

Researchers find spatial awareness shifts right as people fall asleep

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Credit: xiaphias/Wikipedia

(Medical Xpress)—A team of researchers working at Cambridge University in the U.K. has found that spatial awareness shifts to the right when people are falling asleep. In their paper published in the journal *Scientific Reports*, the team describes their study, what they've learned and how it might relate to a certain type of brain damage.

Back in 2005, another team of [researchers](#) reported noting that people experiencing reduced alertness due to sleepiness, tended to have alterations to their spatial awareness. The researchers with this new effort developed a strategy to learn more about the alterations. They devised an experiment that involved hooking up volunteers to an EEG machine and asking each of them to listen to tones being played either to their right or left. The 26 volunteers took turns sitting in a chair with their eyes closed, pressing buttons on their right or left side to indicate the direction of the sound. As they did so, many of them dozed off, which was exactly what the researchers were hoping would happen.

Electrical signals in the [brain](#) change as people start to fall asleep and then succumb to it—the EEG readout allowed the researchers to follow that path with each of the volunteers. Remarkably, the researchers discovered that as a volunteer would start to fall asleep, they would confuse the direction of the sound, consistently pressing the button on the right regardless of its true source. Sounds from the left were interpreted as coming from the right, while sounds from the right were correctly interpreted. This, the researchers suggest, is an example of hemispatial neglect—where the brain simply ignores [spatial information](#) coming from one side or the other.

Most often hemispatial neglect has been seen with stroke patients—damage to one hemisphere typically results in a loss of spatial awareness in the opposite side of the local environment. Those with such a condition tend to be unaware of objects or actions occurring on the impacted side and because of that don't react to them. To see it in non-injured brains during a normal activity might offer neuroscientists clues on how to help those who have such [brain damage](#).

The researchers don't know why the hemispatial neglect they observed always happened on the same side, but suspect it indicates brain activity associated with [spatial awareness](#) must be somehow linked with brain

processing that is charged with keeping us alert.

More information: Losing the left side of the world: Rightward shift in human spatial attention with sleep onset, *Scientific Reports* 4, Article number: 5092 [DOI: 10.1038/srep05092](https://doi.org/10.1038/srep05092)

Abstract

Unilateral brain damage can lead to a striking deficit in awareness of stimuli on one side of space called Spatial Neglect. Patient studies show that neglect of the left is markedly more persistent than of the right and that its severity increases under states of low alertness. There have been suggestions that this alertness-spatial awareness link may be detectable in the general population. Here, healthy human volunteers performed an auditory spatial localisation task whilst transitioning in and out of sleep. We show, using independent electroencephalographic measures, that normal drowsiness is linked with a remarkable unidirectional tendency to mislocate left-sided stimuli to the right. The effect may form a useful healthy model of neglect and help in understanding why leftward inattention is disproportionately persistent after brain injury. The results also cast light on marked changes in conscious experience before full sleep onset.

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