Weight-sensitive prosodification of prefixes in Karuk

Sandy (2017) describes Karuk (isolate, California) prefixes as belonging to one of two categories, cohering or non-cohering. Looking at recordings from an online corpus, we find that this categorization is largely accurate, but there are a number of interesting divergences from Sandy's description. Most notably, the only prefix which underlyingly contains a long vowel, *kii(k)-*, unexpectedly receives high tone. We propose that this reflects syllable-weight-sensitive prosodic word edge placement (Kumaran 2023).

Background. Karuk stress is described and analyzed in detail by Sandy (2017). Words bear a low initial tone, a span of high tone through the stressed syllable, and low tone afterwards (1). If the initial syllable is stressed this overrides the initial tone (2). Similarly, a final stressed syllable receives high tone (3).

(1)	nanichíshiih L H H L 'my dog'	(2)	sáanfuruki H L L L 'bring it in!'	(3)	'akváat L H 'raccoon'

In derived words lacking input tone, stress precedes the rightmost heavy (= containing a long vowel) syllable. If the only heavy syllable is initial, stress is initial. Otherwise stress is penultimate (else on a monosyllable). Accordingly, Kumaran (2023) hypothesizes that stress is preferentially penultimate within the prosodic word (ω) and ω's right edge preferentially aligns with a heavy syllable. as shown in (4).

(4)

/kunpaxeepayaachha/	StressPenult$_\omega$	$^*\sigma_{\text{light}}]_\omega$	AlignEdge$_\omega$
→ [kun.pa.xee.**pá**.yaach.]$_\omega$ha			*
[kun.pa.xee.pa.**yáach**.ha]$_\omega$		*	

Sandy classifies some verbal prefixes as *cohering*, i.e. inside the stress domain (the prosodic stem, PStem); the other prefixes are non-cohering, i.e. outside PStem. This is relevant when the stem is monosyllabic or its sole heavy syllable is initial ('contexts C'). In contexts C, cohering prefixes receive stress (5), in accordance with the regular stress pattern, but non-cohering prefixes do not (6). Sandy posits a PStem layer distinct from ω due to the (claimed) lack of low tone at the edge of the PStem in cases like (7).

(5)	[$_\omega$ [$_{\text{PStem}}$ nápar]] H L 'you bite me'	(6)	[$_\omega$ nu [$_{\text{PStem}}$ pár]] L H 'I bite you'	(7)	[$_\omega$ kun [$_{\text{PStem}}$ ipítih]] L H H L 'they say' (Sandy's claim)

Method. We evaluated Sandy's analysis based on audio data from the *Ararahih'urípih* corpus (linguistics.berkeley.edu/∼karuk). We identified recordings of the prefixes appearing in the relevant environments (a total of 199 tokens). We manually annotated each verb for tone in Praat, relying primarily on inflection points in the pitch track and comparison with surrounding high tones. Tokens with clear pitch were annotated no matter what – we simply relied on our judgment in difficult cases. Despite the noise and uncertainty inherent to this appoach, we feel that we obtained compelling results.

Cohering vs. non-cohering is real; *ta=* is special. Light prefixes behave as expected in contexts C: Sandy's 'non-cohering' prefixes receive low tone and 'cohering' prefixes receive high tone, as shown below.

non-cohering prefix	count	count with L tone
i-	2	2
ku-	2	1
kun-	8	7 (+1 HL)
ni-	16	13
nu- (basic)	15	13
u-	5	3
total	48	39 (+1 HL)

cohering prefix	count	count with H tone
kan-	1	1
kin-	1	0
na-	8	8
nu- (optative)	3	3
total	10	9

Of the 9 counterexamples in the tables above, 7 are preceded by perfective *ta=*. *Ta=* displays additional idiosyncrasies: with glottal-stop-initial stems, coalescence between *ta=* and a vowel-initial prefix unexpectedly fails to occur (8 instances in the dataset); when coalescence *does* occur, unexpected stress appears (more on this below). Overall, then, we can conclude that the cohering / non-cohering classification is robustly supported by the data – though Sandy's description has overlooked the prosodic effects of *ta=*.

PStem = ω. In contexts like (7), the predicted rise in tone on the second syllable fails to occur in 7 of 8 instances, suggesting that non-cohering prefixes are excluded from ω, and the PStem layer is unnecessary.

Heavy prefixes show unexpected stress. One prefix underlyingly contains a long vowel: *kii(k)-*. When preceded by /a/, *u-* and *i-* surface as *oo-* and *ee-* due to coalescence. Sandy states that these 3 prefixes are non-cohering (and that coalescence does not affect stress), yet they mostly receive H tone in contexts C:

'non-cohering' prefix	count	count with H tone	count with stem-initial L tone
kii(k)-	9	9	8 (+1 HL)
ee-	7	7	0
oo-	14	9	3
total	30	25	11 (+1 HL)

It seems to be the case that *kii(k)-* coheres with the stem. As predicted for a cohering prefix, it receives H tone and the stem receives L tone. (Incidentally, this a welcome finding, because it means coheringness is morphosyntactically predictable (contra Sandy 2017, 2018): all and only negative, optative, and Σ-insensitive prefixes (in Kumaran's (2021) terms) can cohere.) The coalesced prefixes, though, do not seem to cohere: the stem generally contains high tone even if the prefix has high tone too, indicating that the prefix and stem form two separate ωs. It seems that long vowel allows them to optionally form a seperate ω (Karuk ω is minimally bimoraic, BinMin (Sandy 2017)). Returning to *kii(k)-*: *outside* of contexts C, it bears H tone (unlike light prefixes) in 12 of 13 instances, 11 of which show H tone in the stem, i.e. *kii(k)-* forms a separate ω. We extend (4) to account for this, as shown below. (SP = StressPenult.)

/kun-paxeepayaachha/	SP(ω_{STEM})	BinMin$_\omega$	$^*\sigma_{\text{light}}]_\omega$	PREFIX=ω	Align(ω, STEM)
→ kun.[pa.xee.**pá**.yaach.]$_\omega$ha				*	*
[kun.pa.xee.**pá**.yaach.]$_\omega$ha				*	**
[**kún**.]$_\omega$[pa.xee.**pá**.yaach.]$_\omega$ha		*	*		

/kiik-paatvi/	SP(ω_{STEM})	BinMin$_\omega$	$^*\sigma_{\text{light}}]_\omega$	PREFIX=ω	Cohere$_{kii(k)\text{-}}$	Align(ω, STEM)
→ [**kíik**.paat.]$_\omega$vi				*		**
[**kíik**.]$_\omega$[**páat**.]$_\omega$vi	*				*	*
[**kíik**.]$_\omega$[**páat**.vi]$_\omega$			*		*	

/kiik-pikaan/	SP(ω_{STEM})	BinMin$_\omega$	$^*\sigma_{\text{light}}]_\omega$	PREFIX=ω	Coh.$_{kii(k)\text{-}}$	Align(ω, STEM)
[**kíik**.pi.]$_\omega$kaan			*	*		**
[kiik.**pí**.kaan]$_\omega$				*		*
→ [**kíik**.]$_\omega$[**pí**.kaan]$_\omega$					*	

In contexts C, either the stem is monosyllabic or its only long vowel is initial, meaning non-initial syllables are excluded from ω. Augmenting ω with the prefix therefore has an advantage: it allows stress to be penultimate within the stem's ω. In other environments, though, the stem lacks this deficiency, freeing up *kii(k)-* to prosodify separately. (Prefixes prefer to be separate words, PREFIX=ω, e.g. Peperkamp 1997.)

Selected references. Kumaran, Elango. 2023. Adjustable word edges and weight-sensitive stress. Proceedings of *AMP 2022* 10:5457. Sandy, Clare S. 2017. Prosodic Prominence in Karuk. Doctoral dissertation, UC Berkeley. Sandy, Clare S. 2018. The role of morphosyntax in Karuk prefix accentability. *SSILA*.