dB SPL for the normal-hearing Ss; the noise bursts were presented at 10 dB SL. Pitch recognition of the noise bursts was affected least in the backward-masking condition and was poorest in the combined-forward-and-backward-masking condition. In the combined masking condition nearly all Ss showed some masking of pitch recognition for one or more of the noise bursts. Masking occurred most often for the low-frequency burst and least often for the high-frequency burst. Generally, release from masking was seen when Δt was lengthened to 100 ms.

ZZ12. Categorizing hearing loss from speech recognition data II: Results of a check against clinical tests. E. L. R. Corliss (Industrial Engineering Division, and E. F. Moore, Fluid Engineering Division, Center for Mechanical Engineering and Process Technology, National Bureau of Standards, Washington, DC 20234)

Patients with clinically diagnosed hearing losses were given the verbal tests and threshold measurements used in the USPHS Health and Nutrition Examination Survey for 1971–75. A computer program for categorizing hearing losses from recognition data [J. Acoust. Soc. Am. **61,** S5(A) (1977)] was applied to the results of the tests, permitting comparison between results of the ordinary clinical tests and computer-aided diagnoses. The program estimates mixtures of losses whereas clinical tests other than hearing by bone conduction primarily diagnose the major component. For minor hearing losses, the speech test does not resolve unequivocal differences between conductive and sensorineural losses, but for higher threshold elevations it appears to resolve conductive, sensorineural, and recruiting components.

ZZ13. Temporal patterning in the perception of spectrally ambiguous speech by deaf and normal listeners. R. G. Stoker (School of Human Communication Disorders, McGill University, 1266 Pine Avenue West, Montreal, H3G 1A8, Canada)

It has been suggested [D. H. Klatt, J. Acoust. Soc. Am. **64,** S114(A) (1976); L. A. Streeter, J. Acoust. Soc. Am. **64,** 1582–1592 (1979)] that temporal information in speech independently influences syntactic analysis. Under conditions of high spectral ambiguity such as is present in severe sensorineural deafness this temporal pattern analysis might be a primary cue for speech perception. The perception of nonlinguistic temporal patterns by deaf and normal subjects was investigated for the visual, auditory, and auditory-visual modalities using a matching paradigm. These data were compared to data from the same S's regarding their single modal and multimodal perception of speech under conditions of high spectral ambiguity (700-Hz low-pass filtering and modulated white noise). The ability to quickly and accurately perceive nonlinguistic temporal analogs of speech was found to be significantly correlated with the ability to comprehend degraded speech. The correlation was particularly marked for the auditory only condition in the right ear across all subjects. Significant effects were found for age, use of vision and hearing aid usage history of deaf subjects. No similar effects were noted for normal subjects.

ZZ14. Identification of synthetic /bdg/ by hearing impaired listeners in monotic and dichotic listening conditions. M. F. Dorman (Program in Speech and Hearing Science, Arizona State University, Tempe, AZ 85281), Sandra Van de Grift Turek (Arizona State University, Tempe AZ 85281), John R. Franks (Arizona State University, Tempe AZ 85281), Quentin Summerfield (MRC Institute of Hearing Research, University of Nottingham, U.K.), and L. J. Raphael (Lehman College, Bronx, NY 10468 and Haskins Laboratories, 270 Crown Street, New Haven CT 06510)

Individuals with sensorineural hearing losses of both flat and sloping configuration evidence difficulty in speech understanding. To assess whether upward spread of masking of F_1 is responsible for the poor identification of stop consonant place of articulation, we presented to hearing impaired listeners stimuli from along a [ba da ga] continuum in both monotic and dichotic (F_1 to one ear; F_2/F_3 to the other ear) listening conditions. In the monotic conditions, hearing impaired listeners with similar audiograms evidenced great variability in labeling performance. In the dichotic conditions, performance did not generally improve although for a few listeners the improvement was striking. We suspect that upward spread of masking is not generally responsible for the poor identification of place in listeners with moderate, flat, and sloping sensorineural hearing losses.

ZZ15. Short and long term effects of commissurotomy on selected tests of central auditory function. Frank E. Musiek and Donald Wilson (Dartmouth-Hitchcock Medical Center, Hanover, NH 03755)

A 19-year-old male, with normal peripheral hearing, was administered various central auditory tests prior to a complete commissurotomy. Testing was also done in one and one half weeks and one year after the commissurotomy. The test battery included speech in noise (+5 *S/N*), dichotic digits, the SSW (staggered spondaic word) test, and intensity and frequency pattern perception tests. Initial postoperative testing showed little change in performance on the speech in noise task. However, results for the dichotic tests (SSW and digits) showed a dramatic left ear decrease. Results from the two pattern perception tests showed a marked decrease in performance for both ears [e.g., Musiek, Pinheiro and Wilson, J. Acoust. Soc. Am. **63,** S31(A) (1978)]. Assessment approximately one year after surgery showed results consistent with initial postoperative testing for speech in noise and both pattern perception tests. However, both dichotic tests showed an improvement for left ear performance. The underlying reasons for this change at this time are speculative. However, the development of certain perceptual strategies and/or the improvement of neurological function over a certain period of time are considerations.

ZZ16. Experiments on the "prosodic intelligibility" of low-frequency speech codes. Donald A. Allen, William J. Strong, and E. Paul Palmer (Department of Physics and Astronomy, Brigham Young University, Provo, UT 84602)

We have reported previously on the intelligibility and discriminability of low-frequency speech codes for the severely hearing impaired. In recent experiments the following versions of speech and speech codes have been tested to explore how well they carry prosodic information: (1) natural speech; (2) speech severely low-pass filtered at 900 Hz; (3) a formant code consisting of three sinusoids scaled to the formant frequencies; (4) a largest harmonic code consisting of four harmonic sinusoids closest to the formants; and (5) an all harmonic code consisting of many harmonic sinusoids. Fundamental frequency and formant frequencies are scaled by different amounts in the various codes. Normal hearing subjects were asked to determine which of five versions of the sentence, "John drove to the store," was heard. Speech and speech codes were tested for two female and two male talkers. "Prosodic intelligibility" results are presented and compared for the various talker, speech, and speech code combinations.

ZZ17. Speaking clearly for the hard of hearing. M. A. Picheny and N. I. Durlach (Room 36-747, Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, MA 02139)

It is obvious that the intelligibility of a given speech message depends strongly on how the message is spoken. Not only does intelligibility vary with the identity of the speaker, but also, for a given speaker, with the effort to speak clearly. Assuming that the variations in intelligibility associated with such factors are substantial, detailed knowledge of these factors could prove use-

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