Color memory of university students:   
Influence of color experience and color characteristic

Journal Article Summary

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In grammar school, children are taught early on “Roy G. Biv”. This acronym is a mechanism for remembering the colors of the rainbow. This is not the only tool used by teachers to help youngsters encode and retain each stimulus, but associations also play a role (e.g., “The sky is blue”; “The grass is green”) However, what they do not learn is that there are individual differences in perception of color, and this is what Bynum, Warsham, Epps, and Kaya (2006) are primarily interested in. There is much variability amongst people’s memory of color. This can depend on how the individual attempts to encode them. Allen’s (1990) research has shown that color recognition improves when colors are encoded visually along with the color’s name, rather than only the color as a word. This inconsistency in color memory is not only attributed to individual differences, but differences in color characteristics, too (i.e., a color’s hue or lightness). Previous research conducted by Collins (1931) showed that specific wavelengths of green and red are difficult to recognize. His research also indicated that yellow is most easily recognized and remembered, contrary to Perez-Carpinell’s (1998) research indicating orange as the easiest. Despite these disagreements, the aspect that has produced the most conflicting research results is the effects of individual experience with color on recognition. Evidence of this effect is reflected in Perez-Carpinell’s, et al. (1998) findings that woman remember color more easily and precisely than men. This is the gap this study attempts to fill. Bynum and his colleagues adopt Perez-Carpinell’s, et al. (1998) “successive color matching” to test the affects of these variables on immediate color recognition in college students with color training. They predicted that collage design majors would better identify colors in a recognition test then those without color training. Second, they explored what interferes with this recognition and distracts them from the “target” color “to determine whether there is a consistent direction of hue, value, or chroma shift” (Bynum et al., 2006). Third, they investigated how the students attempted to remember the colors (i.e., word cues or visual cues).

Participants were sampled from a public university in the southeast United States. It consisted of 40 female students, ages 18 to 25 years old. Half (n=20) had taken a color-training course or were design majors, serving as the experimental group. The other 20 served as the control group, having no color training and studying other majors. All passed the Farnsworth-Munsell 100 Hue test, reflecting normal vision and color discrimination capabilities.

For the experiment, four hue categories (i.e., yellow, orange, purple, and green) were chosen from the Munsell Book of Color. From each set, one target color and nine distracters were chosen. “Each distracter was within two Munsell hue, value, or chroma steps of the target color. This resulted in sets of distracters that were closely related to, but visibly different from the target color” (Bynum et al., 2006). Each participant was first given a target color chip mounted on a 5 cm x 5 cm white card. They held it under standard illuminant D65−to control for light source and replicate natural daylight−in a Macbeth spectralight box, given five seconds before the chip was removed. Next they were handed a stack of ten chips (i.e., the target chip amongst the nine distracter chips) and asked to identify the target chip. After recall they were asked how they attempted to remember the chip (e.g., verbally, visually, or with associations).   
 Results were recorded as frequencies. The top three colors most remembered were yellow−for both groups; chosen by 29 out of 40 participants− purple, than orange. The least remembered color for both groups was green, identified accurately by only five students. The majority of the distracters only differed in hue, while no more than three students incorrectly chose distracters differing in value and chroma for each category (i.e., yellow, orange, green, and purple). Regarding memory cues, the majority of both groups reported using visual.

The results of this study do not support the hypothesis that design majors (i.e., color-trained students) can better identify colors in a recognition test. This is surprising because individuals in that major perceive a wider range of colors on a daily basis. I feel the design of this study was based on the rationale that those trained in artistic design have a finer scope when it comes to recognition of stimuli critical in their field of expertise. Perhaps the five second window before recall only allowed for short-term memory, which is surprisingly similar amongst individuals. This focuses more on materialism, leaving perception up to brain power rather than allowing their passion for this field to enhance their “successive color matching”. Perhaps if there were greater delay intervals, perceptual dualism could be better measured. This study more specifically revealed the relationship between perceived color and wavelengths, focusing on psychophysics. Based on my observations I think something more concrete like these variables would have been better fit for this chosen design.

The results were also congruent with much of the prior research, and had unique findings as well. The findings agreed with those of Collins (1931) and Perez-Carpinell, et al. (1998), that green the most difficult color to remember. However, they agreed with Collins (1931) alone when results indicated that yellow, not orange, is the easiest color to remember. Based on my observations, I do feel there were few confounds that if better controlled would have resulted in more accurate findings. More particularly, the distracters chosen in the study came off as too controlled in the study. For each group they were exactly two hues, values, or chromas off the target. If randomization was utilized instead, I think there would be less order effect on the choices of participants. Also, a majority of participants correctly identified the first color from the set, but performance decreased for the rest of the study. This contradicted the practice effects found in other studies. However, this study provided the exact same range for all color set, possibly making the study appear too difficult, triggering a fatigue effect. Lastly, a sample of only women does not reflect the general population. I understand that Perez-Carpinell’s, et al. (1998) indicated that women have better color memory then men. However, if design majors did not perform better then students with no color training and their experience did not provide an advantage then neither would gender. A larger sample with both men and women would further help clarify results tremendously. However, despite these factors I do still feel this study made notable contributions to the pursuit of further understanding what effects differences in color memory.

References

Allen, C. K. (1990). Encoding of colors in short-term color memory. Perceptual and Motor

Skills, 71, 211-215.

Bynum, Warsham, Epps, & Kaya. (2006). Color memory of university students: Influence of

color experience and color characteristic. *College Student Journal, 40*, 824-831.

Collins, M. (1931). Some observations on immediate color memory. Journal of Psychology, 22,

344-351.

Perez-Carpinell, J., Baldovi, R., de Fez, M. D., & Castro, J. (1998). Color memory matching:

Time effect and other factors. Color Research and Application, 23, 234-247.