

## Pitch Perception Models Responses

1) Pitch, as defined by De Cheveigne, is what we perceive from periodic wave stimuli via the ear. Pitch has more specific elements but is primarily determined by the length of the wave period which correlates to frequency. De Cheveigne points out that The American National Standards Institute's official definition of pitch is rather lacking and is only truly accurate for pure tones and is focused on the psychological rather than the psychophysical.

2) Place theory is a model of how the brain interprets sound and was popularized by Hermann Helmholtz. It states that different pitches vibrate different, specific portions of nerves on the basilar membrane and that this is how our brains define and perceive pitch. There are a number of ideas regarding how our brains are able to pick out fundamental frequencies in the place theory without any clear consensus on the matter, as there are a number of instances that make locating fundamental peaks difficult (multiple strong peaks, a weak fundamental, etc.). This process is not unlike Fourier Transform in the human ear and brain.

3) Essentially, time theory refers to a model that involves pitched sound triggering nerve pulse patterns from the basilar membrane based on pitch and waveform. These patterns of nerve pulses are then decoded by the brain to perceive pitch. The main issue with the time theory is that it is phase sensitive and runs into problems with complex and irregular wave shapes.