DETECTION OF A SIGNAL AS A FUNCTION OF INTERAURAL DIFFERENCES IN THE INTENSITY OF MASKING NOISE

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"But, as frequently occurs, the simplicity that makes the model attractive carries an attendant risk ..... No matter how simple the task may seem to the experimenter, the complex adaptive processor (sensory system) utilizes whatever it has available to optimize performance."

Schubert (1979)

ABSTRACT

A series of experiments was undertaken to explore the effect of interaural differences in the intensity of masking noise upon the detection of a signal. The signal was a 2-kHz sinusoid, and the masker was composed of either one or two 800-Hz wide bands of noise. The centre frequencies of the two bands of noise, one above and one below the signal frequency, were varied. On most occasions both noise bands were used to create a spectral notch surrounding the signal. The following factors were manipulated: (1) The width of the notch: from 0 to 1900 Hz. (2) The location of the lower and upper frequency edges of the notch relative to the signal: either equidistant from the signal, or with one edge 150 Hz nearer to the signal than the other edge. (3) The spectrum level of the noise: either 20, 35 or 50 dB SPL. (4) The degree of interaural disparity in the intensity of some components of the noise: either 0 dB, 10 dB or infinite. (5) The ear to which a particular masking noise was sent. (6) The manner in which the noise was presented: either diotically or dichotically. (7) The manner in which the signal was presented: either diotically or monotically. The results of the first two experiments were interpreted as showing that threshold signal levels in the presence of interaural differences in the intensity of masking noise depended principally on the ear in which the signal-to-masker ratio at the output of the auditory filter was larger. To test this possibility, auditory filter shapes were derived from two listeners. These were then used to predict thresholds when there were interaural differences in the spectral envelope of a masking noise. The results of a comparison between the predicted and obtained thresholds were consistent

with the previous interpretation. Thus it appears that the detector following the filter can discriminate the output of the two ears and base detection on the better output. This ability may be useful in normal listening, where both wanted and extraneous sounds are subject to change from moment to moment.

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