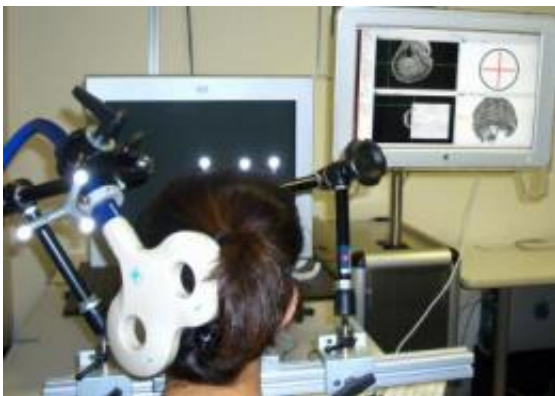


Why older people are less astute drivers and how the answer could help us understand depression

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A test subject has the medial temporal visual area (MT) of her brain temporarily weakened so that researchers can study how it affects her ability to detect motion. University of Rochester Professor Duje Tadin has found that the MT area is responsible for allowing humans to ignore background motion in their environments and instead focus in on more important motion of smaller objects in the foreground. Credit: University of Rochester

When elderly drivers get behind the wheel, they often confront the harrowing reality that they cannot easily see other cars, pedestrians, or cyclists moving around them. This frightening effect of aging, it turns out, is not necessarily a result of a reduced ability to perceive moving objects, as one might suspect, but a heightened awareness of the backdrop against which these objects move.

A team of scientists led by University of Rochester Professor Duje Tadin has isolated the cause of this phenomenon, and the surprising results could not only help train elderly people to be better drivers, but they could also help [psychiatrists](#) better understand abnormal [brain processes](#) in psychological conditions like depression and [schizophrenia](#). Their research, conducted at the Berenson-Allen Center for Noninvasive [Brain Stimulation](#) at the Harvard Medical School, will be published in the [Journal of Neuroscience](#) on January 25.

In a healthy, young person, a brain region called the middle temporal visual area, or MT, actively suppresses often irrelevant background motion so that he or she can concentrate on the more important motions of smaller objects in the foreground. Previous studies have found that elderly people, as well as those with psychological conditions such as schizophrenia and depression, are better at perceiving motion in the background. But this above average motion perception is not something to look forward to as we age. Because the brain is spending its limited resources constantly paying attention to the unimportant motions of background objects, it has a harder time noticing the motions of smaller objects.

“The amount of visual information around us is huge, and we don’t have the brain power to process it all,” Tadin said. “Evolutionarily speaking, [moving objects](#) are the most important visual features to detect quickly, because they could be your lunch or they could want to eat you for lunch. It just makes sense that our vision prioritizes processing them.”

Tadin and his colleagues discovered that the MT was responsible for this effect by using a technique called Transcranial Magnetic Stimulation (TMS). By precisely placing magnetic coils on the back of a subject’s head, the scientists stimulated the MT with electrical signals for 15 minutes to temporarily inhibit its functioning. Then, while the MT was less active, they tested how well subjects identified motions of smaller

and larger objects. They found that when the MT was inhibited, subjects had an easier time identifying the motion of large, background-like objects. These results indicate that an improperly functioning MT may be the cause behind better than normal perception of background motion in older adults.

This knowledge could be useful to psychiatrists trying to better diagnose schizophrenia and depression, Tadin says. Current diagnostic techniques for these conditions can involve subjective and qualitative information like a history of hallucinations or feelings of apathy. But if a person also exhibits better than normal detection of background motion, it could be a quantitative confirmation that he or she has one of these afflictions.

Provided by University of Rochester

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