Dominance as representational: A reanalysis of A’ingae verbal stress

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Introduction. The verbal stress system of A’ingae (an Amazonian isolate) shows complex stress patterns that are conditioned by the morphological composition of the verb, particularly the stress class and the order of suffixes: recessive, dominant stressless, recessive prestressing, and dominant prestressing. Stress assignment is considered sequential, as evidenced crucially by dominant stressless suffixes that exhibit a process-like exponence and induce the deletion of previously assigned stress, as explained in Dąbkowski (2021). The dominant suffix’s stress deletion (i.e. subtraction) effect and its interaction with other suffixes is hard to analyze in a purely representational account. Hence, previous accounts have appealed to non-representational theories of the phonology–morphology interface, such as Cophonology Theory (e.g. Orgun 1996, Anttila 1997) where morphological processes are associated with different cophonologies, or different constraint rankings in OT terms (see Dąbkowski, 2021, 2024).

Claim. In this paper, I show that a purely phonological account of verbal stress in A’ingae is possible in a theory based on Gradient Symbolic Representations (Smolensky and Goldrick, 2016) where all phonological objects can have a certain degree of activity. With the adoption of gradiently active representations, a single phonological grammar derives all stress patterns in A’ingae by general independently motivated constraints while maintaining the Indirect Reference Hypothesis. The analysis offered here is straighforwardly expandable to other languages with accent subtraction and attraction patterns such as Tokyo Japanese, Vedic Sanskrit, Choguita Rarámuri (Uto-Aztecan), and Coastal Bizkaian Basque. This study is hence a step towards a unified formalisation of accent subtraction and attraction patterns in lexical accent systems.

Data. A’ingae is a lexical stress system that shows culminativity (i.e. at most one stress per word) and contrastiveness in roots and functional morphemes (Dąbkowski, 2021). The default stress is rightmost (penlutimate). However, the location of stress cannot be predicted based on surface properties alone; it depends on the lexical stress properties of the root and suffix classes. The verbal roots form two stress classes: (i) **Stressless roots** are assigned default stress on the penultimate syllable in isolation and with stressless recessive suffixes (1a). (ii) **Stressed roots** show initial stress in isolation and with stressless suffixes (1b+d). Dąbkowski (2021) classifies the suffixes into four classes based on two binary parameters: (i) stressless vs. prestressing, and (ii) recessive vs. dominant. The interaction of suffixes with each other and with the root classes leads to different stress patterns. **Recessive suffixes** do not contribute a stress of their own: in combination with a stressed root, the underlying root stress surfaces (1b), and with a stressless root (and recessive suffixes), default penultimate stress is assigned (1a). **Recessive prestressing suffixes** induce a stress on the syllable preceding the ‘leftmost’ prestressing suffix when combined with stressless roots (1c), whereas they have no effect on stressed roots that realize their underlying stress (1d). **Dominant prestressing suffixes** always assign stress to the presuffixal syllable, regardless of root/suffix types (1e+f). **Dominant suffixes** are stressless in that they have no effect on stressless roots; the word receives the default penultimate or is assigned stress by other suffixes (1g). However, dominant suffixes delete preexisting stress in stressed roots (1h), even nonlocally across other suffixes. With dominant suffixes, stress depends on other suffix types: default stress arises with the recessive, and prestressing occurs with the dominant prestressing; the stress may fall on the dominant suffix (1g). Dominant suffixes feed recessive prestressing: they delete the root stress, making prestressing possible (1h).

(1)	a.	ˈpa^{n}dʑa paˈ^{n}dʑa-ĩ-hi hunt-CAUS-PRCM	b.	ˈko^{n}dase ˈko^{n}dase-ã-hi tell-CAUS-PRCM	c.	paˈ^{n}dʑa-ja paˈ^{n}dʑa-ʔfa-ja hunt-PLS-IRR	d.	ˈko^{n}dase-ja ˈko^{n}dase-ʔfa-ja tell-PLS-IRR
	e.	paˈ^{n}dʑa-ĩ-hama paˈ^{n}dʑa-ĩ-ʔfa-hama hunt-CAUS-PLS-PRCM	f.	aˈfa-hama afa-ẽ-ˈʔfa-hama speak-CAUS-PLS-PROH	g.	paˈ^{n}dʑa-ĩ-je pa^{n}dʑa-ĩ-ˈje–hama hunt-CAUS-PLS-PROH	h.	ˈafa-ʔfa-je afa-ˈje-ʔfa-je tell-PASS-CAUS-PLS

The feeding relation between stress subtraction and other stress effects in A'ingae is used as evidence for cophonologies (Inkelas, 2018). This argument is proved unwarranted below.
Theoretical proposal: All stress patterns in the verbal system of A'ingae follow from differences in the morphemes underlying representations that are enriched with gradient activity, shown in (2). The morpheme classes differ in their vowel and moraic representations that show gradient underlying activity, expressed as numerical activity. The activity differences result in different stress preferences. All morphemes are taken as underlyingly stressless here, hence the **stressless** and the **stressed** roots are termed '**normal**' and '**strong**', respectively.

(2)

Normal Rt	Recessive	Strong Rt	Dom Prestressing	Rec Prestressing	Dominant
μ_1 V_1	μ_1 V_1	μ_1 V_4	$\mu_{0.6}$ V_6	$\mu_{0.8}$ V_1	μ_{20} V_1

A single phonological grammar derives all stress preferences in A'ingae from two principles: Ⓐ competition between gradiently active morphemes for stress attraction, and Ⓑ a rightmost preference for stress realisation. Ⓑ captures the default penultimate stress while also enforcing a rightmost threshold effect where the stress cannot not fall too far from the word's right edge. Implementation of these principles is possible in a model where constraints are weighted not ranked, namely Gradient Harmonic Grammar (GHG, Legendre et al. 1990). GHG derives the different interactions of Ⓐ and Ⓑ which lead to different stress patterns from independently motivated constraints. Based on Ⓐ gradient vowels and moras compete and the stronger ones win the stress. More concretely, (i) the stronger vowels 'win the foot' by being parsed as the foot head or tail. This is captured by PARSE φ that is sensitive to vowel activities and penalises unfooted vowels by their activity level. (ii) The stronger mora 'wins the stress', i.e. is parsed as the head of the foot, captured by *STRESS WEAK. The constraint penalises stress on weak moras by their activity. Principle Ⓑ is captured by ALIGN R φ that is sensitive to μ activities; it penalises moras intervening the word's right edge and the foot by the sum of morae activities. The constraint also derives the default stress in A'ingae which is a right-aligned trochaic foot. Interactions of these three constraints in deriving different stress effects are illustrated in the tableaux below. General high-weighted constraints are excluded here for space reasons, e.g. CULMINATIVITY, FOOT BINARITY, and TROCHEE. As (3+4) show, the **dominant prestressing** is strong in its vowels (**V_6**) that should be footed under PARSE φ, while it is weak on the morae (**$\mu_{0.6}$**) that repel the foot head due to *STRESS WEAK. The compromise is the suffix parsed as the 'foot tail', resulting in prestressing even with a **strong root** (4). The subtraction effect of the **dominant** suffix is driven in (5+6) mainly by the strong **μ_{20}** crossing the rightmost threshold, i.e. violating ALIGN R too much when the foot precedes the suffix (5b+6b). The subtraction effect's apparent feeding of the prestressing (6) and default patterns (5) by the subtraction suffix is the confluence of FULL $\acute{\mu}$ and ALIGN R in the parellel account presented here. The same constraints derive the different of stress patterns in A'ingae verbs which are highly suffixing and complex.

Rt: $\mu_1 V_1$, Strong Rt: $\mu_1 V_4$, Dom prestressing: $\mu_{0.6} V_6$

	Input= stressless	*STRESS WEAK 6	PARSE φ 1	ALIGN R 0.3	
☞	3a. $\mu_v\mu_v(\acute{\mu}_v\mu_v)\mu_v$		8	0.6	8.18
	3b. $\mu_v\mu_v\mu_v(\acute{\mu}_v\mu_v)$	1.2	3		10.2
☞	4a. $\mu_v\mu_v(\acute{\mu}_v\mu_v)\mu_v$		11	0.6	11.18
	4b. $(\acute{\mu}_v\mu_v)\mu_v\mu_v\mu_v$		13	2.2	13.66

Rec prestressing: $\mu_{0.8} V_1$, Dom: $\mu_1 V_{20}$, Rec: $\mu_1 V_1$

	Input= stressless	*STRESS WEAK 6	PARSE φ 1	ALIGN R 0.3	
☞	5a. $\mu_v\mu_v\mu_v(\acute{\mu}_v\mu_v)$		6		6
	5b. $(\acute{\mu}_v\mu_v)\mu_v\mu_v\mu_v$		22	3	22.9
☞	6a. $\mu_v\mu_v\mu_v(\acute{\mu}_v\mu_v)\mu_v$		26	0.8	26.24
	6b. $(\acute{\mu}_v\mu_v)\mu_v\mu_v\mu_v\mu_v$		44	3.6	45.08
	6c. $\mu_v\mu_v\mu_v\mu_v(\acute{\mu}_v\mu_v)$	1.6	45		54.6