

PS1061: Sensation and Perception

<http://www.pc.rhul.ac.uk/staff/J.Zanker/PS1061/PS1061.htm>

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Lecture 5: Auditory perception: Hearing noise and sound

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Lecture Topics

- auditory perception opens another window to the world : another 'sensory channel'
- the physical nature of sound: tones, mixtures, noise, complex patterns
- basics the sensory system: peripheral filters and tonotopic cortical representation
- detection and discrimination of pure tones: characterised by frequency and intensity
- the complexity of spoken language, the use of telephones, the effects of hearing loss
- sound localisation (& the cocktail party effect) in auditory scenes
- can we generate auditory illusions ???

After this lecture you should understand some of the main principles underlying the encoding of auditory information:

- the **auditory 'channel'** is an important source of sensory information
- the ear is a highly sensitive and intelligent device to **pick up and convert sound pressure waves**
- frequency filtering is the basis of **perceiving pitch**
- **sound intensity** is the second characteristic property of sound (with high ecological significance!)
- **spoken words** generate complex patterns of frequency and intensity (spectrogram)
- speech covers a wide range of the audible spectrum, which can be affected by **hearing loss**
- sound can be localized by calculating **intensity and phase differences** between the two ears
- **auditory localization** works in difficult environments (cocktail party effect)

Reading list (key readings in bold, papers available through virtual resources room):

- Békésy, G. v., 1967, 'Sensory Inhibition', Princeton University Press, Princeton NJ
- Berrien KF, 1946, 'The effects of noise' Psychol. Bull. 43, 141-161

- **Cherry EC, 1953, 'Some experiments on the recognition of speech, with one and two ears' Journal of the Acoustic Society of America, 25:975-979**
- **Evans EF, 1982, 'Functions of the auditory system' in: Barlow, H & Mollon, J., eds. 'The Senses', Cambridge University Press, 1982 (612.8 BAR) chapter 15, p 307-331**
- Gulick WL, Gescheider GA, Frisina RD, 1989 'Hearing' Oxford University Press, New York
- Kolb, B & Wishaw, IQ (2001) An Introduction to Brain and Behaviour. New York: Worth Publ. (612.82 KOL)
- **Konishi M, 1986 "Centrally synthesized maps of sensory space" Trends in Neuroscience 4/86 163-168**
- Pierce, J.R., 1983, 'The Science of Musical Sound', Freeman, New York (VWBB Pie)
- **Shepard, R. N. (1964). "Circularity in judgements of relative pitch," J. Acoust. Soc. Am.; p 2346-2353**

Textbooks:

- **Zanker, J. M. (2010) Sensation, Perception, Action – an evolutionary perspective. Palgrave, chapters 7 and 8**
- chapters 11 and 12 of Goldstein, E.B. (2007) Sensation and Perception (7th ed.) Wadsworth-Thompson (152.1 GOL)

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