Comments

Comment by Cusack:

You state that the most important feature of your psychophysical results is the asymmetry between the detection of a portion of Iterated Rippled Noise (IRN) in noise compared with the reverse, the detection of a portion of noise in IRN. The asymmetry you observe is as would be expected from a model of feature detection in visual search, which has recently been extended to audition in five experiments by Cusack and Carlyon (2003). According to this model, in a detection task, the activity in a relevant feature detector at the time of the possible target is compared to the pooled activity across the stimulus. From Weber's law, when a feature detector is highly activated by the whole stimulus, thresholds will be elevated relative to when the feature is only present to a small extent. An example for FM detection is shown in Fig. A1 (a). Your task was probably performed through the detection of activity in pitch sensitive neurons. The pooled activity in these will have been higher when noise had to be detected in IRN than vice-versa, leading to the asymmetry in your data (see Fig A1 (b)). Note that asymmetries depend upon the type of feature detectors present in the auditory system, and in this case provide a further illustration that a population of neurons is excited by the IRN that is not excited by the noise, as demonstrated by your MEG recordings.

Cusack, R and Carlyon, R.P (2003) Perceptual asymmetries in audition. J. Exp. Psychol.: Hum. Percept. Perform., 29, 313-725.

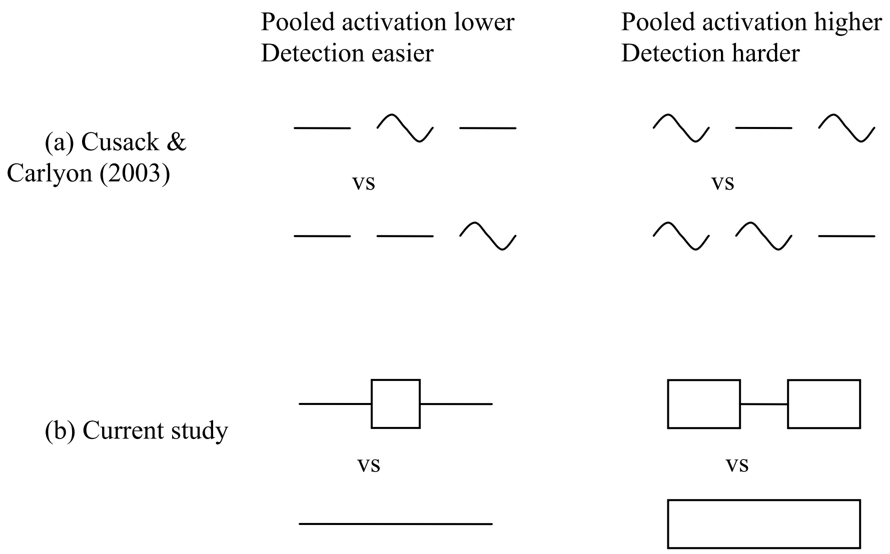

Fig. A1. Asymmetries in FM detection (a) and asymmetries in your study (b). In the lower panel, straight lines correspond to noise and rectangles to IRN.

Reply:

We think that the important aspect of our data is the asymmetry in the masking. It appears to suggest that, whereas you have a fast, precise mechanism for detecting the onset of pitch, you do not have a comparable mechanism for processing noise. Listening to the stimuli suggests that you have to use the offset of the pitch feature to detect the onset of the noise. It seems that it takes much longer to construct a noise perception, or to detect/recognise that such a perception has been produced. Your model focuses on a single, presumably key feature, rather than on the relative value of two features. The absence of a fast noise processor limits the listener to one stimulus feature (pitch) in our experiment, and in this case, your model of feature extraction would appear to apply.