

Blind man walking: With no visual awareness, man navigates obstacle course flawlessly

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Researchers have demonstrated for the first time that people can successfully navigate an obstacle course even after brain damage has left them with no awareness of the ability to see and no activity in the visual cortex, a region of the brain's cortex that is primarily responsible for processing visual inputs. The findings published in the December 23rd issue of *Current Biology*, a Cell Press publication, reveal the importance of alternative routes in the brain, which are active in both those who have suffered severe brain damage to the visual cortex and in all of our everyday lives, according to the researchers.

Earlier studies had shown a similar ability in monkeys with comparable brain lesions. The new study was possible only because of the participation of an unusual patient known as TN, who was left blind after selective damage to the visual cortex in both hemispheres of his brain following consecutive strokes.

"This is absolutely the first study of this ability in humans," said Beatrice de Gelder of Tilburg University, The Netherlands and of the Martinos Center for Biomedical Imaging and Harvard Medical School. "We see what humans can do, even with no awareness of seeing or any intentional avoidance of obstacles. It shows us the importance of these evolutionarily ancient visual paths. They contribute more than we think they do for us to function in the real world."

TN was previously known to have what is called blindsight—the ability to detect things in the environment without being aware of seeing them. For instance, he responds to the facial expressions of others, as indicated by activity in brain regions consistent with emotional expressions of fear, anger, and joy. He is nevertheless totally blind. He walks like a blind person, using a stick to track

obstacles and requiring guidance by another person when walking around buildings.

To test his navigational ability in the current study, the researchers constructed an obstacle course consisting of randomly arranged boxes and chairs and asked him to cross it without the help of his cane or another person. Astonishingly, they report, he negotiated the course perfectly, never once colliding with any obstacle. Several onlookers witnessed the feat and applauded spontaneously when he reached the end of the maze.

The demonstration shows that alternative visual paths available in the brain allow people to orient themselves and rapidly detect obstacles in the environment without any conscious attention or experience of seeing them. "It's a part of our vision that's for orienting and doing in the world rather than for understanding," she said. "All the time, we are using hidden resources of our brain and doing things we think we are unable to do."

That's an important message for patients with brain damage in particular. "There is much that patients can do outside the grip of their being too aware of what they cannot do," de Gelder said.

Source: Cell Press

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