intensity-related effects. At the lowest levels there were no differences in the trauma produced by G and nonG exposures. At Leq=90 dB(A), nonG exposures produced increased trauma relative to equivalent G exposures. By removing energy from the impulsive transients by limiting their bandwidth, trauma could be reduced. The use of noise bursts to produce the nonG noise also reduced the amount of trauma. A metric based on kurtosis and energy may be useful in modifying existing exposure criteria. [Work supported by NIOSH.]

2pPP37. The application of the equal energy hypothesis (EEH) to interrupted, intermittent and time-varying Gaussian noise exposures. Wei Qiu, Roger P. Hamernik, and Robert I. Davis (Auditory Res. Lab., State Univ. of New York at Plattsburgh, 101 Broad St., Plattsburgh, NY 12901)

Interrupted, intermittent, time-varying (IITV) noise exposures may reduce the susceptibility of the cochlea to hearing loss through toughening or conditioning effects. Six groups of chinchillas were exposed to a broadband Gaussian IITV noise over the course of 19 days at an Leq=101 or 106 dB(A) SPL. All exposures at a given Leq had the same total energy. Each daily exposure consisted of two 4.25-h periods with an hour break in between. Each 4.25-h exposure was interrupted for 15 min and each 5-day sequence was separated by a 2-day break. Daily IITV exposures at 101 dB varied between 90 and 108 dB(A), while those at 106 dB(A) varied between 80 and 115 dB(A). For the IITV exposures three different variations in the SPL temporal profile were used. Five-day continuous, equal energy exposures at 100 or 106 dB(A) SPL served as control conditions. The IITV exposures produced up to 40 dB toughening that did not have any effect on thresholds or sensory cell losses. There were some differences in the permanent threshold shift and cell loss across equal energy exposures but the differences were small. The EEH may be valid for Gaussian IITV exposures. [Work supported by NIOSH.]

2pPP38. Temporal characteristics of extraction of size information in speech sounds. Chihiro Takeshima (Grad. School of Music, Kyoto City Univ. of Arts, Kyoto 610-1197, Japan, ctakeshima@yahoo.co.jp), Minoru Tsuzaki (Kyoto City Univ. of Arts, Kyoto 610-1197, Japan), and Toshio Irino (Wakayama Univ., Wakayama 640-8510 Japan)

We can identify vowels pronounced by speakers with any size vocal tract. Together, we can discriminate the different sizes of vocal tracts. To simulate these abilities, a computational model has been proposed in which size information is extracted and separated from the shape information. It is important to investigate temporal characteristics of the size extraction process. Experiments were performed for listeners to detect the size modulation in vowel sequences. All the sequences had six segments. Each segment contained one of three Japanese vowels: "a," "i," and "u." Size modulation was applied by dilating or compressing the frequency axis of continuous, STRAIGHT spectra. Modulation was achieved by changing the dilation/compression factor in sinusoidal functions. The original *F*0 pattern of the base sequence, except for warping of the time axis, was used for all stimuli. The minimum modulation depth at which listeners were able to detect the existence of modulation was measured as a function of the modulation frequency. The results will be compared with low-pass characteristics in a temporal modulation transfer function obtained with the amplitude-modulated noise. They will be discussed in relation to a computational model based on the Mellin transformation.

2pPP39. She hears seashells: Detection of small resonant cavities via ambient sound. Ethan J. Chamberlain, Lawrence D. Rosenblum, and Ryan L. Robart (Dept. of Psych., Univ. of California, Riverside, Riverside, CA 92521)

There is evidence that blind listeners can detect the presence of obstacles based on how the obstacles structure the ambient sound in a quiet room [Ashmead *et al.*, J. Vis. Impair. Blindn. **9**, 615 (1998)]. Potentially, this ability is based on auditory sensitivity to the buildup of ambient wave interference patterns in front of the obstacle. This effect is not unlike how the internal structure of a seashell amplifies a room's ambient sound to emulate the sound of the ocean. Experiments were conducted to determine whether unpracticed, sighted listeners were sensitive to this information. Blindfolded listeners were placed in a quiet room and were asked to determine the location of a small resonant cavity placed next to either their left or right ear. Results revealed that listeners were very accurate at this task. Follow-up experiments examined the limits of this sensitivity as well as its acoustical support. These findings suggest that unpracticed listeners might be sensitive to subtle changes in the ambient acoustic structure of a quiet environment.

2pPP40. Effects of listening environment on speech recognition in noise. Linda Thibodeau and Tina Keene (Univ. of Texas at Dallas, 1966 Inwood Rd., Dallas, TX 75235)

The ability to recognize speech in noisy situations varies among individuals despite normal hearing. Although some of the variation may be related to physiological differences, some may be attributed to environmental experiences. The purpose of this investigation was to examine how everyday listening experiences were related to speech recognition in noise abilities. Using the Hearing in Noise Test, reception thresholds for speech were compared for listener groups who differed in their preferred listening levels for music and signal-to-noise ratios for daily communication. Results suggested that speech recognition in noise was related to listening levels. These results have implications for the use of assistive devices to improve the signal-to-noise ratio in adverse communication situations.

2pPP41. Comparing vowel formant thresholds from two tasks: Classification versus 2-alternative forced choice (2AFC) adaptive tracking. Eric Oglesbee (Dept. of Linguist., Indiana Univ., Bloomington, IN 47405, eoglesbe@indiana.edu) and Diane Kewley-Port (Indiana Univ., Bloomington, IN 47405)

Accurate classification of vowels in American English is difficult because of the number of acoustically similar vowels. Previous experiments in our lab [Kewley-Port *et al.*, J. Acoust. Soc. Am. **118**, 1929–1930 (2005)] described a new method to obtain formant thresholds using a classification task rather than the more typical 2AFC task. The goal of the present experiment was to directly compare formant thresholds estimated from a classification task with a modified 2AFC paradigm using adaptive tracking. Stimuli, generated by STRAIGHT, consisted of separate continua for formants F1 and F2 based on natural productions of "bid" shifted to "bed," and "cut" shifted to "cot." Separate 7- and 14-step continua were created for the classification and 2AFC tasks, respectively. Eight subjects participated first in the classification task, followed by the 2AFC task. Classification threshold results here replicated those observed in our previous experiments. Within-subject comparisons of the classification and 2AFC data refined our method for calculating a classification threshold from logistic psychometric functions. Individual thresholds calculated using this refined method were very similar to those from the 2AFC task. Results demonstrate the viability of using a more natural, single-interval classification task to estimate formant discrimination thresholds. [Work supported by Grant NIHDCD-02229.]

2pPP42. Cochlear and cognitive models for speech enhancement. Melissa Dominguez (DBK Acoust., 110 Village Station Ln., Grayslake, IL, 60030), Jeff Bondy, and Andrew Dittberner (GN Resound, Glenview, IL, 60026)

There has been a long running interest in using cochlear models for audio processing. Psychophysical masking stemming from normal cochlear operation is used as the basis for most audio compression circuits, while the cochleas mel-frequency response is mimicked by most automatic speech recognition circuits. An area that has been less well explored