

Researchers study impact of head movement on fMRI data

February 19 2014

Kessler Foundation researchers have shown that discarding data from subjects with multiple sclerosis (MS) who exhibit head movement during functional magnetic resonance imaging (fMRI) may bias sampling away from subjects with lower cognitive ability. The study was published in the January issue of *Human Brain Mapping*. (Wylie GR, Genova H, DeLuca J, Chiaravalloti N, Sumowski JF. Functional MRI movers and shakers: Does subject-movement cause sampling bias.) Glenn Wylie, DPhil, is associate director of Neuroscience in Neuropsychology & Neuroscience Research at Kessler Foundation. He is also associate director of the Neuroimaging Center at Kessler Foundation, and an associate professor at Rutgers - New Jersey Medical School.

Because [head movement](#) during fMRI degrades data quality, data associated with severe movement is frequently discarded as a source of random error. Kessler Foundation scientists tested this assumption in 34 persons with MS by examining whether head movement was related to task difficulty and cognitive status. Cognitive status was assessed by combining performance on a working memory and processing speed task.

"We found an interaction between task difficulty and cognitive status," explained Dr. Wylie. "As task difficulty increased, there was a linear increase in movement that was larger among subjects with lower cognitive ability." Healthy controls showed similar, though far smaller, effects. This finding indicates that discarding data with severe movement artifact may bias MS samples such that only subjects with

less-severe cognitive impairment are included in the analyses. However, even if such data are not discarded outright, subjects who move more will contribute less to the group-level results because of the poor quality of their data.

It is important for researchers to be aware of this potential [bias](#). "Some newer scanners can correct for motion," noted Dr. Wylie. "Another approach is to monitor each subject's motion parameters and ensure that an adequate number of subjects with low cognition are included. Recruiting a large number of subjects may ensure inclusion of a sufficient number of people with low cognition/low movement. It is however, a costly option."

Provided by Kessler Foundation

Citation: Researchers study impact of head movement on fMRI data (2014, February 19) retrieved 23 April 2024 from <https://medicalxpress.com/news/2014-02-impact-movement-fmri.html>

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