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Metrics of Central Alaskan Yup'ik Stress

Abstract:

Yupik languages are known for their complex prosodic systems. For Central Alaskan Yup'ik (henceforth Yup'ik), scholars agree that, in a neutral environment, stress alternates, such that syllables with long vowels or diphthongs are always stressed, light syllables alternate stress, and word-initial closed syllables are stressed. Interestingly, all stresses within a word are assumed to be of equal prominence. This pattern, and more broadly, the question of whether codas contribute to weight in Yup'ik, has led to divergent accounts of the stress system (e.g. van de Vijver 1998; Halle 1990; Hayes 1995; Jacobson 1984; Leer 1985; Miyaoka 1971; Woodbury 1995).

This study is composed of two elements: the development of a metrical stress account based on existing literature and an acoustic analysis. The goal of the theoretical portion is to create a systematic and consistent means of identifying and predicting where stress will fall in Yup'ik. This model was then applied to six recordings of spoken Yup'ik (Alaskan Native Language Center, n.d.), so that the acoustic characteristics of stressed-long, stressed-short, and unstressed-short syllables could be compared. In this regard, this study is intended deepen the shallow pool of acoustic studies in Yup'ik prosody research.

The literature evaluation compares accounts of Yup'ik stress in different phonological frameworks. Ultimately, the metrical account proposed in Hayes (1995) was selected as the best model for systematically identifying stressed syllables. Hayes' model for Yup'ik stress is straightforward: essentially, stress is assigned based on a sequence of phonological processes that constrain foot shape. While Hayes (1995) provides a very strong foundation, in practice it required some adjustment to work consistently on recorded data. For example, Hayes' discussion about codas and weight is restricted to short-closed syllables, when long-closed syllables are common and are also affected by clash. Other minor tweaks include adding in lexical processes that affect syllabification, adjusting environments for gemination that affects foot shape, and resolving some ambiguity involving the metrical effects of schwa deletion. Once the final model was produced, it was tested against a sample of the acoustic study data to ensure accurate stress assignment.

The acoustic portion of this study examines how the presence of stress affects the acoustic characteristics of syllabic nuclei. Six transcribed recordings of spoken Yup'ik, four educational recordings and two narrative performances (2,204 vowel tokens), were analyzed for vowel duration, intensity, maximum F0, and F0 fall. Linear mixed-effect models show that the presence of stress significantly affects a syllabic nucleus' duration and intensity, such that stressed long vowels return the highest values, followed then by stressed and unstressed short vowels, respectively. Stress also affects a syllable's maximum F0, such that stressed vowels are higher in F0 than unstressed vowels; however, this effect is only marginally significant. While F0 fall is not significantly affected by stress, it is affected by a vowel's underlying length, such that underlyingly long vowels have a steeper F0 fall than short vowels. This implies a connection between duration and F0 fall: a long vowel has a higher total duration, and therefore more time for F0 to fall across that duration, than a short vowel, regardless of stress.

This study produces two significant results. The model proposed in this study provides an easy-to-follow step-by-step guide for identifying Yup'ik stress for the non-speaker. Secondly, the acoustic correlates of stress identified in the acoustic portion set the stage for future prosodic work on Yup'ik, including investigating perceptual stress cues and examining stress culminativity in the context of polysynthetic languages.

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