

# The Effects of Color on Memory

Ann Del Rosario, Anthea Deveyra, Morgan Hartsell, Dakota Lehman,  
Lydia Stellwag, Mariel Valino

# Introduction

- **Purpose:** To see whether color has an effect on memory and the recall of words



# Introduction (con.)

- Gao, C., Hermiller, M., Voss, J., Guo, C., (2015) Basic perceptual changes that alter meaning and neural correlates of recognition memory. *Frontiers in Human Neuroscience*. 9 (49).
  - Purpose – whether changing the color of a shape also changes its meaning or salience.
  - Participants rated meaningfulness of ambiguous squiggles which were then shown on a screen in different colors. They were then told to rate the meaningfulness again.
  - Results revealed that the color changed the meaning of abstract shapes

# Introduction (con.)

- Red for romance, blue for memory (Jung et al., 2011)
- Investigate the effect of the color red, blue, and gray on memory through a word recognition task
- Video clip (Red condition=more attractive)
- Blue condition=Better word recall
- Conclude: Certain color has an effect on human perception and memory

# Introduction (con.)

- Joint effects of emotion and color on memory (Kuhbandner & Pekrun, 2013)
  - Is emotion-induced memory enhanced by color?
  - Hypothesized red might enhance memory for negative info, green memory for positive
  - Results: Memory enhanced for colored words with emotional significance. Red (negative) and green (positive) words were easier to remember than blue (neutral) words.

# Introduction (con.)

- Differential binding of colors to objects in memory: red and yellow stick better than blue and green (Kuhbandner et al., 2015)'
  - Objects presented in colors red, green, blue, and yellow; Memory measured later for the presence of an object and for color of object
  - Memory high: red and yellow
  - Memory low: green and blue
  - Binding of color into object memory representations varies depending on color
  - Confident remembering red objects than green

## Introduction (con.)

**Hypothesis:** Our study hypothesizes that the color red will enhance memory and allow for better word recall, compared to the colors blue or black.

# Participants

- 48 total subject
  - 16 male
  - 32 female
- Age ranged from 18 to 65 (M= 24.35, SD=10.2)

# Materials

- Sheet of paper folded in half vertically
  - One side had a list of 15 random, three syllables or less words in either black, blue, or red ink
  - The other side was blank aside from a designated area for participants to record gender and age
- Writing Utensil
- Stopwatch

# Method

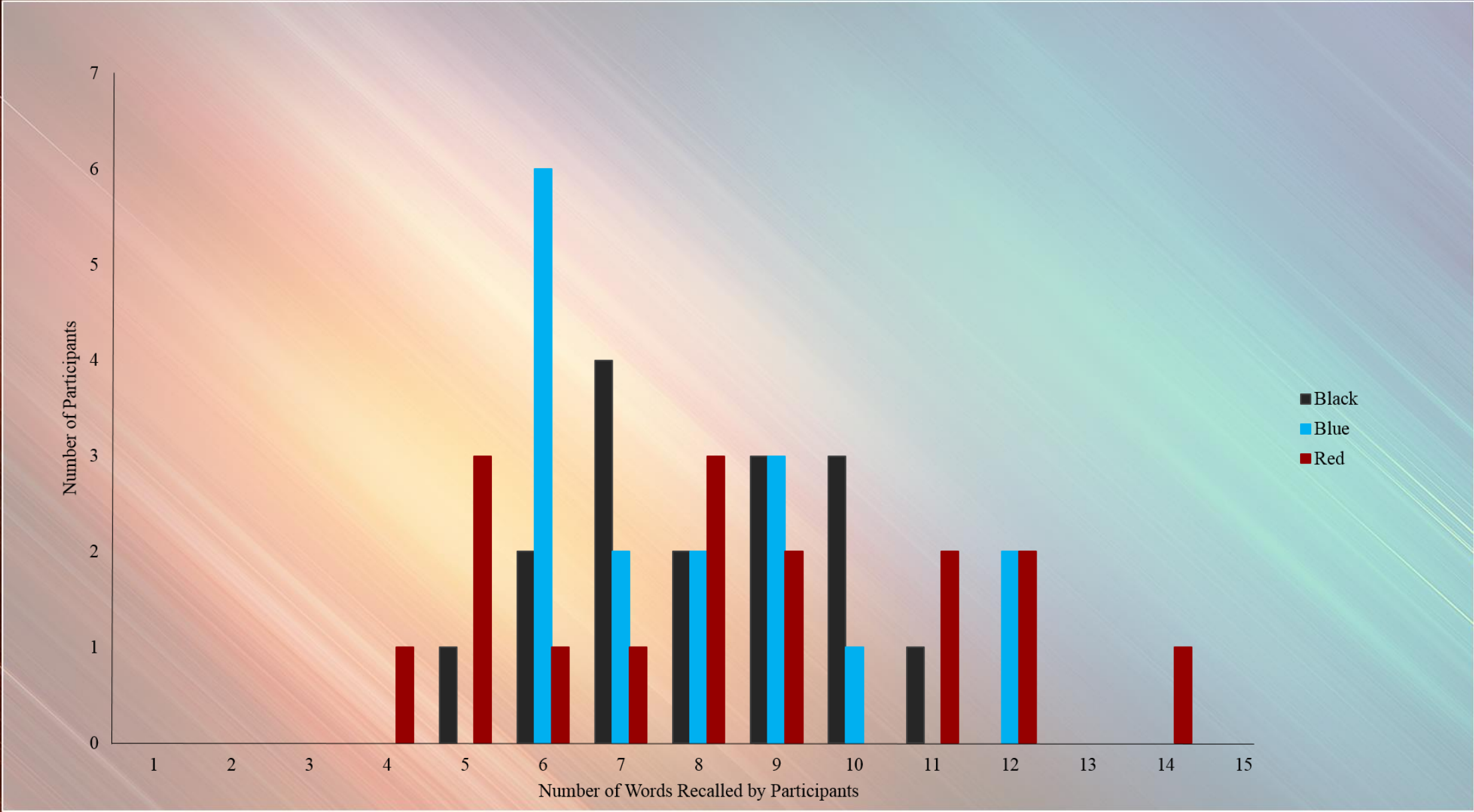
- One Independent Multi-level Between Subjects design
- The 15 words decided by a random word generator. Each word was assigned a number and a random number generator was used to randomize those 15 words for each sheet
- Each member of the group got 8 sheets with one of the assigned colors (black, blue, or red)

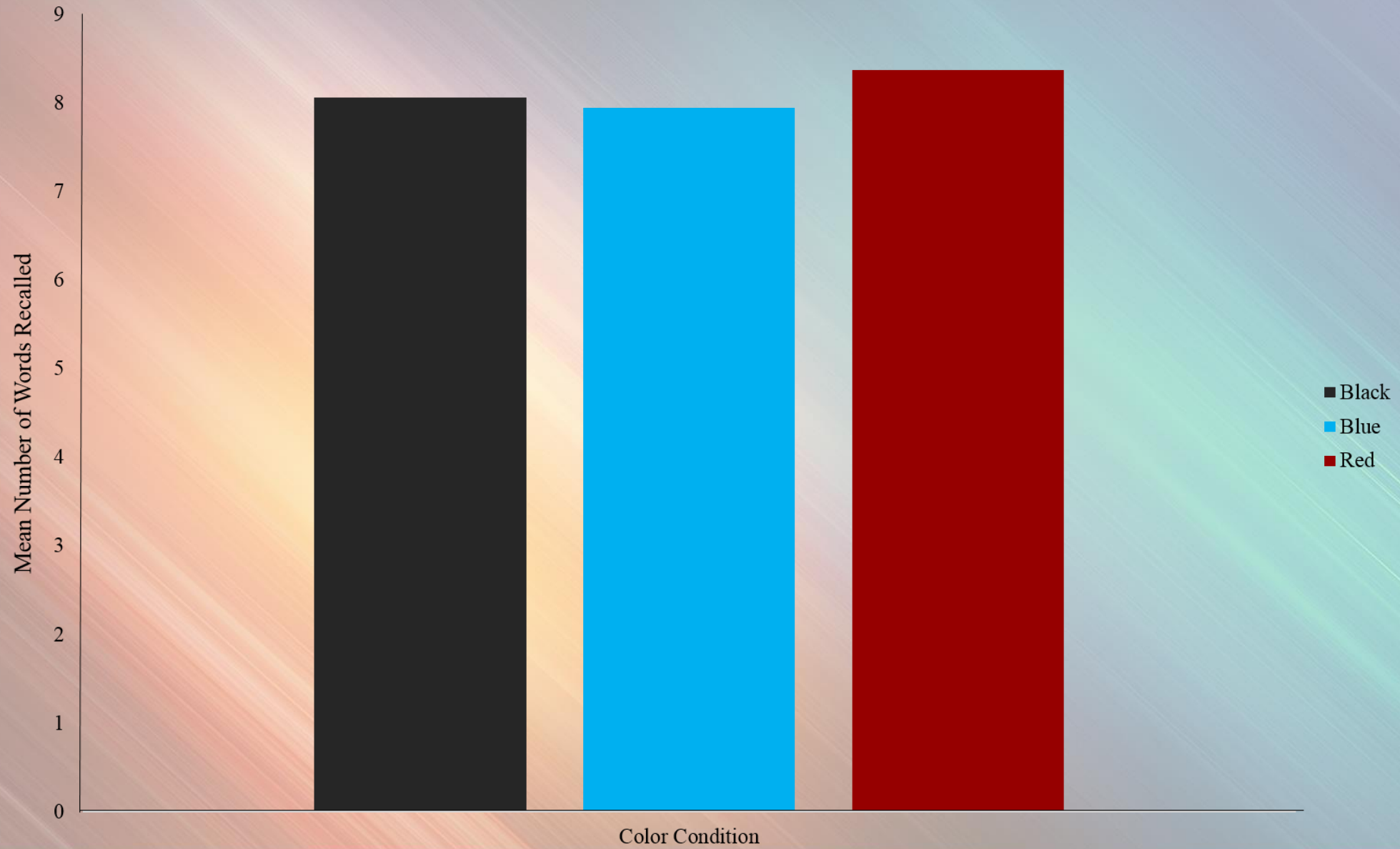
# Method

- Participants asked to participate in the study and about color blindness
- Given a writing utensil and the sheet of paper, blank side up.
- Informed that they had 45 seconds to review the words on the sheet. When that time was up, they flipped the sheet over and had another 45 seconds to recall as many words from the previous side as possible.
- Handed everything back to experimenter and informed that results were anonymous and the study was explained

# Results

- We ran a one way ANOVA on our data.
- The recall for color one (black) was ( $M = 8.06, SD = 1.73$ )
- The recall for color two (blue) was ( $M = 7.94, SD = 2.08$ )
- The recall for color three (red) was ( $M = 8.37, SD = 2.97$ )
- The Analysis of Variance revealed that there was no significance ( $F(2,45) = .15, p = .86$ ) when answer recall means and standard deviations were compared.





# Discussion - Population

- Gender Differentiation

- 16 Males (1/3 population)
- 32 Females (2/3 population)
- 37.5% of Males recalled 10 or more words
  - (6 people)
- 18.75% of Females recalled 10 or more word
  - (6 people)

- Age

- There was no significant difference between age ranges.
- Participants who were over the mean age of 24.35 (SD=10.19) recalled an average of 8 words, congruent to the other age ranges.

# Discussion - Limitations

- Different memory capacities per individual
- People who are in a certain major or career may have a higher working memory capacity or be geared to learn in a certain fashion.
- Testing the subjects alone or in multiples
- Testing Environment and potential distractions
- Testing Time Influenced Perceived Pressure

# Discussion- Previous Studies

- The previous articles supported the hypothesis that color has an effect on memory. Our hypothesis agreed with their findings. However, our results did not support the hypothesis, whereas the previous articles did.

# Discussion - Future Studies

- Would color have an effect on other memory capacities?
  - Could integrating a task in-between memorization and recall influence the number of words remembered?
- Separating by gender, while using a single color, would a participant's gender significantly influence the number of words recalled?
- Conduct a study between participants in different majors who are towards the end of their college career to see if there is a difference in working memory capacity based on profession preference.

# References

Gao, C., Hermiller, M., Voss, J., Guo, C., (2015) Basic perceptual changes that alter meaning and neural correlates of recognition memory. *Frontiers in Human Neuroscience*. 9 (49).

Jung, I., Kim, M. S., Han, K. (2011). Red for romance, blue for memory. *International Conference on Human-Computer Interaction*, 284-288 DOI: 10.1007/978-3-642-22098-2\_57

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Kuhbandner, C., Spitzer, B., Lichtenfeld, S., & Pekrun, R. (2015). Differential binding of colors to objects in memory: red and yellow stick better than blue and green. *Frontiers in Psychology*, 6, 231. doi: 10.3389/fpsyg.2015.00231