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Short Term Memory and Color

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Abstract

This study tried to see if there was any difference in memory retention whether the individual was exposed to color or black ink. We looked at how students from College of Saint Benedict and Saint John's University (N=20) were able to memorize a list of words. Participants were given list of words in either black ink or a mix of colors. They were then asked to repeat back what they remembered from those lists. We found that the students who had the list of words averaged a higher number of words memorized (10.33) vs those students who had the words in black ink (8.11). The results show significance between the two scores ($P < .028$). The results suggest that there is better retention of memory when participants are exposed to color than black ink.

Introduction

The ability to memorize affects various aspects of an individual's life whether it is in their job, the work place, or simply at home. Memory is a complex process that requires the translation of information from an external sensory experience into an internal representation Luu, S. (2018). Tasks ranging from remembering a simple telephone number or remembering the process of a mathematical formula require use of memory. The use of memory is very important for everyday use and can be useful to try and find ways to increase the capacity of an individual's memory.

There are two known forms of memory; short-term and long-term memory. Short-term memory can hold about seven items for no more than 20 or 30 seconds at a time. Long term memory on the other hand, can store unlimited amounts of information indefinitely Mohs, R. (2007). Short term memory can be transferred into long term memory with the passage of time and repeated use of short term memory. This can be anything from an advertisement you repeatedly see or a set of class notes that you review. Building the ability to transfer information from short-term memory and long-term memory can be very useful to various aspects of a person's life.

Color is a part of the visual focus that helps the individual differentiate objects. Depending on what the color is, and its context individuals get an understanding of what the object can mean even without having to focus on it. An example of this is street lights or stop signs. We recognize the color and its context and remember to perform certain actions based on previous memories. Although the mechanisms of matching colors between different contexts have been widely studied under the rubric of color constancy, little research has investigated the role of long-term memory in such tasks or how memory interacts with color constancy Allred, S. R., & Olkkonen, M. (2015). This study will attempt to see if there is any link between memory and variety of colors.

Over the past five decades much research in short-term and working memory has been devoted to the mechanisms of maintaining the serial order of a list of items Peteranderl, S., & Oberauer, K.

(2018). Short term memory is what this study will be focusing on and will show if having colors shown to individuals visually help people remember better. Long term applications of this can very useful if the participants do show a better memory when given colors rather than no color.

This study attempted to see whether or not using colors would help a person remember a list of words better than having no color. The study focuses on short term memory and has no application towards long term memory. I do predict that participants will be able to remember a list of words better when the words are in different colors.

Methods

Design

There were 20 subjects who participated in the study; all participants attend College of Saint Benedict and Saint John's University. They were not coded by gender because there were only three male participants. Subjects were asked to memorize a list of words either in color or in black ink. The students were given exactly one minute with the list of words and given 1 min of down time before being asked to recall the list of words. The same procedure was done for both the color and non-color group.

Participants

There was a total of 20 students from College of Saint benedict and Saint John's University who participated in this study. They were sorted through block randomization to decide what group they are in. All participants were current students in the 2017-2018 school year.

Materials

We experimented student with a convenience sample. The students were from the Spring 2018 Research methods class and close friends who were asked to participate in the study. The list of words consisted of random words. There were two lists one in black ink and one in color ink.

Results

The results were analyzed using SPSS. We found that the students who were given the list of words in black ink had an average number of words memorized of 8.11. They also had a minimum of 6 and a maximum of 12. Students who were given the list of words in color had an average of 10.30. They also had a minimum of 7 and a maximum of 13. There was significance between number of words memorized between the two groups. There was a significance of $<.028$. The results show us that there was a significant mean difference between the color and black lists of words.

Discussions

The results show that there is a significant mean difference between the list of words in color and black ink. My hypothesis was correct showing that when the list of words is in color, then the participants will be able to remember it better than if they were in black ink. The significant mean difference between both averages of the color ink and the black ink shows that there is influence on an individual's memory when there is color involved.

This study had a weak external validity. The samples were collected in a convenient sample meaning that students asked people close in their vicinity whether it was friends or classmates to take part in the experiment. It is also not generalizable to Saint John's University because there were only 3 male participants. It also does not generalize to the population because all the participants are college students. The internal validity was strong for this experiment. The experiment was straightforward. Both lists of words had the same number of words and the same words used. The only difference between the list was the use of color. The participants were also given the same time with the list of words.

This study had good statistical validity. There was statistical significance between the mean differences of the two groups. There was only one outlier that has been completely removed from the samples. There was also good construct validity. The task was simply defined and easily measurable. There was no outside interference nor problems for the participants to understand the task.

There are not many studies that have been conducting regarding the use of color with memory. Just as it was stated before; little research has investigated the role of long-term memory in such tasks or how memory interacts with color constancy Allred, S. & Olkkonen, M. (2015). Similar studies like this were conducted, but rather than words there was shapes. Wilton, R (1989) found that the recall of the colors, in response to the names of the shapes, was superior for the group for which the shapes themselves had been colored. This study supports the idea that color can have positive influences on a person's memory.

This study tells us that memory can be positively affected by color. This is only if you take into account the sample used to tell us this. We also do not know if it was only positively affecting certain words such as nouns vs verbs. In addition to that, we do not know if there was more memory when the words were in a certain color. Moving forward, there should be an experiment testing the different variables on a more specific scale to try and find what exactly helps the human memory.

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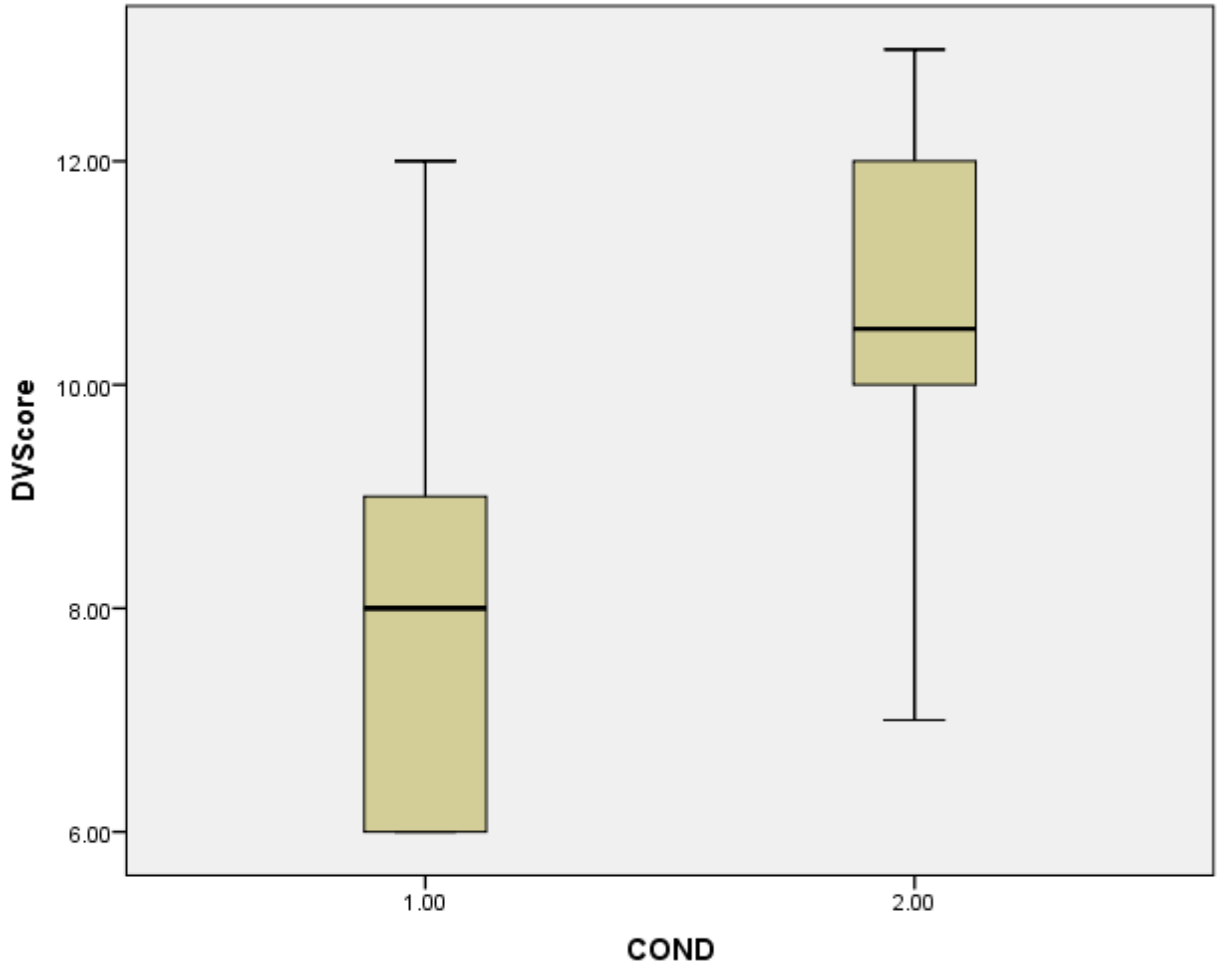


Fig 1. This box and plot graph shows the mean differences between the color and black group. It also shows the spread range of the different scores. 1= Black; 2=Color (N=19).