

7–8, and 9–11, children with phonological disorders, ages 4–11, and typical adults were studied. Twelve CVC words and nonwords, six high probability and six low probability, were used as stimuli. Each subject produced the stimulus items for audio-recording and later waveform analysis. Acoustic measurements, specifically duration, differed based upon the phonotactic probability of the stimulus item. Differences in the acoustic measurements of these productions by children of varying ages and language abilities reflect the influences of phonological and lexical variables of words stored in the mental lexicon. Results will be discussed with respect to developmental implications and cognitive skills.

4aSC11. Word perception in time-compressed speech. Hugo Quené^{a)} and Esther Janse (Utrecht Inst. of Linguist, Utrecht Univ., Trans 10, NL-3512 JK Utrecht, The Netherlands, hquene@indiana.edu)

Certain applications, e.g., voicemail playback or text read-out, time-compress their output speech, usually in a linear fashion. This paper compares spoken-word perception, as measured by phoneme monitoring, in natural fast-rate speech and in normal-rate speech that is linearly time-compressed to the same fast rate. Perception is predicted to be more difficult in the natural-fast condition, in spite of its naturalness, due to its reduced articulation and intelligibility. Results show that listeners indeed reacted considerably faster in the time-compressed condition, as predicted. Nevertheless, the time-compressed condition suffers from inappropriate timing patterns, since fast-rate speech timing patterns differ from normal-rate speech on which it is based. In a second experiment, it is investigated whether perception can be improved by providing listeners with the appropriate timing patterns. To this end, the timing patterns (segmental durations) of time-compressed speech are manipulated to equal those of natural-fast speech. Hence the effects of segmental intelligibility and of temporal patterns can be separated. In summary, results obtained so far show that spoken-word perception in natural-fast speech is hampered by speakers reduced articulation. In time-compressed speech, the perceptual advantages of improved segmental intelligibility are apparently more important than the abnormality of hearing very fast but fully articulated speech. ^{a)}Hugo Quené is currently at Linguistics Department, Indiana University, Bloomington, Indiana.

4aSC12. Positional and planning effects on the durational structure of repetition strings. Alan Bell and Cynthia Girand (Dept. of Linguist., Univ. of Colorado, Boulder, CO 80309, abell@psych.colorado.edu)

Gaining time to resolve some difficulty in the production of upcoming speech is the primary function of unplanned repetitions. Understanding their duration structure is thus crucial to modeling their production, which surely differs greatly from fluent phrases. When the duration structure of the entire repetition string of unplanned repetitions is examined, strong global dependencies are found. Repetition strings are words/phrases repeated once or more, together with silent and filled pauses optionally occurring next to them. The main effects are that durations of first and second string items, whether repeated words or pauses, are positively correlated with the duration of the rest of the string; items, whether words or pauses, are shorter as they occur later in the string; and strings that begin with a pause average longer than strings that do not. The study is based on an analysis of 503 disfluent repetitions taken from the ICSI phonetically transcribed sample of the Switchboard conversation corpus, extensively checked and recoded. The results help explain local durational dependencies of the repeated words [Bell and Girand, LabPhon 7 (2000)] and imply that the articulation of repetitions is influenced from the onset by the nature and degree of difficulty they address.

4aSC13. Frequency and predictability effects on the duration of content words in conversation. Michelle Gregory (Dept. of Linguist. and Cognit. Sci., Brown Univ., Providence RI 02912, michelle_gregory@brown.edu), Alan Bell, Daniel Jurafsky (Dept. of Linguist., Univ. of Colorado, Boulder, CO 80309), and William Raymond (Dept. of Linguist., Ohio State Univ., Columbus, OH 43210)

This study carefully examines the proposal that word forms in conversation are shorter when they have higher probability, where this includes all factors of their context (Jurafsky *et al.*, *Frequency and the Emergence of Linguistic Structure*, edited by Bybee and Hopper, 2001, pp. 229–254). Higher word frequencies have long been known to be linked to shorter durations. But it has been hard to confirm a direct relationship between the two. One confound is with predictability or conditional probability, which also affects surface form and is closely related to frequency. Another difficulty is controlling factors related both to duration and contextual probability. Linear regression (and sampling to avoid violating independence assumptions) was used to control for phonological form, speech rate, prosodic prominence, previous uses, and neighboring disfluencies. Both greater word frequencies and greater conditional probabilities given the following word have a strong shortening effect on durations of content words. The effect of other probability measures considered did not reach significance. The study is based on a sample of about 1000 content words from a portion of the Switchboard corpus, phonetically transcribed at ICSI, Berkeley, and coded for intonation by P. Taylor, M. Ostendorf, and S. Shattuck-Hufnagel. [Work supported by NSF.]

4aSC14. Frequency and category factors in the reduction and assimilation of function words. Dara Kanwischer, Bryan Gick, Ian Wilson (Univ. of British Columbia, Dept. of Linguist, E270-1866 Main Mall, Vancouver, BC V6T 1Z1, Canada, gick@interchange.ubc.ca), and Rusheh Shi (Univ. of British Columbia, Vancouver, BC V6T 1Z3, Canada)

It has been observed that there are phonetic and phonological differences between function words and content words. However, it is unclear whether these differences are actually the result of the distinct syntactic categories, or of other secondary effects such as frequency or stress. A production experiment was conducted to distinguish between the factors of category and frequency while controlling for stress. EPG and acoustic data were collected for five subjects. The effects of the two factors were examined within several processes of reduction and assimilation, including final-t/d dropping, initial-/h/ dropping, and palatalization. Preliminary results suggest that both word frequency and category are important factors in these processes. The consonant-dropping processes seem to show a strong sensitivity to category, but also show within-category effects of frequency. Palatalization appears to be a more gradient phonetic process, with results thus far suggesting greater sensitivity to frequency than to category. The fact that the same processes were affected by both factors suggests that at least some of the phonetic and phonological properties traditionally assigned to function words as a category may be wholly or partly the result of high word frequency. [Research supported by NSERC.]

4aSC15. Representational specificity of lexical form in the perception of spoken words. Conor T. McLennan, Paul A. Luce, and Jan Charles-Luce (Lang. Percept. Lab., Univ. at Buffalo, 245 Park Hall, Buffalo, NY 14260)

The specificity of form-based lexical representations of spoken words was examined. Using a repetition-priming paradigm, we attempted to determine (1) if flapped intervocalic alveolar stops in American English are mapped onto underlying representations of /t/, /d/, or both or (2) if flaps have an independent representational status. Participants shadowed or made lexical decisions to spoken words in two blocks of trials. Stimuli in the first block served as primes and those in the second block as targets. Primes and targets consisted of flapped and carefully articulated bisyllabic