

Glottalized stops in K'ekchi (Maya)

S. Pinkerton

Citation: *The Journal of the Acoustical Society of America* **64**, S93 (1978); doi: 10.1121/1.2004461

View online: <https://doi.org/10.1121/1.2004461>

View Table of Contents: <https://asa.scitation.org/toc/jas/64/S1>

Published by the *Acoustical Society of America*



JASA
THE JOURNAL OF THE
ACOUSTICAL SOCIETY OF AMERICA

Special Issue:
Additive Manufacturing and Acoustics

Read Now!

The banner features a background image of a 3D printer nozzle printing a red, lattice-like structure. The text is overlaid on the left side of the image.

3:03

II22. Glottalized stops in K'ekchi (Maya). S. Pinkerton (Department of Linguistics, University of California, Berkeley, CA 94720)

Stop duration (VOT and closure) and intraoral air pressure were measured for comparison of the production of glottalized stops with that of nonglottalized stops. The pitch and duration of the preceding and following vowels were also measured. Subjects read natural language minimal pairs in which glottalized and nonglottalized stops contrasted in word initial, medial, and final positions. The results establish preliminary acoustic and physiological variables by which glottalized stops in K'ekchi may be characterized and distinguished from such stops in other languages. These glottalized stops had a significantly greater VOT than their nonglottalized counterparts. However, /b'/ had two productions in free variation: (1) a voicing lead and (2) a zero VOT. Glottalized /t'/, /k'/, and /q'/ exhibited a greater positive air pressure than their nonglottalized counterparts. /b'/ exhibited a zero air pressure, thus demonstrating that the inventory of glottalized stops in K'ekchi consists of one bilabial implosive and three ejectives. The pitch of a vowel following a glottalized stop began at a lower frequency than that of a vowel following a nonglottalized stop except when the vowel was found before /q'/ and /q/. The pitch in these latter cases was the same.

3:06

II23. Acoustic correlates of stress in K'ekchi. Ava Berinstein (Phonetics Laboratory, Department of Linguistics, University of California, Los Angeles, CA 90024)

At the last meeting of the ASA it was shown that speakers of different languages have different biases with respect to the location of stress in a string of syllables of equal duration [A. Berinstein, *J. Acoust. Soc. Am.* 63, S55A (1978)]. English speakers had a bias to locate stress on an initial syllable, K'ekchi a final syllable, while Spanish had no syllable bias. When the length of syllables was systematically varied it was possible to overcome the effect of the bias in English and obtain judgments which equated length with stress. This was clearly not the case for K'ekchi. The investigation has proceeded to establish the acoustic correlates of stress in K'ekchi by comparing stressed and unstressed syllables in a corpus of field recordings controlled for vowel quality, phonemic vowel length, and word length. Intensity, pitch, and duration have been measured and particular attention paid to the inter-relationship of word final lengthening, phonemic length, and duration as a cue for stress. [Work supported by NIH.]

3:09

II24. Timbre of Kiais: Analysis and synthesis. J-L Lassez (Department of Computer Science, University of Melbourne, Parkville, Victoria, 3052, Australia)

Kiai is a name given to sudden and violent vocalizations practiced by Martial Artists. An investigation to determine formant frequencies, bandwidths and source-spectrum slope was performed on vocalizations made by five high ranking Karateka. Spectral classifications were made using adaptations of those used for infant cries [H. M. Truby and J. Lind Act, *Paed. Scand.* 163, 11 (1965)]. All cepstra show strong peaks regularly spaced at pitch-period intervals. This phenomenon is usually linked with irregularities in the pitch-pulse timing [A. M. Noll, *J. Acoust. Soc. Am.* 41, 293-309 (1967)]. However digital simulations using a Terminal Analog Synthesizer indicate that it is likely that these peaks are due to an opening quotient of the vocal cords which is less than 10%. This leads to a nearly flat source spectrum. The fundamental frequency range was found to be in the order of 450-500 Hz and high amplitude resonances were found up to 6000 Hz for all vocalizations studied. Physiological considerations concerning the production and percep-

tion of these screams will be discussed and shown to be consistent with claims that Kiais have a characteristic timbre, which this analysis supports. [Work supported by U.M.E.R.G.]

3:12

II25. Disturbance of the rhythmic structure of speech in the dysarthrias. H. Hirose and M. Sawashima (Faculty of Medicine, University of Tokyo, Bunkyo-ku, Tokyo, 113 Japan)

Disturbance of rhythm in the speech flow process is one of the important factors in prosodic abnormalities. The rhythmic structure of Japanese is considered to depend, to a considerable extent, on regularity in syllable (mora) length, which is often affected in dysarthric cases of cerebellar dysfunction or Parkinsonism. In the present study, the dynamic patterns of the articulatory movements in the repetition of Japanese monosyllables were observed in dysarthric cases by means of a pellet tracking technique using an X-ray microbeam system. It was found that in the case of ataxic dysarthria of cerebellar origin, the breakdown of speech rhythm is related to inconsistency in the velocity, range, and rate of repetitive articulatory movements. In Parkinsonian dysarthria, so-called hastening phenomena were observed in terms of a gradual decrease in the velocity, range, and interval of repetitive movements. An analysis of the dynamic aspects of the dysarthrias will be a promising approach for elucidating the nature of central problems in the production of speech. [Work supported by a Grant-in-Aid for Scientific Research (No. 148271), Ministry of Education.]

3:15

II26. Abstract withdrawn.

3:18

II27. Tip of the tongue and slip of the ear: A comparative study. C. P. Browman (Bell Laboratories, Murray Hill, NJ 07974)

Lexical retrieval errors (tip of the tongue) and perceptual errors (slip of the ear) occurring in casual conversation were collected and analyzed. The distribution of the errors with respect to the position within the word, position within the syllable, and level of stress was determined. Both lexical and perceptual errors occurred less frequently on the final syllable of the word and on stressed syllables. Lexical errors occurred less frequently on initial syllables of the word, while perceptual errors occurred more frequently on initial syllables of the word. Implications for processing models will be discussed [Work supported by NIH and the UCLA Phonetics Laboratory.]