

Getting lost -- a newly discovered developmental brain disorder

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Feeling lost every time you leave your home? You may not be as alone as you think. Researchers at the University of British Columbia and Vancouver Coastal Health Research Institute recently documented the first case of a patient who, without apparent brain damage or cognitive impairment, is unable to orient within any environment. Researchers also believe that there are many others in the general population who may be affected by this developmental topographical disorder.

The study, published in the journal *Neuropsychologia*, and led by Giuseppe Iaria, a UBC Faculty of Medicine and VCH postdoctoral fellow, used functional magnetic resonance imaging (fMRI) together with behavioural studies to assess and characterize the navigational deficiencies of the patient, who is completely unable to orient within the environment, getting lost even within the neighborhood where the patient lived for many years.

"Imagine not being able to do the simplest of tasks such as finding your way home from the grocery store," says Iaria, who is affiliated with the Brain Research Centre. "Navigating and orienting in an environment are complex cognitive skills, involving parts of the brain used for memory, attention, perception, and decision-making. It also requires using at least two distinct types of memory systems."

The procedural memory system involves using landmarks, distances, or following stereotyped movements to move between locations. The spatial memory system is more complex. When moving through an environment

– familiar or not – a person creates a mental representation of the environment, called a cognitive map. It is the ability to "create" and "read" these cognitive maps that enables a person to navigate by following a route without getting lost.

Brain malformations or lesions in parts of the brain important for navigation are known to cause navigation difficulties. However, no such defects or lesions in the patient's brain were detected. Moreover, a series of behavioural tests revealed that patient's problem was due to a specific inability to form cognitive maps.

"We suspect that this patient is not unique, and that there are others suffering varying degrees of selective developmental topographical disorientation," says Dr. Jason Barton, Canada Research Chair and director of the Human Vision and Eye Movement Laboratory where the patient was studied. "They might have a lifelong story of episodes like getting lost in their own house or neighbourhood, at school or at work, and having to rely on others for directions. In extreme circumstances, this can even lead to social isolation."

Source: University of British Columbia

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