

# Neuroscientist scans brain for clues on best time to multitask

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In today's fast-paced world, multitasking has become an increasingly necessary part of our daily routine. Unfortunately, multitasking also is notoriously inefficient. However, a new brain imaging study led by a cognitive neuroscientist at the University of New Hampshire finds that there are optimal times when we are better suited to multitask.

In the study "Neural predictors of moment-to-moment fluctuations in cognitive flexibility" published in the latest issue of the *Proceedings of the National Academy of Sciences*, Andrew Leber, assistant professor of psychology at UNH, explains how the brain can act as crystal ball to predict when people are efficient multitaskers.

"We typically sacrifice efficiency when we multitask. However, there are times when we're quite good at it. Unfortunately, not much has been known about how to predict when these periods of time will occur," Leber said.

While having the study participants multitask, Leber and his colleagues at Yale University monitored their brain activity using functional magnetic resonance imaging (fMRI). The research confirmed that multitasking is, on average, inefficient. However, the brain scans allowed the researchers to predict when people would be poor multitaskers and optimal multitaskers.

Most dramatically, the changes in performance were preceded by changes in the participants' brain activity patterns. Higher levels of activity in brain regions such as the basal ganglia, anterior cingulate cortex, prefrontal cortex, and parietal cortex corresponded to better multitasking performance.

"What is so striking about this result is that brain activity predicted multitasking performance before participants even knew whether they would be asked to switch or repeat tasks," Leber said.

Being able to predict when people are in optimal multitasking states raises tantalizing prospects for maximizing productivity in our daily lives, according to Leber. Ideally, we should reserve task juggling for known periods of optimal multitasking while doing repetitive tasks during known periods of poor multitasking.

Yet, while the brain imaging results reflect a critical step in helping us to better schedule our daily routine, they don't provide a truly practical solution quite yet. "Obviously, the average person can't bring an fMRI scanner to work," Leber said. "It may take more time before our research translates to real-world benefits for each of us."

Nevertheless, he believes that the current study represents a promising start.

"The fact that we are able to so rapidly switch from one task to another is no accident of nature, as it reflects an enhanced capacity to flexibly interact with our environment. And, it's to our benefit to exercise this remarkable skill from time to time, although the key might be to keep it in moderation," he said.

The research also may inform scientists' understanding of neurological disorders, such as Parkinson's disease, which is marked by degeneration of the basal ganglia. While it is commonly known that Parkinson's patients experience deficits in controlling movement, multitasking also is adversely affected.

"We've known that multitasking suffers when the physical makeup of the basal ganglia degenerates over time, as in Parkinson's disease," Leber said. "However, the current study shows that even in healthy adults, short-term changes in the basal ganglia also impact multitasking."

This observation opens new potential avenues in studying normal brain functioning to help provide a

more complete picture of the disordered functioning  
in Parkinson's disease.

Source: University of New Hampshire

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