Session 3aSC

Speech Communication: Development, Disorders, Etc. (Poster Session)

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Contributed Papers

All posters will be on display from 8:30 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 8:30 a.m. to 10:15 a.m. and contributors of even-numbered papers will be at their posters from 10:15 a.m. to 12:00 noon.

3aSC1. Syntactic location facilitates word segmentation by infants. Elizabeth K. Johnson, Amanda Seidl, and Peter W. Jusczyk (Psych. and Cognit. Sci. Depts., Johns Hopkins Univ., 3400 N. Charles St., Baltimore, MD 21218)

English learners begin to segment words and parse speech into prosodic units between 6 and 12 months. Recent experimental evidence suggests that segments are more fully realized at the edges of major syntactic constituents. For example, the [s] in ''bass'' will completely assimilate to [S] in the absence of a major syntactic boundary between the words ''bass'' and ''shoppers.'' In this study, we examine whether the location of words in a phrase (and hence the phonological strength of a word's initial segment) affects infants' segmentation. Eleven-month-olds were familiarized with stories containing the target words ''acorn'' and ''shoppers,'' using the head-turn preference procedure. For half of the infants, ''shoppers'' occurred after a major syntactic boundary, whereas ''acorn'' did not. For the other half, ''acorn'' occurred after a strong syntactic boundary, but ''shoppers'' did not. Infants in the first condition listened significantly longer to isolated versions of ''shoppers'' than to ''acorn.'' In contrast, infants in the second condition listened equally long to both familiar words. These findings suggest that words located at major syntactic boundaries are easier to segment. Our results also provide further evidence that infants' segmentation of vowel-initial words is delayed compared to their segmentation of consonant-initial words.

3aSC2. Infants use of visual information in speech segmentation. George J. Hollich, Peter W. Jusczyk (Johns Hopkins Univ., Baltimore, MD), and Rochelle S. Newman (Univ. of Maryland)

What are infants abilities to segment the running stream of speech in a noisy environment? Infants often find themselves in situations far louder and more complex than the acoustic isolation chambers and minimalist rooms of traditional infant testing. The current series of studies used the headturn preference procedure (with video familiarization) to examine 7.5-month-old infants abilities to use visual/auditory correlations to reliably segment a given speech stream in the face of a distracting voice. Results indicated that infants gained a 10-dB advantage when the visual display matched the acoustic passage. That is, when two blended voices were of equal loudness, infants could use visual correspondences to reliably recognize words presented in the matching video. In contrast, in cases where the target voice was 5 dB softer than the distracting voice or a static picture of the face was presented, infants did not show an ability to segment the speech stream.

3aSC3. Infant-directed vowels are easier to learn for a computer model. Bart de Boer and Patricia K. Kuhl (Ctr. for Mind, Brain, and Learning, Univ. of Washington, Box 357988, Seattle, WA 98195)

When addressing infants, caretakers use a special register, called ''motherese'' or ''parentese.'' Kuhl *et al.* (Science, 1997) demonstrated that the formant patterns of the centers of vowels in this register are farther apart than those in adult-directed speech, and postulated that this helps children learn the categories of speech in their language. In this study, this hypothesis was tested with a computer model. Three words were used: sock, shoe, and sheep. Recordings of these words were available from ten mothers in both infant-directed and adult-directed registers. The first two formants were automatically extracted from the voiced parts of each word. Automatic formant extraction often results in formant patterns with errors, but no corrections were made. After formant extraction, their distributions were compared and a mixture of three Gaussians was fitted to the data points. The results demonstrated that infant-directed tokens not only used a larger part of the acoustic space, but also resulted in a better distribution of the centers of the Gaussians, indicating better patterning of the input. Better patterning of the input makes it easier to learn the categories of speech sounds. [Research supported by the NIH and the Talaris Research Institute.]

3aSC4. Analysis on infant speech with longitudinal recordings. Shigeaki Amano, Tadahisa Kondo, and Sachiyo Kajikawa (NTT Commun. Sci. Labs., NTT Corp., 2-4 Hikari-dai, Seika-cho, Souraku-gun, Kyoto 6190237, Japan)

The utterances of five infants with their parents was recorded every month from their birth until five years old to investigate spoken language development from the viewpoint of acoustic characteristics. Recording time was at least one hour per month. An infant speech database is now being developed from the recordings. Each entry of the database contains a speech file of an utterance and its transcription with some tags such as speaker, utterance category, and clarity. Using a beta version of the database, preliminary analyses were conducted on utterance duration, speaking rate, interutterance interval, and utterance overlap. Some tendencies were observed. For example, utterance duration became longer for infants as a function of infant age, but it was almost constant for parents. On the other hand, the speaking rate was almost constant (about 4 mora/s) for infants but became faster (from 6 to 8 mora/s) for parents as a function of infant age. An interutterance interval of ''Parent to Infant'' correlated with that of ''Infant to Parent,'' even before infants spoke a word. Parent utterance often overlapped infant utterance only after infants spoke two-word sentences. The implication of these tendencies for spoken language development is discussed.