

MS study correlates fMRI with negative effect of warmer weather on cognitive status

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Kessler Foundation scientists correlated functional magnetic resonance imaging (fMRI) findings with the negative impact of outdoor temperature on cognitive functioning in multiple sclerosis (MS). This study, "[Warmer outdoor temperature is associated with task-related increased BOLD activation in patients with multiple sclerosis](#)," released by *Brain Imaging & Behavior* as epub ahead of print, corroborates the group's previous study that established that people with MS performed worse on processing speed and memory tasks during warmer outdoor temperatures versus during cooler outdoor temperatures. "Increased MS disease activity during warmer months is a recent discovery. Now, this work is the first report of brain activation associated with outdoor temperature in MS. This finding is novel and important for persons with MS who are shown to have worse cognition during warmer weather," said Victoria M. Leavitt, Ph.D., research scientist at Kessler Foundation and principal investigator for the study, funded by the National MS Society.

Kessler Foundation researchers previously demonstrated that patients with [multiple sclerosis](#) (MS) demonstrate worse cognition on warmer days. (Leavitt VM, Sumowski JF, Chiaravalloti N, DeLuca J. [Warmer outdoor temperature](#) is associated with worse cognitive status in multiple sclerosis. *Neurology*. 2012 Mar 27;78(13):964-8). The purpose of the current study was to identify the neurophysiological basis for worse cognition. "Here, we examined the neurophysiology underlying this temperature-cognition relationship, said Dr. Leavitt. "The association between task-related BOLD fMRI activation and outdoor temperature

was investigated in 28 MS patients who demonstrated worse cognitive function on warmer days. In MS patients, warmer outdoor temperature was associated with greater BOLD activation during performance of a simple sustained attention task. The brain areas that showed greater activation on warmer days were regions typically activated by MS patients during task performance: the frontal, dorsolateral, prefrontal and parietal cortex. The relationship between outdoor temperature and cerebral activation was absent in healthy controls. Increased brain activation required by MS patients on warmer days to perform a simple task may signify neural inefficiency."

Kessler Foundation co-investigators are Glenn Wylie, D.Phil., associate director of Neuroscience Research and the Center for Neuroimaging Research @ Kessler Foundation, Nancy Chiaravalloti, Ph.D., Director of Neuropsychology & Neuroscience Research, John DeLuca, Ph.D., Vice President for Research & Training, and James F. Sumowski, Ph.D., research scientist. All also have faculty appointments at Rutgers New Jersey Medical School.

According to Dr. Sumowski, "The significant effect of warmer weather on cognition should be considered when designing and conducting clinical trials. This information might assist clinicians in choosing clinical treatment, and help researchers develop effective strategies for coping with the negative effects of weather-related effects on cognition that impact independence, education, employment and activities of daily living."

Provided by Kessler Foundation

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