Sonority-driven stress in Paiwan: phonological or phonetic factors?

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Sonority-driven stress (de Lacy 2004) or quality-sensitive stress (Kenstowicz 1997), in which vowel sonority/quality affects the location of stress within the metrical domain, can be observed in languages such as Kobon (Davies 1981), Takia (Ross 2002) and many others. The analyses of this stress type are mostly built on phonological grounds, involving metrical peak- or trough-specific constraints (Kenstowicz 1997, de Lacy 2004); however, Hargus (2001) considers such stress to be conditioned by phonetic factors, mainly durational difference of vowels. This paper investigates the sonority-driven stress pattern in Paiwan, and shows that peak-specific phonological constraints decide the location of stress; however, when the two vowels in the metrical domain are equally bad, a phonetic constraint sensitive to duration is then activated.

Paiwan is an Austronesian language spoken in the southern mountainous area of Taiwan. The data in this study are collected from two village dialects of Paiwan, Piuma and Kazangiljan, which differ from most Paiwan dialects in the assignment of stress. Stress in Piuma (Chen 2006) and Kazangiljan Paiwan favors peripheral vowels [i u a] over central schwa [ə] within the two syllables at the right edge, while stress in most Paiwan dialects is regularly penultimate (Ho 1977, Ferrell 1982). For words without the central vowel schwa [ə], the natural, unmarked pattern is penultimate, as shown in (1). Stress shifts to the final syllable when the penultimate nucleus is a schwa and the final one a peripheral vowel, as shown in (2). Stress never seeks out /ə/ if any peripheral vowel /i u a/ is available. Strangely, stress falls on the ultima when identical schwas occur within the domain such as *CəCə́C*, as shown in (3), whereas the unmarked penult stress is assigned when identical peripheral vowels appear in the domain, as in (4).

In an Optimality-Theoretic account, a fixed hierarchy of peak-specific constraints referring to the peripheral/central distinction (Kenstowicz 1997, de Lacy 2004) are employed, e.g. *PEAK/*ə* >> *PEAK/ *i, u, a*, showing that stress prefers peripheral vowels over schwa in the foot. When no central vowel schwa is involved, penultimate stress is the most unmarked pattern. The constraint ranking so far works: ALL-FT-R, TROCHEE >> *PEAK/*ə* >> FT-BIN, *PEAK/ *i, u, a*. Nevertheless, it fails to account for the occurrence of final stress rather than penultimate stress in words with both schwas. This knot can be disentangled by simply adding a phonological constraint *FT/*ə*, to ban schwas in feet; however, this study suggests a solution based on phonetic grounds—vowel duration. A primary phonetic measurement shows that the duration of a vowel is longer word-finally than that of the identical phoneme in the penultimate syllable, even when the penultimate vowel bears stress. Therefore, a

phonetic constraint avoiding stress on a shorter schwa is needed, overriding the unmarked penultimate stress when both vowels in the foot are schwas. To sum up, this study displays the pattern of sonority-driven stress in Piuma and Kazangiljan Paiwan, and provides a possible account which employs both phonological and phonetic constraints. The fixed ranking of peak-specific constraints predicts the preference for stressing peripheral vowels over the central one, and the phonetic constraint favoring final longer schwa overwhelms the unmarked stress pattern in words with two schwas in the foot. Thus, phonological and phonetic factors run parallel in the stress assignment of these two Paiwan dialects.

(1) General penultimate stress

a.	[k**í**.na]	'mother'	e.	[p**á**.naq]	'bow and arrow'
b.	[ɭ**á**.vu]	'ash'	f.	[sa.v**í**.ki]	'betel nut'
c.	[q**í**.ɭas]	'moon'	g.	[ku.ɭ**á**.vaw]	'rat'
d.	[v**á**.ɭi]	'wind'	h.	[t͡sa.ɭ**í**.ŋa]	'ear'

(2) Final stress with penultimate schwa

a.	[va.kə.ɭ**á**]	'arrow'	c.	[cə.v**ú**s]	'sugarcane'
b.	[kə.r**í**]	'small'	d.	[t͡su.qə. ɭ**áʌ**]	'bone'
e.	[qa.pə.d**ú**]	'gall'	f.	[qə.ʀ**íʌ**]	'sparrow'

(3) Final stress with both schwas

a.	[ɭə.ʌə́t]	'lip'	c.	[t͡sə.kə́**ʌ]**	'spouse'
b.	[və.t͡sə.qə́ɭ]	'short necklace'			

(4) Unmarked penultimate for identical peripheral vowels

a.	[ka.má.ja]	'mango'	c.	[ɭ**ú**.kut͡s]	'bird's nest fern'
b.	[sa.ɭ**í**.ɭim]	'midnight'			

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