

terns of the word guesses corresponded to the accent patterns of the actually spoken words with a probability significantly above chance from the second fragment onwards, i.e., from the middle of the vowel in the first mora of the word. Accent correspondence averaged 79.6% at this point, rising to 89% by the fourth fragment (vowel of second mora). This demonstrates that Japanese listeners can exploit pitch-accent information effectively at an early stage in the presentation of a word, and use it to constrain selection of lexical candidates.

5aSC5. Simultaneous communication in beginning signers, Part I: Temporal characteristics of speech. Robert L. Whitehead (Appl. Lang. and Cognit. Res., Natl. Tech. Inst. for the Deaf, 52 Lomb Memorial Dr., Rochester, NY 14623-5604), Nicholas Schiavetti, Dale Evan Metz, and Thomas Farrell (State Univ. of New York, Geneseo, NY 14454)

Simultaneous communication combines spoken English with manual representations of English words by signs and fingerspelling. The purpose of this study was to investigate temporal characteristics of speech produced during simultaneous communication (SC) by beginning signers. Audio recordings of stimulus words embedded in sentences produced with speech only and SC were made by 12 students during the first and last weeks of a 15 week introductory sign language course. Temporal measures included: (a) sentence duration; (b) experimental word duration; (c) vowel duration of the experimental word; (d) interword interval before the experimental word; and (e) interword interval after the experimental word. Results indicated significant temporal differences between speech-only and SC conditions at both the beginning and the end of the sign language course. In addition, a pattern emerged in which beginning signers first signed between words in SC, thereby extending interword intervals, and then, at the end of the sign language course, shifted toward attempting to simultaneously sign while speaking the words, thereby elongating segmental temporal characteristics such as vowel duration. These results are consistent with previous findings regarding the effect of simultaneous communication on temporal characteristics of speech with experienced signers.

5aSC6. Pathologic discrimination through acoustic analysis of voice. Marcelo de Oliveira Rosa, Jose Carlos Pereira (Escola de Engenharia de Sao Carlos, USP, R. Dr. Carlos Botelho, 1465, C. P. 359, Sao Carlos, SP, Brazil, 13560-250, marceloI@lim.sel.eesc.sc.usp.br), Simone Adad Araujo, and Marcos Grellet (Faculdade de Medicina de Ribeirao Preto, Ribeirao Preto, SP, Brazil, 14049-900)

The acoustic analysis of voice from dysphonic patients has been studied, mainly for classification of voice quality in terms of roughness, breathiness, and hoarseness. By a data reduction of speech signal, researchers have produced several acoustic measures in order to relate them with a perceptual diagnosis. In this work, a proposal was made to modify acoustic parameters in order to support a higher sample quantity, instead of using only a data window by digitalized speech. Also, robust statistics is used to obtain reliable measures that estimate the abnormal condition of a voice signal as well as to discriminate several pathologies of the larynx and vocal cords, without any perceptual consideration. Using only seven measures from adaptive inverse filtering (Kalman and Wiener filters) and a neural network for pattern classification on 228 voice signals of speakers (20 groups of distinct types of pathologies and one of normal speakers) evaluated through videolaryngoscopy, results of the pathologic discrimination showed 22% of uncertainty. Redrawing the patient sample in seven distinct groups (five with defined pathologies, one with all others pathologies, and one control), then the error in the pathologic discrimination is 18%. [Work supported by Capes.]

5aSC7. Acoustic cues to syntactic structure. Kris Tjaden, Lewis P. Shapiro (Dept. of Commun. Disord., San Diego State Univ., 5500 Campanile Dr., San Diego, CA 92182-1518), Janet Nicol (Univ. of Arizona, Tucson, AZ 85721), and David Swinney (Univ. of California at San Diego, La Jolla, CA 92093-0109)

Duration and fundamental frequency (f_0) are used by listeners in on-line sentence processing as cues to syntactic structure [H. Nagel, L. P. Shapiro, and R. Nawy, *J. Psycholing. Res.* **23**, 473–485 (1994)]. Research suggests, however, that speakers may not reliably use duration and f_0 to disambiguate syntactic structures [D. W. Albritton, G. McKoon, and R. Ratcliff, *J. Exp. Psych.* **22**, 714–735 (1996)]. The present study explored prosodic differences in a variety of syntactic structures for sentences read by five speakers. Speakers failed to utilize f_0 or duration to disambiguate verbs followed by either a direct object or sentential clause; this finding does not support Nagel *et al.*'s (1994) results for one speaker. In contrast, intransitive verbs were characterized by longer durations and greater f_0 excursion as compared to transitive verbs. Acoustic differences for noun phrases (NPs) following transitive and intransitive verbs also were present; NPs following transitive verbs were longer in duration and were associated with a steeper f_0 change, as compared to NPs following intransitive verbs. The results suggest that speakers may distinguish some but not all syntactic structures using the prosodic cues of f_0 and duration; implications for theories of on-line sentence processing will be discussed. [Work supported by NIH DC00494, DC03347.]

5aSC8. Rethinking the basics of declination. Yi Xu (2299 N. Campus Dr., Northwestern Univ., Evanston, IL 60208)

Declination, the tendency of fundamental frequency to gradually fall over the course of an utterance, has for a long time been treated as if it were a universal principle of speech intonation. Most intonation models adopt declination as a baseline upon which more local F_0 patterns reside. A reexamination of the literature related to declination finds, however, that the existence of declination as an independent F_0 -determining mechanism is far from being firmly established. Instead, some recent as well as earlier studies are found to provide evidence that various linguistic factors may be responsible for generating different local as well as global patterns of intonation, which, taken as a whole, may sometimes give the appearance of declination. These factors include sentence focus, topic initiation, word stress, and lexical tone. When these factors happen to be neutralized, virtually flat F_0 contours may occur, as have been observed in some tone languages. Furthermore, the commonly assumed declination rate is found to well exceed the possible rates of pitch decline due to global physiological limitations. It is concluded that, rather than being a basic principle of intonation, declination is more likely to be an artifact of various linguistic factors plus certain local physiological constraints.

5aSC9. Interactions among F_0 , duration, and amplitude in the perception of focus. H. Timothy Bunnell, Steven R. Hoskins, and Debra Yarrington (duPont Hosp. for Children/Univ. of Delaware, 1600 Rockland Rd., Wilmington, DE 19803)

F_0 , amplitude, and durational cues are considered the primary acoustic correlates of focus or sentence-level stress. However, questions remain regarding: (a) the degree to which each of these cues are necessary or sufficient for signaling focus; (b) the relative importance of each of these cues; and (c) how they interact in the perception of focus. Natural productions of the sentence "Bob bought Bogg's box," in which focus was varied over each of the four words of the sentence were altered to produce prosodic cue neutralized versions. The alterations were applied singly and in all possible combinations to form eight experimental versions of each original sentence (the original and seven cue-neutralized versions). The sentences were presented to listeners with the task of identifying the focused item in the sentence. Results indicated that: (a) neutralizing any acoustic cue produced some degradation in performance, but even with all cues nullified, performance remained above chance for at least some words; (b) overall, F_0 was more important than either amplitude or dura-