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2aSC16. Korean students' repetition of English sentences mixed with noise at various speed. Byunggon Yang (Dept. of English Education, Pusan Natl. Univ., 30 Changjum-dong, Keumjung-gu, Pusan 609-735, South Korea) and Eunjee Kim (Dongeui Univ, Pusanjin-gu, Pusan 614-714, South Korea) MANYorean students feel quite frustrated by native speakers' fast talk, especially in a noisy situation. In this study, it was examined how well 33 Korean university students repeat 48 recorded English sentences at normal speed, fast speed, normal speed mixed with noise, and fast speed mixed with noise. The subject's production was scored by the percent ratios of correctly produced words to the total words in each sentence. Results showed that overall the student group correctly repeated around 65% of all the words, while the native speakers demonstrated almost perfect performances. Students achieved 69% and 61% accuracy in their repetition of content and function words, respectively. The high-proficiency group outperformed the low-proficiency group, particularly in their repetition of function words. Student's accuracy of repetition remarkably dropped when both the speed and noise of normal sentences were modified. The noise condition seemed to have the strongest effect on their accuracy. Finally, it was observed that the more words a stimulus sentence had, the harder the Korean students found it to repeat correctly. Those results may be helpful for English teachers to develop better teaching materials for listening skills and to offer some criteria of proficiency level in English.

2aSC17. Identification of American English vowels by native Japanese speakers: Talker-and-token-based analysis. Takeshi Nozawa (Faculty of Economics, Ritsumeikan Univ., 1-1-1 Nokihigashi, Kusatsu, Shiga, 525-8577 Japan), Elaina M. Frieda (Auburn Univ., Auburn, AL 36849), and Ratree Wayland (Univ. of Florida, Gainesville, FL 32611) Native speakers of Japanese identified American English vowels /i, ɪ, ɛ, ɔ, ʌ/ produced by four female native speakers of American English in /CVC/ contexts. Native speakers of American English served as the control group, and they outperformed the Japanese subjects in identifying all the English vowels in every /CVC/ context. In another experiment the Japanese subjects equated these English vowels with Japanese vowels. In general, English vowels were equated with phonetically close Japanese vowels, but significant talker effect was observed. The /ɪ/ tokens equated with the Japanese long high front vowel /a:/ were much more correctly identified as /ɪ/ than those equated with the Japanese short high front vowel /i/. These tokens were more often misidentified as /h/. The /ɜ:/ and /ɜ/ tokens were predominantly equated with the Japanese low vowel /a/. The percent-correct identification of /æ/ and /ʌ/ was low in most of the /CVC/ contexts, and these two vowels were often misidentified as each other, and the Japanese subjects' latency before they decided what vowel they had heard was longer when /æ/ or /ʌ/ tokens were presented. The Japanese subjects do not seem to have salient cues to differentiate /æ/ and /ʌ/.

2aSC18. Does clear speech enhance the voice onset time contrast in Croatian and English? Rajka Smiljanic and Ann Bradlow (Linguist., Northwestern Univ., 2016 Sheridan Rd., Evanston, IL 60208) This study investigates the effect of intelligibility-enhancing clear speech on voice onset time (VOT) in two languages with different phonetic realizations of a two-way voicing contrast. Specifically, it was explored whether the contrasts between prevoiced and short-lag categories in Croatian and short-lag and long-lag categories in English are enhanced along the VOT dimension in clear speech. Word-initial stops in words embedded in sentences read by native speakers of each language in conversational and clear speaking styles were examined. The results revealed that in English, the long-lag category (i.e., voiceless) extended somewhat in the positive VOT direction (longer aspiration), and in Croatian, the prevoiced category (i.e., voiced) extended somewhat in the negative VOT direction (longer prevoicing) in clear speech. However, in both languages, the short-lag tokens (i.e., voiced in English, voiceless in Croatian) were unchanged in clear versus conversational speech. Overall, then, the distance between the two voicing categories was rather stable across the two speaking styles in both languages. These results suggest that VOT is not a dimension of voicing category contrast enhancement. Rather, the language-specific pronunciation norms along this dimension are maintained in clear and conversational speech.

2aSC19. Tuning in and tuning out: Speech perception in native- and foreign-talker babble. Kristin Van Heukelom and Ann R. Bradlow (Linguist. Dept., Northwestern Univ., 2016 Sheridan Rd., Evanston, IL 60208, k-van@northwestern.edu) Studies on speech perception in multtalker babble have revealed asymmetries in the effects of noise on native versus foreign-accented speech intelligibility for native listeners [Rogers et al., Lang Speech 47(2), 139–154 (2004)] and on sentence-in-noise perception by native versus non-native listeners [Mayo et al., J. Speech Lang. Hear. Res., 40, 686–693 (1997)], suggesting that the linguistic backgrounds of talkers and listeners contribute to the effects of noise on speech perception. However, little attention has been paid to the language of the babble. This study tested whether the language of the noise also has asymmetrical effects on listeners. Replicating previous findings [e.g., Bronkhorst and Plomp, J. Acoust. Soc. Am., 92, 3132–3139 (1992)], the results showed poorer English sentence recognition by native English listeners in six-talker babble than in two-talker babble regardless of the language of the babble, demonstrating the effect of increased psychoacoustic/energetic masking. In addition, the results showed that in the two-talker babble condition, native English listeners were more adversely affected by English than Chinese babble. These findings demonstrate informational/cognitive masking on sentence-in-noise recognition in the form of linguistic competition. Whether this competition is at the lexical or sublexical level and whether it is modulated by the phonetic similarity between the target and noise languages remains to be determined.

2aSC20. Second language vowel training using vowel subsets: Order of training and choice of contrasts. Kanae Nishi and Diane Kewley-Port (Dept. of Speech and Hearing Sci., Indiana Univ., 200 S. Jordan Ave., Bloomington, IN 47405) Our previous vowel training study for Japanese learners of American English [J. Acoust. Soc. Am. 117, 2401 (2005)] compared training for two vowel subsets: nine vowels covering the entire vowel space (9V condition); and the three more difficult vowels (3V condition). Trainees in 9V condition improved on all vowels, but their identification of the three most difficult vowels was lower than that of 3V trainees. Trainees in 3V condition improved identification of the trained three vowels but not the other vowels. In order to further explore more effective training protocols, the present study compared two groups of native Korean trainees using two different training orders for the two vowel subsets: 3V then 9V (3V-9V); and 9V then 3V (9V-3V). The groups were compared in terms of their performance on all nine vowels for pre-, mid-, and post-test scores. Average test scores across the two groups were not different from each other. A closer examination indicated that group 3V-9V did not improve on one of the three more difficult vowels, whereas group 9V-3V improved on all three vowels, indicating the importance of training subset order. [Work supported by NIH DC-006313 and DC-02229.]

2aSC21. Lexical status effects on compensation for fricative assimilation. Claudia Kuzla, Holger Mitterer, and Anne Cutler (Max Planck Inst. for Psycholinguist., P.O. Box 310, 6500 AH Nijmegen, The Netherlands) In German, word-initial voiced fricatives may be devoiced if they follow /h/. This assimilation could make recognition of words beginning with /h/ harder, since there may be competing words beginning with /h/, but will not affect words beginning with /l/, since initial /l/ in German is illegal. Previous research has shown that speakers indeed produce more
assimilation across word boundaries than across phrase boundaries for /l/, but inhibit the assimilation across word boundaries for /v/. In the present study, German listeners identified the fricative continua /f–v/ and /s–z/, across word-versus-phrase boundaries, in viable-versus-nonviable contexts for assimilation. Less voicing was required for a /v/ judgment in viable than in nonviable assimilation contexts. This context effect was larger after a word boundary than after a phrase boundary. Within the viable-context condition, a prosodic effect appeared for /f–v/, with less voicing required for /v/ judgments after a word than a phrase boundary, but no such effect appeared for /s–z/. This asymmetry reverses the difference observed in production. Thus, listeners adjust phoneme category boundaries to compensate for prosodically conditioned variation where such adjustment is functional for word recognition, but show less compensation where adjustment would have no functional consequences.

2aSC22. Lexical statistics of competition in L2 versus L1 listening.
Anne Cutler (Max Planck Inst. for Psycholinguist., F.O. Box 310, 6500 AH Nijmegen, The Netherlands)

Spoken-word recognition involves multiple activation of alternative word candidates and competition between these alternatives. Phonemic confusions in L2 listening increase the number of potentially active words, thus slowing word recognition by adding competitors. This study used a 70,000-word English lexicon backed by frequency statistics from a 17,900,000-word corpus to assess the competition increase resulting from two representative phonemic confusions, one vocalic (ae/æ) and one consonantal (/l/), in L2 versus L1 listening. The first analysis involved word embedding. Embedded words (cat in cattle, rib in ribbon) cause competition, which phonemic confusion can increase (cat in kettle, rib in liberty). The average increase in number of embedded words was 59.6 and 48.3 temporary ambiguity. Even when no embeddings are present, multiple alternatives are possible: para- can become parrot, paradise, etc., but also pallet, palace given /l/–/l/ confusion. Phoneme confusions (vowel or consonant) in first or second position in the word approximately doubled the number of activated candidates; confusions later in the word increased activation by on average 53 third, 42 confusions significantly increase competition for L2 compared with L1 listeners.

2aSC23. Some novel allophonic and phonemic phenomena in Biscayan Basque. Rebeka Campos-Astorkiza (Linguist. Dept., Univ. of Southern California, University Park GPS 301, Los Angeles, CA 90089-1693, rebekaca@usc.edu)

An acoustic study of novel allophonic and phonemic phenomena in the isolate language Basque is presented. The focus is on speakers of the Biscayan dialect. First, Basque shows a spirantization process by which voiced plosives are produced as approximants, particularly intervocally. Interestingly, we find that Basque /ll/ sequences, where spirantization is not expected [Hualde (1991) Basque Phonology], are realized as a lateral approximant followed by a voiced lateral fricative. Second, in this variety of Basque, the historical three-way contrast among sibilants (two alveolars and one postalveolar) has been reduced to a two-way distinction. The original contrast, still found in other varieties, between a laminal alveolar and an apical alveolar has merged with different results depending on the tonicity of the sibilants. Third, Basque presents a contrast between trill and flap intervocally. However, elsewhere this is neutralized, and the precise realization of this segment varies from trill to frication. Finally, the Basque five-vowel inventory allows for almost any sequence of two vowels. The same vowel sequence might be a diphthong (tautosyllabic) or a hiatus (heterosyllabic) depending on the lexical item. That is, diphthongs and hiatus are contrastive. [Submitted for the student paper competition.]