Analysis on short-term memory and chocolate consumption among college students

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Abstract

This experimental study analyzes the relationship between short-term memory and chocolate consumption among college students. The hypothesis was that eating chocolate would help improve short-term memory function. Upon consent agreement, subjects, Penn State college students, were randomly assigned to either a treatment or controlled group via coin flip; treatment group was given 1 Hershey Kiss (milk chocolate) to consume before participating in the experiment. The data did not support the hypothesis and the results concluded that chocolate consumption was not significant with short-term memory. Limitations of this experiment included health-consciousness and many confounds were present in the overall experiment.

Objectives

The objectives of this assignment were to learn how to run an experimental study that involves consent, in addition to learning how to write up a lab report and following ethical and class guidelines.

Disclaimer

The purpose of this paper is to fulfill course requirements for BBH 411W and to stand as a personal writing sample, but the findings should not be treated as generalizable research.
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i. Introduction

In this experimental study, the relationship between short-term memory and chocolate consumption was analyzed. The goal of this study was to predict that eating chocolate could help improve memory function. Chocolate contains high amounts of sugar which can help influence the individual to demonstrate the ability to remember vast amounts of information in a short amount of time.

In a research study done by Crichton et al. (2016), scientists studied the relationship between chocolate consumption and memory. Their methods were designed through cohort study and community-based study in New York, where they collected cognitive functioning and dietary intake of 1,049 participants. In dietary intake questionnaires, participants were asked what kinds of food they frequently eat. Next, participants were given a test that challenged their cognitive function. As a result, participants that frequently ate chocolate scored a higher outcome on cognitive tests. This led to scientists believing that chocolate intake has a strong, positive association with cognitive function and short-term memory.

Another study showed a group of researchers studying the relationship between chocolate and an individual’s neurobiological behavior. Their design was an observational study, where researchers observed participants in solving various problem-solving questions. While solving these questions, participants were given the option on

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whether or not to eat chocolate. As a result, participants who ate chocolate had a higher score compared to those who did not eat any of the chocolate\(^2\).

Evidence shows that the mechanism of chocolate consumption helps improve memory function due to flavanols having a strong connection with good health, such as cardiovascular and neurobiological behavior. Previous studies show chocolate consumption is associated with cognitive function, measured by general battery of neuropsychological performance on various tasks such as Visual-Spatial memory and Organization, Mini-Mental State, Working Memory, Scanning and Tracking, and Abstract Reasoning. Furthermore, other components in chocolate help enhance alertness due to exposure of caffeine, methylxanthines and theobromines\(^1\).

Additionally, researchers believed that glucose could help stimulate blood flow in the brain and induce growth of new blood vessels and new cell growth in the hippocampus, a part of the brain involved in memory and emotions\(^3\).

ii. Methods

The timeline of our experiment took approximately two minutes – one minute explaining the procedure, seeking consent from participants, and randomly assigning subjects to groups, and another minute where subjects perform the experiment. Subjects were addressed a consent before the start of the experiment:

“In this study, you will be asked to flip a coin for random assignment. Furthermore, you may be asked to eat chocolate depending on assignment. If you have any food-related

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allergies or for any reason don’t want to eat chocolate, please inform the experimenter and the study will end now.”

Subjects whom agreed to participate were randomly assigned to treatment or control via coin flip. The treatment group ate 1 Hershey Kiss (milk chocolate) before the experiment started. Next, he/she was given a sheet containing 25 random words where subjects had 30 seconds to memorize as many words as they can. Once the time is up, he or she was given another 30 seconds to write down as much as they could remember on a separate piece of paper. Upon completion, each subject was thanked for participating in our experiment.

ANOVA test was used to look for an association between both variables and was conducted using IBM SPSS Statistics version 22. Categorical variables were analyzed as quantitative variables. Alpha was set at 0.05.

iii. Results

On a quantitative scale, the range was 8-20 words written down – 8 being the least of words and 20 being the most number of words. Among the total words, there were 7-19 words that were correctly written (i.e. no misspellings, words matched those from the table). There were 40 subjects; 24 were randomly assigned to control and 16 were randomly assigned to treatment. Among the 40 subjects, the mean words memorized were 6.708 words. Based on ANOVA test, short-term memory was not associated with chocolate consumption (F=4.279, between-subjects df=1, within-subjects df=38, p-value>0.05).
iv. Discussion

The results concluded that there was no significance between chocolate consumption and short-term memory. Despite a study on glucose stimulation in blood flow and growth of new blood vessels and nerve cell growth, this experiment contrasted the work of Katz et al. (2011). A reason for this is probably due to chocolate containing high levels of sugar that can stimulate the person to become more active than normal and can hinder his or her focus level performance when memorizing a table of words in a short amount of time. Furthermore, there were a handful of female participants who were health-
conscious about eating chocolate, which can also influence the results of this experiment as well.

In conclusion, a total of 40 subjects participated in the experiment, where 24 subjects were randomly assigned to control and 16 subjects were randomly assigned to treatment. Based on ANOVA test, short-term memory was not associated with chocolate consumption (F=4.279, between-subjects df=1, within-subjects df=38, p-value>0.05). These results do not support the hypothesis.

v. References


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