The effect of amplitude comodulation on extracting sentences from noise: Evidence from a variety of contexts

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(Δt) either 0, 40, or 160 ms. The precursor was either unmodulated, modulated at 10 Hz in-phase with the masker, modulated at 10 Hz antiphasic to the masker, or modulated at 20 Hz. With a Δt of 160 ms, precursor modulation characteristics had little effect. For Δt's of 0 and 40 ms, modulation of the precursor lowered probe AM detection thresholds with performance generally best with 10-Hz precursor AM. In the fringe conditions, the unmodulated probe carrier preceded the masker onset, with the probe- and masker-modulation onsets synchronous. Fringe duration was either 50, 100, or 200 ms. The addition of the fringe improved performance only with the 50-ms fringe. Results will be discussed in terms of perceptual grouping of stimulus events. [Work supported by NSF.]

11:00

3aMU7. Monotic and dichotic modulation detection interference.
Jane M. Opie and Sid P. Bacon (Psychoacoust. Lab., Dept. of Speech and Hear. Sci., Arizona State Univ., Tempe, AZ 85287-1908)

Monotic and dichotic modulation detection interference was measured for both practiced and naive subjects who listened to either all monotic or all dichotic conditions first. Subjects detected 10-Hz amplitude modulation of a 1-kHz target tone in the presence of a 4-kHz masker that was either unmodulated or modulated from 2 to 80 Hz at a depth of 100%. The target and masker were presented for 500 ms at a level of 60 dB SPL. Both practiced and naive subjects demonstrated less interference when the masker was presented to the ear opposite the target. On average, the maximum amount of interference was approximately 4 dB in the dichotic condition and approximately 7 dB in the monotic condition. In addition, the tuning for modulation detection was similar for the dichotic and monotic conditions, with the greatest interference observed for masker modulation frequencies that were the same as or similar to the target modulation frequency. [Work supported by NIH.]

11:15

3aMU8. Across-frequency interactions in an interaural correlation experiment.
William S. Woods, Andrew R. Brughera, H. Steven Colburn, and Hany Ibrahim (Dept. of Biomed. Eng., Boston Univ., 44 Cummington St., Boston, MA 02215)

The work reported here investigated whether across-frequency comparisons can be made when the only relevant information is contained in binaural comparisons. Subjects were required to detect a difference in interaural correlation (IC) between a target band and surrounding fringe bands. Noise stimuli of 500-ms duration and 115-, 354-, 1000-, and 4000-Hz bandwidth, centered on 500 Hz, were used in an adaptive 2I,2AFC task. In each interval, the reference IC was roved between 0.7 and 1.0. In the target interval, the IC was additionally reduced in the 115-Hz target band centered on 500 Hz. Results indicate that the threshold reduction-in-IC is lowest for the 115- and 4000-Hz bandwidth conditions, and highest for the 354-Hz bandwidth condition, consistent with subjects' use of across-frequency comparisons of binaural information. For the 1000- and 4000-Hz conditions, subjects reported using the presence of a perceived narrow-band object in the target interval as the basis for decision. This basis was eliminated by delaying the onset of the 115-Hz target band 500 ms relative to the fringe band. Resulting thresholds were unchanged or smaller than in the corresponding synchronous condition, possibly due to the subjects' use of image-width cues.

11:30

3aMU9. The effect of amplitude comodulation on extracting sentences from noise: Evidence from a variety of contexts.
Thomas D. Carrell (Commun. Sci. & Disord., Northwestern Univ., Evanston, IL 60208-3570)

While signal-to-noise ratios range from about 50–90 dB in laboratory experiments, measurements of speech levels in most natural environments show much poorer listening conditions. For example, Teder [Hear. Instrum. **11**, 32–33 (1990)] measured signal-to-noise ratios ranged from a high of 13 dB in a carpeted office to low of 1 dB in a 1986 Chevy Nova traveling at 55 mph. These numbers indicate an immense difference between speech signals presented to listeners in laboratory experiments as opposed to the real-world environment. Although speech intelligibility has been well studied in noise, there has been little study of the acoustic characteristics of speech that allow the message to be separated from the background noise. One characteristic of voiced speech that shows great promise in this regard is amplitude comodulation. In the present research, amplitude comodulated tone-analog sentences [Carrell and Opie, Percept. Psychophys. **52**, 437–445 (1989)] were presented with simultaneous white noise and multispeaker babble at 0-, 5-, and 10-dB signal-to-noise ratios. It was found that the beneficial effect of amplitude comodulation was greater at the lower signal-to-noise ratios.

11:45

3aMU10. Why do masker fluctuations as in interfering speech lower the speech-reception threshold?
Joost M. Festen (Dept. Otolaryngol., Free Univ. Hospital, P.O. Box 7057, 1007 MB Amsterdam, The Netherlands)

Two experiments will be presented to explain the difference in speech-reception threshold (SRT) between conditions with a steady-state noise masker and an interfering voice. In experiment I, the possible role of comodulation masking release is investigated by manipulating the comodulation in the interfering voice by introduction of temporal shift among filter bands of various width. The spectral spread of masking from the manipulated interfering voice was controlled by interleaving mutually shifted speech bands with 1/3-octave bands of noise. Although comodulation in interfering speech appears to be very important for the low SRT, the contribution of *across-frequency processing* of masker fluctuations—commonly considered as the origin of CMR—is only 1.3 dB. In experiment II, the level dependence of masking release with an interfering voice is investigated. The data confirm the hypothesis by Festen and Plomp (1990) that the release from masking with an interfering voice is limited by forward masking. It appears that up to about 55 dBA, the release from masking increases with level up to about 7 dB. Above 55 dBA, the difference in SRT obtained with a noise masker or an interfering voice is constant due to the limited modulation depth of speech.