

## Colour – Emotions Association and its Affective Interpretation



## Management

**KEYWORDS :** Achromatic colours, Affective, Emotions, Hue, Munsell Colour System, Stimuli

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### ABSTRACT

*Colour symbolism can be apparent in how people link colors with things, objects or physical space. This paper attempts to understand how students of post graduate management institute located in Gujarat State (India) associate affective responses to five principle hues (i.e., red, yellow, green, blue, purple), five intermediate hues (i.e., yellow-red, green-yellow, blue-green, purple-blue, and red-purple), and three achromatic colours (white, grey, and black) and the reasons for their choices. The colour stimuli were referenced from the Munsell Colour System. The results revealed that the principle hues comprised the highest number of positive emotional responses, followed by the intermediate hues and the achromatic colours. Moreover the study also revealed that colour green induced mainly positive emotions such as relaxation and comfort because it reminded most of the respondents of nature. Colour green-yellow had the lowest number of positive responses because it was associated with anxiety and elicited the feelings of sickness and abhorrence. For the achromatic colours, white attained a large number of positive responses, followed by the colours black and grey. The reasons for the colour-emotion associations are discussed in this paper. Here, an attempt is made by the researcher to suggest future areas of research related to colour and its associations with human psychology.*

### Introduction

Colour is an inseparable part of our everyday lives and its presence is evident in everything that we perceive. It is widely recognized that colours also have a strong impact on our emotions and feelings (Hemphill, 1996; Lang, 1993; Mahnke, 1996). For instance, the colour red has been associated with excitement and enthusiasm, orange has been perceived as distressing and upsetting, purple as dignified and stately, yellow as cheerful, and blue has been associated with comfort and security (Ballast, 2002; Wexner, 1982). Additionally, some colours may be associated with several different emotions and some emotions are associated with more than one colour (Linton, 1999; Saito, 1996). Red, symbolically known as a dominant and dynamic colour, has an exciting and stimulating hue effect. It has both positive and negative impressions such as active, strong, passionate, warm, but on the other hand aggressive, bloody, raging and intense. Green has been found to have a retiring and relaxing effect. It too has both positive and negative impressions such as refreshment, quietness, naturalness, and conversely tiredness and guilt (Davey, 1998; Mahnke, 1996; Saito, 1996).

The relationship between colour and emotion is closely tied to colour preferences. In particular, colour preferences are associated with whether a colour elicits positive or negative feelings. While particular colours have been found to be highly preferred regardless of age, racial group, or culture (Adams & Osgood, 1973; Eysenck, 1941), there is some evidence that colour preference may be culturally-based. For example, Choungourian (1968) found that the colours red and blue were the most preferred colours among American subjects, but were less preferred in other cultures. In a comparison of Japanese and Korean subjects, Saito (1996) found unique colour preference tendencies between the two countries, and also with respect to age, gender, and geographical region within the individual country.

In an exploration of children's emotional associations with colours, Boyatzis and Varghese (1994) found that light colours (e.g., yellow, blue) are associated with positive emotions (e.g., happy, strong) and dark colours (e.g., black, grey) with negative emotions (e.g., sad, angry). In a study examining colour-emotion associations among college students in Australia, Hemphill (1996) also found that bright colours elicited mainly positive emotional associations, while dark colours elicited negative emotional associations, confirming the results obtained by Boyatzis and Varghese (1994). However, Saito (1996) found that the colour black elicited both negative and positive responses among Japanese subjects, and that black was often a preferred colour among young people.

Colours can also be described in temperature terms, such as "warm" or "cool" as related to the dominant wavelength of the

colour. The cool colours (e.g., blue, green, purple) are generally considered to be restful and quiet, while the warm colours (e.g., red, yellow, orange) are seen as active and stimulating (Ballast, 2002). As cited in Lang (1993), Grandjean made observations about the effects of colour on perceptions of room size and psychological response noting that cool colours such as blue and green make a space restful and increase spaciousness; however warm colours such as red, orange, and yellow make a space less spacious, while increasing stimulation. Furthermore, people exposed to red and yellow colours reported higher levels of anxiety than did people exposed to cool blue and green colours (Kwallek, Lewis, & Robbins, 1988; Mahnke & Mahnke, 1993). However, in other studies, no relationships have been found between the individuals' mood states and colours (Ainsworth, Simpson, & Cassell, 1993; Kwallek, Lewis, Lin-Hsiao, & Woodson, 1996).

Of the numerous colour systems that exist (Jacobson & Bender, 1996), one colour system noted internationally for its precise identification process is the Munsell Colour System (Ballast, 2002; Valdez & Mehrabian, 1994). According to this system, each colour has three basic attributes: hue, value (brightness), and chroma (saturation). Hue is the first attribute of a colour by which we distinguish one colour from another (e.g., blue from red, green from yellow). There are 10 hues; five of which are identified as principal hues (i.e., red, yellow, green, blue, and purple) and the other five are intermediate hues (i.e., yellow-red, green-yellow, blue-green, purple-blue, and red-purple). Value, the second attribute of colour, describes the degree of lightness or darkness of a colour in relation to white and black. Black, white and the shades of grey are called neutral (achromatic) colours. The third attribute of a colour is chroma, which is the degree of purity or vividness of the hue (i.e., with high saturated colours containing less grey) when compared with a neutral grey of the same value (Ballast, 2002).

Regardless of a rapidly growing literature on the impact of colour on our emotions and considerable interest in this research area, many studies have failed to use colour samples from a standardized system of colour notation (Boyatzis & Varghese, 1994; Hemphill, 1996; Terwogt & Hoeksma, 1995), while others elicited individuals' responses to verbal labels of colour (e.g., "red", "blue") instead of using actual colour stimuli (Hupka, Zaleski, Otto, Reidl, & Tarabrina, 1997). Furthermore, several studies have used colour-emotion matching tasks (Zentner, 2001); matching colours (e.g., red, yellow, blue) to a certain number of emotions (e.g., happiness, sadness, anger), which results in limited assessments of reactions to colours.

The purpose of the study was to examine college students' colour-emotion associations, referencing colour samples from the standardized Munsell Colour System and to investigate the rea-

sons for students' emotional reactions to each colour.

## Research Methodology

### Participants

The sample consisted of 39 volunteered college students (25 Boys and 14 Girls) from an MBA Institute located in semi-urban area of Gujarat. The mean age was 22 years (range = 21-27 years). None of the participants had defective colour vision.

### Stimuli

Ten fully saturated chromatic colours were chosen from the Munsell Colour System: red, yellow, green, blue, purple, yellow-red, green-yellow, blue-green, purple-blue, and red-purple. The Munsell notations are shown in Table 1. The colour samples were prepared by using Paint Application. Apart from these ten hue groups, three achromatic colours (white, black and middle grey) were also used.

### Procedure

Participants were tested at a computer laboratory where they were provided a personal computer. Each colour sample (10cm-12 cm) was displayed in the middle of the computer screen. Order of presentation of the colour samples was randomized across participants. Participants were asked, "What emotional response do you associate with this colour? How does this colour make you feel?" and "Why do you feel this way?" These questions were adapted from Boyatzis and Varghese (1994) and Hemphill (1996). Further, they were allowed to state only one emotional response for each colour. Their answers were recorded on an observation sheet. Experimental session lasted for about one and half hour.

### Results

Data was analyzed using a spreadsheet. Based on the results obtained from the students' responses, a total of twenty-two emotions were gathered (see Table 2). Some of the emotions were overlapping (e.g., happy, happiness, joy), so they were grouped under the same emotion category. There was also a category for those responses that indicated no emotional response.

Because of the low frequencies in several cells, the emotions were coded as "positive", "negative", or "no emotion" (see Table 3). Overall, 71.60% of the participants expressed positive responses to colours, 24.06% expressed negative responses, and 4.34% expressed no emotion. About 80% of the responses to the principle hues, including red, yellow, green, blue, and purple were positive, compared with only 54.70% for the achromatic colours, including white, grey, and black (see Table 3). Only 18.97% of the responses to the principle hues were negative, whereas 39.32% of the responses were negative for the achromatic colours.

As shown in Table 3, the colour green attained the highest number of positive responses (100%), closely followed by Blue (94.87%). The majority of emotional responses for the green colour indicated the feelings of relaxation and calmness, followed by happiness, comfort, peace, hope, and excitement. Green was associated with nature and trees, and thus creating feelings of comfort and soothing emotions. The colour Blue was generally seen to be lively and energetic and elicited positive emotions including happiness and excitement because it was associated with the sky, ocean water.

Among the principle hues, the next highest number of positive response was given for the colour Purple (92.31%), followed by Red and Yellow (61.54% and 51.28%). Blue revealed the feelings of confidence and calmness, followed by happiness, peace, and joy. The negative emotions for the colour Blue was discomfort (see Table 2). Furthermore, colour Red prompted both positive and negative emotional reactions. Red was seen to be positive because it was associated with love and romance, while the negative aspects of red included having associations with fight and blood as well as danger and evil. Finally, the colour purple elicited the feelings of Confidence and joy, followed by elegance, style, excitement, and happy (see Table 2). The positive aspects of Purple are tend to be mainly associated with children and

laughing; while reasons given for negative responses to Purple consistently showed that Purple was not a favourite colour.

For the intermediate hues, the majority of emotional reactions (73.33%) were positive. As shown in Table 3, Red-Purple elicited the highest number of positive responses (89.74%), followed by Yellow-Red (82.05%), Blue-Green (76.92%), and Purple-Blue (74.36%). On the contrary, the colour green-yellow elicited the highest number (53.85%) of negative emotional responses because it was associated with vomit and elicited the feelings of sickness and disgust (see Table 2 and 3).

For the achromatic colours, White attained a large number of positive responses (87.18%), compared with only 41.03% and 35.90% positive responses for Black and Grey, respectively. White was seen to be positive and was associated with the feelings of innocence, peace, and hope because it tended to be related with purity and being simple and clean. Further, it reminded some respondents of bride, snow, dove, and cotton. Reasons given for negative emotional responses to White consistently showed that White elicited the feelings of emptiness, loneliness, and death. In addition, the colour Black was seen to evoke negative emotions such as sadness, depression, fear, and anger because it was associated with mourning and tragic events as well as darkness and night time. The positive aspects of Black were richness, wealth, and power.

Finally, colour Grey was mainly associated with negative emotions (46.15%); including the feelings of sadness, depression, boredom, and confusion, as well as tiredness, loneliness, and mystery. Reasons given for negative emotional responses to Grey consistently showed that the colour Grey made reference to bad weather, rainy, cloudy days and indicated feelings of sadness and depression.

### Discussion & Future Scope of Research

The primary goal of this study was to examine the colour-emotion associations among college students, referencing colour stimuli from the standardized Munsell Colour System. Based on Munsell Colour System, the present study used five principle (i.e., red, yellow, green, blue, and purple) and five intermediate hues (i.e., yellow-red, green-yellow, blue-green, purple-blue, and red-purple), in addition to three achromatic colours (i.e., white, grey, and black). Overall, the participants' responses of colour-emotion associations for the principle hues were positive (80%), compared with the positive responses for the intermediate hues (73.33%) and achromatic colours (71.60%). The colour green elicited mainly positive emotional responses, including the feelings of relaxation, calmness, and happiness as well as comfort, peace, and hope. This is somewhat in agreement with the findings of Saito (1996), whose subjects found green to be refreshing and beautiful. Reasons given for positive responses to green showed that green was associated with nature, grass, trees, and reminds someone of outdoors and spring-time, consistent with Hemphill's (1996) findings. Similarly, Saito (1996) noted that some of the Asian subjects who preferred green indicated the positive feeling about the colour because of its association with the image of a forest.

Blue elicited a high number of positive emotional responses, including the feelings of relaxation and calmness, happiness, comfort, peace, and hope, with a low number of negative responses, including sadness and depression. Reasons that blue elicited positive emotions seem to be because many participants associated the colour blue with the ocean, beach, water, or the sky and thus inducing relaxing and calming effect. Blue evoked negative emotions because it was associated with the night and dark skies, thus making someone feel depressed.

Colours are rich with symbolism. This symbolism can be apparent in how an individual associates colours with things, objects or physical space. For instance, in the present study, the colour yellow-red was associated with the colour of autumn.

One respondent said that yellow-red made her happy because "it reminds me of school buses and my childhood". Furthermore,

the colour blue-green was associated not only with the ocean and the sky; hut also reminded some respondents of cool mints and toothpaste. Red-purple was associated with the colour of bridesmaid dress.

One said red-purple makes her feel happy because “it reminds me of being in love”. In addition, the colour red was associated not only with love and romance, but also with blood. One respondent said that the colour red reminded her of Valentine’s Day and the shape of heart. Some associated black with “power,” and said it reminded them of nice sport cars. Black made some respondents feel sophisticated and reminded them of “fashion and clothing”. Yet, another respondent said black made him sad and reminded him of “funerals where Indian women wear black”. Therefore, it seems that a colour-related emotion is highly dependent on personal preference and one’s past experience with that particular colour.

Moreover, colour conventions differ from one society to another. In Western cultures, red is supposed 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 (Linton, 1991). Many attempts have been made to identify the impact of various hues, but it cannot be ascertained whether these reactions are innate or cultural. For example, death and mourning are associated with the colour black in Western traditions, whereas in India the colour of death is white. Findings of both positive and negative feelings about the colour black were in agreement with those of Saito (1996), although the specific associations differed between the two studies. In the present study, the colour black was associated not only with royalty, power, and wealth, but also with death, mourning, and tragic events. Saito noted positive images of clearness, tightness, sharpness, dignity, and nobleness, but negative associations with anxiety, fear, and death. Saito (1996) also found a very strong preference for the colour white among the Asian groups studied, particularly the Japanese subjects. Within Saito’s study, white was found to be positively associated with the feelings of being clean, pure, harmonious, refreshing, beautiful, clear, gentle, and natural. Saito (1996) further explained the possible influence of ancient Japanese religion and mythology on the Japanese preference for white. A small number of Saito’s subjects in Taipei expressed a negative feeling toward white, indicating an association with the image of death. In the present study, the findings revealed that the colour white was seen to be generally positive and was associated with purity and being simple and clean. Some respondents associated white with innocence and peace and said it reminded them of a bride or dove. Another said the colour white reminded her of snow. However, it also evoked negative emotions and was associated with emptiness and void. Some associated white with loneliness and boredom. Cross-cultural research could shed light on these issues by determining how cultural differences vary in colour-emotion associations.

In addition to cross-cultural studies and investigation to reasons for colour associations, future work might also utilize rating scales for colour associations, such as “beautiful-ugly”, “warm-cold”, etc. that have been studied by Kawamoto and Soen (1993). Also, in the study, all colours were presented on a neutral background. Future work might involve investigation of colour-emotion associations in which colours are presented on different coloured backgrounds. This could lead to investigations of feelings about colour harmony and colour associations.

Table: 1  
The Munsell Color System  
❖ Five Principle Hues



❖ Five Intermediate Hues



❖ Three Achromatic Colors



Table: 2



Table-3

Emotional Association				
		Positive Emotions	Negative Emotions	No Emotions
Principle Hues	Red	(24) 61.54	(15) 38.46	(0) 0.00
	Yellow	(20) 51.28	(19) 48.72	(0) 0.00
	Green	(39) 100.00	(0) 0.00	(0) 0.00
	Blue	(37) 94.87	(1) 2.56	(1) 2.56
	Purple	(36) 92.31	(2) 5.13	(1) 2.56
	Total	400.00	94.87	5.13
Intermediate Hues		(80)	(18.97)	(1.03)
	Yellow-Red	(32) 82.05	(4) 10.26	(3) 7.69
	Green-Yellow	(17) 43.59	(21) 53.85	(1) 2.56
	Blue-Green	(30) 76.92	(7) 17.95	(2) 5.13
	Purple-Blue	(29) 74.36	(6) 15.38	(4) 10.26
	Red-Purple	(35) 89.74	(1) 2.56	(3) 7.69
Achromatic Colors	Total	366.67	100.00	33.33
		(73.33)	(20)	(6.67)
	White	(34) 87.18	(5) 12.82	(0) 0.00
	Gray	(14) 35.90	(18) 46.15	(7) 17.95
	Black	(16) 41.03	(23) 58.97	(0) 0.00
	Total	164.10 [54.70]	117.95 [39.22]	17.95 [5.96]
	Overall	930.77	312.82	56.41
		(71.60)	(24.06)	(4.34)

Note: The cell no indicates percentages, The frequencies are listed in parentheses

**Table-4**  
**Frequencies of Emotional Reactions Given to Each Color**

Emotions*	R	Y	G	B	P	Y-R	G-Y	B-G	P-B	R-P	W	G	B
Anger <sup>a</sup>	10	4	0	0	0	1	0	0	0	0	0	0	0
Anxiety <sup>a</sup>	0	4	0	0	0	0	6	0	1	0	0	0	0
Calm <sup>b</sup>	0	0	0	0	0	1	2	1	4	0	4	3	0
Clean <sup>b</sup>	0	0	0	3	0	2	1	6	1	0	5	0	0
Coldness <sup>b</sup>	0	0	1	0	0	0	1	5	1	0	0	0	0
Confidence <sup>b</sup>	0	0	2	6	3	0	0	0	0	1	0	0	2
Cool <sup>b</sup>	0	0	4	8	0	0	0	4	5	0	7	0	0
Determination <sup>b</sup>	0	3	0	0	0	3	0	0	1	1	0	0	2
Discomfort <sup>a</sup>	0	3	0	1	2	0	11	0	2	0	0	0	3
Elegant <sup>b</sup>	0	0	0	2	2	0	1	0	1	1	0	0	0
Energy <sup>b</sup>	1	3	5	1	0	4	2	0	0	0	0	0	0
Excitement <sup>b</sup>	0	11	2	1	2	0	2	1	2	9	0	0	0
Faith <sup>b</sup>	0	0	0	1	0	0	0	0	0	0	3	0	0
Fear <sup>a</sup>	4	1	0	0	0	0	0	0	0	0	0	1	5
Greedy <sup>a</sup>	0	1	0	0	0	3	2	0	2	1	0	1	0
Happy <sup>b</sup>	0	0	2	2	4	1	1	1	2	6	0	0	0
Hostile <sup>a</sup>	0	0	0	0	0	0	1	0	0	0	0	3	0
Innocence <sup>b</sup>	0	0	1	0	1	0	0	0	0	0	1	0	0
Intelligence <sup>b</sup>	0	0	0	0	0	0	0	1	0	0	0	0	0
Intention <sup>b</sup>	0	0	0	0	0	0	0	0	0	0	0	0	1
Joy <sup>b</sup>	1	0	2	3	7	2	0	2	2	7	0	0	0
Jumpy <sup>a</sup>	0	0	0	0	0	0	0	0	0	0	0	0	6
Love <sup>b</sup>	20	0	0	0	5	0	0	0	0	5	0	0	0
Mystery <sup>a</sup>	0	0	0	0	0	0	1	2	0	0	0	13	0
Nature <sup>b</sup>	0	0	17	2	0	4	2	3	0	0	0	0	0
Optimism <sup>b</sup>	0	0	0	0	1	0	0	0	0	0	0	0	0
Peace <sup>b</sup>	0	0	3	4	0	1	1	1	1	0	9	0	0
Power <sup>b</sup>	1	0	0	0	0	7	0	0	0	0	0	0	1
Powerful <sup>b</sup>	1	1	0	2	1	3	0	0	5	0	1	0	2
Sad <sup>a</sup>	1	6	0	0	0	0	0	5	1	0	5	0	9
Shame <sup>a</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0
Simple <sup>b</sup>	0	0	0	1	0	1	1	3	3	1	1	4	0
Style <sup>b</sup>	0	0	0	1	10	0	0	1	0	2	0	0	8
Trust <sup>b</sup>	0	2	0	0	0	3	3	1	1	2	3	7	0
No Imotions	0	0	0	1	1	3	1	2	4	3	0	7	0

Note:	Emotions are listed in alphabetical order	Color:	Principle Hues	Intermediate Hues	Achromatic Color
	The Cell no indicate frequencies		R-Red	G-Y-Green -Yellow	W-White
	<sup>a</sup> negative emotions		Y-Yellow	B-G- Blue-Green	G-Gray
	<sup>b</sup> positive emotions		G-Green	P-B- Purple-Blue	B-Black
			P-Purple	R-P-Red-Purple	

#### Annexure

##### Questionnaire

##### ❖ Personal Details

Age: \_\_\_\_ Gender: \_\_\_\_ Education Qualification: \_\_\_\_\_

Marital Status: \_\_\_\_ Name of City/Village: \_\_\_\_\_

##### ❖ State your response for each color. (Only one response for each color)

	What emotional response do you associate with this color? (Emotion)	How does this color make you feel? (Traits)	Why do you feel this way?
1.Green			
2.Red			
3.Blue-Green			
4.Green-Yellow			

5.Purple			
6.Blue			
8.Blue-Purple			
9.White			
10.Red-Purple			
11.Grey			
12.Yellow			
13.Black			

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