

### *Stress and Morphological Boundaries In Hawaiian*

This paper offers a new analysis of stress assignment in Hawaiian. I argue that a surface-oriented analysis of stress in Hawaiian cannot correctly characterize all of the attested secondary stress patterns, and that stress in Hawaiian is sensitive to morpheme boundaries, which effectively create prosodic-word subdomains for stress assignment.

**Prior Analyses:** Schütz (1981) offers the conventional analysis of stress assignment in Hawaiian, in which main stress falls either on the penult or the final syllable, if heavy, with secondary stress iterating every second syllable from the main stress up to the beginning of the word; additionally, heavy syllables always receive stress. For Schütz (1981), a syllable is counted as heavy when it has two morae, including long vowels and diphthongs. Schütz's characterization of the moraic status of Hawaiian segments is adopted straightforwardly here. Schütz's analysis largely follows Newbrand (1951), and is repeated in Elbert & Pukui (1986).

However, many words of five or greater syllables defy this pattern. For example, words with five short syllables appear to follow two different patterns, one (1b) that follows the description above (main stress on penult, secondary stress on the second syllable in the word), the other (1a) with unexpected secondary stress on the word-initial syllable.

- |     |                               |                                   |
|-----|-------------------------------|-----------------------------------|
| (1) | a. 'irregular' stress pattern | b. 'regular' stress pattern       |
|     | hòloholóna - animal           | kakà'awále - separate             |
|     | pùlelehúa - butterfly         | leleleáka - light rain/mist       |
|     | lùpelupéa - pleasing          | kahèlaláni - shell used by chiefs |
|     | 'èkeekému - to answer briefly | ulàkoláko - supplies              |

In light of (1), Schütz argues that secondary stress in the irregular pattern is lexically specified, with the result that secondary stress is lexically specified in some words but not others.

**Proposal:** I argue that stress placement in Hawaiian applies to morphological subdomains, expressed as prosodic-words and governed by a set of alignment constraints, which I formalize within Optimality Theory. While Alderete & MacMillian (2014) and Senturia (1998) suggest that morphological domains are relevant for the stress-assignment paradox illustrated in (1), a formal analysis has yet to be developed. The analysis here is also similar to the proposal for Samoan stress patterns presented in Zuraw et al. (2014), where prefixes (which include reduplicated structure) form independent prosodic domains, whereas suffixes are taken to form prosodic domains with their roots.

However, I also claim that stress assignment (more properly, foot assignment) in Hawaiian is bidirectional, with main stress assigned from the right and secondary stress assigned iteratively from the left (see Kager (1999) for similar analysis Garawa, Piro, and Indonesian, and Hayes (1995) for a preliminary analysis Fijian along these lines). This proposal applies to all prosodic words, with the assumption that prosodic word structure may be recursive, such that the maximal prosodic word may dominate multiple, word-internal prosodic words. Consider the following examples (which are representative of the different stress patterns in (1)), in which reduplicated structure is treated as a prefix.

- |     |  |
|-----|--|
| (2) | a. 'èkeekému - to answer briefly (ekemu + reduplicated prefix)                 |
|     | [ <sub>PrWd</sub> [ <sub>PrWd</sub> 'eke][ <sub>PrWd</sub> ekemu]] → 'èkeekému |
|     | b. ulàkoláko - supplies (lako + reduplicated prefix + prefix -u)               |
|     | [ <sub>PrWd</sub> [ <sub>PrWd</sub> ulako][ <sub>PrWd</sub> lako]] → ulàkoláko |

In order to link morphological structure to prosodic structure, I invoke four alignment constraints (6,7,9,10), which are discussed in Prince and Smolensky (1993/2004) and McCarthy and Prince (1993). Additional constraints enforce bimoraic foot structure and left-headedness (5,8). Finally, two un-dominated constraints (3,4) enforce the trochaic pattern and ensure that main stress is assigned to the right-most trochee (an additional constraint, WSP, ensures that heavy syllables are always stressed). The ranked constraint set appears as (3-10), which is applied to the examples in (2) as (11) and (12); a vertical line indicates prosodic word boundary.

- (3) **RH-TYPE-T** - Feet have initial prominence.
- (4) **RIGHTMOST** - The head foot is rightmost in PrWd.
- (5) **FT-BIN** - Feet are binary under moraic or syllabic analysis.
- (6) **ALL-STEM-R** - Align (Stem, Right, PrWd, Right)
- (7) **ALL-PREFIX-R** - Align (Prefix, Right, PrWd, Right)
- (8) **PARSE-SYL** - Syllables are parsed by feet.
- (9) **ALL-WD-RIGHT** - Align (PrWd, Right, Ft, Right).
- (10) **ALL-FT-L(EFT)** - Align (Ft, Left, PrWd, Left)

(11) 'eke'ekemu - to answer briefly (reduplication from 'ekemu)

/ 'eke   'ekemu/	<b>FT-BIN</b>	<b>ALL-STEM-R</b>	<b>ALL-PREFIX-R</b>	<b>PARSE-SYL</b>	<b>ALL-WD-R</b>	<b>ALL-FT-L</b>
☞ ('èke)   'e(kému)				*		*
'e(kè'e)(kému)			*!	*	*	**
('èke)   (éke)mu				*	*!	

(12) ulakolako - supplies (lako + reduplicated prefix + prefix -u)

/ulako   lako/	<b>FT-BIN</b>	<b>ALL-STEM-R</b>	<b>ALL-PREFIX-R</b>	<b>PARSE-SYL</b>	<b>ALL-WD-R</b>	<b>ALL-FT-L</b>
☞ u(làko)   (láko)				*		*
(ùla)ko   (láko)			*!	*	*	*

(13) illustrates how this constraint set enforces bidirectional footing within a long prosodic word such as *kalakupua*. The low-ranked All-FT-L decides between the top two candidates, such that the candidate with an unfooted medial syllable is selected.

(13) ho'okalakupua - to do wondrous acts (from ho'o + kalakupua)

/ho'o   kalakupua/	<b>FT-BIN</b>	<b>ALL-STEM-R</b>	<b>ALL-PREFIX-R</b>	<b>PARSE-SYL</b>	<b>ALL-WD-R</b>	<b>ALL-FT-L</b>
☞ (hò'o)   (kàla)ku(púa)				*		*
(hò'o)   ka(làku)(púa)				*		**!
ho('òka)(làku)(púa)		*!		*	*	***

This analysis shows that a fuller account of Hawaiian stress can be made when taking the morphological structure of words into consideration. In effect, the grammar of Hawaiian is one that emphasizes the demarcative and quantity-sensitive property of stress as opposed to the rhythmic property of stress.