YUROK SYLLABLE WEIGHT[1]

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This paper examines syllable weight in Yurok, a highly endangered Algic language of northwestern California. A productive truncation process has only a two-way weight contrast between light and heavy syllables, shortening nouns to a bimoraic word minimum, CVV or CVC. Within the prominence system, however, CVV and CVC syllables must be distinguished. Syllables with long vowels in Yurok always attract stress and are realized with a steady high pitch on the stressed syllable, while CVC syllables do not attract stress. Additional issues addressed include the syllabification of preglottalized sonorants and laryngeal codas.

[KEYWORDS: Yurok, syllable weight, truncation, stress]

> And once I asked my father what did *Okā* mean? Was it the same as *kāmuks* (bastard)? Then my father said that his teaching did not go so far as that, but he thought that I must be right.
>
> —Robert Spott (Spott and Kroeber 1942:226)

1. Introduction. Yurok is a highly endangered language of northwest California whose stress patterns and prosody have yet to be described. In this paper, I examine a productive truncation process and predictable nominal stress patterns, arguing for two distinct but compatible systems of syllable weight in Yurok. A productive truncation process has only a two-way weight contrast between light and heavy syllables, shortening nouns to a bimoraic word minimum, CVV or CVC. Within the prominence system, however, CVV and CVC syllables must be distinguished. Syllables with long vowels in Yurok always attract stress and are realized with a steady high pitch on the stressed syllable. In the absence of long vowels, closed syllables may carry word stress and, in their absence, light (CV) syllables can be

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stressed. For stress, then, there are three degrees of syllable weight: the heaviest syllables, which contain long vowels; heavy syllables which are closed but have short vowels; and light open syllables. Truncation supports a bimoraic word minimum, with the stress rule and its tonal component further differentiating subclasses of bimoraic syllables. Additional issues addressed include the syllabification of pre-glottalized sonorants and laryngeal codas.

The transcription system used here is phonemic. Symbols have their approximate IPA values, with the following exceptions: *kw* = [k^{w}], *k'w* = [k'^{w}], *c* = [tʃ], *c'* = [tʃ'], *hl* = [ɬ], *s* = [ʂ] ([ʃ] /*i*__), *g* = [ɣ], *'* = [ʔ], *y* = [j], *r* = [ɻ], [ɚ] (nonsyllabic in the margin, syllabic in the nucleus); long vowels are written as doubled letters.[2] The consonants are: voiceless stops /p, t, k, kw/; glottalized or ejective stops /p', t', k', k'w/; affricates /c, c'/; voiceless fricatives /s, hl, x/; plain voiced sonorants /m, n, l, r, w, y/; preglottalized sonorants /'m, 'n, 'l, 'r, 'w, 'y/, laryngeal glides /', h/, and the voiced velar fricative /g/. The vowels are short /i, u, e, o, a, r/, and long /ii, uu, oo, aa, rr/.[3] Syllable breaks are marked with a period. Primary word stress is marked with an acute accent, and secondary stress with a grave accent, except that secondary stress on *r* is marked with a hacek. Predictable high pitch is not transcribed.

The primary published data sources for this study are Kroeber (1911), Waterman (1920), Spott and Kroeber (1942), Robins (1958), Berman (1982*a*), Sapir (2001), and Exline (n.d.). The primary unpublished data for this work comes from my 2001–2002 fieldwork with the six speakers mentioned in footnote 1, which consists primarily of elicitations but also includes spontaneous speech. Unmarked data are from my own fieldwork; in many cases the same forms were confirmed by two or three different speakers and also occur in published sources. As a potential check on my early

[2] The orthography used here follows Robins (1958), with the following exceptions: Robins's *i*·, *u*·, *o*·, *a*· are written as *ii*, *uu*, *oo*, *aa*; Robins's *ɻ*, *ɻ*· are written as *r*, *rr*; Robins's *š*, *ł* are written as *s*, *hl*; Robins's *k*^{w}, *k'*^{w} are written as *kw*, *k'w*. Note that here, orthographic *r* represents both a central rhotic vowel (*krhl* 'earring', *mrrk* 'crane') and a rhotic consonant (*raak* 'creek', *hipur* 'downriver'). The substitution of *r* for Robins's "turned r" is made for practical typographical reasons and does not imply phonemic identity between syllabic and nonsyllabic instances of *r*. Phonetic values associated with vowels are highly variable, especially for short unstressed vowels.

[3] For a discussion of the relationship between short /e/ and /a/, /aa/, see Blevins (forthcoming). For a sketch of Yurok phonology, see Robins (1958:1–15). The laryngeal glides /', h/ have a special phonological status in Yurok. In some cases, they are the result of a regular sound change inserting /h/ before voiceless stops and /'/ before ejectives (Berman 1981). In addition, /h/ undergoes sandhi when preceded by vowels within the phonological word, while /'/ gives rise to translaryngeal vowel harmony. Finally, nouns and nonattributive verbs cannot end in vowels, resulting in regular, word-final /h/ or /'/.

transcriptions of stress and vowel reduction, which was not described by Robins (1958), I compared my own notes with some of the unpublished fieldnotes of A. L. Kroeber, M. Haas, E. Sapir, and W. Bright. In most cases where primary stress was marked, all linguists were in agreement about its location. In addition, in phonetic transcriptions, all linguists had ways of indicating reduced vowels in unstressed syllables. As a final check on patterns of stress and reduction, I listened to field recordings made by R. H. Robins and W. Bright (see n. 1), which include texts and spontaneous speech. In general, the patterns I heard in running speech were consistent with those of the modern language, and with the descriptions I provide below.

Four distinct dialects of Yurok are mentioned in Kroeber (1911): three coastal dialects and one river dialect. However, very little is known about coastal dialects, and all speakers contributing to this study speak "river" Yurok. Within the river dialect described here, differences among speakers include the phonetic realization of glottalized sonorants, differences in the distribution of short /e/ and /a/, distinct thematic vowels within verbal inflectional paradigms, and sandhi phenomena before /h/-initial words. A useful summary of differences between a speaker of an upriver dialect and a speaker from Requa, at the river mouth, is provided by H. Berman in Sapir (2001:sec. 5). As far as I am aware, the syllabification, truncation, and prominence patterns described in this paper do not vary significantly across speakers or dialects. Given the limited data on coast dialects, however, it would be best to regard this description as holding for river Yurok only.

2. Syllables and syllabification in Yurok. Apart from the prosodic phenomenon to be discussed in this paper, there is independent evidence for syllables and syllabification in Yurok. Native speakers have little problem identifying the number of syllables in a word, and when asked to speak slowly, they naturally break words into component syllables. Of particular note is the fact that speakers who break words into syllables in slow speech are consistent in where they pause. In addition, several writing systems in use by the Yuroks, including Unifon and the current Yurok Writing System, mark syllable breaks with hyphens. In these systems, no one has taught the users where to put the hyphens, so we can assume that these represent some natural structure within the spoken word. Exline (n.d.) contains hundreds of Yurok words in Unifon, with syllable breaks marked, and *To the American Indian* by Lucy Thompson (1991, first published in 1916) contains over 150 hyphenated words and phrases in her own orthography. When syllable breaks are marked in this paper, then, they are based on slow speech and

writing. Since these breaks are consistent across speakers, they are taken to reflect a significant aspect of Yurok sound structure.[4]

The general rules of syllabification in Yurok are fairly simple. There are no onsetless syllables. All words begin with a nonsyllabic element (a consonant or glide) and medial VCV sequences are syllabified V.CV. Intervocalic biconsonantal clusters are heterosyllabic, so medial VCCV is syllabified VC.CV. A limited number of complex onsets and complex codas are allowed word-initially and word-finally, respectively; however, medial CCC clusters are rare and are most often the result of root/stem compounding or reduplication, maintaining the root/stem syllabification. In stressed open syllables, the following consonant can be somewhat lengthened: VCV > VC:V. This gemination, most common in sonorants, is sometimes written (e.g., by Thompson 1991 [1916] and Spott and Kroeber 1942) or represented by CVC-V syllabification in this context (Exline, n.d.).

3. Yurok truncation. A seemingly productive truncation process reduces multisyllabic nouns (including proper nouns) to monosyllables.[5] The first description I have found of this process is in Waterman (1920). He notes that: "Place names are often shortened in composition, or become

[4] It is true that some writers of Yurok have had exposure to English writing and its arbitrary conventions of syllabification. However, it is doubtful that this has had an effect on how Yurok is written by those with Yurok as a first language since (*i*) syllabifications are consistent with syllable-by-syllable slow speech (including the speech of those with rudimentary literacy skills) and (*ii*) syllabifications appear to be consistent across native speakers. As far as I am aware, there is no Yurok tradition, or clarification, which informs the properties of slow speech. It is this slow speech which appears to be the basis of the placement of hyphens in Unifon and in the writing system devised by Lucy Thompson. I have observed the use of hyphenation in both Yurok language classes and master-apprentice sessions, and in both settings, hyphenation was based on slow speech, uttered in a syllable-by-syllable fashion. In a few places Exline (n.d.) deviates from this practice; one is where the hyphen is used to mark the boundary between verb stem and inflectional suffixes.

Unifon, an alphabetic system, was introduced to the Yurok in the late 1960s. Hyphens were used to mark syllable breaks, but where these breaks occurred was left to native-speaker intuition. See Hinton (1994:215–18) for more on the history of Unifon in northwestern California.

[5] Shortened verbs are the result of a distinct morphological truncation rule. Yurok verb stems are composed of initials, medials, and finals (Proulx 1985). Truncated verbs (referred to by Robins [1958] as "uninflected verbs") are verbs which lack finals and therefore cannot be inflected. Some of these uninflected stems have lost segments due to regular phonological changes (Garrett 2002). For example, the verb *kaam-un-ow-* 'grow badly' consists of an initial *kaam-* 'bad, evil', a medial *-un-* 'grow', and a final *-ow-* 'do, act, be'. An inflected form of *kaam-un-ow-* is *kaamunowok'* 'I am growing badly', while the uninflected truncated form is *kaamun.* Notice the contrast between this short form, which is disyllabic, and the nominal truncations discussed below, which are all monosyllabic. In this paper, I focus on the nominal truncation and stress system.

otherwise modified. Whether or not this modification is due to the dropping off of endings, I cannot say" (Waterman 1920:199). "Place names, when used in this way, as terms of address and in combination with suffixes, are curiously clipped.[6] I can only refer to this clipping, without attempting to explain it" (Waterman 1920:217). A later description can be found in Robins (1958:28):

> Some nouns have a shorter form which occurs only with the pronominal prefixes. . . . Within this class in one set of nouns the two forms alternate in free variation, though the shorter form is more common. . . . Generally the shorter form consists of the first syllable of the nonprefixed longer form, sometimes with the initial consonant of the second syllable. In a few cases, however, there are slight differences.

In my own fieldwork, I have found that short forms are extremely common. They occur with and without pronominal prefixes, and appear to obey only a single pragmatic restriction. According to the native speakers I worked with, short forms are only used when the listener already knows what the speaker is talking about.[7] One speaker referred to them as "handy abbreviations."

In (1), I give examples of short forms with the longer forms from which they are derived. In (1*a*) and (1*b*), short forms consist of the first C(C)VC sequence of the long form, while in (1*c*) words are truncated to the initial C(C)VV of the long form.[8] A preliminary analysis of this word formation process is the satisfaction of a bimoraic syllable template, treating both VC and VV rhymes as bimoraic. Truncation is expressed in (2). Long forms become short forms by mapping the heavy syllable template in (2) to the beginning of the unprefixed word. Notice that the CVC syllables which result from truncation can be distinct from input syllabifications, which contain word-initial CV syllables (2*a*).

(1) Short forms

	Short Form	Long Form	Gloss
(1*a*)	*cel*	*ce.lo.gaa.pihl*	'rib(s)'
	cin	*ci.no.me.wes*	'young man'
	c'ig	*c'i.gol*	'saliva, foam'

[6] Personal names in Yurok are often of the form 'Y of X', where Y is a designation of a person (man, woman, widow, widower, old man, old woman, etc.) and X is a village, settlement, or house name. As a consequence, shortened forms of place-names sometimes occur inside of personal names.

[7] This was the most salient aspect of elicitation sessions with these forms. After every few short forms, I would hear "yes, I can say that—as long as you know what I'm talking about."

[8] Stem-internal long vowels are less frequent in Yurok than short vowels, and many appear to be of fairly recent origin, as a result of loss of glottal stop between identical vowels (Garrett 2001).

	c'is	*c'i.sah*	'dog'
	lek	*le.ki.tah*	'back (of body)'
	lew	*le.wet*	'net'
	mic	*mi.cos*	'brother'
	rur	*ru.ro.woo*	'song'
	tekw	*te.kwo.nekws*	'box'
	tep	*te.poo*	'tree'
	wey	*we.yec*	'sister of man'
	wrhl	*wr.hlry*	'tail'
(1*b*)	*k'ep'*	*k'ep'.c'em*	'daughter-in-law'
	mehl	*mehl.kwehl*	'cane'
	mes	*mes.kwoh*	'medicine'
	mrw	*mrw.prh*	'lunch, packed food'
	pek	*pek.cic*	'thread, string, rope'
	pop	*pop.sew*	'bread'
	sar	*sar.kew*	'pitchy gum'
	sec	*sec.kes*	'dried strip of salmon'
	skry	*skry.trk'w*	'woman's dress'
	trkw	*trkw.trm*	'dentalium shell'
	wen	*wen.cokws*	'woman'
	'wes	*'wes.kwe.loy*	'life'
(1*c*)	*paa*	*paa.goh*	'brother (of a man)'
	trr	*trr.kun*	'head of fish'
	woo	*woo.mehl*	'acorn'
	haa	*haa.lop*	'clear pitch'
	roo	*roo.tah*	'sunray; time'

(2) Yurok truncation

Word = [μ μ]σ

Truncation, as formulated in (2), has interesting implications for several problematic issues in Yurok phonology. First, it allows us to clarify the status of syllable-final /h/. The general surface distribution of *h* in Yurok might lead one to question its phonemic status: *h* contrasts with glottal stop in initial, medial, and final positions but not with zero in any of the same positions. In addition, syllable-final *h* is, to a great extent, predictable in Yurok nouns and verbs: *h* is found after stressed short nonhigh vowels *a/e, o, r* before voiceless stops (Berman 1981), and word-finally after the same vowels.[9] Is the syllable-final aspiration which occurs after short nonhigh

[9] The surface tautosyllabic sequence *eh* does not occur in Yurok. Blevins (forthcoming) shows that *ah* is from *eh*, via a regular lowering rule. There are a few exceptions to the generalizations

vowels preaspiration of the following consonant, phonetic aspiration of the mid vowel, or does /h/ function as an independent consonant in these contexts? The data in (3) suggest that not only is /h/ an independent segment in preobstruent position, but also that it constitutes a mora for the purposes of the truncation rule. Notice that in the case of *'lah* 'plate', from *'lahp.sew*, the short form is a substring of the original word-initial syllable.

(3) Short forms with final /h/

Short Form	Long Form	Gloss
cah	*cah.kwoh*	'trousers'
'lah	*'lahp.sew*	'plate'
lrh	*lrh.pr.yehl*	'drool, spittle'
nrh	*nrh.pry*	'berry'
pah	*pah.tun*	'neck'
toh	*toh.pew*	'hole'
'ah	*'ah.ke.coyp'*	'thorn, prickle'

Yurok truncation also provides evidence for the segmental status of glottalized sonorants. Yurok has ejective or glottalized obstruents and glottalized sonorants. Glottalized sonorants are phonetically preglottalized, with audible glottal stop or creak on the preceding vowel before the oral articulation of the sonorant, which is often voiceless syllable-finally. Preglottalized sonorants surface with preglottalization only in postvocalic position. Elsewhere they are neutralized to plain sonorants. Compare the phonological words [yoc] 'boat', [ne'yoc] 'my boat', and ['o'ne'yoc] 'at my boat'. The stem /'yoc/ surfaces with initial preglottalization when it is preceded by a vowel within the phonological word. The same is true for the first-person pronominal prefix /'ne-/, which surfaces with preglottalization when preceded by vowel-final particles like /'o/ 'locative', but elsewhere without glottalization.[10]

Several morphological processes suggest that glottalized sonorants are single segments with the same monosegmental status as ejective obstruents. For example, in the indicative paradigm, third-person singular is marked in *e*-class and type 1 *o*-class verbs by regular laryngealization of the stem-final consonant. Under this process, stem-final plosives show up as ejectives in third singular forms, while sonorants surface with preglottalization.

noted in the text. Compare, for example, *slekwoh* 'shirt' with *srahkwoh* 'loincloth', *cahkwoh* 'trousers'. The expected form is ***slahkwoh*, with a laryngeal increment and vowel lowering. See Berman (1981) for a detailed discussion of Yurok laryngeal increments.

[10] In Robins's orthography, these stem-initial glottalized sonorants are written with parentheses around the glottalization ('), while in the present system they are written without parentheses. The segmental status of glottalized sonorants and their unique syllabification, discussed briefly below, is analyzed in Blevins (2002*b*).

Some examples are shown in (4) for obstruent- and sonorant-final *e*-class stems. For other morphological processes which treat glottalized sonorants as single segments, see Blevins (2002*b*).

(4) Glottalization in third singular indicative *e*-class verbs

Stem	First Singular	Third Singular	Gloss
ciweyet-	*ci.we.ye.tek'*	*ci.we.yet'*	'to crave'
ro'op-	*ro.'o.pek'*	*ro'op'*	'to run'
ciwey-	*ci.we.yek'*	*ci.we'y*	'to be hungry'
holim-	*ho.li.mek'*	*ho.li'm*	'to weave (baskets)'

Truncated forms with medial glottal stop or glottalized sonorants are shown in (5). The truncation data in (5) are consistent with an analysis of preglottalized sonorants as single segments. Where glottal stop is prevocalic, as in (5*a*) and (5*b*), or precedes an obstruent, as in (5*c*) and (5*d*), it functions as an independent segment, closing the preceding syllable. However, where it precedes a sonorant, as in (5*e*)–(5*g*), glottalization behaves as a feature of that sonorant and the entire glottalized sonorant is enlisted to close the syllable in the truncated form. Compare the short forms in (5) with those in (3), where *hC* is not found in truncated forms.

(5) Short forms with final glottalization

	Short Form	Long Form	Gloss
(5*a*)	*wo'*	*wo.'o.mehl*	'shelled acorn'
(5*b*)	*ka'*	*ka'a'n*	'blanket'
(5*c*)	*'wr'*	*'wr'hl.pi.trk*	'root'
(5*d*)	*kya'*	*kya'hl.'oo'*	'ulcer, sore'
(5*e*)	*cne'w*	*cne'w.k'wos*	'son-in-law'[11]
(5*f*)	*ke'm*	*ke'mow*	'food'
(5*g*)	*'o'l*	*'o'lehl*	'house'

Notice that I have omitted syllabification from the long forms of (5*f*) and (5*g*). This is because native-speaker syllabifications show consistent syllabification of intervocalic preglottalized sonorants as clusters. Where intervocalic glottalized sonorants occur, the surface syllabification shows a glottal stop closing the first syllable, with the sonorant functioning as onset of the following syllable. As noted earlier, syllabifications are those found in slow syllable-by-syllable speech and in syllable-based writing. Some examples are given in (6). In (6), the first column shows the syllabification given in Exline (n.d.), while a check mark (√) in the second column indicates an attested slow speech form with the same syllabification. Items without check marks are, thus far, unattested in slow, syllable-by-syllable speech.

[11] Robins (1958) and Berman (1982*a*) have *-cnewk'wos* as the long form, but my interpretation of Exline's (n.d.:214) transcription is *cne'wkw'os.*

(6) Syllabifications of preglottalized sonorants[12]

Exline	Attested in Slow Speech	Gloss
to'.woh	√	'enough'
ko'.mi	√	'excessively'
me'.re.po.yoh		'file (a tool)'
ne.pe'.wis	√	'fish'
nahc.pu.me'.moh		'we allow'
noo'.rep'	√	'he follows'
me'.yehl		'nettles'
we'.yo.nes-	√ (*we'.yon* 'young woman')	'to offer a bride price'
he'.log-		'to stir food with a paddle'
he'.mi'	√	'pigeon'

Blevins (2002*b*) demonstrates that the syllabifications in (6) can be predicted from syllabification algorithms which are derived from surface word-edge phonotactics. Recall that preglottalized sonorants are neutralized to plain sonorants in word-initial position. As a result, no Yurok words begin with preglottalized sonorants. In addition, no Yurok words begin with vowels. These word-based constraints appear to determine word-internal syllabifications. In a word like *he'mi'* 'pigeon', the expected syllabification *he.'mi'* is ruled out, since a syllable begins with a preglottalized sonorant. Since preglottalized sonorants are illicit in word-initial position, they are illicit syllable-initially as well. As noted above, no Yurok words begin with vowels and, by extension, onsetless syllables are illicit word-internally. As a consequence, the syllabification *he'm.i'* is also ill formed, since it contains an onsetless syllable. In sum, Blevins (2002*b*) demonstrates that in cases where word-edge syllabifications conflict with word-internal ones, Yurok preglottalized sonorants, which otherwise pattern as single segments, undergo segmental fission, resulting in syllabifications like those in (6).

A final twist in the description of Yurok short forms is that there are noticeable phonetic differences between vowels in long and short forms, even when syllable structure is identical. Vowels in the short forms are noticeably longer and laxer than those in the long forms. Where long-form vowels have noticeable offglides, these are absent in short forms. These phonetic differences are noted by Robins (1958:6, 8) and are sometimes transcribed in the work of others, including Spott and Kroeber (1942) and

[12] Not all glottal stops and glottalized sonorants are written in this dictionary, but where intervocalic glottalized sonorants are represented, they are generally syllabified as shown in (6).

Waterman (1920).[13] For example, (8*b*) below (from Spott and Kroeber 1942:154) is written *ne-têl*, though the long form (with /e/ in the initial open and final closed syllables) is written *telogeł* (Spott and Kroeber 1942:155). In (7), I give some examples from my own notes, where IMP = imperative, PERF = perfective, and SF = a short (truncated) form. Notice that the offglides in the long forms in (7*a*)–(7*c*) are absent in the corresponding short forms.

(7) Vowel differences between long and short forms

(7*a*) *weno'os ku **pek**cic* [pe^{y}ktʃ itʃ]
*weno'os ku **pek*** [pɛˑk]
give.IMP the string

'give me the string'

(7*b*) *yo' ne-**slekw**slekwoh* [sle^{y}k^{w}sle^{y}k^{w}oh]
*yo' 'ne-**slekw*** [slɛˑk^{w}]
that my-clothes

'those are my clothes'

(7*c*) *kic hekwsek' 'ne-**lew**et* [le^{yy}wit]
*kic hekwsek' 'ne-**lew*** [lɛˑw]
PERF find.1sg my-net

'I found my net'

(7*d*) *ci 'o' ku **pop**sew* [pɔpsɛw]
*ci 'o' ku **pop*** [pɔˑp]
IMP give.IMP.SF the bread

'give me the bread'

The phonetic differences between vowel qualities in the long and short forms are of interest because they appear to be automatic and exceptionless. What aspects of Yurok sound patterns determine vowel quality in the short forms? If phonological processes like monomoraic lengthening begin as automatic phonetic processes, then perhaps this is just such a case.[14] Shortened

[13] Robins (1958:8) seems to be referring to the same differences in vowel quality when he writes: "Words of more than one syllable are characterized by an optional slight lengthening of the initial syllable. . . . Phonemic distinctions of vowel length are not obscured by this facultative phonetic vowel lengthening." In other words, the [e^{y}] diphthongs transcribed in (7) may have been heard by Robins as longer than their [ɛˑ] counterparts. Ongoing phonetic work should help clarify the extent of lengthening in monosyllables and initial syllables of multisyllabic words.

[14] Note that data like that in (7) are not indicative of a rule of "monomoraic lengthening" in Yurok, where a monomoraic syllable is bulked up to two moras, via vowel lengthening (with

forms, which constitute monosyllabic words, all carry word stress. One possibility is that this phonetic lengthening and accompanying lowering are a feature of word stress in monosyllables. At the phonological level, CVC syllables are bimoraic and function as such for the purposes of the truncation rule in (2) and word stress, discussed below. However, once stressed, these monosyllables take on additional phonetic length which leads to phonetic differentiation both from their counterparts in long forms and monosyllabic CV:C words, whose vowels are even longer.

Finally, a remark is in order regarding the context and use of short forms. Robins (as quoted above) suggests that short forms are restricted to use with the pronominal prefixes (*'ne-*, *k'e-*, *'we-/'u-*). While this is the most common context for short forms (8*a*, 8*b*), they occur unprefixed as well (8*c*, 8*d*). Abbreviations in (8) are: IMP = imperative, SF = a short (truncated) form; 3 = third-person pronominal prefix; FUT = future; PASS = passive; IND = indicative; 1sg = first singular inflectional suffix; 3sg = third singular inflectional suffix; MOT = motion particle; EMPH = emphatic.

(8) Short forms in context

(8*a*) *ci* *'o'* *ku* *'oohl* ***'u-pop*** LF = ***popsew***
IMP give.IMP.SF the Indian 3-bread/SF
'Give me some Indian bread!'

(8*b*) *ki* *hloom-el-ek'* ***'ne-tel*** LF = ***telogehl***
FUT take.away-PASS-1sg.IND my-pain/SF
'She is taking away my pain'. (Spott and Kroeber 1942:154)

(8*c*) *Frank* *ha'm* ***Wec*** *ki* *nu* *wey* LF = ***Wecpus***
Frank say.3sg.IND Wecpus/SF FUT MOT go
'Frank says he is going to go to Wecpus'. (Waterman 1920:199)

(8*d*) *hehl* *nii'nes* *noorew* *ku* ***c'is*** LF = ***c'isah***
EMPH look.IMP pretty the dog/SF
'Look at the pretty dog'.

This is an important observation, since the CV-prefix plus the following heavy syllable creates what could be viewed as an iambic foot. While trun-

secondary lowering of the lengthened vowel). Recall the analysis of truncation in (2), which involves a bimoraic syllable. If short forms constitute bimoraic syllables, then we cannot invoke monomoraic lengthening to account for the vowel differences noted above. An additional argument against the lengthening in (7) as phonological bulking is the fact that neutralization of the long/short contrast does not occur. For example, the somewhat lengthened vowel in *pop* 'bread' still contrasts with the long vowel in words like *rookw* 'wind' and *sook* 'thing'. See Berman (1982*b*:416) for mention of historical vowel lengthening in monosyllabic words under certain conditions which did result in a long/short vowel contrast.

cation may have originated as shortening of a long form to an initial iambic foot, including a light pronominal prefix + heavy syllable (= short form of noun), the productive synchronic word-formation rule for nouns appears to be syllable-based, as stated in (2).

To summarize, Yurok nominal short forms are heavy monosyllables, formed by taking the shortest possible string from the long form which satisfies the monosyllabic bimoraic template. The laryngeals /h/ and /'/ both give weight to syllables. Preglottalized sonorants act as single segments for this process, despite the fact that the same glottalized sonorants are bisegmental for the purposes of syllabification, where they are regularly split between syllables. Short forms undergo audible vowel lengthening, which may be a feature of monosyllables with word stress. Finally, short forms are common with pronominal prefixes but not restricted to this context.

4. A preliminary description of Yurok nominal stress.[15] Yurok stress or accent is transcribed by Kroeber in his published and unpublished work, in Waterman (1920), and in various teaching materials circulated by the Yurok Tribe. In his early sketch of Yurok, Kroeber (1911:418) writes:

> The stress accent of words if often well balanced between several syllables and often marked on one or two. Accent is however less a matter of intensity or loudness of sound, than a rise in pitch and a holding of the accented syllable, which is manifested in lengthening of the vowel or doubling of the preceding or following consonant. Accent is not however determined by organic length of vowels, and often falls on syllables that are intrinsically short. The dwelling of the voice, and its rise of pitch, on the accented syllable, give a peculiar and pleasing quality to Yurok speech.

Robins (1958:10), who does not transcribe stress, also makes a few remarks on this subject:

> Stress and pitch are not used as lexically differential features in Yurok, but are rather to be regarded as features of tempo and style. In connected speech most words of more than one syllable have one syllable prominent, by its being on a higher pitch than adjacent syllable [*sic*] and sometimes bearing louder stress as well; but the same word may have any one of its syllables prominent according to style, tempo, and rhythmic pattern of the sentence.

[15] Transcriptions of Yurok stress are impressionistic and have yet to be phonetically quantified. What is heard as "stress" may be more properly labeled as "prominence." However, the generalizations about distinct syllable weights hold under either account. See **1** and footnote 1 above for a description of the spoken corpus on which stress generalizations are based. The corpus includes both citation forms and words in running speech. In both contexts, unstressed syllables undergo significant vowel reduction. Stress is rarely transcribed in Yurok as written by native speakers, though I have heard elders correct second-language learners who put stress in the wrong place.

Monosyllabic words may also be prominent, but this is rarely the case except with monosyllabic nouns and verbs.

Where a prominent syllable has a long vowel, this vowel may be somewhat overlengthened and on a markedly higher pitch, this being particularly noticeable when prominence falls on monosyllabic words containing long vowels.

In this section, I limit myself to the description of nominal stress in Yurok.[16] Stress in Yurok nouns appears to be sensitive to syllable weight, and findings in the area of nominal stress can be directly compared to aspects of nominal truncation described above.

First, let us briefly review the Yurok vowel system. Robins (1958) sets up a phonemic inventory of six short vowels and five long vowels, as shown in (9).

(9) Yurok vowels (Robins 1958:1)

Front	Central	Back
i, ii		*u, uu*
	r, rr	
e		*o, oo*
	a, aa	

A re-examination of the Yurok data suggests that most instances of Robins's surface short *a* are predictable allophones of /e/, while surface long *aa* can be viewed as the long counterpart of /e/ (Blevins, forthcoming). Given this, Yurok can be understood to have five distinct vowel qualities /i, u, e, o, r/, each with a length contrast, with /a/ as an incipient phoneme, contrasting with /e/ in very few environments.[17]

Another fact relevant to nominal stress is that no noun ends in a light syllable. Table 1 shows a variety of nouns, with no true nouns ending in (C)CV.[18] Where we might expect a final short vowel, an /h/ or /'/ closes the syllable. Nonfinal syllables of nouns are unrestricted, and may be open or closed, heavy or light. Nouns contrast with verbs, adverbs, and particles, which can end in light syllables, as shown in (10).

[16] Verbal morphology appears to play a significant role in verb stress. For example, *e*-class inflectional suffixes in the unipersonal indicative do not attract stress, while *o*-class inflectional suffixes do. Compare the *e*- class verbs *népek'* 'I eat' and *cíwéyek'* 'I'm hungry' with the *o*-class verbs *newók'* 'I see' and *húnowók'* 'I grow' (said by a plant).

[17] Robins also describes extra long vowels, as in the words *soool* 'yew', *knuuu* 'chicken hawk', which appear to be the result of recent consonant loss between adjacent long and short vowels or instances of double ablaut with double intensives. If these extra-long vowels exist, they are disyllabic. For 'yew', Exline (n.d.) shows *so.ol.*

[18] Attributives like *ceykeni* 'little one, child' are verb forms which can be used as nouns. Apparent irregular locative nouns in *i*-, *-ik* include *meci*, *mecik* 'fire-LOC', *'yonci*, *'yoncik* 'boat-LOC', *laasi* 'road-LOC'. Since this *-i*, *-ik* alternation is typical of adverbs of place (e.g., *keski*, *keskik* 'down', *hinoy*, *hinoyk* 'behind, after', *sohci*, *sohcik* 'up, on top, above', *woop'i*, *woop'ik* 'out in the water'), I take the apparent nominal locatives in *-i* to be adverbs.

TABLE 1

FINAL SYLLABLE TYPES IN NOUNS
(T AN OBSTRUENT, R A SONORANT)

Rhyme	Noun	Gloss	Noun	Gloss
VV	*te.**poo***	'fir tree'	*mec.**laa***	'chimney'
VT	*le.**wet***	'salmon net'	*wen.**cokws***	'woman'
VR	*lu.**mon***	'eel net'	*we'.**yon***	'adolescent girl'
V'	*ho'.mo.**no'***	'tan oak'	*c'e'.**gi'***	'black oak'
V*h*	*ho'.mo.**nah***	'live oak'	*haa.**moh***	'bear grass'
	*pi.**'ih***	'mussel'	*tek.**toh***	'log'
VVT	*ha.**'aag***	'rock'	*caa.**nuuks***	'baby'
VVR	*koy.**kuu'l***	'hollow rock'	*hoo.**luul***	'baggage'
VV'	*pe.co.**loo'***	'kind of sugar pine'	*pry.**krr'***	'brain'

(10) Words with final light syllables

	Gloss	Part of Speech
ceykeni	'small'	3p attributive verb
weykoni	'finished'	3p passive attributive verb
nimi	NEG	preverbal particle
kiti	FUT	preverbal particle
kolo	'it seems'	adverb
tema, teme	'in vain'	adverb
pecu	'upriver'	adverb
hasi, hesi	'toward'	preposition

We are now in the position to look at stress patterns in Yurok nouns. Within the word, there appear to be three degrees of stress: primary stress, secondary stress, and the absence of stress. Unstressed syllables are heavily reduced and, much like English, the vowels of unstressed syllables are highly variable, often assimilating to preceding or following segments. Stressed syllables are louder than unstressed syllables and somewhat longer. They are often marked by a high pitch which either remains high (see below) or falls. As noted by Kroeber above, stress also often results in perceptible lengthening of post- and pre-tonic consonants; in other words, not just the vowel but the entire syllable is longer. In the discussion which follows, I restrict my attention, for the most part, to the contrast between stressed and unstressed syllables and their relationship to syllable weight. Potential differences between primary and secondary stress are only transcribed where they are clearly distinguishable from other surface stress patterns.

Let us begin by looking at a range of disyllabic forms whose stress patterns suggest a three-way contrast in syllable weight. In (11), we see sequences of closed syllables with short vowels. In these words, there is stress on both syllables; the syllables are of similar duration, and vowels are full

(unreduced). It is difficult to hear any difference between these stresses, and in (11), I show them as equal prominences. Throughout, L = a light syllable (short vowel, open syllable), H = a heavy syllable (short vowel, closed syllable), and H+ = the heaviest syllable type (long vowel, open or closed).

(11) Stress in [HH] disyllables

(11*a*)	*'ó'.léhl*	'house'
(11*b*)	*ké'.wín*	'eel'
(11*c*)	*'láhp.séw*	'plate'
(11*d*)	*méhl.kwéhl*	'cane'
(11*e*)	*póp.séw*	'bread'
(11*f*)	*hí'n.k'éhl*	'white oak'
(11*g*)	*kíkw.tén*	'moss'
(11*h*)	*nŕh.pŕy*	'berry'

However, when a light syllable is followed by a heavy syllable, the initial syllable is usually unstressed and reduced, with stress on the final syllable, as in (12). (Recall that word-initial sonorants like those in 12*b* and 12*c* are realized as plain sonorants in initial position.)

(12) Final word stress in [LH] disyllables

(12*a*)	*'r.kŕhl*	'knee'
(12*b*)	*'we.róy*	'3sg-stream'
(12*c*)	*'we.séc*	'3sg-fillet'
(12*d*)	*ko.wís*	'stick'
(12*e*)	*ce.cékw*	'fish bones'
(12*f*)	*pr.gís*	'golden eagle'
(12*g*)	*me.gókw*	'dog'
(12*h*)	*cpe.gár*	'ear'

Notice in comparing (11) and (12) that, as with the truncation data, /h/ and /'/ can both serve as moras when not prevocalic. Compare (11*h*) *nŕh.pŕy*, where the initial syllable is stressed and not reduced due to syllable-final /h/, with *'r.kŕhl* (12*a*) or *we.róy* (12*b*), where the initial light syllable is unstressed and reduced.[19]

In contrast to the truncation data, where preglottalized sonorants behave as single segments, their fission under syllabification results in distinct stress patterns for words with medial plain versus glottalized sonorants. A near-minimal pair is *ké'.wín* 'eel' vs. *ke.wóy* 'burden basket'. Similar near-minimal pairs are found in prefixed short forms: compare *k'é'wŕs* 'your skin' from /'wrskun/ 'skin' to *k'ewén* 'your woman' from /wencokws/ 'woman'. The stress pattern is consistent with syllabification judgments in

[19] The reduction in *we.róy* is evident in Waterman's (1920) transcriptions of the same word as *wroi´*, where the final acute accent marks primary stress.

(6) above, but stress and syllabification are inconsistent with the truncation pattern in (5). As with the syllabifications in (6), I follow Blevins (2002*b*) in attributing fission of preglottalized sonorants to word-based syllabification algorithms. Since syllabifications serve as input to the stress rules, the stress patterns themselves are the expected ones.

Another difference between the weight system evident in truncation and that relevant to stress is the treatment of syllables with long vowels. Syllables with long vowels are always stressed in Yurok, while those with closed syllables are not. Many nouns have final unstressed CVC syllables.[20] Compare the forms in (13*a*)–(13*e*), where CVV and following CVC both have surface stress, to those in (13*f*)–(13*h*), where final CVC syllables are unstressed and reduced. Syllables with long vowels also have a high (level) pitch: this high pitch may be maintained through the following stressed syllable, but tends to fall when the following syllable is unstressed.

(13) Initial word stress in [H+ H] disyllables

(13*a*) *cíi.sép* 'flower'
(13*b*) *cíi.gŕy* 'huckleberry'
(13*c*) *hóo.léhl* 'garden'
(13*d*) *hóo.lóh* 'basket'
(13*e*) *háa.móh* 'bear grass'
(13*f*) *náa.wec* 'my back'
(13*g*) *níi.kwec* 'grizzly bear'
(13*h*) *káa.mes* 'sea serpent'
(13*i*) *núuk.soh* 'my children'

Words with sequential long vowels have even stress on the two syllables, with a level high tone typically maintained over both stressed syllables. Words of this type, shown in (14), are not common (see n. 8), and are typically the result of compounding or suffixation.

(14) Stress in [H+ H+] disyllables

(14*a*) *cáa.núuks* 'baby, newborn', cf. *caan-* 'young', *huuks* 'child'
(14*b*) *káa.múuks* 'bastard', cf. *kaam-* 'bad', *huuks* 'child'
(14*c*) *tóo.lóohl* 'on the face', cf. *tooloh* 'cheeks, face', *-ohl* 'LOC'

When a long-voweled syllable is preceded by a syllable without a long vowel, it also carries the word stress, as shown in (15). A preceding light syllable (15*a*–15*c*) is unstressed and subject to vowel reduction, while a preceding closed syllable has what I transcribe as secondary stress in

[20] Unstressed CVC syllables are also found finally in verbs, where they occur nonfinally as well. In the unipersonal first-person indicative *e*-class, we find forms like *ce'.lóok.sek'* 'I'm thirsty', with main stress on the long vowel and no stress on the initial or final syllables, which are reduced.

(15*d*)–(15*f*). Forms like (15*d*)–(15*f*) have a prominence pattern which is noticeably different from even-stressed words like those in (11), (13*a*)–(13*e*), and (14). This systematic difference further supports an apparent weight contrast between CVC and CVV syllables.

(15) Stress in [H H+], [L H+] disyllables

(15*a*) *ha.'áag* 'rock'
(15*b*) *pa.'áahl* 'water-LOC'
(15*c*) *pa.'áap'* 'red fern'
(15*d*) *'è'.góo* 'bed'
(15*e*) *'ř'.gŕrk* 'sweathouse'
(15*f*) *wř̀t.nŕrg* 'horsetail'

Regular exceptions to the pattern in (12) are forms which contain V'V, identical short vowels interrupted by a glottal stop. In disyllables, main stress is always on the first of these, as shown in (16), with a following unstressed syllable, even though this syllable is closed.

(16) Stress in [CV'VC] disyllables

(16*a*) *hú.'uh* 'nut'
(16*b*) *má.'ah* 'spear'
(16*c*) *pá.'ah* 'water'
(16*d*) *pí.'ih* 'mussels'
(16*e*) *sá.'ahl* 'spirit, ghost'

In (16), the entire V'V(C). sequence functions as a single heavy syllable. Compare (16*c*) to its locative counterpart in (15*b*). Though V'V(C). sequences act as single heavy syllables, V'V: sequences act as LH sequences. Again, obligatory stressing of long vowels is in evidence.

In (17), the same patterns are illustrated in longer words. Notice that final CVC. is stressed in (17*d*), where it constitutes a syllable independent from the V'V sequence, but not in (17*f*), where the entire string *sŕ.'rhl* is acting as a single heavy syllable in attracting stress. Note also the final unstressed CVC syllables in (17*a*) and (17*b*), which appear to have the same status as those in (13*f*)–(13*i*).

(17) Stress-attracting properties of V: and V'V(C.)

(17*a*) *cè̀.lo.gáa.pihl* 'ribs'
(17*b*) *wr.'ŕr.grc* 'alder tree'
(17*c*) *me.cáa.nèp* 'wormwood'
(17*d*) *hó.'o.lèk* 'bracken fern'
(17*e*) *kwó.'o.lòh* 'maple tree'
(17*f*) *cpi.sŕ.'rhl* 'window'

One other regular exception to the stress patterns examined so far involves reduplication. In reduplicated forms, as shown in (18), the first syl-

lable unexpectedly bears main stress.[21] Compare these words with those in (11) and (14) involving adjacent syllables of equal weight, where syllables are of equal prominence. In the words in (11) and (14), pitch level can stay nearly constant across the stress domain; however, in (18), there is a pitch drop on the first (primary stressed) syllable, with a lower pitch on the secondary stressed syllable.

(18) Stress in reduplicated forms

(18*a*) *káh.kàh* 'sturgeon'
(18*b*) *túup.tùup* 'sword fern'
(18*c*) *mús.mùs* 'cow'

Though the general pattern for [LH] disyllables is that shown in (12), there are a handful of exceptions to this pattern. I assume that these words have lexically marked stress.[22]

(19) Exceptional stress in disyllables

(19*a*) *c'í.sáh* 'dog'
(19*b*) *c'ú.c'ís* 'bird'
(19*c*) *nŕ.yrt* 'duck'
(19*d*) *sé.gep* 'coyote'
(19*e*) *wŕ.grs* 'fox'

Finally, longer words show that light syllables may carry main stress in the absence of long vowels and nonfinal closed syllables. Examples are given in (20).

(20) Main stress on light syllables

(20*a*) *hé.yo.mus* 'skunk'
(20*b*) *tŕ.wr.mrs* 'bee, yellow jacket'
(20*c*) *cì.no.mé.wes* 'adolescent boy'
(20*d*) *tó.lo.wèhl* 'Tolowa'

This pattern is compatible with stress patterns in other word categories: adverbs of the form CVCV have initial stress, and attributive verb forms ending in /-eni/ have penultimate main stress.[23] As in earlier examples, final

[21] The pattern is different again when the noun is clearly derived from a reduplicated verb. Compare the stress patterns in (18) to *cèycéyes*, *cèycéyos* 'mosquito', from /ceykum-/ 'to bite', and *còkcóopa'r* 'to drum'. Reduplicated verbs all show this pattern of secondary stress on the CVC- reduplicant, and primary stress on the base.

[22] The words in (19*a*) and (19*b*) are likely loans (Blevins 2002*a*). The forms in (19*d*) and (19*e*), which contain the infix *-eg-*, are doubly exceptional, since for most speakers, this infix is consistently postaccenting. A handful of place-names also show this exceptional pattern, including *Kenek*, *Kepel*, and *Murekw*, all with initial stress. There is some evidence that a stress shift may have occurred. Compare the house-name *kepél* (Waterman 1920:211) with the place-name *képel* (Exline, n.d.:53), both translated as 'house-pit'. Conditions on this stress shift are unclear.

[23] It is likely that all nouns longer than two syllables are derivationally complex. This derivational complexity may cloud the stress rules somewhat.

unstressed CVC syllables occur in (20*a*)–(20*c*). In sequences of light syllables, then, there is evidence of an alternating trochaic pattern.

From the data examined, we can extract the general features of Yurok nominal stress shown in (21).

(21) General features of Yurok nominal stress

(21*a*) Syllables with long vowels are always stressed and bear a level high pitch, which may spread to following stressed syllables. Because such syllables are always stressed, they never undergo reduction.

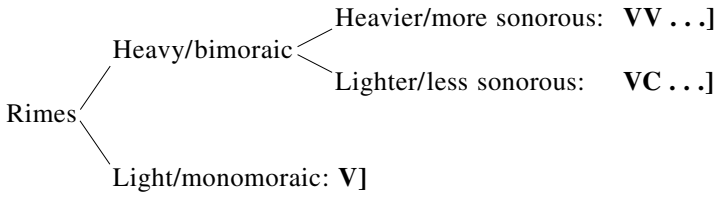
(21*b*) Closed syllables with short vowels may bear primary stress, but when adjacent to long vowels or in final position, they may be unstressed. When unstressed, closed syllables are often reduced.

(21*c*) Unstressed light syllables bear main stress only in words which lack long vowels or which lack nonfinal closed syllables. Unstressed light syllables are reduced.

The syllabifications used in deriving Yurok stress patterns are entirely consistent with syllabifications provided by native speakers in slow speech, and those evident in syllable-based writing.

5. Discussion. Nominal truncation and nominal word stress in Yurok make use of distinct but overlapping definitions of syllable weight. From a cross-linguistic perspective, this is not altogether unusual (Blevins 1995 and Gordon 2002). In nominal truncation, the notion "heavy syllable" or "bimoraic syllable" does not discriminate between CVV and CVC, while in the stress system, these two syllable types fall into distinct weight classes, since CVV is always stressed but CVC is not. The most straightforward way of reconciling these differences is to assume a distinction among heavy syllable types, where CVV is more sonorous and CVC less sonorous. This view is represented in (22), where syllable weight appears to be a measure of intrinsic prominence.

(22) Syllable weight in Yurok



Nominal truncation, which finds the smallest string that can satisfy the minimal bimoraic word template, distinguishes only between heavy and light syllables. The nominal stress rule, which is prominence-based, distin-

guishes between more and less sonorous heavy syllables. Syllables with long vowels are always stressed, while CVC syllables are not. Syllables with long vowels are also the target of an H-tone association rule, which does not apply to less sonorous CVC syllables. Both truncation and stress treat coda /h/ and glottal stop as moraic elements, and both systems suggest that the minimal foot is a single heavy syllable. Syllabifications defining syllable weight for the purposes of stress are consistent with syllabifications based on native-speaker intuitions.

A second difference between truncation and stress is their treatment of preglottalized sonorants. Recall that for the purposes of truncation, preglottalized sonorants behave as single segments, filling the final mora of the bimoraic template. On the other hand, evidence from native-speaker intuitions and weight-sensitive stress points to a bisegmental syllabification of V'RV as V'.RV. Blevins (2002*b*) suggests a solution to this problem which is based on the view that syllabifications internal to the word are based on surface word-edge phonotactics. Glottalized sonorants are phonologically single segments. However, when intervocalic, their syllabification as single-segment onsets or codas is inconsistent with syllabification algorithms based on surface word forms. Word-medial onsets must be subsets of word-initial onsets, while word-medial codas must be subcases of word-final codas. When this is not the case, syllabification results in fission of preglottalized sonorants into bisegmental sequences. Since truncation makes a syllabic parse of the string which is independent of the base parse, the entire glottalized sonorant is available for the word-final coda position, where it is well formed.

The contrast between light and heavy syllables and the normal reduction of unstressed light syllables allow us to see new meaning in Kroeber's observation that "Yurok vowel qualities are very shifting and often indeterminate" (1911:415) and Waterman's remark that "[t]he vowels of Yurok have always seemed to me to be very much like the vowels of English" (1920:181). At the same time, this study offers further insight into the intuitions of Robert Spott and his father, found in the quotation at the beginning of this paper. Out of context, short forms are not easily interpreted, but the regular rule of truncation described above predicts that nouns of the form CVV may be associated with longer words containing identical initial substrings. Robert Spott's suggested source for *'o-kaa*, mountain of the inland whale, illustrates the invaluable and continuing contribution of native-speaker intuitions to our ultimate understanding of language structure.[24]

[24] See "The Inland Whale" in Spott and Kroeber (1942) and the expanded version in T. Kroeber (1959). The place-name *'o-kaa* is the name of the mountain where the inland whale appears, where *'o* is the locative particle common in place-names. The whale itself is a bastard (*kaamuuks*) and the boy, to whom the whale appears, is *kaamuuks* as well. The entire story can be read as a compassionate plea to see good in all people.

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