Sonority-driven stress and vowel reduction in Uyghur

In addition to quantity sensitivity, a number of researchers have argued that stress may also exhibit sonority sensitivity (Kenstowicz 1994, 1997; Morén 2000; de Lacy 2002, 2004; Crowhurst & Michael 2005). Previous work has focused on sonority's influence in languages with variable stress placement. In these languages, stress is preferentially attracted to high-sonority vowels, e.g. /a/, concomitantly avoiding less sonorous vowels, like high vowels (cf. Shih 2016, 2018). However, work to-date has not investigated the role of sonority-sensitivity in a language with fixed stress placement. Using production data from Uyghur, I show that a sonority-dependent weight distinction in the language accounts for both the asymmetric augmentation of stressed vowels and positional reduction of low vowels, demonstrating the role that sonority may play in a language with fixed stress placement.

Stress in Uyghur falls on the final syllable in native words (Nadzhip 1971; Comrie 1997; Hahn 1998). Phonetically, stress is realized as increased vowel duration (Yakup & Sereno 2016). Crucially, Uyghur exhibits asymmetric augmentation of the stressed vowel, as shown in (1). If the stressed syllable is open, a high vowel is lengthened (1a-c). In closed syllables (1d-g) and in syllables with [-hi] vowels (1e-j) though, no comparable lengthening is observed . Also, in medial open syllables, [-hi] vowels are raised to [+hi] (1c,g,j).

These claims are corroborated by a production study conducted during fieldwork (9 speakers, 6,836 vowels). Vowel duration was analyzed using a mixed effects model with effects for position, syllable type, and vowel height; with maximal by-speaker random effect structure.

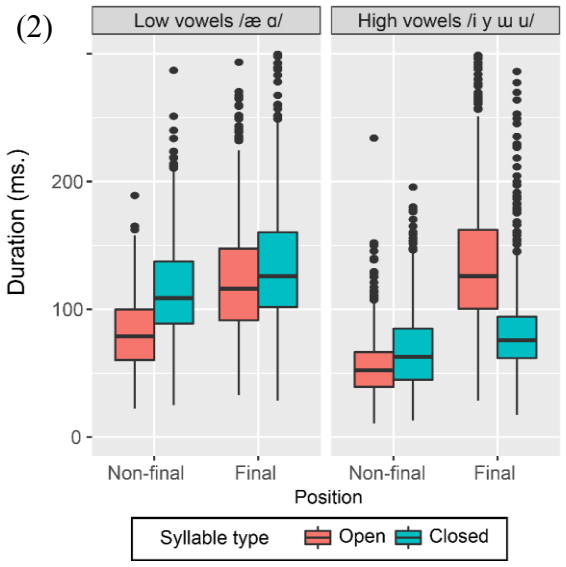
(1)

a.	/kiʃi/ → [ki.ˈʃiː]	'person'
b.	/kiʃi-ni/ → [ki.ʃi.ˈniː]	'person-ACC'
c.	/sællæ-ni/ → [sæl.li.ˈniː]	'turban-ACC'
d.	/kiʃi-m/ → [ki.ˈʃim]	'person-POSS.1S'
e.	/sællæ-m/ → [sæl.ˈlæm]	'turban-POSS.1S'
f.	/kiʃi-lær/ → [ki.ʃi.ˈlær]	'person-PL'
g.	/sællæ-lær/ → [sæl.li.ˈlær]	'turban-PL'
h.	/sællæ/ → [sæl.ˈlæ]	'turban'
i.	/kiʃi-dæ/ → [ki.ʃi.ˈdæ]	'person-LOC'
j.	/sællæ-dæ/ → [sæl.li.ˈdæ]	'turban-LOC'

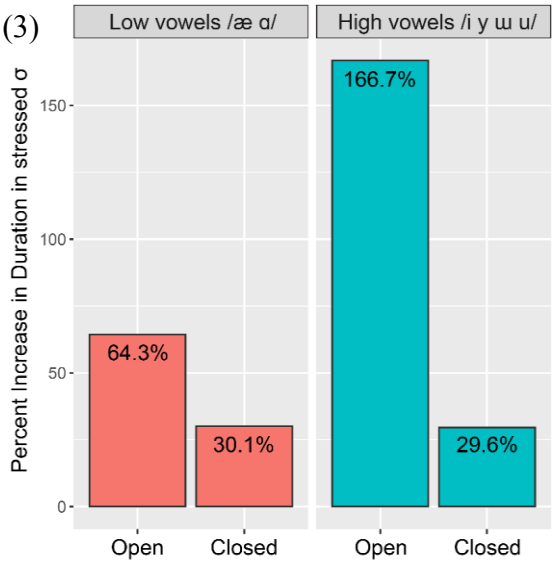
Three generalizations emerge from the study. First, final-syllable vowels are longer than other vowels regardless of syllable type, supporting the claim that stress is final in the language. Second, vowels in closed syllables are longer than vowels in open syllables (see also Lahiri & Hankamer 1988; Jannedy 1995). Third and unsurprisingly, low vowels are longer than high vowels, as is true in many languages (e.g. Peterson & Lehiste 1960; Abramson 1962).

However, vowel durations in final open syllables flout the second and third generalizations. Vowels in final open syllables are longer than in final closed syllables. Moreover, in final open syllables the duration distinction between low and high vowels is neutralized. These are evident in (2), which presents vowel duration by position and syllable type and (3), which shows percent increase in vowel duration in stressed syllables compared to unstressed syllables.

(2)



(3)



To account for this pattern of positional augmentation, the analysis makes three claims. First, stressed syllables must be heavy (*$\acute{\sigma}_{\mu}$ / STRESS-TO-WEIGHT, Prince 1990). Second, high vowels are monomoraic while non-high vowels are bimoraic in Uyghur. This same argument has recently been made for related Kazakh (McCollum 2018). A sonority-dependent weight distinction accounts for why vowel lengthening in stressed position applies only to high vowels. Low vowels are already bimoraic. Furthermore, this offers an explanation for low vowel raising in unstressed open syllables (e.g. 1c, /sællæ-ni/ → [sæl.li.ˈniː]). Low vowel raising is positional reduction. By raising to a high vowel, a heavy syllable loses a mora, which allows for more syntagmatic contrast between prominent and non-prominent syllables. Third, coda consonants are moraic (WEIGHT-BY-POSITION). Since stressed syllables must be heavy and coda consonants contribute a mora, syllables with a non-high vowel, as well as closed syllables are heavy (with no distinction between different types of heavy syllables). Thus, the only syllable type that is not heavy is $CV_{[+hi]}$, the very syllable type that is augmented in stressed syllables. By adding a second mora to open final syllables, the language satisfies STRESS-TO-WEIGHT at the expense of DEPLINK-μ.

The proposed analysis demonstrates that sonority-sensitivity may exist in languages with fixed stress placement, triggering asymmetric augmentation under the effect of STRESS-TO-WEIGHT. Additionally, a sonority-based weight distinction offers an explanation for the low vowel raising in medial open syllables. Although some recent work has challenged sonority-sensitivity in languages with putatively variable stress placement (Shih 2016, 2018; Rasin 2017), Uyghur provides new evidence for sonority-sensitivity. Rather than stress shift, sonority drives both asymmetric augmentation of stressed vowels and positional reduction in the language.

Selected references: De Lacy, Paul. 2004. Markedness conflation in optimality theory. *Phonology* 21.2 • Hahn, Reinhard. 1998. Uyghur. In *The Turkic Languages* • Kenstowicz, Michael. 1997. Quality-sensitive stress. *Rivista di linguistica* 9 • Nadzhip, E.N. 1971. Modern Uighur • Shih, Shu-hao. 2018. On the existence of sonority-driven stress in Gujarati. *Phonology* 35.2 • Yakup, Mahire, and Joan Sereno. 2016. Acoustic correlates of lexical stress in Uyghur. JIPA 46.1