

PS1061: Sensation and Perception

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

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Lecture 6: Touch, smell, taste: Basic, but hidden senses

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Lecture Topics

- the range and role of somatic (body) senses
- basic physical and biological aspects of tactile processing
- spatial resolution and cortical representation of touch
- basic processing steps and perceptual space of smell (olfaction)
- olfactory localisation and active exploration
- basic mechanisms of taste – primary 'gustatory' qualities

After this lecture you should understand some of the main principles underlying the encoding of somatic and chemical information:

- **somatic senses**: body posture and body surface are perceived along a set of different dimensions (pain, temperature, pressure...)
- **touch** is a spatial sense with a range of biological functions
- tactile perception : **receptive field** organisation and cortical representation
- **active exploration** is crucial for low-resolution touch perception
- **chemical senses** (smell and taste) have similar properties and interact
- **olfactory perception**: the complex dimensionality of this sense requires population coding
- **gustatory perception** (taste): generally believed to have 4 (or 5) basic

Reading list (key readings in bold, papers available from journals):

- Amoore JE (1964) "Current status of the steric theory of odor" Ann. N.Y. Acad. Sci. 116, 457-476
- **Caterina, MJ et al. (1997) 'The capsaicin receptor: a heat-activated ion channel in the pain pathway.'** Nature **389**, 816 – 824
- Hänig DP (1901) "Zur Psychophysik des Geschmackssinnes" Philosophische Studien 17: 576-623
- **Heller MA et al. (2002) "The haptic Muller-Lyer illusion in sighted and blind people."** Perception **31**, 1263-1274
- Penfield W, Rasmussen T (1950) The Cerebral Cortex of Man. A Clinical Study of Localization of Function. New York, The Macmillan Comp.

- **Ramachandran VS (2000) “Phantom Limbs and Neural Plasticity” Archives of Neurology 57, 317-320**
- Rolls ET, Critchley HD, Treves A. (1996) “Representation of olfactory information in the primate orbitofrontal cortex” J. Neurophys 75, 1982-1996
- von Henning H (1916) Der Geruch. Leipzig: Barth

Textbooks:

- **Zanker, J. M. (2010) Sensation, Perception, Action – an evolutionary perspective. Palgrave, chapters 10 and 9**
- chapters 14 and 15 of Goldstein, E.B. (2007) Sensation and Perception (7th ed.) Wadsworth-Thompson (152.1 GOL)

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