

## HEALTH & HUMAN SCIENCES

### Walking Your Brain to Better Ideas: The Effects of an Acute Bout of Exercise on Creativity

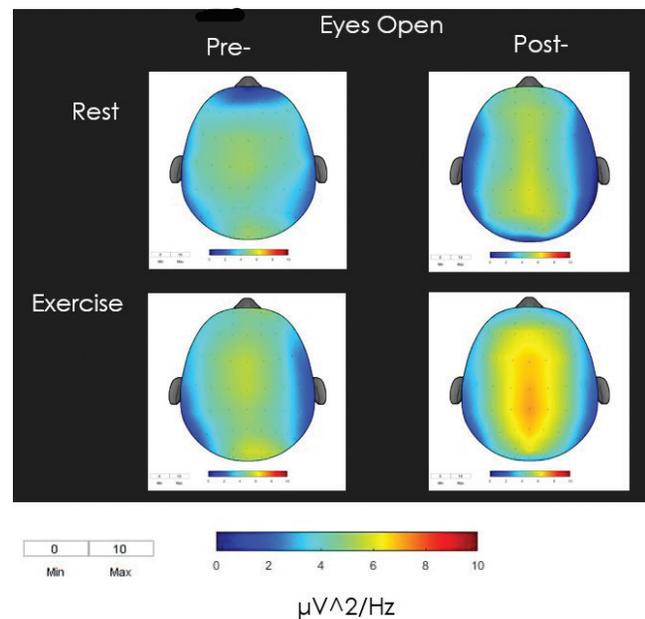
**Student researcher:** Alexis Swingendorf, Senior

Creative thinking is a cognitive ability essential for generating creative solutions to modern problems in most real-life settings. Despite its constant use, research on cognitive enhancement has primarily focused on other forms of cognition such as attention, executive function, and memory as well as their underlying brain mechanisms. This study aims to determine whether a single bout of moderate-intensity aerobic exercise, a well-established cognition-enhancing strategy, may play a role in changing the way the brain works to support creative performance.

This study utilized a within-subject design (N=27, male: N=11) to compare the acute effects of moderate-intensity aerobic exercise versus quiet sitting on resting cortical activation (i.e., electroencephalogram [EEG] at rest) and creativity performance. The convergent and divergent creative abilities were measured using Remote Association and Guilford Alternate Uses tasks, respectively. The results show a higher number of creative responses accepted only in the Guilford Alternate Uses task following exercise rather than quiet sitting. This suggests that the acute exercise benefit may be selective to divergent forms of creativity and problem solving. Further, a trend of increased EEG alpha frequency activation in the parietal brain region from baseline was observed following both exercise and rest, while such an increased alpha activation was correlated with superior Guilford Alternate Uses task performance only following exercise. These findings suggest the importance of exercise-induced alteration in cortical

activation to divergent creativity performance. Future studies should consider altering the duration and intensity of exercise to maximize the observed acute exercise benefits to brain function and creativity.

*Research advisor Alvin Kao writes: "Exercise has recently become a popular strategy for temporal cognitive enhancement, likely through de/activating brain regions responsible for various cognitive processes. Alexis Swingendorf's project adds to the literature by showing that exercise-induced changes in parietal cortical activation may be the key contributing to the acute improvements in creative thinking following exercise."*



*Following a bout of quiet sitting, there is a slight increase in activity during a resting EEG. Following moderate-intensity constant exercise, there is a much larger increase in activity during the resting EEG ( $p = 0.07$ ). A change in color from blue to red suggests an increase in the activity in the brain that was recorded by the electrodes in the cap.*