10:00

5aPP5. Peripheral auditory processing and the precedence effect. Klaus Hartung and Constantine Trahiotis (Dept. of Neurosci. and Dept. of Surgery (Otolaryngol.), Univ. of Connecticut Health Ctr., Farmington, CT 06030, tino@neuron.uchc.edu)

This work addresses how a consideration of peripheral auditory processing can help one to understand the relative salience of binaural information conveyed by successive binaural transients in precedence experiments. It appears that much of the variability in the data is amenable to an explanation based on peripheral interactions that result from auditory filtering and the functioning of hair cells in combination with a binaural model based on cross correlation. This approach does not include inhibitory mechanisms that are commonly considered as being necessary in order to account for the precedence effect. [Work supported by NIH.]

10:15

5aPP6. Observer weighting of interaural delays in echo clicks preceded by source clicks that have been attenuated. Raymond Dye, Jr., Jose Gallegos, and Christopher Brown (Parmly Hearing Inst., Loyola Univ. Chicago, 6525 N. Sheridan Rd., Chicago, IL 60626, rdye@luc.edu)

This investigation examined the effect that the relative levels of leading and lagging clicks have on binaural precedence. A diotic pulse was presented during the first interval to mark the intracranial midline. In the second interval, two dichotic pulses were presented, separated by an ''echo delay'' ranging from 1 to 32 ms. The interaural delays of the two pulses were independently selected from a Gaussian distribution. Listeners were instructed to respond according to the laterality of the lagging click. The leading click was attenuated by from 0 to 30 dB. Performance was measured by proportion correct, relative echo weight, and the proportion of responses predicted by the derived weights. At the shortest echo delays, the effect of attenuation on echo weight and proportion correct occurred after merely 6 dB of attenuation. At echo delays longer than 8 ms, the echo weights started out higher but were not as dependent upon source attenuation. The same effect was found for proportion correct. At 4 ms, there were steady increases in both echo weight and proportion correct as the source was attenuated. The proportion of responses accounted for by the weights was dependent upon neither source attenuation nor echo delay. [Work supported by NIDCD.]

10:30–10:45 Break

10:45

5aPP7. Effect of reverberation on spatial unmasking for nearby speech sources. Barbara G. Shinn-Cunningham (Hearing Res. Ctr., Depts. of Cognit. and Neural Systems and Biomed. Eng., Boston Univ., 677 Beacon St., Boston, MA 02215, shinn@cns.bu.edu), Lisa Mraz, and Norbert Kopčo (Hearing Res. Ctr., Boston Univ., Boston, MA 02215)

Individualized HRTFs were measured in a moderately reverberant room ($T60=450$ ms) for sources directly in front of and to the right of a listener for both near (15 cm) and far (1 m) distances. The full HRTFs (including reverberation) and pseudo-anechoic HRTFs (time windowing out the reverberation) were used to simulate a speech target and a speech-shaped noise masker over headphones. Speech reception thresholds were measured adaptively, varying the target level while keeping the masker level constant at the better ear. Thresholds were measured for both left and right monaural signals as well as for binaural signals. Results show the magnitude of spatial unmasking that can arise for sources very close to the head, where large interaural level differences (ILDs) arise, and determine the degree to which spatial unmasking is due to better ear and binaural effects. These results are compared to previous anechoic results simulating sources near a listener in which large ILDs appear to degrade binaural performance below predicted better-ear performance. Comparisons between pseudo-anechoic and realistic reverberation conditions address the degree to which reverberation interferes with spatial unmasking. [Work supported by a grant from the Air Force Office of Scientific Research.]

11:00

5aPP8. The role of masking in the Franssen effect. William M. Whitmer, William A. Yost, and Stanley Sheft (Parmly Hearing Inst., Loyola Univ. of Chicago, 6525 N. Sheridan Rd., Chicago, IL 60626, wwhitme@luc.edu)

The sudden onset of a sound which slowly decays at one loudspeaker can occlude the presence and location of the same sound presented simultaneously with a slow rise time at another loudspeaker. This phenomenon, known as the Franssen effect, has been shown in previous research to be specific to low-frequency pure tones in reverberant rooms. To examine the possible mechanisms involved, listeners heard pure-tone transient/steady-state signal pairs at frequencies ranging from 250–4000 Hz from either one loudspeaker or two contralateral loudspeakers in an eight-speaker array. Signals were masked with Gaussian noise. Using a two-interval, forced-choice tracking procedure, thresholds for detecting the steady-state signals were measured. The transient tone was present in both intervals. The results showed increases across frequencies in threshold of approximately 6 dB for two-source (Franssen) conditions compared to single-source conditions. In an auxiliary experiment, signals were masked with tones of differing frequencies. For Franssen conditions, masking was dependent on the interaction of signal and masker frequencies. Both results are discussed in terms of onset dominance, nonecho suppression and free-field masking. [Work supported by NIDCD.]

11:15

5aPP9. Contralateral masking effects in dichotic listening with two competing talkers in the target ear. Douglas S. Brungart (AFRL/HECB, WPAFB, OH 45433, douglas.brungart@wpafb.af.mil) and Brian D. Simpson (Veridian, Dayton, OH 45431)

Some of the most influential experiments in selective auditory attention have been based on a dichotic cocktail party task where listeners are asked to respond to a speech signal presented to one ear while ignoring a simultaneous competing speech signal presented to the other ear. These experiments have generally shown that the intelligibility of a monaural speech signal is unimpeded by the presence of an interfering speech signal at the opposite ear. However, recent results in our laboratory indicate that listeners cannot ignore a speech signal at the unattended ear when two simultaneous speech signals are presented to the target ear. In this study, the intelligibility of a target phrase in a two-talker stimulus presented to one ear was measured monaurally and with a speech or noise signal in the opposite ear. Performance in this task was unaffected when noise was added to the unattended ear, but degraded substantially when speech was added to the unattended ear. These results suggest that there are strong interactions between the monaural processes that listeners use to segregate two spatially colocated voices and the binaural processes they use to segregate voices originating from different apparent locations in space. [Work supported by AFOSR.]

11:30

5aPP10. Measurements of the directional performance of commercial hearing aids. Robert B. Schulein, Laurel A. Christensen, and Andrew J. Haapapuro (Etymotic Research, 61 Martin Ln., Elk Grove Village, IL 60007, r_schulein@etymotic.com)

Various estimates of directional microphone performance are possible, yielding a wide variety of published and advertised signal-to-noise improvements. There appears to be a growing concensus that the ratio of on-axis sound to diffuse sound (the ''directivity index'') provides the most realistic measure for real-world use of hearing aids. We undertook to measure several commercial digital and analog hearing aids, mostly of recent design, using the methods under consideration for ANSI standard adoption: anechoic polar measurements with data numerically integrated to obtain a diffuse-field directivity index estimate and direct anechoic and reverberation-room measurements. These measurements generally agreed, and showed a wide range of performance across designs.