

The human brain: Detective of auditory and visual change

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The human brain is capable of detecting the slightest visual and auditory changes. Whether it is the flash of a student's hand into the air or the faintest miscue of a flutist, the brain instantaneously and effortlessly perceives changes in our environment. Several studies have indicated, however, that even a small span of time in between pre- and post-change images can disturb the brain's ability to detect visual discrepancies.

“The pre-change scene must be memorized in some way,” explained psychologists Laurent Demany, Wiebke Trost, Maja Serman and Catherine Semal from the University of Bordeaux and the French National Center for Scientific Research (CNRS). “In the visual domain, numerous experiments have shown that even a very short gap of less than 100ms can dramatically disrupt our ability to detect a local change in complex images. Following such a gap, local changes can be detected only in very simple images.” This phenomenon is known as ‘change blindness.’

In a recent study, the aforementioned psychologists assessed the effect of time gaps on change detection in audition. Their goal was to determine if the brain uses similar mechanisms to perceive auditory changes as it does with vision. Participants had to detect a pitch change in one tone presented together with other tones. The complexity of the pre-change sound was varied, as well as the duration of the silent interval between the pre- and post-change sounds.

The experimenters reasoned that if auditory change detection is similar

to the visual process, a complex sound (including many tones) should be remembered less well than a simple sound (including few tones).

The psychologists discovered, however, that this was not the case. The participants were able to remember even the most complex sounds—reaching up to 12 tones—despite the time delays.

The results of the study, which appear in the January 2008 issue of *Psychological Science*, a journal of the Association for Psychological Science, indicate that the brain uses more efficient mechanisms in auditory memory than in visual memory. To that extent, the human brain appears to be a keener detective of auditory change than visual change.

Source: Association for Psychological Science

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