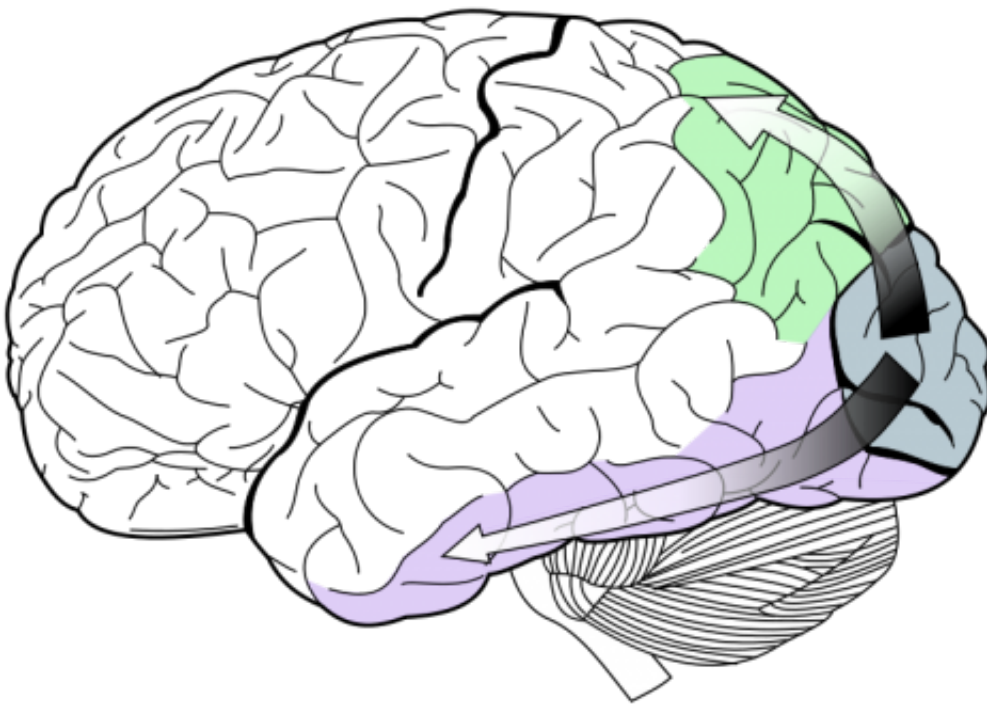


Sound and vision: Visual cortex processes auditory information too

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The dorsal stream (green) and ventral stream (purple) are shown. They originate from primary visual cortex.

Scientists studying brain process involved in sight have found the visual cortex also uses information gleaned from the ears as well as the eyes when viewing the world.

They suggest this auditory input enables the visual system to predict incoming information and could confer a survival advantage.

Professor Lars Muckli, of the Institute of Neuroscience and Psychology at the University of Glasgow, who led the research, said: "Sounds create visual imagery, mental images, and automatic projections.

"So, for example, if you are in a street and you hear the sound of an approaching motorbike, you expect to see a motorbike coming around the corner. If it turned out to be a horse, you'd be very surprised."

The study, published in the journal *Current Biology*, involved conducting five different experiments using functional Magnetic Resonance Imaging (fMRI) to examine the activity in the early [visual cortex](#) in 10 volunteer subjects.

In one experiment they asked the blindfolded volunteers to listen to three different natural sounds – birdsong, traffic noise and a talking crowd.

Using a special algorithm that can identify unique patterns in brain activity, the researchers were able to discriminate between the different sounds being processed in early visual cortex activity.

A second experiment revealed even imagined images, in the absence of both sight and sound, evoked activity in the early visual cortex.

Lars Muckli said: "This research enhances our basic understanding of how interconnected different regions of the brain are. The early visual cortex hasn't previously been known to process auditory information, and while there is some anatomical evidence of interconnectedness in monkeys, our study is the first to clearly show a relationship in humans.

"In future we will test how this [auditory information](#) supports visual

processing, but the assumption is it provides predictions to help the [visual system](#) to focus on surprising events which would confer a [survival advantage](#).

"This might provide insights into [mental health conditions](#) such as schizophrenia or autism and help us understand how sensory perceptions differ in these individuals."

The project was part of a five-year study funded by a €1.5m European Research Council consolidator grant entitled 'Brain reading of contextual feedback and predictions', and the Biotechnology and Biological Sciences Research Council.

The researchers will explore more sounds to find out how precise predictive coding in the brain can be.

More information: Decoding Sound and Imagery Content in Early Visual Cortex, [dx.doi.org/10.1016/j.cub.2014.04.020](https://doi.org/10.1016/j.cub.2014.04.020)

Provided by University of Glasgow

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