of gain or loss of individual speech sound could be predicted. Speech banana has been constructed for English (Northern and Downs, 1984) and Swedish (Liden and Fant, 1954); however, none has been proposed for tonal languages, such as Thai. This work presents a construction of speech banana for Thai, a language with 21 consonants and 5 lexical tones. Specifically, intensity of each phoneme in the speech banana was calculated by differences of sound pressure level between the local maxima of power spectral density and equal loudness contour at 0 dB. Distribution of the 21 consonants is around 170-5700 Hz and 25-65 dB. Predictions of gain or loss of the phonemes from the constructed speech banana and audiograms were evaluated based on perception test results from seven Thai sensori-neural hearing loss patients, where they identified what they heard from a pair of rhyming words (210 stimuli) differing in initial phonemes, equally distributed across phonemes. Interestingly, the results showed high prediction rates of 71.4-85.7% for phonemes predominantly emphasized on frequency below 2000 Hz.

1:30

3pSC3. Effects of vowel duration and increasing dynamic spectral information on identification of center-only and edges-only syllables by cochlear-implant users and young normal-hearing listeners. Catherine L. Rogers, Gail S. Donaldson, Lindsay B. Johnson, and Soo Hee Oh (Commun. Sci. and Disord., Univ. of South Florida, USF, Dept. of Comm. Sci. & Dis., 4202 E. Fowler Ave., PCD1017, Tampa, FL 33620, crogers2@usf.edu)

In a previous study, cochlear implant (CI) users' vowel-identification performance was compared to that of young normal-hearing (YNH) listeners. Stimuli included full syllables and two duration-neutralized conditions: center-only and edges-only (silent-center). CI users performed more poorly than YNH listeners overall and showed proportionately larger decrements in performance for partial syllables. Error analyses suggested that at least some CI users rely more heavily on vowel-duration cues than YNH listeners. The present study was designed to test this hypothesis and to determine whether increasing duration of dynamic cues in the edges-only conditions would improve performance, particularly among poorer-performing CI users. Ten YNH listeners and ten adult CI users heard /dVd/ syllables recorded from three talkers. Full syllables were edited to create center-only and edges-only stimuli in which vowel duration cues were or were not preserved, plus edges-only stimuli with different durations of dynamic information. Performance of both groups improved in the duration-preserved condition for center-only, but not edges-only, stimuli. The center-only duration benefit was larger for the CI than for the YNH group. Increasing the duration of dynamic information in the silent-center stimuli improved vowel-identification performance for both groups. Individual differences among CI users and implications for listener-training programs will be discussed.

1:45

3pSC4. Communicative intent and affect in mothers' speech to hearing-impaired infants with cochlear implants. Maria V. Kondaurova, Tonya R. Bergeson (Otolaryngol. – Head & Neck Surgery, Indiana Univ. School of Medicine, 699 Riley Hospital Dr. – RR044, Indianapolis, IN 46202, mkondaur@iupui.edu), and Christine Kitamura (MARCS Lab., Univ. of Western Sydney, Penrith, NSW, Australia)

Emotional properties of infant-directed speech influence normal-hearing (NH) infants' attention to speech sounds. The current study examines communicative intent/affect in speech to hearing-impaired (HI) infants following the first year of cochlear implantation. Mothers of HI infants (HI group, ages 13.3—25.5 months), NH age-matched infants (NH-AM group, ages 13.5—25.7 months) and NH experience-matched infants (NH-EM group, ages 2.3—3.6 months) were recorded playing with their infants at three sessions over the course of one year. 25-second speech samples were low-pass filtered, leaving pitch but not speech information intact. Twelve adults rated stimuli along five scales of communicative intent/affect: Positive/Negative Affect, Intention to Express Affection, Encourage Attention, Comfort/Sooth and Direct Behavior. ANOVAs demonstrated main effects of Group and/or Session for all scales (ps = 0.01 to 0.07). Speech to HI and NH-EM infants was more positive, affective, encouraging, and comforting than speech to NH-AM infants. Mothers decreased affective (NH-EM group) and comforting (HI group) speech qualities over three sessions but increased directive behavior (NH-EM group). The results suggest that affective properties are modified in speech to HI infants depending on their hearing experience rather than chronological age. Mothers adjust these properties to their infant's developmental stage over the 12-month period.

2:00

3pSC5. Feature divergence of pathological speech. Steven Sandoval (School of ECEE, SenSIP Ctr., Arizona State Univ., 2323 E Apache Blvd., Apt. 2120, Tempe, AZ 85281, ssandova@gmail.com), Rene Utianski, Visar Berisha, Julie Liss (Speech and Hearing Sci., Arizona State Univ., Tempe, AZ), and Andreas Spanias (School of ECEE, SenSIP Ctr., Arizona State Univ., Tempe, AZ)

Many state of the art speaker verification systems are implemented by modeling the probability distribution of a feature set using Gaussian mixture models. In these systems, a decision is made by comparing a likelihood of an observation using both a Gaussian mixture model corresponding to an individual, and a Gaussian mixture model universal back ground model. In this study we propose to use a similar framework to instead characterize the divergence of the feature set distribution between healthy and pathological speech. We accomplish this by determining the difference between a universal background model trained on healthy speech and model of an individual's pathological speech. There are several known methods to evaluate the difference between two probability distributions, one example being the Kullback-Leibler divergence. By building a universal background model using healthy speech, we hope to capture the expected distribution of our feature space. Then by computing a difference between a dysathric individual's feature distribution, and the universal background model, we can determine the features that are most likely to capture the effects of a specific motor speech disorder.

2:15

3pSC6. The functional impact of incidental orofacial muscle activity. Lauren R. Johnson, Nancy L. Potter, and Mark VanDam (Speech & Hearing Sci., Washington State Univ., Spokane, WA)

Repetitive use of specific muscle groups is known to increase both strength and the ability to sustain muscle activity (i.e., endurance) of those muscle groups. Certain orofacial muscles are necessarily recruited in the course of playing a brass instrument, and thus regular performers may incidentally gain strength and endurance in the orofacial muscles used to perform. To test this possibility, 16 skilled trumpet players and 16 non-playing controls contributed strength and endurance (at 50% of maximum strength) measures for buccal, lingual, and labial muscle groups. Results indicate that trumpet players had greater cheek strength and lip endurance, but there were no differences between test and control groups for tongue strength or endurance. Findings suggest that incidental orofacial muscle activity may have a positive functional impact on orofacial muscle strength and/or endurance. This finding supports a clinically useful, objective measure for diagnosis and may be useful for functional rehabilitation for patients with orofacial disorders including those with Bell's palsy, complications associated with otitis media, acoustic neuromas, or other facial- or cranial nerve damage due to surgery, trauma, or disease.