International Journal of Medicine Research
ISSN: 2455-7404; Impact Factor: RJIF 5.42
Received: 09-01-2019; Accepted: 12-02-2019
www.medicinesjournal.com
Volume 4; Issue 1; January 2019; Page No. 63-65

A prospective study of psychological effect of different colours: An observational study from central India

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Abstract
Background: Colours in nature around us plays a significant role in human life, they entered as a mean within the framework of artistic and aesthetical considerations from ancient times and they gain a place in human psychology according to experience levels.
Aims and Objectives: To study the effects of different colour on the psychology of people.
Material and Methods: Hundred participants were subjected to five principle hues i.e., red, yellow, green, blue, and purple, five intermediate hues i.e., yellow-red, green-yellow, blue-green, purple-blue, and red-purple, and three achromatic colours (white, gray and black) and their emotional responses and the reason for it were recorded.
Results: The principle hues evoked the highest positive emotional responses, then by the intermediate hues and least by achromatic colours. Relaxation and comfort like emotions induced by the green colour reminded the respondent about the colour of nature. We observed lowest positive responses for green-yellow colour which is associated with vomit and sickness feeling. Among the achromatic colours, white has induced large number of positive responses.
Conclusions: There is a significant relationship between colour and emotional response evoked by it, the emotional response may vary from society to society due to the cultural and symbolic meaning of the colour.

Keywords: colour response, emotions, psychological effects

1. Introduction

Colours around us are what we see in things, in nature or in imagination. They are an integral part of human lives. The existence of colours is apparent in everything we observe or imagine. Impact of colour on emotions and feelings is a well-known fact, different colours affect mood differently. For example, the colour red is associated with excitement, orange is considered distressing and upsetting, purple as honorable and yellow perceived as cheerful and blue has been linked to comfort and security [1].

Furthermore, some colours can be linked with different emotions and some emotions can be linked with more than one colour. Red symbolically identified as a dominant and dynamic colour and it has a thrilling and exciting hue effect. Red has both positive and negative impressions such as active, strong, passionate, warm, at the same time it is considered aggressive, bloody, raging and intense. Similarly green has both positive and negative impressions such as refreshment, quietness, naturalness and on the other hand tiredness and guilt [2].

The association between colour and emotion is very much tied to colour likings and colour preferences are linked with whether it evokes positive or negative moods. However, particular colours have been found to be very much liked irrespective of age, racial group, or culture [3]. In a study by Boyatzis and Varghese on children's emotional associations with colours, it has been found that light/bright colours (e.g. yellow, blue) are linked with positive emotions like happy or strong and dark colours like black and gray are liked with negative emotions like sad, and angry [4]. Saito in his study revealed that the black evoked both negative and positive responses among Japanese subjects and black was frequently a chosen colour among young subjects [5]. Colours can also be classified in temperatures such as warm colour or cool colour based on the dominant wavelength of that colour. The cool colours like blue, green, purple are usually perceived as restful and quiet whereas the colours like red, yellow, orange i.e. warm colours are considered energetic and exciting [1].

Of the numerous colour systems that exist, one colour system noted internationally for its precise identification process is the Munsell Colour System [6]. Munsell colour order system is based on a three-dimensional model depicted in the Munsell colour tree. Each colour has three qualities or attributes: Hue (colour such as red, orange, yellow, etc.), Value (the lightness or darkness of a colour) and Chroma (the saturation or brilliance of a colour). Hue, Value and Chroma are also referred to as HVC. The Munsell Colour system is set up as a numerical scale with visually uniform steps for each of the three colour attributes in Munsell colour notation; each colour has a logical and visual relationship to all other colours [7]. The current study was planned to study the association between colours and emotional responses in the youth of age 18 to 22 years, for this study the Munsell Colour System was followed.

2. Material and Methods

It was an observational study which recorded the responses and the underlying reason for it towards a colour. Only the subjects who provided the formal consent were included and excluded if they had defective colour vision. As part of the experiment, subjects were individually presented with different colours from the Munsell colour order system on a computer screen, the background of the screen was gray neutral colour and surrounding was quite.

Subjects were given 10 minutes to answer three questions during every experiment.

- What emotional response do you associate with this colour?
- How does this colour make you feel?
- Why do you feel this way?

Subjects were instructed to record only one emotional response against each colour.

All the data analysis was performed using IBM SPSS ver. 20 software. Quantitative data were expressed as mean ± standard deviation. Categorical data were expressed as numbers and percentage.

3. Results

Majority of the participants were male (n=60) with a mean age of 20±1.45 years and female (n=40) had a mean age of 19.8±1.17 years.

Table 1: Records of the emotional responses against the colour presented to subjects (emotions were classified as positive or negative mood)

Emotions	+ve or -ve	R	Y	G	B		YR	GY	BG	PB	RP	W	Gr	Bl
Angry	+	29	0	0	0	0	0	0	0	0	0	0	3	8
Annoyed	+	0	0	0	0	0	5	8	7	0	2	0	0	0
Bored	+	0	0	0	0	5	4	2	0	0	4	9	14	0
Confused	+	0	0	0	0	0	0	2	5	0	0	0	5	0
Depressed	+	0	0	0	6	0	0	0	0	12	8	0	23	22
Disgusted	+	0	0	0	0	0	8	24	2	0	3	0	0	0
Empty/void	+	0	0	0	0	0	0	0	0	0	0	28	0	0
Fearful	+	0	0	0	0	5	0	0	0	0	0	0	3	15
Lonely	+	0	0	0	4	0	0	0	0	4	0	6	5	0
Sad	+	3	0	0	8	12	0	0	0	9	0	0	25	23
Sick	+	0	0	0	0	0	0	31	0	0	0	0	0	0
Tired	+	0	6	0	0	8	0	0	0	6	0	0	4	7
Calm	-	7	0	31	59	32	0	0	17	39	15	8	5	0
Comfortable	-	0	0	15	4	3	3	7	7	0	0	0	0	5
Energetic	-	5	10	0	0	0	14	0	10	0	0	0	0	0
Excited	-	19	8	2	0	4	25	6	11	0	12	0	0	0
Happy	-	20	76	29	11	22	33	12	39	14	25	0	0	0
Hopeful	-	0	0	8	0	0	0	0	0	5	0	6	0	0
Innocent	-	0	0	0	0	0	0	0	0	0	0	33	0	0
Loved	-	14	0	0	0	0	0	0	0	0	16	0	0	0
Peaceful	-	0	0	12	4	0	0	0	0	8	0	13	0	0
Powerful	-	0	0	0	0	7	0	0	0	0	7	0	2	14
No emotion	Neutral	4	0	5	4	5	6	5	4	5	9	3	4	3

Data is expressed as number of responses, R; red, Y; yellow, G; green, B; blue, P; purple, W; white; Gr; gray, Bl; black, YR; yellow-red, GY; green-yellow, BG; blue-green, PB; purple-blue, RP; red-purple

Out of 100 subjects, 64 have recorded positive responses to the colours presented, 32% had given negative, and 4% were neutral. Out of all responses, 78% have expressed a positive opinion for the principle hues red, yellow, green, blue and purple as compared to 28% for the achromatic colours, including white, gray and black. Of all 16% of the recorded responses to the principle, hues were negative, whereas 68% of the replies were negative for the achromatic colours.

Colour-wise, green was perceived as the most positive and recorded 94% responses positive and yellow recorded 92% positive. Most of the emotional responses for the green colour were for the positive feelings of relaxation and calmness, then happiness, comfort, peace, hope, and excitement. As green is associated with the colour of nature and trees, it creates feelings of comfort and soothing emotions.

The colour yellow was generally seen to be lively and energetic and elicited positive emotions including happiness and excitement because it was associated with the sun, blooming flowers, and summertime.

After green and yellow in principle hues, blue (80%) and purple (65%) perceived positively by the subjects, major emotions evoked were relaxation and calmness, followed by happiness, comfort, peace, and hope. The negative emotions for the colour blue were sadness, depression, and loneliness.

Red colour provoked both positive and negative emotional responses. Red is seen to be positive since it is associated with love and romance, while the negative aspects of red included having relations with fight and blood as well as Satan and evil. Colour purple prompted mixed feelings mostly of relaxation and calmness, followed by happiness, sadness, tiredness, power, fear, boredom, excitement, and comfort.

Intermediate hues were perceived positively in the majority of emotional responses i.e. 65% were positive. As per the response blue-green evoked the highest number of positive responses (82%), followed by red-purple (77%), yellow-red (76%) and purple-blue (65.3%), on the other hand, green-yellow evoked the highest negative emotional responses i.e. 71.4% as it was associated with the feelings of sickness and abhorrence.

In achromatic colours, white perceived as the most positive by 62%, followed by black by 19.6% then gray by 7.5% perceived as positive. Most of the positive emotions evoked by white colour were associated with the feelings of innocence, peace, and hope because it tended to be related to purity and being simple and clean. Negative emotional responses were associated with the feelings of emptiness, loneliness, and boredom.

The black colour was evoked negative emotions like sadness, depression, fear, and anger, which are associated with death, mourning and tragic events, darkness and night time. The positive features of black were richness, wealth, and power.

Colour gray was majorly linked to negative emotions i.e. 90% responses associated with the sadness, depression, boredom, and confusion, as well as tiredness, loneliness, anger, and

fear. An explanation for negative responses to gray constantly presented that the colour gray tends to make reference to bad weather, rainy, cloudy or foggy days and brings out the feelings of sadness, depression, and boredom.

4. Discussion

The current study was planned to examine the colour-emotion associations among the youth of age 18 to 22 years based on the colour stimuli from the standardized Munsell Colour System. This study used five principles red, yellow, green, blue, and purple and five intermediate hues yellow-red, green-yellow, blue-green, purple-blue, and red-purple), in addition to three achromatic colours which are white, gray, and black. Overall, the participants' responses of colour-emotion associations for the principle hues were positive (78%), compared with the positive responses for the intermediate hues (65%) and achromatic colours (29%). Emotional responses to colour green elicited majorly positive emotional responses, like feelings of relaxation, calmness, and happiness as well as comfort, peace, and hope. These findings are in congruence with the findings of Saito *et al* [5]. where subjects have seen green as refreshing and beautiful. Reasons for positive responses were also associated with nature, grass, trees, and remind someone of outdoors and springtime, consistent with Hemphill's findings [8]. Blue evoked a high number of positive emotional responses, like relaxation and calmness, happiness, comfort, peace, and hope, with very few numbers of negative emotional responses like sadness and depression. Associated reasons for provoked positive feelings were attributed to the ocean, beach, water, the sky and thus inducing relaxing and calming effect. Blue colour also caused negative emotions because it was associated with the night and dark skies, thus making an inducing feeling of depression. This is partially in agreement with Saito *et al* as the negative feelings were not expressed in their study on Asian subjects; this could be due to different colour symbolisms followed in different societies. [5] Furthermore, colour symbolism differs from one society to another. For example in western cultures, red is thought to be a fiery colour, green is said to be soothing. Another well-known example is with the two achromatic colours, black and white. Black is accepted as the symbolism of mourning in some countries, however, it symbolizes wedding in some others [9]. Most of the colour-emotional responses have due to the inherent cultural and social affiliations. For example, death and mourning are linked with the colour black in Western traditions, whereas in Asia the colour of death is white. Therefore both positive and negative feelings in this study about the colour black were in agreement with those of Saito [5]. The current study was done with controlled groups of the almost same age and social background and therefore some of the observation may be conflicting with other group or society. To understand the colour impact on emotional responses a cross-cultural with a more realistic sample is needed.

5. Conclusion

Observations of this study conclude that the different colours evoke different emotional responses; principal colours have evoked more positive emotions than the intermediate and achromatic colours. Most of the colours evoked both positive and negative emotional responses due to prior experience and social and cultural backgrounds.

6. References

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