

Session 2aSC

Speech Communication: Articulation (Poster Session)

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Contributed Papers

All posters will be on display from 9:00 a.m. to 12:00 noon. To allow contributors an opportunity to see other posters, contributors of odd-numbered papers will be at their posters from 9:00 a.m. to 10:30 a.m. and contributors of even-numbered papers will be at their posters from 10:30 a.m. to 12:00 noon.

2aSC1. A cross-linguistic acoustic study of fricatives. Matthew K. Gordon, Paul Barthmaier, and Kathy Sands (Dept. of Linguist., Univ. of California, Santa Barbara, Santa Barbara, CA 93106)

This work presents results of an acoustic study of fricatives in 7 languages (Aleut, Chickasaw, Hupa, Montana Salish, Scottish Gaelic, Toda, and Western Apache), all of which contrast fricatives made at several places of articulation. Measurements of the frequency of spectral peaks and centroid frequencies indicate many similarities between the languages in the acoustic properties defining the fricatives. Some of the principal findings are the following. Alveolar sibilants typically have the highest spectral peak and centroid frequency. Lateral and palatoalveolar fricatives have spectral peaks and centroids intermediate in frequency between alveolar sibilants and backer fricatives. Among the back fricatives, peaks and centroids of uvulars are characteristically lower than those of velars. Rounding of back fricatives induces further lowering of peaks and/or centroids. Contrasts in backness and rounding among the back fricatives are also associated with differences in $F2$ of the following vowels: $F2$ values are lower following uvulars than velars, and lower following rounded than unrounded fricatives. Labiodental fricatives typically have flat spectra with poorly defined spectral peaks. Finally, the contrast between lateral fricatives and palatoalveolar sibilants is variably realized, depending on language and speaker, as a difference in the location of spectral peaks and/or centroid frequency.

2aSC2. The noise spectrum characteristics of retroflexed consonants in Mandarin Chinese. Jing-Yi Jeng (Dept. of Special Education, Natl. Tainan Teacher College, Taiwan, ROC)

Retroflexed consonants are the most complex and difficult sounds for Mandarin speakers. The four retroflexed consonants in Mandarin are produced with the tip of the tongue retracted and curled up close to the positions of the hard palate. The purpose of this study was to investigate the acoustic characteristics of retroflexed consonants for normal speakers. The moment analysis and the noise duration of retroflexed and nonretroflexed fricatives and affricates were studied for 10 adult speakers. Moment analysis is a statistical approach for the power spectrum. The results showed that retroflexed consonants had lower mean noise frequencies (M1) than nonretroflexed consonants. The standard deviation of noise energy frequencies (M2) of retroflexed consonants was smaller than those of nonretroflexed consonants. Results will be discussed in terms of the linkage between acoustic data and tongue positions. The discriminant analysis by using moment and duration parameters to classify word-initial retroflexed consonants was also reported.

2aSC3. New effects of laryngeal configurations on f_0 : Voiceless stops in Korean. Sunyoung Oh (Dept. of Linguist., Univ. of British Columbia, E270-1866 Main Mall, Vancouver, BC V6T 2E1, Canada, sunyoh@interchange.ubc.ca)

Korean has three sets of voiceless stops in word-initial position which are distinctive from one another in terms of laryngeal adjustments: lenis unaspirated, fortis unaspirated, and aspirated [P. Ladefoged and I. Maddieson, 47–101 (1996)]. It has been observed that, in Standard Korean, the aspirated stops have higher f_0 value than the fortis stops, while both stops have higher f_0 value than the lenis stops [D. Silva, 11–34 (1998)]. It could be argued that this indicates a universal correspondence between laryngeal configurations for voicing and pitch—at least within Korean. However, the current paper reveals a different observation. In South Kyungsang dialect in Korean, little difference is found in the f_0 value between the aspirated and the fortis stops, while the f_0 of the lenis stops is relatively lower, similar to Silva's (1998) finding. A total of 600 tokens, by five speakers, were recorded and digitized, then analyzed using Macquiere software for pitch tracking. The results show that the f_0 following the fortis stops are consistently higher than that of Standard Korean, regardless of the place of articulation, and the higher f_0 of the fortis stops patterns with the lower f_0 of the lenis stops among speakers.

2aSC4. Acoustic evidence of a phonetics-phonology mismatch in Nuu-chah-nulth. Ian L. Wilson (Dept. of Linguist., Univ. of British Columbia, Buchanan E270-1866 Main Mall, Vancouver, BC V6T 1Z1, Canada)

Measurements were made of the acoustic properties of the pharyngeal ʕ in Ahousht Nuu-chah-nulth (Nootka), an endangered language spoken on Vancouver Island. One goal of the study was to test whether phonetics and phonology make the same predictions regarding the classification of ʕ . Although the phonological data largely favors an analysis of ʕ as a type of glottalized pharyngeal stop, the results of acoustic measurements suggested that it is a glottalized glide. These acoustic measurements included a comparison of the waveforms and spectrograms of ʕ to those of glottalized resonants and glottalized stops. Three types of acoustic evidence were found to support the claim that ʕ is a glottalized glide. Specifically, the timing of glottalization in ʕ was like that of a glottalized resonant, rather than a glottalized stop; in several tokens full stop closure was not achieved; and the duration of the formant transition of ʕ is more like that of a glide than a stop. This acoustic evidence helps to illustrate one example of a phonetics-phonology mismatch, and the fact that there is a mismatch supports a modular view of grammatical organization. [Work supported by SSHRCC and NSERC Grants.]