東北学院大学 TOHOKU GAKUIN UNIVERSITY

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

プレスリリース

報道機関　各位

学校法人東北学院　広報部広報課

2019 年 9 月 5 日

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Complex exercise improves the brain function

Points

- Complex exercise such as badminton improves high order cognitive function.
- Complex exercise might activate brain regions associated with high order cognitive function more than simplex exercise.
- In future research, the association between complex exercise and the activation of specific brain regions will be studied using physiological measurements.

Dr. Shinji Takahashi from the Faculty of liberal arts at Tohoku Gakuin University, Japan and Dr. Philip M. Grove at the University of Queensland, Australia examined that 1) complex exercise like badminton for 10 min improves high-level cognitive function and 2) simple exercise like running for 10 min does not have a positive impact on cognitive functions. These findings could be helpful for exercise prescription for health promotion.

This study is published in “PLOS ONE” at 14:00 eastern of September 4th 2019 time (Japanese time 4:00 of September 5th 2019).

Back Ground

Regular exercise can maintain health and prevent lifestyle-related disease. It is known that exercise also increases blood flow in the brain and reduces brain atrophy with aging. To elucidate how exercise has a positive impact on the structure and function of the brain, the influence of acute exercise on the brain has recently been investigated. So far substantial studies have demonstrated that moderate aerobic exercise has an effect on the structure and function of the brain. However, most of the previous studies employed only simple exercise such as walking, running, and cycling. The effects of complex exercise such as ball games on cognitive functions have received less attention. Therefore, Dr. Takahashi and Dr. Grove chose badminton, a complex exercise, and examined its effect on cognitive functions. Badminton is typical complex exercise because

it requires various motions such as jumping and racket swinging as well as cognitive demands such as strategy, and shot choice/placement.

Experiment methods

Twenty healthy young adults completed the modified Stroop tasks before and after 3 experimental interventions: the badminton, running, and control (seated rest) conditions, respectively (see Figure 1). One of the Stroop tasks was the neutral test which participants were asked to select the name of the color corresponding to the color patch. The neutral task is a measure of simple cognitive function. Another test is the incongruent test, which participants were asked to select the name of the color (e.g., red) to the written using a different colored ink (e.g., blue). The incongruent test was a measure of high-level cognitive function.

Figure 1. The scene of experiments. The left side is the running condition. The right side is the badminton condition.

Main findings

Figure 2 shows changes in the neutral and incongruent tests for pre- and post-test. Although there were no differences of interventions in the changes of the neutral tests, badminton significantly improved the incongruent test more than the control. These results show that complex exercise selectively enhances high-level cognitive function, suggesting that complex exercise might activate the region of the brain required for high-level cognitive function. Dr. Takahashi and Dr. Grove plan to investigate how complex exercise activates the brain using functional near-infrared spectroscopy.

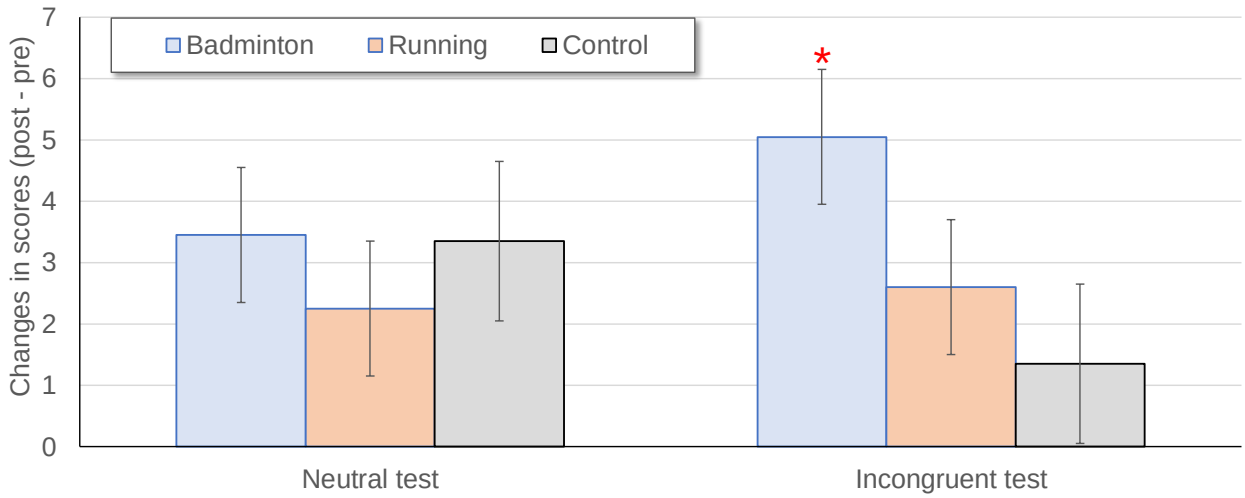

Figure 2. Changes in cognitive functions between pre- and post-test. Asterisk (*) shows significantly higher than control.

Funding

The research was supported by Japan Society for the Promotion of Science 15K01563 (Principal Investigator: Shinji Takahashi).

Publication

Title： Comparison of the effects of running and badminton on executive function: a within-subjects design

Authors： Shinji Takahashi, Philip M. Grove

Journal： PLOS ONE

URL： http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0216842

DOI: 10.1371/journal.pone.0216842

Date: September 04 2019

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