Comments

Comment by Carlyon:

Reply:

Comment by Yost and Meddis:
Our presentation referred to two specific weaknesses of the pooled interspike interval (a.k.a. summary autocorrelation) model of pitch: (1) it underestimates the pitch salience of pure tones compared to complex tones (Cariani and Delgutte 1996); (2) it does not account for the lower salience and poorer discriminability of pitch based on unresolved harmonics compared to that based on resolved harmonics when the harmonics occupy the same frequency region (Shackleton and Carlyon 1994). These conclusions were based on using the largest peaks in the pooled interval distributions (relative to background) as a measure of pitch salience. Yost and Meddis suggest that alternate measures of pitch salience might better account for the psychophysical data.

As pointed out by Carlyon in his comment (below), the autocorrelation in the Yost (1982) model is derived by Fourier transformation of a smeared power spectrum. The mathematical relationship of this "autocorrelation" to the time-domain summary autocorrelation is quite complex, so that conclusions that apply to one representation do not necessarily apply to the other. Even if these two representations can be compared, the rather elaborate pitch salience measure used by Yost (1982) works remarkably well for ripple noise stimuli, but has not been shown to be effective for a wide class of stimuli including pure tones, complex tones with resolved and unresolved harmonics, and AM noise.

Meddis and O'Mard (1997) do not specify a measure of pitch salience per se, but rather use the Euclidian distance between the summary autocorrelation functions as a measure of discriminability between two stimuli. The failure of this approach to account for the Shackleton and Carlyon (1994) results has been thoroughly and convincingly documented by Carlyon (1998; see also his comment). A fundamental issue with the metrics used by Yost (1982) and Meddis and O'Mard (1997) is that, because they depend on the entire shape of the autocorrelation function rather than just the largest peaks at the pitch periods, they are likely to be sensitive to timbre as well as pitch. For this reason, the simpler peak-to-background measure used by Meddis and Hewitt (1991), Cariani and Delgutte (1996), Yost et al. (1996), Yost (1996) and in our paper is likely to be more generally useful for pitch salience. Using this measure, we find that pitch salience derived from pooled interspike interval distributions is maximum in the F0 range below 400 Hz where harmonics are not resolved by the cat cochlea, contrary to the Shackleton and Carlyon (1994) results. In view of these results, a search for alternative models of pitch is likely to be productive.


Comment on the comment by Yost and Meddis, by Carlyon