

## Two types of listeners

Experiments on the perception of complex tones with a missing fundamental (F0) show that listeners can be categorized into two groups, depending on what pitch they perceive to be more salient: the *virtual* pitch (corresponding to F0) or the *spectral* pitch (the pitch of a single spectral component). Laguitton et al (1998) found an effect of handedness in that left-handers tended to select the virtual pitch judgments less frequently than right-handers. Schneider et al (2005) used MRI and MEG to look for a neural basis behind these two types of pitch perception and found that virtual pitch listeners demonstrated a leftward asymmetry in the lateral Heschl's gyrus, while spectral pitch listeners possessed the opposite asymmetry. So far, the bimodal distribution found among listeners has not been linked to the perception of information in speech stimuli. In speech, information about the emotions and attitudes of the speaker can be conveyed both by F0 modulation, as well as by changes in the timbre. For example, F0 changes are typically associated with the speech act status of an utterance (question, assertion) and with the epistemic state of the speaker (certainty about the truth of the utterance), viz. Safarova (2006), while timbre has been linked to speaker's emotions, especially milder affective states (e.g., tense voice and anger, breathy and creaky voice with boredom or sadness), viz. Gobl & Ni Chasaide (2003). One could hypothesize that virtual pitch listeners would be more sensitive to the information contained in the F0 variation, while spectral pitch listeners would perceive changes in the spectrum as more salient.

One way of testing the pitch sensitivity in speech is to compare listeners' judgments on the presence of an emotion or attitude in a speech stimulus with their judgment on the sine wave extracted from the same stimulus. We would expect that participants who are virtual pitch listeners would be more consistent in their judgments of the speech-sine wave pairs than participants who are spectral pitch listeners.

A pilot study with 20 Dutch native speakers (10 musical professionals and 10 non-professionals, with an equal distribution of gender) and 12 complex-tone stimuli (each composed of two tones comprising two harmonics) showed a trend in the predicted direction. Participants who were identified as spectral pitch listeners were less consistent in their judgments on 16 speech-sine wave pairs (32 stimuli in total) than participants who were virtual pitch listeners. An experiment with musical non-professionals is currently under way, using both ambiguous and non-ambiguous complex-tone stimuli and 32 speech-sine wave pairs (64 stimuli). In a second study, we are testing the two groups of listeners on differences in accent perception in an eye-tracking experiment modeled on the experiment of van Hooijdonk et al (2007).

### References:

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