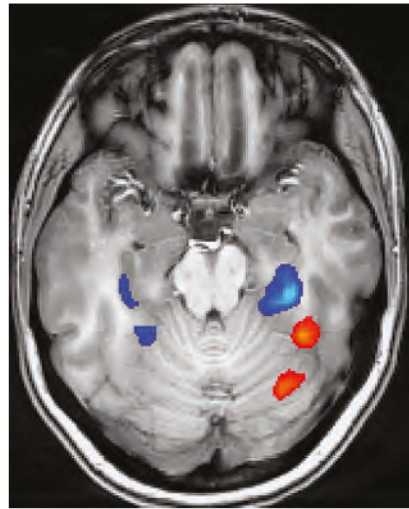


# Rethinking the Senses

Uniting the Philosophy and Neuroscience of Perception

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SCIENCE IN CULTURE



Philosophers, psychologists and neuroscientists have always shared an interest in the senses, with vision often being their primary concern. The recent rise of interest in the other senses, and even more so in their interaction, is attracting the attention of researchers in diverse fields. This shift towards the study of multisensory experience requires an entirely new framework, to which the humanities and the sciences need to contribute.



“ This shift in the study of perception towards multisensory experience requires an entirely new framework, to which both the humanities and the sciences need to contribute. ”

**Professor Colin Blakemore** Institute of Physics

Our everyday understanding of perception is that we see, touch, smell, taste, and hear. The vocabulary of five distinct senses ramifies through descriptions of thought, emotion, and aesthetics. Until recently, philosophers and scientists have accepted this framework and studied each of the senses in isolation. Modern cognitive neuroscience is challenging this understanding: instead of five we might have to count up to 33 senses, served by dedicated receptors. Studying isolated senses is misleading: everyday experiences, such as watching a film or eating a meal, involve different senses working together. At the cinema, the sounds seem to originate from the lips of the actors, even though we know they come from distant loudspeakers. Flavour is a rich example of sensory interaction: what we call the ‘taste’ of food largely comes from smell rather than taste buds. A loss of smell will greatly affect one’s eating experience. Flavour experiences are also affected by colour, spatial arrangements and even sounds. Finally, the sense of our bodies not only combines tactile and proprioceptive cues, but is also dependent on vision. These effects demonstrate that multisensory interactions are the rule rather than the exception.

The science of perception is advancing quickly, through psychophysical experiments, and through brain imaging techniques including for those with sensory or cognitive deficits. We needed a new theoretical framework to host the explosion of scientific results: philosophical thinking is needed to relate brain processes, behaviour, and subjective experience. The multisensory nature of perception will be understood only through philosophers and cognitive neuroscientists working together to re-evaluate how the senses work together.

The project integrates philosophical and scientific studies of multisensory perception. Philosophers and scientists will work together considering existing scientific evidence within a philosophical framework, with the specific intention of raising

critical questions to be tested empirically, including the design and conduct of experiments. This will provide vital philosophical input to the development of a cognitive neuroscientific account of the senses, of non-sensory influences on perception, and of the underpinning of conscious perceptual experience. Through extensive collaboration with partners in the arts, industrial, medical and educational sectors, the project will have impact within and beyond the academic world. It will aid in the development and design of new technologies that use multisensory interactions to help deaf and blind people and those who suffer from untreatable pain, changes in body image, or reduction in the sense of smell. It will inform advancing efforts to enhance sensory experience, such as in the appreciation of the visual and performing arts, in the retail and service industries, and in gastronomy and education.

The AHRC award enables us to allow philosophers, psychologists and neuroscientists to work together in entirely new ways. For example, the award will help to create an experimental space at the Institute of Philosophy, the first to be dedicated to interactions between the sciences, the arts and the humanities. Collaborations, events and online resources, available to specialists, the media and the public, will highlight the importance of the multisensory revolution in research on perception.

[www.thesenses.ac.uk](http://www.thesenses.ac.uk)  
<http://33senses.org>

**Cover left:** A drawing by Leonardo da Vinci (1490), in which he depicts three imaginary, fluid-filled chambers or ‘cells’ inside the brain, the first of which, known as the *Sensus communis*, is connected to all the sense organs. Royal Collection Trust/© Her Majesty Queen Elizabeth II 2014.

**Cover right:** A Magnetic Resonance Image (MRI) of a horizontal slice through the living human brain. Image courtesy of Tim Andrews, from a study published by T.J. Andrews et al., ‘Activity in the Fusiform Gyrus Predicts Conscious Perception of Rubin’s Vase-Face Illusion’, *NeuroImage* (2002) 17, pp.890–901.

**Above:** Blindfolded participant catching a ball while wearing a minimal TVSS (tactile vision sensory substitution system). © E-sense project, [www.esenseproject.info](http://www.esenseproject.info)

