

# What does a virtual roller coaster ride tell us about migraine?

July 21 2021

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When experiencing the ups and downs of a virtual roller coaster ride, people who get migraine headaches reported more dizziness and motion sickness than people who do not get migraines, according to a new study

published in the July 7, 2021, online issue of *Neurology*, the medical journal of the American Academy of Neurology.

Researchers also found that people who get migraines also had more nerve cell activity in certain areas of the [brain](#) during the virtual roller coaster ride and less activity in other areas. Researchers said this abnormal processing of the visual motion stimuli in the brain was linked to migraine disability and more susceptibility to motion sickness.

"Millions of people regularly experience painful and debilitating [migraine headaches](#) that can reduce their quality of life," said study author Arne May, MD, Ph.D., of the University of Hamburg in Germany. "People with migraine often complain of dizziness, balance problems and misperception of their body's place in space during migraine. By simulating a virtual roller coaster ride, our study found that some of these problems are not only magnified in people who experience migraine, but they are also associated with changes in various areas of the brain. By identifying and pinpointing these changes, our research could lead to a better understanding of migraine which could in turn lead to the development of better treatments."

The study involved 20 people with migraine who were compared to 20 people without migraine. Participants had an average age of 30 and more than 80% were women. People with migraine had an average of four migraines per month.

Researchers used [functional magnetic resonance](#) imaging (fMRI) to take brain scans of each participant as they watched videos to experience the virtual roller coaster rides. No participants experienced a migraine during the virtual rides. After the virtual rides, participants were surveyed about their perceived levels of dizziness, motion sickness and other symptoms.

Researchers found that 65% of people with migraine experienced dizziness compared to 30% of people without migraine. On a questionnaire about motion sickness, which scored symptom intensity on a scale of 1-180, those with migraine had an average score of 47 compared to an average score of 24 for people without migraine. People with migraine also experienced symptoms longer, an average of 1 minute and 19 seconds compared to an average of 27 seconds. Their symptoms were also more intense.

From the brain scans, researchers were able to identify changes in nerve cell activity based on blood flow to certain areas of the brain. People with migraine had increased activity in five areas of the brain, including two areas in the occipital gyrus, the visual processing area of the brain, and decreased activity in two other areas including the middle frontal gyrus. These brain changes correlated with migraine disability and [motion sickness](#) scores.

"One other area of the brain where we found pronounced nerve cell activity in people with migraine was within the pontine nuclei, which helps regulate movement and other motor activity," said May. "This increased activity could relate to abnormal transmission of visual, auditory and sensory information within the brain. Future research should now look at larger groups of people with [migraine](#) to see if our findings can be confirmed."

Provided by American Academy of Neurology

Citation: What does a virtual roller coaster ride tell us about migraine? (2021, July 21) retrieved 4 May 2024 from <https://medicalxpress.com/news/2021-07-virtual-roller-coaster-migraine.html>

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