APRIL 01 1992

Acoustic-perceptual factors in nasal place assimilation. FREE

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J. Acoust. Soc. Am. 91, 2473 (1992)
https://doi.org/10.1121/1.402979

Categorical perception of certain speech and speech-like sounds has been critical to models of speech perception for decades. Furthermore, refining our knowledge of the stimulus and task characteristics that lead to categorical perception continues to be an important part of research in speech perception. Auditory evoked potentials (AEPs) have the capability of providing new perspectives on this important phenomenon. The mismatch negativity (MMN) AEP is elicited in response to a physically deviant stimulus occurring in a series of standard stimuli [Näätänen *et al.*, Acta Psychol. **42**, 313–329 (1978)]. The MMN has been shown to be sensitive to fine acoustic differences and was used in the present study to examine a stimulus continuum that typically leads to categorical perception. The primary auditory cortex is thought to be a major source contributing to the generation of the MMN. In the present experiment a stimulus continuum ranging from /da/ to /ga/ was synthesized by varying the frequencies of F_2 and F_3. An identification task showed the expected steep slope in the identification function along this continuum, indicating that they were perceived categorically. An electrophysiologic index of discrimination was obtained by recording the MMN in adults to stimulus pairs, having equal acoustic differences, within and across categories. The MMN was observed in all subjects and was the same size both across and within categories. That is, the MMN indicated equal discrimination both across and within categories. These results suggest that the MMN reflects the processing of auditory aspects of these speech-like signals, but not processing into phonetic categories.

2:50–3:05

Break

3:05

9SP8. Acoustic-perceptual factors in nasal place assimilation. Patrice Speeter Beddor and David K. Evans-Romaine (Program in Linguistics, Univ. of Michigan, Ann Arbor, MI 48109)

Phonologically, nasal consonants often assimilate to the place of a following oral stop. While the source of this assimilation is generally taken to be anticipatory coarticulation, this study examines the possibility that acoustic-perceptual factors are partially or even primarily responsible. Two American English speakers produced /zV́NCə/ tokens (V = /ɪ/, /æ/, /ə/; NC = /mb/, /nd/, /ŋg/). Stimuli were split into /zVN/ and /Cə/ portions. /zVN/ portions whose final N was identified with at least 97% accuracy (four judges) were cross-spliced with /Cə/ portions to yield all possible N–C pairings. Listeners identified N and C of the cross-spliced /zV́NCə/ stimuli. Homorganic clusters were correctly identified 95% of the time (preliminary results with eight listeners). Listeners varied in accuracy of N identification in nonhomorganic clusters, but across subjects one-third of nonhomorganic nasals were misidentified, with homorganic responses comprising 80% of these errors. Although different places of articulation showed different response patterns, overall results indicate that place cues for nasals may be overridden by those of a following oral stop. Even nasals whose place is unambiguous in final position may shift perceptually before heterosyllabic oral stops.

3:20

9SP9. The role of allophonic variation in the perception of the junctural position of /l/. Dawn L. Dutton (Dept. of Psychol., SUNY at Buffalo, Amherst, NY 14260)

Many theories of spoken word recognition assume speech is segmented at syllable or word boundaries prior to contact with the lexicon. A number of researchers [see K. W. Church, Cognition **25**, 53–69 (1987)] have observed systematic acoustic differences (or allophonic variations) within a phonetic class that may serve as cues to juncture points between syllables or words. The most common difference cited between syllable initial and syllable final /l/ is the proximity of the first two formants. Some researchers have also noted a difference in the amplitude profile of /l/ depending on its position relative to a word boundary. In this experiment, two starting phrases, "see leaves" and "seal eaves," were synthesized. *F*1 frequency profile, *F*2 frequency profile, and amplitude profile were varied orthogonally for both starting phrases. The junctural position of /l/ was cued primarily by *F*1 frequency profile. *F*2 frequency profile, and thus the proximity of the first two formants, and amplitude profile seemed to play a very small role in the perception of /l/ position. [Work supported by NIDCD Grant No. DC 00219 to SUNY at Buffalo.]

3:35

9SP10. Visual-auditory integration and vocalic effects on fricative perception. Naoyuki Takagi and Virginia Mann (Dept. of Cognitive Sci., Univ. of California at Irvine, Irvine, CA 92717)

This study investigates the effect of visual presentation of four syllables ([sa], [ʃa], [su], [ʃu]) on perception of a fricative noise continuum. The visual stimuli were taken from videotapes of a speaker uttering the four syllables. The nine-step noise continuum ranged from [s] to [ʃ], and when followed by the acoustic vocalic portions taken from natural utterances of [sa], etc., replicated Mann and Repp's (1980) findings about the context effects of vowel lip rounding and consonant place of articulation on fricative perception. To determine if similar context effects would occur when the vocalic information was specified visually rather than auditorily, stimuli from the noise continuum were dubbed in place of the natural utterances on the video tapes and subjects identified the visual-auditory hybrids by naming each syllable aloud. The results showed a significant lip rounding effect on perception of "s" vs "sh" indicating that listeners' compensation for the decrease in frication noise frequency that is caused by anticipatory lip rounding takes place whether the lip rounding is perceived visually or auditorily. The effect of consonant place of articulation was less consistent.

3:50

9SP11. Integration of acoustic cues for consonants across frequency bands. B. A. Rubin, R. M. Uchanski, and L. D. Braida (Res. Lab. of Electron., MIT, Cambridge, MA 02139)

To what extent can disjoint frequency bands of speech be treated as independent perceptual channels when consonants are identified? To test the independence hypothesis, consonants were filtered into four bands (0.0–0.7, 0.7–1.4, 1.4–2.8, and 2.8–5.0 kHz). Filtered speech bands were presented to listeners with normal hearing monotically. Pairs of these bands (e.g., 0.0–0.7 and 0.7–1.4 kHz) were presented dichotically, and summed (producing a 0.0–1.4 kHz band) for diotic presentation. Consonant identification scores for the combined band