A

Auditory Processing

Scott L. Decker and Rachel M. Bridges
Department of Psychology, University of South Carolina, Columbia, SC, USA

Definition

Auditory processing is used to describe the manner in which sound waves are transformed into neurological impulses and subsequently decoded by the primary auditory cortex in the temporal lobe of the brain. Simply put, object vibration causes surrounding molecules of air to condense and pull apart, producing waves that travel away from the object. Receptor cells within our ears will be stimulated if the vibration ranges between approximately 30 and 20,000 times per second (Carlson 2007). These waves will then be perceived as sound.

There are three dimensions of sound: pitch, loudness, and timbre. The pitch of an auditory stimulus is determined by the frequency of repetitive (cyclic) vibrations per second (Hertz); a "high-pitch" sound has a high frequency of vibrations per second, whereas a "low-pitch" sound has a low frequency of vibrations per second. The loudness, or intensity, of a sound determines if it is perceived as "loud" or "soft" – vigorous vibrations of an object produce more intense sound waves, resulting in louder sounds. Finally, timbre is the quality of sound, which further differentiates two sounds (e.g., voice vs. piano) when they have identical pitch and loudness.

Our ears are able to detect stimuli, determine the spatial location of those stimuli (by differentiating interaural time and interaural sound intensity; Gazzaniga et al. 2014), and recognize the identity of such stimuli.

References and Readings

Carlson, N. R. (2007). *Physiology of behavior* (8th ed.). Boston: Pearson.

Gazzaniga, M. S., Ivry, R. B., & Mangun, G. R. (2014). *Cognitive neuroscience: The biology of the mind* (4th ed.). New York: W.W. Norton & Company.

J. Kreutzer et al. (eds.), *Encyclopedia of Clinical Neuropsychology*,
DOI 10.1007/978-3-319-56782-2_1437-2