

# Memory Rainbow

## Science Inquiry

*Madeline Barr*

*VMS - 8th Grade*

*March 2015*

# PROBLEM STATEMENT

**Do bright colors increase  
memorization abilities?**

# ABSTRACT

**Many people believe that color improves memorization skills. Color draws your attention and deepens the level of memory your brain uses. The level of memorization that we use is affected by our brain's concentration. The higher level of attention, the higher level of memory. There are two levels of memory. There are two levels of memory: intermediate memory processing and shallow memory processing. Intermediate memory processing is the ability to recognize and analyze at a higher level. Shallow memory processing is the basic analysis fo information. The brain pays attention to bright colors more than plain colors such as white. Because color engages our attention and higher level of memory, we will not only understand the information given in color, but we will also retain it longer than information given in plain colors.**

**The purpose of this behavioral health experiment is to test if brighter colors will increase a test subject's memory more than plain colors.**

# HYPOTHESIS

**If the color is bright, than the subject will complete the memory game faster.**

# TEST HYPOTHESIS: Materials

- **test subjects (at least 10% of population)**
- **20 colored flash cards to make memory matching game (red, blue, yellow, and the control white)**
- **timer**
- **everyday words to put on cards**
- **quiet testing room**

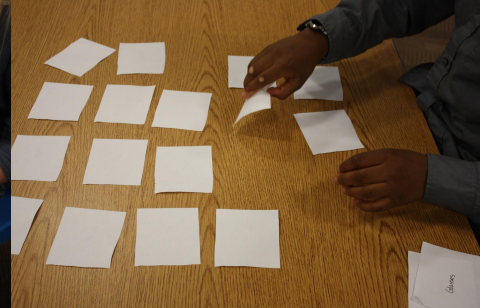
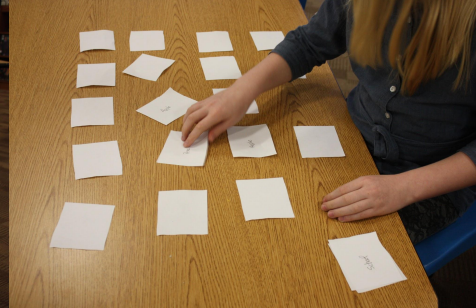
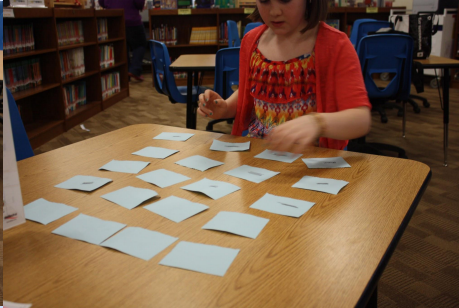
# TEST HYPOTHESIS: Procedure

- 1. Write everyday words on memory cards. Write the same words on all the color cards.**
- 2. Set up matching game (all color groups arranged in the same positions) have a set of 20 cards to match.**
- 3. Gather test subjects and separate them into groups. These groups will complete the same matching game but in different colors.**
- 4. Have test subject complete the game (match all cards) time how long it takes for the subject to complete the matching game.**
- 5. Repeat step 4 with all the different color groups.**
- 6. Record data.**

# PICTURES



Test subject  
completes blue  
memory game.



Test subjects  
complete white  
memory game

# TEST HYPOTHESIS: Variables

**MANIPULATED/INDEPENDENT VARIABLE (What is changed/what is tested):**

*The color of cards (red, blue, yellow, and the control white)*

**RESPONDING/DEPENDENT VARIABLE (What is measured):**

*The time taken to complete the memory game*

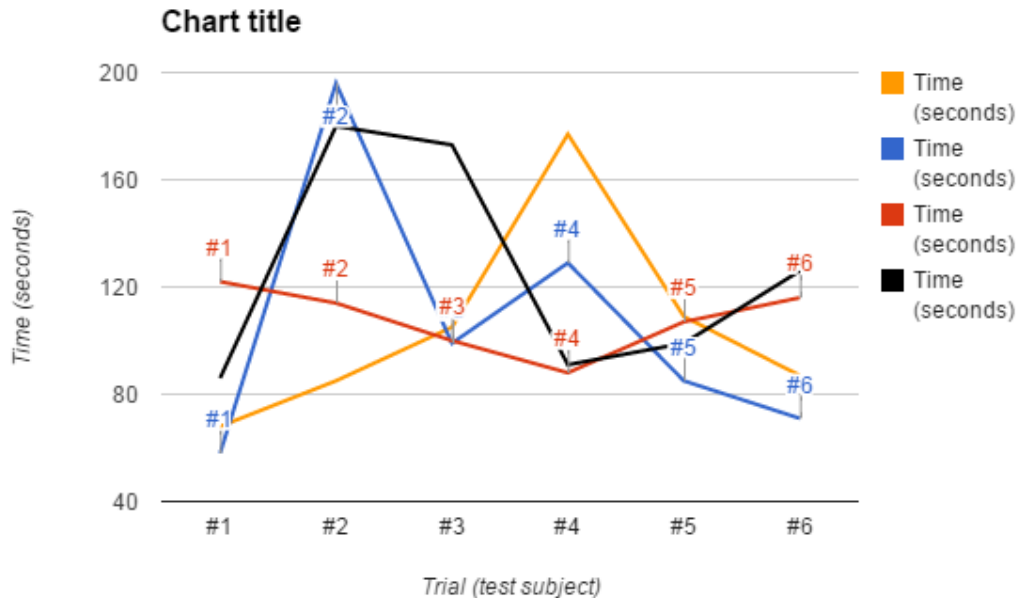
**CONTROL/CONSTANTS (What is kept the same or controlled, so it is a “fair test”)**

- *the words on cards*
- *the age of test subjects*
- *the testing room - limit distractions*
- *the arrangement of cards*



# DATA

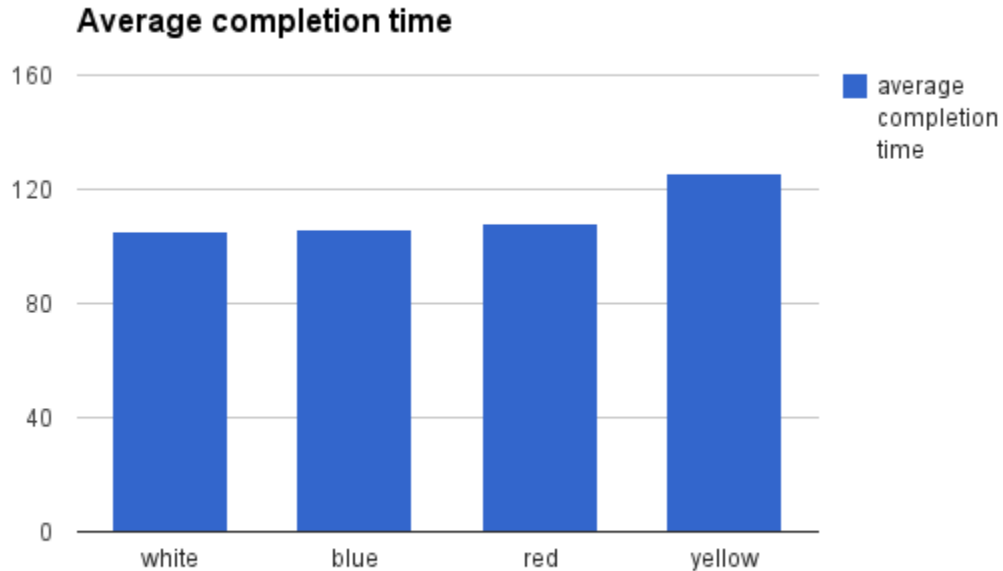
## *Quantitative Data:*



| White | Time (seconds) | Blue   | Time (seconds) |
|-------|----------------|--------|----------------|
| #1    | 68             |        | 58             |
| #2    | 85             |        | 196            |
| #3    | 105            |        | 99             |
| #4    | 177            |        | 129            |
| #5    | 109            |        | 85             |
| #6    | 87             |        | 71             |
| Red   | Time (seconds) | Yellow | Time (seconds) |
| #1    | 122            | #1     | 86             |
| #2    | 114            | #2     | 180            |
| #3    | 100            | #3     | 173            |
| #4    | 88             | #4     | 91             |
| #5    | 107            | #5     | 99             |
| #6    | 116            | #6     | 126            |

# DATA

## *Quantitative Data*



| color  | average Time |
|--------|--------------|
| white  | 105.2        |
| blue   | 106.3        |
| red    | 107.8        |
| yellow | 125.8        |

# DATA

## *Qualitative Data*

- **Test subjects with brighter colors tended to look at the cards longer**
- **Test subjects with plain colors did not look at cards as long**
- **Some test subjects muttered the words**

# CONCLUSIONS

**The hypothesis was rejected. The hypothesis stated that if the color is bright, then the subject will complete the memory game faster. The data showed that the two brightest colors, red and yellow, had the slowest average completion time. The yellow cards' average completion time (125.8 s) was slower by a large margin of 18 seconds. The red cards' time (107.8 s) however, was only about a second slower than the blue cards' time (106.3 s) and about two seconds slower than the white cards' time (105.2 s). This small margin between times means that there is not a significant difference between the colors.**

**However, according to the research, the bright colors should have attracted the attention of the brain making it easier to memorize. This might have happened in reverse. The color of the cards might have distracted the brain from the actual words. This effect might also have been increased by the age of the test subjects. (4th grade) At this age, the test subjects do not have as high of an attention span as adults do.**

# ANALYSIS

**The data would have been more reliable if there were more test subjects. 10% of the population is the minimum amount of test subjects in order for the test to be reliable, however, more than 10% is preferable. Some of the test subjects might have had better memorization skills than others. Some test subjects might have bigger attention spans than others, allowing them to concentrate better. There are many variables about the test subjects that are uncontrollable but might have affected the data.**

**All of the data was very close together with the exception of the yellow cards. The yellow cards' time was significantly slower than the rest of the data. This is caused by an outlier in the data set. This test subject might have been affected by one of the variables previously mentioned.**

**For future tests of this experiment, I would like to test both kids and adults to see if age plays a role in memorization skills. I would also like to test more people to get more accurate results. I would also like to test with more colors.**

# JUSTIFY CLAIMS WITH EVIDENCE

**Based off of the data, bright colors do not improve memory because the two brightest colors were the two slowest colors. The yellow card test was an outlier and is invalid because trial #2 and #3 were very slow. If the outliers are taken out, then all the colors have about the same completion time, based off of this, color does not play a significant role in memorization.**

# BIBLIOGRAPHY

"Jana Jan." *The Edynco Blog*. Web. 21 Mar. 2015. <<http://blog.edynco.com/instructional-design/how-colors-can-enhance-memory-performance/>>.

"Why Our Memories Work Better in Colour." *Mail Online*. Associated Newspapers. Web. 21 Mar. 2015. <<http://www.dailymail.co.uk/news/article-112944/Why-memories-work-better-colour.html>>.

Dzulkifli, Mariam, and Muhammad Mustafar. "The Influence of Colour on Memory Performance: A Review." *The Malaysian Journal of Medical Sciences : MJMS*. Penerbit Universiti Sains Malaysia. Web. 21 Mar. 2015. <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3743993/>>.