Exercise good for older minds, researchers say

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Older folks who exercise regularly don't just feel better physically, they may react faster and more effectively to mental challenges like road conditions while driving.

People whose average age was in the mid 60s and who were classified as engaging in high levels of physical activity scored as well as college students in a study reported recently by University of Illinois researchers.

"There's no significant difference between them," said Charles Hillman, a UI kinesiology professor who authored the study with colleague Edward McAuley, psychology Professor Arthur Kramer and graduate students Artem Belopolsky and Erin Snoon.

The study monitored electrical activity in the brains of older adults with a history of engaging in low, moderate and high levels of physical activity, as well as the college students, while they participated in a computer-generated test designed to tap "executive control function."

Simply put, executive control function refers to thinking that requires more effort or concentration, mediated largely by the brain's frontal lobe. Hillman characterized it as "intentional environmental control."

Kramer said that includes, for example, dealing with distractions such as a phone call in the middle of writing a story, doing multiple activities at the same time, which driving requires, and setting priorities to decide which thing demands attention now - all in the blink of an eye.

As we age, we tend to become less focused and adept at responding in such situations, Kramer said.

Kramer and McAuley are studying aging, exercise and its impact on the brain using magnetic resonance imaging, or MRI, among other things.

But in the new study, they worked with Hillman on using a method akin to an electroencephalogram, or EEG. All three researchers are affiliated with the UI's Beckman Institute and are part of an interdisciplinary group in a new UI initiative to study aging.

Hillman said physical activity appears to have at least two benefits related to executive control.

The brains of the active subjects performed more efficiently, in a sense used less brain power, when confronted with the tasks in the UI study.

They also exhibited less "latency" in registering the situations presented by the study. Hillman said. That is, the exercisers recognized and responded to stimuli faster.

McAuley said the study adds to evidence, a lot of it from UI research, that exercise as we age isn't only good for us physically, but cognitively and mentally as well. Other studies show it improves such things as self-esteem and sociality, he noted.

"I think we have very strong indications," Kramer said. "Those folks who are more fit tend to outperform those who are less fit."

Hillman said actual exercise also appears to be more beneficial than normal, day-to-day activity, such as cooking and cleaning.

The highly active people who scored best in the study regularly engaged in things like jogging, swimming, tennis, lifting weights and bike riding.

"It's really physical activity that makes a difference, not just activity," Hillman said.

In the study, 32 people were tested while wearing what looks like a rubber swimming cap arrayed with sensors to record images of electrical activity in the brain.

The older subjects ranged from their late 50s to their 70s. Prior to the study, they were surveyed and broken into groups that had regularly engaged in little or no, moderate, or a lot of physical activity.

They then had to respond as quickly as possible to combinations of letters, flashed on a computer screen about every second and a half, by pressing the left or right button on a keypad depending on what they saw - an exercise designed to spur executive control function.

Why exercise yields cognitive as well as physical benefits is something scientists are still trying to find out. Kramer said animal studies indicate it could be related to increased production of a protein that protects the brain's electrical network, better blood flow and, potentially, the creation of new neurons, the signal-firing cells in the brain.