Blindsight: How brain sees what you do not see

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Blindsight is a phenomenon in which patients with damage in the primary visual cortex of the brain can tell where an object is although they claim they cannot see it. A research team led by Prof. Tadashi Isa and Dr. Masatoshi Yoshida of the National Institute for Physiological Sciences, Japan, provides compelling evidence that blindsight occurs because visual information is conveyed bypassing the primary visual cortex. Japan Science and Technology Agency supported this study. The team reports their finding in the *Journal of Neuroscience* on Oct 15, 2008.

The researchers recorded eye movements of Japanese monkeys that had damage in one side of the primary visual cortex. Training with an eye movement task for 2-3 months enabled the monkeys to move their eyes to the correct direction where an object was even in the affected side of their visual fields. Brain became able to feel where an object was without 'seeing' it. After the training, their eye movements looked almost normal; they discriminated five different directions even in the affected visual field.

To investigate how eyes move, the monkeys' eye movements to targets in their affected visual field were compared with those to dark targets in their normal visual field. Both were 'equally difficult to see'. By this trick, the researchers found two differences from the normal: 1) the trajectory of their eye movements was straight and 2) the response time of their eye movement was short. These differences were thought to be due to the damage of eye movement control and decision making, not purely on that of vision. Therefore, the researchers concluded that the monkeys' eye movements after damage in the primary visual cortex were mediated by a qualitatively different vision which is supported by alternative brain circuits bypassing the primary visual cortex.

"Our finding will provide a new strategy for rehabilitation of these patients with damage in the primary visual cortex. That will be a rehabilitation training to activate alternative brain circuits to see what you do not see", said Dr. Yoshida. "A similar training may help the patients to know where an object is even without 'seeing' it."

Source: National Institute for Physiological Sciences