

20.30: Exercise and Memory

Learning Objectives

- To study the benefits of exercise on memory

Research conducted by

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Overview

Physical exercise has many beneficial effects on physiological processes, including those that affect cognition and memory. Exercise increases brain-derived neurotrophic factor (**BDNF**), which is a protein found in the learning and memory centers of the brain where it supports nerve cell survival and the growth of new neurons and neuronal connections. A polymorphism of **BDNF** (a variant genotype) alters the release of **BDNF** during exercise. The researchers of this study sought to compare the effects of a single bout of exercise versus a 4-week exercise regimen on cognition and memory and to determine if **BDNF** genotype influences the intensity of those effects of exercise.

Questions to Answer

How do regular exercise and/or an acute bout of exercise affect cognitive memory? Does type of **BDNF** genotype (Val/Val or Met carrier) mediate the effect of exercise on memory? How do we calculate a one-way ANOVA by hand and how do different post-hoc tests compare?

Design Issues

The group sample sizes are small, perhaps limiting the power to detect significant differences between the four exercise/control groups.

Descriptions of Variables

Table 20.30.1: Description of Variables

Variable	Description
Group	0W-: sedentary group 0W+: sedentary group with one bout of exercise at least 2 hours before Visit 2 4W-: regularly exercising group 4W+: regularly exercising group with a bout of exercise at least 2 hours before Visit 2
Accuracy	The percentage of objects each group accurately identified as old or new when performing the novel object recognition task during each study visit
Difference score	Accuracy achieved by the subject in the novel object recognition task during Visit 2 minus accuracy during Visit 1, in percent

BDNF genotype

Whether a subject's BDNF genotype is Val/Val or Met carrier (Val/Met and Met/Met)

Links

How Exercise Affects the Brain: Age and Genetics Play a Role

BDNF

References

- Hopkins, M. E., Davis, F. C., Van Tieghem, M. R., Whalen, P. J., Bucci, D. J. (2012). Differential effects of acute and regular physical exercise on cognition and affect. *Neuroscience*, 215, 59-68.

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