
☞ b. ʃø:n haɪ̯t	-1	-1	-9

Discussion: This account of morphologically distinct templates based on strength of prosodic nodes assigns the explanatory power to independent markedness restrictions of the language, obviating the need for morpheme-specific mechanisms or complex autosegmental treelets. In addition, the account implicationally restricts different templates within one language. If, for example, two different morphological foot templates φ_A and φ_B exist in a language and two markedness constraints C_1 and C_2 are relevant penalizing marked foot structures, it is impossible for φ_A to obey C_1 but not C_2 if φ_B obeys C_2 but not C_1. Gradient activity only allows to predict morphologically distinct feet that have more (=lesser activity) or less (=higher activity) marked structure, it is impossible to predict arbitrary behaviour for different markedness constraints.