

The Innate Influence of Colors on Learning

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ABSTRACT

Color, a seemingly simple concept, has the power to predispose people to be attentive to certain colors. Colors have provided people with the chance to enhance their memories, with little effort. Color memory, as researchers have explored, is primarily innate, influencing much of the way humans store memories and thus the way learning occurs. Research has shown that learning can be made much more efficient with the help of certain colors, such as red. Certain colors significantly increase attention, which in turn has increased the capabilities of learning. By using colors while learning students are able to retain information more efficiently as information becomes part of their implicit memories. Learning can take place anywhere from classrooms to the workplace, one common factor in every place is color.

Introduction

Color is a part of the environment and people's everyday lives. Coming from different shades and hues they are extremely unique. In spite of this, people are only drawn to a few select colors. These colors are extremely prevalent in society, as they have managed to provide an advantage to one of the most valued processes: memory.

Memory is one of the most complex aspects of the human mind. It serves people in their everyday lives, encoding, storing, and retrieving information. In every aspect of the memory-making process, both long-term and short-term, there is one common factor: Color. Surrounded by color every day, individual colors rarely draw people's attention. Having said that, there are specific colors that are used to draw attention. People are predisposed to be alerted by certain colors. Recent studies have shown that color plays one of the most important roles in our memory, to the point of enhancing it, through a heightened sense of arousal and attention (Dzulkifli & Mustafar, 2013). The use of colors, such as red and yellow, inherently promote a higher attention span. Due to this they have had a large impact on what is perceived as important in everyday environments from nature to workplaces and educational facilities.

The impact of colors at large can be seen in many places throughout time. Originally, a survival mechanism it has been passed down to generations, it is something that has become innate. In the modern age, it has been used to warn people on the road or even posed as factors that draw peoples' attention to advertisements.

Significance

The use of colors to signify importance dates back thousands of years. Historically, colors have been used as means of communication. Today, colors are actively used in various environments: educational, media advertisements, and nature. As the use of color increases in the environment, it should be used efficiently. An overload of color greatly diminishes the original purpose of using colors. Thus, studying the various colors that draw the attention of many people could explain as to why these colors enhance memory. According to recent studies, it has been proven that compared to gray-scale scenes, people are much more likely to remember colored scenes of the same images (Dzulkifli & Mustafar, 2013). This predisposition of people to remember colored images affects the way it is stored in their memory.

Research Methods

The main method of research used in the research study was experimental research. It gave researchers a chance to explore different aspects of memory rather than just looking for a correlation between memory and color. In one study, four experiments were performed: verbal memory, visual memory, visual scenes, and incidental learning. Through these experiments, researchers were able to get insight into how color contributed to each form of learning. The use of experimental research methods provided a greater advantage while looking into the effects of color. This showed that different parts of the memory can be affected differently and gave researchers a chance to conduct a much more detailed study. The detailed study consisted of testing the effects of color on more than one type of memory, like visual and verbal. In doing so researchers discovered that color influences every kind of memory (Kuhbandner et al., 2015).

Results

Colors have held extreme importance and thus have led to a variety of experiments being performed. One such experiment was done by researchers, in which the visual memory and verbal memory were tested, showing that the best color memory was red (Kuhbandner et al., 2015). In another experiment, incidental learning, the participants were told only to judge how real each scene was and later were given a memory test at the end. Most participants remembered the red scenes, which were automatically encoded into their memories (Kuhbandner et al., 2015). Understanding why people are predisposed to be more attentive to some colors and how these colors affect memory could revolutionize learning in all aspects of society.

Recent studies have shown that color directly enhances memory often due to the predisposition of humans to be attracted to certain colors more than others. Objects that were either red or yellow were more strongly bound to the memory (Kuhbandner et al., 2015). Researchers found that these colors are “attention grabbers” as a result of them being survival mechanisms in the past. Now, they have become evolutionary traits. Street signs such as stop signs and caution signs alert people of possible danger. As opposed to green signs which are seen almost everywhere resulting in us paying minimal attention to them. These attention grabbers have also been used in advertisements as they are more likely to get the viewer's attention.

Time and again red and yellow have proven to be the colors that remain in the memory, this can be seen during eyewitness testimonies. It has been proven that eyewitnesses are more likely to remember red and yellow colors when asked to recall something (Kuhbandner et al., 2015). This is linked to implicit memory, in which information is automatically encoded. Learning using warm colors in classroom settings has proven to be valuable. Students have been able to learn much more efficiently without even realizing it. Overall, the use of these colors has benefited people whether they are in classrooms or workplaces.

Discussion

In the research study on color memory, “Differential binding of colors to objects in memory: red and yellow stick better than blue and green”, there are confounding variables present that negatively affect the statistical significance. Confounding variables cause the results of the study to be inaccurate. They are caused by the survey in this study. In the survey, there is no way to confirm that someone is being truthful about their color blindness and as a result a colorblind person could be a part of the study, presenting a confounding variable. One of the limitations is that the sample group that has been taken, consisting of only female participants in all four experiments, may result in an inability to generalize these results to the entire population; it is not a representative sample. Another limitation to this study is that the sample size is too small to be applied to the entire population. The final limitation to this study is that every person who participated in this study was doing it for course credit. The only requirement of this study was not

being colorblind, which was self-reported. Participants could have been inclined to participate in this study for the course credit despite being color blind. Thus, the statistics drawn from these studies are not inferential as they cannot be generalized for the population.

Application

Humans are wired to see certain colors (red and yellow) as important. Through research it has been discovered that certain colors grab people's attention due to predisposition. These findings can be applied to the everyday lives of people in society, including in important objects: street signs and traffic lights.

Traffic accidents often happen due to a lack of attention, oftentimes subconsciously. The attention of an individual can be drawn to the wrong kind of sign, a billboard, for example, whose goal is to draw people's attention by using colors, like red and yellow (Oviedo-Trespalacios et.al, 2019). While stop signs, caution signs, and traffic lights do use these colors, the signs that make up the majority, like guide signs, are green. Green is seen as a neutral color by people, not by choice but because that is how they have evolutionarily adapted. Green is the color of the majority of trees and plants in the environment, and over time people have begun to view green as a common and harmless color thus becoming naturally ignored (Kuhbandner et al., 2015). The color itself does not trigger attention in any way. The ability to view the colors red and yellow as signs of danger or caution is embedded into people's memories.

Predisposition can also be beneficial in the workplace, educational environments and even marketing. When it comes to learning facts and dates, effortful encoding is required. However, with the discovery of predisposition in color memory, automatic encoding can take place. Without much thought, students can learn about a topic or concept much quicker and more efficiently.

Students learning a different language were tested using different colored sheets, red, yellow, and blue. The students that performed the best were those that had sheets that were either red or yellow (Khan & Liu, 2020). In both educational facilities and workplaces, the use of color has extreme importance whether it be color-coding documents or using colors to make assignments more fun. Either way, the use of certain colors to increase the attention of students and coworkers alike, helps a topic become much more memorable. This aids the process of fully processing and encoding information into their long-term memory (Chang et al., 2018).

Relevance

Color memory continues to influence the lives of people every day. The studies of color memory predisposition could completely change the way in which humans learn and live their everyday lives. Hardly any experiments have been done with color memory. The majority of the experiments performed have involved finding correlations between color and emotions and exploring color research for marketing and advertising. The findings of the effects of color memory on learning can help eliminate confounding variables and the third variable problem in experiments. These variables otherwise may give one group of participants an advantage over the other. An example of such a scenario is two groups being given different colored objects in a study. While the color of the object might not be important to that specific study, research with color memory has shown that warm colors enhance memory, which may make the results inaccurate.

Rather than researching the effects of color on human emotions and how they affect behavior, researchers could better understand the effects of color on human cognition. Researchers have done most of their research based on the low road of cognition. Studying the high road of cognition could help understand why people react the way they do when seeing certain colors. Advancing studies could provide insight into why people tend to remember only

specific parts of an event. Studies could elaborate on Elizabeth Loftus's study on the misinformation effect and constructive memory, and contribute to understanding the basis of memory creation and people who are predisposed to remembering certain details of an event based on color (Loftus & Palmer, 1974).

Conclusion

Color memory is predisposed and innate and is one of the key survival mechanisms for people. Warm colors, like red and yellow, help alert humans due to increased attention levels as they have in the past (Kuhbandner et al., 2015). This process of alerting people when they see a color is a trait that has been passed down through generations. This important trait has ensured the safety of many people.

Along with being a survival mechanism, color has proven useful in everyday life, specifically, learning. In the learning environment, one of the hardest things to do is memorization. However, with the research of color memory learning can be much easier. Knowledge of the effects of red and yellow colors can be applied in creative ways helping students to memorize and pick up general information much faster, regardless of the topic.

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