Perception of American-English in noise by Greek listeners

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CC8. Effects of category knowledge and syllable truncation during auditory training on Americans' discrimination of Hindi retroflex-dental contrasts. John S. Pruitt (Dept. of Psychol., Univ. of South Florida, Tampa, FL 33620-8300), Winifred Strange, Linda Polka, and Manuela C. Aguilar (Dept. of Commun. Sci. and Disorders, Univ. of South Florida, Tampa, FL 33620-8300)

Previous research has shown that the Hindi retroflex-dental contrast among stop consonants is not easily differentiated by English speakers even after some training. In the present study, subjects were given four days of training (768 trials) in a categorial AX discrimination task on full (unmodified) or truncated tokens of naturally produced breathy-voiced [ɖʰa] vs [d̪ʰa]. Truncation involved removing the vowel from the syllables. Half the subjects were given category knowledge during training (i.e., response forms listed the identity of the first token of each pair). Truncation of the stimuli resulted in better performance during training, but the advantage did not transfer to post tests with the full syllables. Category knowledge resulted in greater improvement during training on both truncated and full syllables. It also led to better performance on the post test of full syllables only for subjects trained on full syllables. Large individual differences found in each training condition suggest that subjects' strategies may be more important than stimulus and task variables in predicting success in perceptual differentiation of non-native contrasts.

CC9. Discrimination of syllable duration in English and French short sentences. Yukihiro Nishinuma (CNRS URA 261, Inst. de Phonétique, Univ. de Provence, 13621 Aix-en-Provence, France)

Two experiments were conducted in order to study the perceptual discrimination of syllable duration within sentences. Two natural French sentences and one English sentence, each consisting of eight syllables were resynthesized with 15% increases and decreases in syllable duration up to ± 60%. The modified, then randomized, stimuli were presented once to 20 subjects whose task was to judge how natural they sounded (experiment I). The same stimuli were then used to determine whether the modifications in duration were perceptible (experiment II). The results provide evidence of the fact that judgment of the rhythmic quality of sentences (a psycholinguistic task) and temporal discrimination (a psychoacoustic task) both have the same functional basis. The differential limen found in two experiments for both languages is remarkably similar and its estimated value is approximately 25% for an average syllable duration.

CC10. Perception of American–English in noise by Greek listeners. Maria Roussohatzaki and Mary Florentine (Commun. Res. Lab., 133 FR, Northeastern Univ., Boston, MA 02115)

This study examined the ability of Greek listeners to understand American–English in noise. The speech perception in noise (SPIN) test was administered at 75 dB SPL in the presence of babble noise to 23 Greek and 10 American listeners with normal hearing. The Greek listeners had studied English for an average of 8 yr and lived in the U.S. for an average of 2.5 yr. Noise levels were chosen in 3-dB steps to encompass the range from 20% to 90% correct performance. At each noise level, 50 new sentences were presented and the percent correct for 25 high- and 25 low-predictability sentences was measured. Results show (1) the slope of the psychometric functions in terms of Z score per decibel of speech-to-noise ratio was steeper for the native than the Greek listeners, (2) the native listeners could obtain 50% correct performance at significantly higher noise levels (about 3 dB) than the Greek listeners, (3) both groups performed significantly better on the high-predictability sentences than on the low-predictability sentences, and (4) the difference in tolerable noise levels (levels yielding 50% correct) between the high- and low-predictability sentences was the same for both groups. These results corroborate earlier studies with other non-native languages [e.g., Florentine, J. Acoust. Soc. Am. Suppl. 1 77, S106 (1985)].

CC11. Contribution of duration and intensity to the perception of prominence. Ilse Lehiste (Dept. of Linguistics, Ohio State Univ., Columbus, OH 43210) and Robert Allen Fox (Division of Speech and Hearing Science, Ohio State Univ., Columbus, OH 43210)

In a comparison of word stress perception in Estonian and Russian, Arvo Eek showed that the stress judgments of Estonians were mostly associated with F0 patterns, while for Russians, duration was the leading parameter [*In Honor of Ilse Lehiste*, edited by R. Channon and L. Shockey (Foris, Dordrecht, Holland, 1987)]. Intensity played a negligible role for listeners with either language background. The current experiment describes perception of prominence by English and Estonian listeners under conditions where no F0 is present. Listeners heard sequences of four "noise" tokens created by randomly changing the polarization of individual samples of a digitized [ba]. The basic token was 400 ms in duration. However, in the experimental trials, one token in the sequence could be lengthened to 425, 450, or 500 ms and/or one token could be increased in intensity by 3 or 6 dB—the duration and intensity changes were independent. Listeners were required to indicate which token was "more prominent." Listening tests were given to 24 native speakers of English in Columbus, Ohio and to 38 native speakers of Estonian in Tallinn, Estonia. The responses showed that for English listeners, intensity cues overrode duration cues, while Estonian listeners were more responsive to duration cues. [Work supported partly by NSF.]

CC12. Noncategorical perception of a voiced–voiceless fricative continuum. C. Formby, H. L. C. Olson (Dept. of Commun. Disorders, Box J-174/JHMHC, Univ. of Florida, Gainesville FL 32610), D. G. Childers, A. L. Lalwani (Dept. of Elec. Eng., Univ. of Florida, Gainesville, FL 32611), and J. J. Raney (Psychoacoustics Lab., Dept. of Psychol., Univ. of Florida, Gainesville, FL 32611)

A nine-token synthetic VOT continuum for /feɪl/–/veɪl/ was constructed with 10-ms steps in fricative voicing. Perceptual studies revealed better-than-chance discrimination between pairs of tokens labeled /feɪl/, chance discrimination between pairs of tokens labeled /veɪl/, and a slight peak in the discrimination function at the labeling boundary between /feɪl/ and /veɪl/. To better understand the noncategorical discrimination data, relative onset time (ROT) difference limens were measured for a range of durations of a 100-Hz sawtooth waveform, which served as the analog for voicing in the speech continuum. ROT difference limens increased systematically with increasing duration of the standard sawtooth waveform. The ROT data suggest that better-than-chance discrimination near the /feɪl/-endpoint and chance discrimination near the /veɪl/-endpoint reflect larger absolute difference limens for onset of voicing as voicing duration was increased from /feɪl/ to /veɪl/. Traditional phonetic processes presumably account for the slight peak in the discrimination function at the labeling boundary between the /feɪl/ and /veɪl/ categories. [Research supported by NIH.]

CC13. Perceptual learning of /r/ and /l/ by Japanese speakers of English: Effects of phonetic environment. Scott Lively and John Logan (Speech Res. Lab., Indiana Univ., Bloomington, IN 47405)

Six adult Japanese speakers of English were trained for 15 days in a 2 AFC identification paradigm. Training stimuli were minimal pairs contrasting /r/ and /l/ in initial position, initial cluster, and intervocalic positions. The training stimuli were produced by five talkers. Subjects participated in a pretest, a post test, and two tests of generalization. Subjects improved their identification performance from week to week and were differentially sensitive to the voices of the training talkers and to the phonetic environment in which the /r/–/l/ contrasts occurred. These results replicated the earlier findings of Logan, Lively, and Pisoni (1989). The results are discussed in terms of a stretching and shrinking of the non-native speaker's perceptual space for the /r/–/l/ contrast. [Work supported by NIDCD.]