Colors and its relation with Depression

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(Clinical)

Submitted by
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UNDER THE SUPERVISION OF

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THAPAR UNIVERSITY
PATIALA
June, 2017

CERTIFICATE

This is certify that the thesis entitled "**Colors and its relation with Depression**" being submitted in partial fulfillment of requirements for the award of degree of **Master of Arts in Psychology**, submitted in **the School of Humanities and Social Sciences, Thapar University, Patiala** is a bonafide work carried out under the supervision of **Dr. Santha Kumari,** Professor & Head, School of Humanities and Social Sciences, Thapar University, Patiala and that no part of this project has been submitted for the award of any other degree.

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This is to certify that above statement made by the student concerned is correct and true to the best of my knowledge.

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CANDIDATE'S DECLARATION

I hereby declare that the work presented in this thesis entitled, **" Colors and its relation with Depression"** in partial fulfillment of the requirement for the award of Degree of **Master of Arts in Psychology**, submitted in **the School of Humanities and Social Sciences, Thapar University,** Patiala, is an authentic record of my own work carried out under the supervision and guidance of **Dr. Santha Kumari**, Professor & Head, School of Humanities and Social Sciences, Thapar University, Patiala and refers other researcher's work which are duly listed in the reference section.

The matter embodied in this thesis has not formed the basis for the award of any other degree of this or any other university.

Date: 1st June, 2017
Place: Patiala

(MITHALI MEHRA)

This is to certify that the above declaration made by the student concerned is correct and true to the best of my knowledge.

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Abstract

Colors have a great impact on our lives. The aim of the present study was to see the effect of level of depression on color choice and to study the association of emotions (positive and negative) on choosing different shades of color by different levels of depressed people. A total of 115 adults (including 37 males and 78 females) participated in the study. The age range was 18-25years. It was hypothesized that different levels of depression affects the color choice. It was also predicted that Individuals with high level of depression will associate dark shades with positive emotions and Individuals with high and low level of depression will associate dark shades with negative emotions. Beck's Depression Inventory, Color preference test, negative emotion (sad, gloomy, depression, shame), positive emotion (joy, hope, happiness) were used in the present study. ANOVA and Regression were used to analyze the data. Findings of the study confirmed all the hypotheses. Findings are explained in terms of Beck, (1968) a depressed will tend to distort the world, irrespective of a happy or sad moment. Calculated results are beneficial for clinical settings.

Key words: color, depression, emotions, BDI TEST, Color preference test.

Chapter 1

INTRODUCTION

How amazing it is, when we are happy, we find good in everything, and when we are sad, that every good thing changes into bad thing in no time. We all are living in the common world, but the way we all perceive it is totally different from each other. For some people the glass is half filled and for other it is half empty. If we talk about colors, they play a vital role in our thoughts, perception, reason and emotions etc. They subconsciously affect an individual's emotions, behavior and functioning based upon their age, gender, biological and psychological factors. There are 16.7 million different colors in the universe to perceive (Barker, 2004).

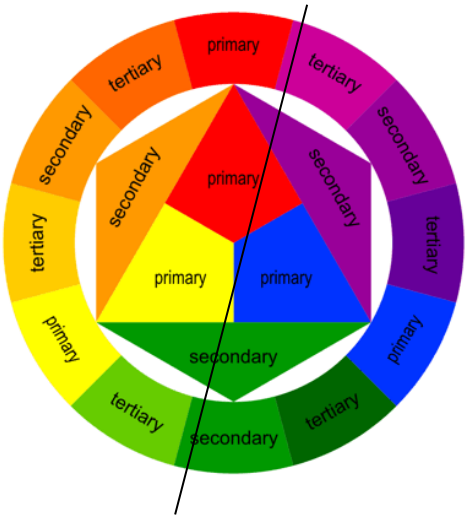
1.1 History of colors

The history of colors originates from (C f. Sir Isaac Newton, 1666), who developed the theory of spectrum and color wheel or color circle the basic wheel for combining colors. Different color wheel have been made but the most common color wheel is contains 12 colors based on (R Y B) color model. (R Y B) color model first was found in the work of (C.f. Franciscus Aguilonius,1567–1617). Sir Isaac Newton recognized in his experiment that different colors could be created by mixing primary colors. In this way he created secondary colors; green, orange and violet with assimilation of primary colors. Secondary colors are duller than primary colors. Primary + primary = secondary. Intermediate territory colors are orange, blue, green, violet, red violet and are even duller then the secondary colors because the primary has been mixed with secondary.

Primary + secondary = intermediate colors

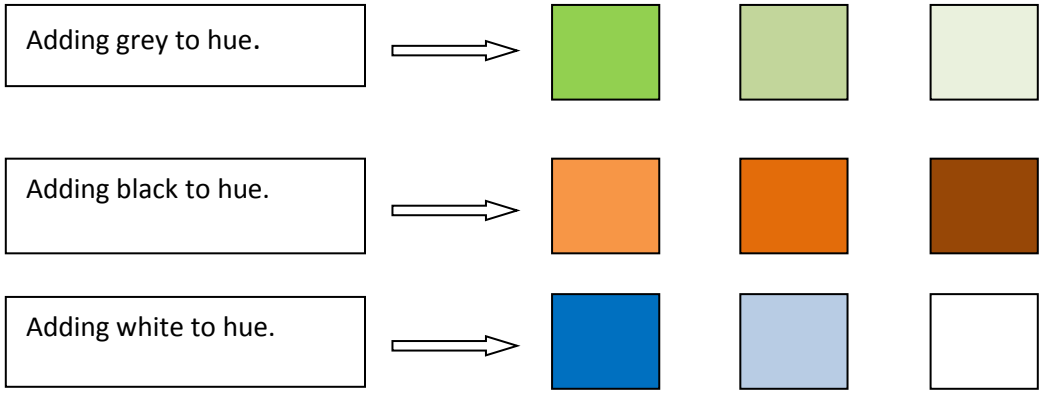
1.2 The warm and cool color scheme

According to Hummie (2009) cool colors are blue, green and purple. These colors give sense of coolness and calmness. Warm colors are red, orange, and yellow. Studies confirmed that space with warm color provides more comfortable area than cool color (Pile, 1997). A study by Valdez (1994) gives the findings that red, orange, yellow gives the feeling of arousal whereas opposite colors like green, blue, purple gave the calming effect.



(Fig. 1.1 describes warm color and cool colors)

As per Morton (1995) Monochromatic colors are white, grey and black. Other then these 12 primary shades there are millions of colors which are made with tint, tone and shade. These colors lie within monochromatic color scheme. Hue is the original property of color. Any hue mixed with black color become the shade, mixed with white become tint and any hue when mixed with grey become the tone.

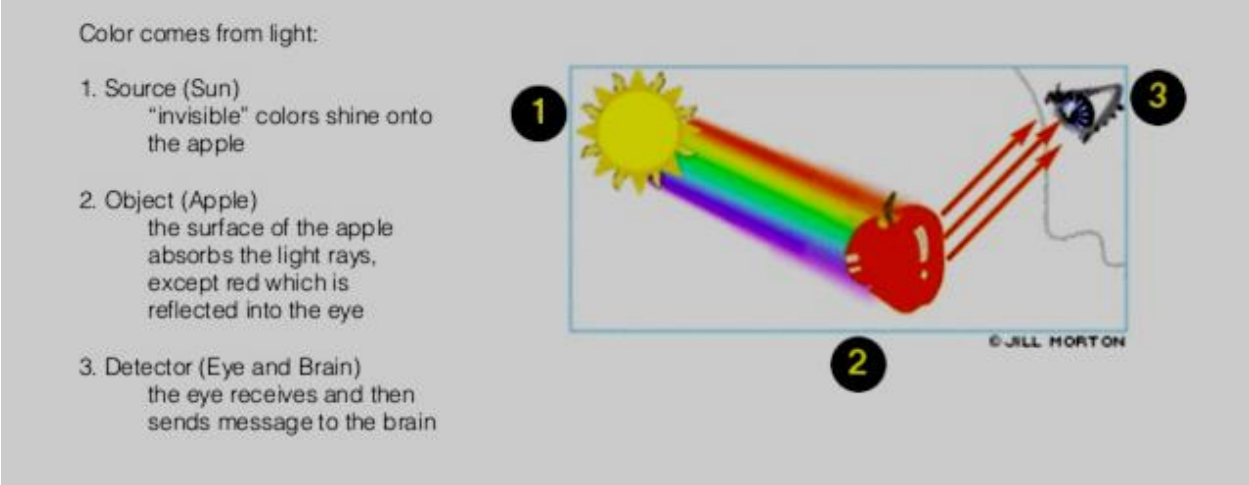


1.3 Color perception

There are two different structures in the retina of eyes that is **rods and cones** with which we can perceive the light. Rods perceive brightness, not color. They are widely distributed in the eye, and quite sensitive. Cones perceive color. Their density is highest near the fovea (the center of where you are looking), and they are less sensitive, functioning well only with relatively high levels of light.

1.4 Optical system

Light in form of color, emerges from sun in form of waves. When light falls onto the object, only wavelength are absorbed by the object and reflect the rest what we see. Our perception is influenced by wavelength, the eye receives light and then sends message to the brain. (Morton, 1995)



(Fig.1.3 representing optical system)

When light strikes the retina they are converted into electrical impulses, these impulses are passed to the hypothalamus, automatically. Our eyes are constantly adapting to these wavelengths although we are unaware of it. Further these impulses are sent to brain to the major endocrine regulating glands that cause emotional and psychological responses (Nielson, 2007).

1.5 Colors and its relation to emotion

Varghese (1994) reported a study related to color and emotion indicated that people attach colors like sky blue, light green with positive emotions, like joy, surprise, happiness etc (Varghese, 1994). According to Hemphill (1966) people attach dark shades or hues with negative emotions like disgust, anger etc. Boyatzis (1994) found that bright colors are mainly attached with positive emotions and dull colors are associated with negative emotions. Japanese associate negative and positive emotion with black color Saito (1996). Light enters the eye passes to pituitary gland which produces hormones that result into effect on our behavior and mood. In a study by

Clifton, it was found that workers lifting boxes with black color experienced more heaviness whereas they felt lighter when the boxes were painted with green color (2006).

1.6 Color Preference

People's choice or preferences varies or change corresponding to their age, occasion, and situation. According to Varghese (1994) particular age group prefers the particular shade or tone of colors. New born infants are suggested to surround them with pastel colors. Children from the age of 2 or above prefer brighter colors and so on (Zentner, 2001). In findings of sybert (2007) tint, tone and shade, is strongly correlated with particular situation, age or occasion. Studies have shown that people prefer things more that are in brighter color. People attract to packaging that are visible from the distance. This is because of longer wavelength. From the color preferences the question also raises why do people preference more of cooler color in summers and warm color in winters? Answer to the question is dark color absorbs the heat and gives the warmth and light color reflects (Varghese, 2001). One study investigated the dark versus light clothing and facial expressions on male raters of female job applicant. Men rated models who wore dark clothes. Also, brightness of clothing was more important than facial expression in determining judgment of effectiveness (Damhorst, 1986).

1.7 Physiological effect of color

Numbers of studies are conducted to see color and its relation with physical reactions Varghese (2001) discusses the process of visual search and attention in regard to signal detection theory. Striving too much of color continuously stresses the mind as well as eyes. Behind every color and light there is radiant energy which actually affects the stimulus, for example, radiant energy is apparently vital for the growth of plants. It was found by Walkner (1991) Patient suffering from jaundice disease felt irritated with red and relaxed with green and pink may suppress the aggressive behavior. Engelbrechet (2003) explains that light may reach the hypothalamus and releases the hormone which affects the energy level. As per Pile (1997) the wave length and energy of each color varies with the intensity and this in turn affects us in different ways. Warm colors like red, yellow stimulate the person and cool colors like blue violet calms the person.The effect of black and nonblack uniforms of football and hockey teams on aggressive behavior was

studied by Gilovich (1988). It was found that the team with black uniforms associated with greater degree of perceived aggression and showed higher levels of player aggressiveness.

Table 1.1 Physiological and psychological effect of color

Categories	Findings	Sources
RED	Raise blood pressure. Warm color.	(Vodvarka,2008)
YELLOW	Cheerful and happy color.	(Pile, 1997)
GREEN	Calming, refreshing and relaxing.	(Pile, 1997)
BLUE	Calming, restful, reduce B.P, pulse.	(Varghese, 2001)
ORANGE	Color with happy implication. Color increases the oxygen through brain. Attraction	(Seybert, 2007)
VIOLET	Color with full of mysteries.	(Pile, 1997)
BLACK	Seriousness, dignity.	(Ladu,1989)
WHITE	Symbol of blankness, simplicity, cleanliness and purity.	(Ladu,1989)
GRAY	Dark gray can be depressive, light gray is useful as background	(Barren,1988)
PINK	Relaxing, sophisticated color	(Barren, 1989)

1.8 Color Associations

Emotions are commonly associated with various colors, but these associations vary among individuals and cultures. Studies indicate that particular color and its tint tone and shade have some psychological association (Morton, 1995). Some research indicates red speeds up heart and respiration rates and elevate blood pressure and yellow is associated with cheerful feeling. Pink is associated with sweetness and romance (Pile, 1997).

Thompson (2009) has shown that pink color diffuses tension. Men wearing pink are perceived more gentle and sophisticating. As per Patteson (2009) Orange is a highly universal color that is associated with warmth, sociability and change. Blue and green are associated with calm, security, and peace. Purple is most associated with royalty and dignity (Wexner, 1954). The different hues of purple are found to have stimulating calming effect and tend to ignite memories from the past. White is most often associated with purity which is why brides are most likely to wear white (Patteson, 2009). Light is linked with peace and spirituality. Since white gives feeling of cleanliness, we can see that healthcare professionals and chefs mostly wear white attire. Black is suppressing and aggressive (Thompson, 2009). The value and intensity of a color changes the association (Morton, 1995).

1.9 Words and Color Association

Emotions such as joy and anger are abstract contents dealing with one psychological state. In a study crowdsourced term – emotion association lexicon consisting of associations of over ten thousand words –sense pairs with 8 emotions – joy, sadness, trust, distrust, surprise, - argued to be the basic and prototypical emotion (Plutchik,1980). In the study it has been perceived that emotions have strong associations with certain colors. Mostly anger is associated with red. Other negative emotion - disgust, fear, and sadness has been strongly associated with black. Among positive emotions such as joy has been strongly co-related with yellow and green colors. Thus color can add to the emotional potency of visualization.

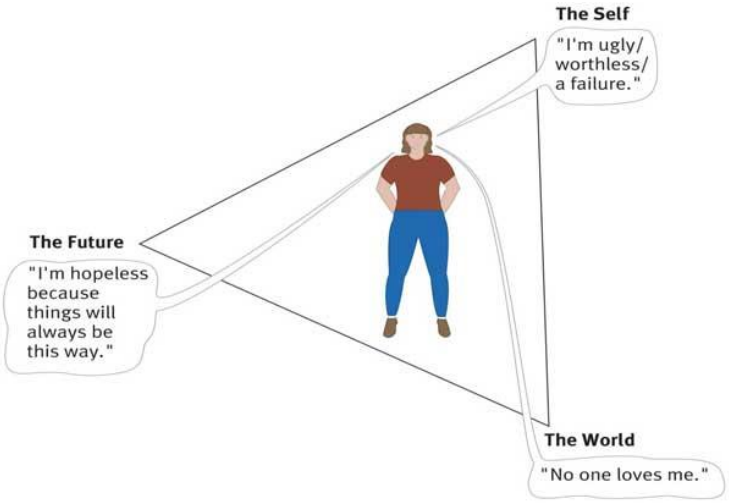
1.10 Depression

According to Beck (1968) Depression is a state of low mood that can affect person's well being. In his theory he has identified three mechanisms that he thought were in charge for depression.

A) Negative automatic thinking (cognitive triad).

B) Negative self schemas.

C) Faulty thinking



(Fig. 1.3 cognitive triad)

Individual with depression have negative automatic thinking about self, world and future. They view themselves as helpless or of no value. Then they interpret the world or events in a pessimistic way. Therefore they see their future totally with distorted image.

Negative self schemas are the beliefs about self they are mostly pessimistic. Negative self schemas are the result of disturbing or distressing life events. Disturbing events may include death of loved one, rejection, criticism bullying etc. People with negative self schemas make's logical errors in their thinking and they focus selectively on certain aspects of a situation and ignore the rest information. Everything is seen as black and white.

As per .Kockrow (2006) Depression is mixed feeling in which person has mostly no interest in doing physical activity, low confidence, loss of interest and pessimistic thought. Person can feel low sometimes but when the low feelings continued till 15 days to month signs of depression appears. The study conducted by Hamalanien (2005), usage of dark colors, living in darker environment which includes dim light can affect person psychologically.

Chapter 2

2.1 Literature review

Relationship between depression and color preference had been studied by various investigators. Some of the work done in this regard is given in the section.

A Study on relationship between color and emotion was investigated by Naz kaya (2004). Ninety-eight college students were asked to give their emotional 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 colors (white, gray, and black). The results indicated that the principle hues exhibited highest number of positive emotional responses, followed by the intermediate hues and the achromatic colors. The green color elicited positive emotions such as Relaxing effect and comfort ability because green indicates color of nature. Munsell color system was used in this test.

Kristi (2001) in his research studied the relationship between effect of color on learning and behavior. The areas they studied were (1) the inclusive classroom for students with disabilities, (2) color theory, and (3) the psychological and physiological aspects of hue. The results prove that color is important in designing functional learning spaces. The result is beneficial to see how color effect space.

Influence of color on physiological response studied by Freiders and Kim (1996). Participants were shown pictures in different colors and their responses were measured and also response to a grayscale version of the same image was measured. They used an Electroencephalography (EEG), Electrooculography (EOG), and pulse oximeter to record the participants' heart rate, neutral activity, and retinal focus. They hypothesize that color in nature that signal danger will increase the physiological activity like retinal focus heart rate. Whereas the natural color, non-threatening will decrease the retinal focus, heart rate.

In findings of Ulrich and Verdeber (1984) conducted research on the effects of a window with the view of nature and brick wall in a hospital setting to see its effect on patient's well-being. They found that there is effect of window on patient's well being. Natural view result into the recovery of the patient faster. Similarly Sam (1982) in his study found that any changes in the

environmental color will have physiological effect like reduction in aggressive behavior, drop in blood pressure.

Pierman (1976) gave psychological and physiological human responses to color.

Table 2.1

Physiological response to color.	When light strikes in eye our pupil changes the size, shape, resets eyeball position. Our blood pressure changes with the change of pulse rate and hormonal activity.
Psychological response to color.	Some colors cheers or excites the mind, some are relaxing, others are irritating and boring, some colors or color contrast gave illusions and perceptive confusion.
Different impression of colors on mind	Colors have impression in every field like food, (with color food may appear tempting or unhealthy), clothes (individual wearing brighter or lighter tone, in particular occasion or time may have great impression on others), by making use of different color we can make space smaller, larger

In one findings by Torice (1989) cool colors are preferred by passive children and active children have mostly choice of warm colors.

A Study on colors and emotions where preferences and combination was investigated by Mark & Jan (2001) found that particular age group has consistent preferences for emotion and colors but different age group has their own preferences. They found that pattern of combination between color and emotion more meaningful related to preference order to colors and emotion in adult age group.

In a study where college students were asked to associate their emotions with colors provided to them, proved that 92 % students associated brighter color with positive emotion (Jessica, 2014).

The effect of color light therapy was investigated by Rose (2010). In this study color preference was seen before color light therapy and after color light therapy. It was found that after color light therapy they preferred green tint as positive and blue as negative color.

Beck (1968) has given the concept of depression based on cognition which is triad of a negative interpretation of self, future and life experiences. According to beck depressed will tend to distort the world, irrespective of a happy or sad moment.

A person is likely to feel jolly on a bright day and gloomy on a rainy one. Conversely, dim colors have an effect on nervous system and physical responses. The person's feeling can be calm cheerful or depress based on the color effect of the space that he is attracted to. In today's current environments color is very important. Many psychologists have noted that response to color is impetuous and emotional Birren (1988). Hupka (1997) claims that associations are based on cultural and life experiences along with the genetics of the participants.

As per Tervogt and hoeksma (2001) have found in their studies that different age groups have different attributes about colors and value of emotions. seven year olds found yellow to be appealing and green to be unappealing whereas adults found the reverse to be true.

A study compared color associations with pleasure and arousal by looking at the participants' brain waves. Two pictures were presented to the participants from different picture categories: one grey scale and one in color. Both the pictures were presented for 6 seconds then flashed for 24 milliseconds. The participants were hooked up to an EEC while looking at the different pictures. Codispoti (2011) found that unpleasant pictures were more unpleasant in color than in black and white and that unpleasant pictures were more arousing in color than black and white.

Chapter 3

3.1 Motivation behind the study

Colors play an important role in this world. Results of many studies have concluded that colors have acquired the power to sway our thoughts, perception, and thus can cause reactions which leads to alteration in actions. Previous studies on colors and emotions where preferences and combination was investigated proved that pattern of combination between color and emotion more meaningful related to preference order to colors and emotion in adult age group (Mark & Jan 2001). In another study, where college students were asked to associate their emotions with colors provided to them, proved that 92 % students associated brighter color with positive emotion (Jessica, 2014).

The motivation behind this study is to find out the association of color choice with different levels of depression among young adults. Studies relating color preference evaluated that there is association between emotions and color choice, but the reason behind the conductance of this study is to find the association of not only color choice but also the positive and negative emotions linked with particular color. Furthermore, this study aims to find out the effect of different levels of depression; minimal, mild, moderate and severe on the color choice, as well as positive and negative emotions among young adults.

3.2 Objectives

1. To study the effect of level of depression on color choice.
2. To study the effect of kind of emotion on choosing different shade of color.

3.3 Hypotheses

H_1 Different level of depression affects the color choice.

H_2 Individuals with high level of depression will associate dark shades with positive emotions.

H_3 Individuals with low level of depression will associate dark shades with negative emotions.

Chapter 4

Method

4.1 Sample A total of 115 adults, 37 males and 78 females participated in the study. The age range was 18-25years with the mean age of 23. Convenient sampling method was used in this study.

4.2 Design

Independent variable: BDI Scores

Dependent variable: color preference Scores

Negative emotions associated scores

Positive emotion associated scores

4.3 Material used

4.3.1 BDI test Beck's depression inventory was created by Aaron T. beck, 1988. It is widely used psychometric test among psych - professionals to check severity level of depression. The test contains 21 questions of multiple choices. It is a self – report inventory. Each question has a set of at least four possible responses, ranging in intensity. For example:

"(0) I do not feel like failure

(1) I feel I have failed more than the average person.

(2) As I look back on my life, all I can see is a lot of failures.

(3) I feel I am a complete failure as a person."

The total scores obtained for an individual indicated the level of depression.

"Score	range
0-13	Minimal depressed
14-19	Mild depressed
20-28	Moderate depressed
29 and above	Severe depressed"

4.3.2 Color preference test

Color Preference Questionnaire was used to assess the color preferences of the participants. Test includes 10 questions. According to these questions participants had to fill the color in the given block. Test includes questions like, which color is your favorite color. Test also contains the question like associate color with these emotions: sad, disgust, lonely (with negative emotion). Associate color with these emotions: happy pleasure, joy (with positive emotions). These two questions were used as a dependent variable to check association of emotion with color. (Global color survey)

4.3.3 Munsell's color wheel was used as score the color preference test. Scoring was done based on 12 hues with each hue's tint, tone and shade. A score of 4 was given for shade. And 3 was given for tone, and 2 for hue and 1 for tint (Munsell,1944).

4.3.4 Negative emotions: sad, gloomy, depression, shame.

4.3.5 Positive emotions: joy, empathy, hope, happiness.

4.4 Procedure

Before administering the test informed consent was taken from the participants. Participants were also assured that all their answers would remain strictly anonymous and confidential also that they had the right to withdraw from participation at any time. Our aim of the study was to see the difference between color choice by depressed and mild depressed. In BDI test was given to check the depression level of individuals. In second phase they were given the color preference test to check their color choices. They were instructed that they have to give responses in the form of color by filling in the given block next to the each question. Participants were described that they have to choose color from the given color chart and then fill the block with camlin caryon which was also provided to them. In color preference test question no.8 and 9 was to evaluate the relationship between positive emotions and negative emotions with colors. In this way association of colors was checked with positive emotions and negative emotion of all the participants.

Chapter 5

RESULTS

The present research aims to study the impact of levels of Depression on Color Preference. The study targets the young population in order to check the level of depression among them through Beck Depression Inventory and Color Preference Test. The age range of sample is 18-25 years (23years). Convenient sampling method was used to conduct the research. Results of the current study are explained below;

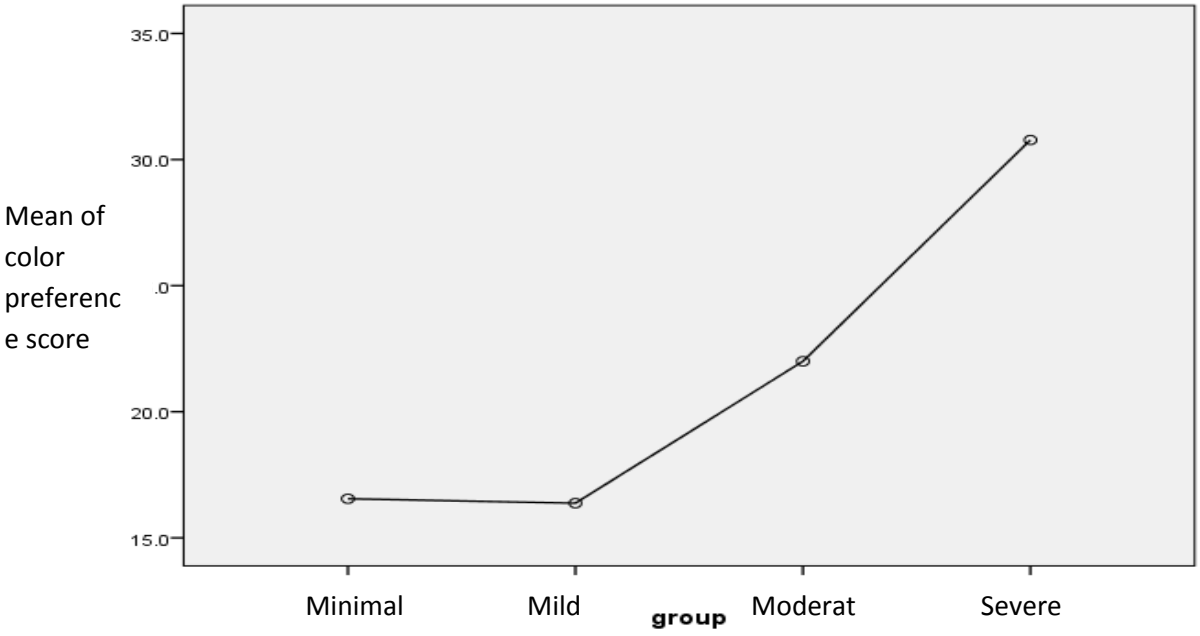
Result of color preference on four level of Depression.

Table 5.1 describes descriptive statistics of Color Preference Test on four levels of Depression.

Groups	Color Preference test (Mean)	Standard Deviation	(N= 115)
Minimal dep.	16.5	2.74	40
Mild dep.	16.3	1.36	16
Moderate dep.	22.0	1.66	19
Severely dep.	30.7	3.56	40

Above Table 5.1, clearly indicates the Mean and standard deviation of Color Preference Test on four levels of Depression; minimal, mild, moderate and Severe. These results of these mean values, shows that mean value of color preference test is higher in severely depressed individuals (M= 30.7, S.D= 3.56), as compared to color preference of on other levels of depression; minimal (M= 16.5, S.D= 2.74), mild (M= 16.3, S.D=1.36) and moderate (M=22.0, S.D= 1.66).

Figure 5.1Graphical Representation of Mean Values of Color Preference Test on four different levels of Depression.



In the Figure 5.1 Four levels of Depression lies on X-Axis and Color Preference lies on Y-Axis. This graph is representing the linear curve of mean values of color preference test on four levels of depression. This curve illustrates the positive relation among different levels of depression and color preferences. With increase in level of Depression as from mild to severe, individual's choice on color also increases from lighter tone to darker shades. At Mild and Minimal levels of Depression, there is less difference in the curve, but at moderate level, the curve shoots up and at severe depression level, it has scored highest number in color preference respectively.

Further ONE WAY ANNOVA was computed to compare color choice difference between four levels of depression.

Table 5.2 ANOVA summary table for four levels of depression and Color Preference.

Source	Sum of Squares	Df	Mean Square	F	Sig.
Group	4758.297	3	1586.099	202.685	.001
Error	868.625	111	7.825		
Total	63195.000	115			

Table 5.2 represents the ONE-WAY ANOVA of levels of Depression on Color Preference. This statistical analysis was carried out to compare the mean of color preference at four levels of Depression. The F-value ($F_{(3,111)}$ = 202.69, P. <001) of above discussed variables clearly demonstrates that there is significant difference between different levels of depression on color choice.

Regression analysis was carried out to substantiate the result further.

Table 5.3 Regression Analysis of Color Preferences

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficient Beta	T	Sig.	Adjusted R sq.
1 (constant)	9.569	.532		17. 986	.001	.865
BDI score	.607	.022	.930	27.001	.001	

It can be seen in Table 5.3 that 86.6% variation in color preferences can be attributed to different level of depression. The t-value is significant at .001 level. The B-value is .61 is significant. B-value specifies that 1unit of increase in depression level will lead to .61 units of increase in color choice.

Result of Association of Positive Emotion with colors on four levels of Depression.

Table 5.4 Descriptive Statistics of Positive Emotions on four levels of Depression.

Groups	Positive emotion (Mean)	Standard Deviation	(N= 115)
Minimal dep.	1.6	0.54	40
Mild dep.	2	0.81	16
Moderate dep.	3	0.74	19
Severely dep.	3.05	0.78	40

Table 5.4 represents the Mean and Standard Deviation of Positive Emotions on four levels of Depression. The results indicate that Mean value of positive emotions of severely depressed individuals (M=3.05, S.D=0.78) is higher than mean values on other levels of depression; minimal (M=1.6, S.D=0.54), mild (M=2, S.D=0.81) and moderate (M=3, S.D=0.74).

Figure 5.2 Graphical Representation of Mean values of Positive Emotions on four different levels of Depression.

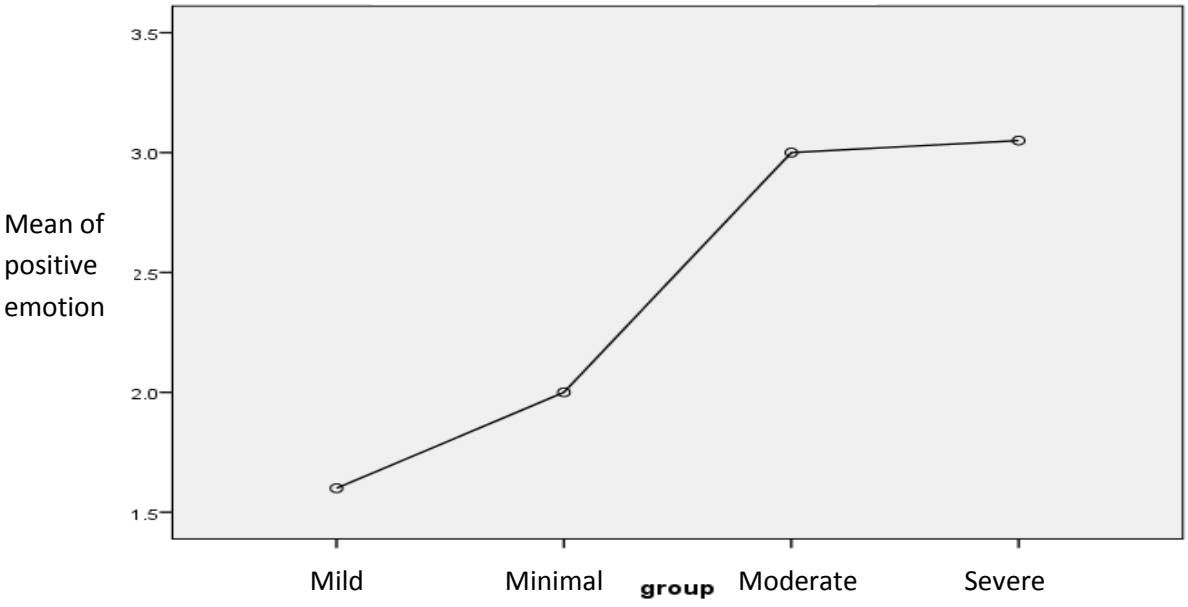


Figure 5.2, is a graphical representation of Table 5.4. This graph represents the mean values of positive emotion on different levels of Depression. On X-Axis, lies the levels of Depression and On Y-Axis, lies the positive emotions. This curve is indicating the progressive association of color preference at positive emotions in four levels of Depression. It determines that individuals with severe level of depression had associated dark shades with positive emotions as compared to other levels; minimal, mild and moderate, who have associated lighter tone of colors with positive emotions.

ONE-WAY ANOVA was calculated to find the significant difference between positive emotions and levels of Depression.

Table 5.5 ONE-WAY ANOVA of four different levels of Depression on Positive Emotions

Source	Sumof Squares	Df	Mean Square	F	Sig.
Group	51.891	3	17.297	34.594	.001
Error	55.500	111	.500		
Total	765.000	115			

To calculate the difference between positive emotions and four levels of Depression, ONE-WAY ANOVA, was computed. The F-value ($F_{(3,111)}$ = 34.594, p<.001) is clearly reflecting the significant difference between positive emotions of four levels of Depression.

Table 5.6 Regression Analysis of four different levels of Depression on Positive Emotions.

	Unstandardized Coefficient		Standardized Coefficent			
Model	B	Std. Error .	Beta	T	Sig.	Ad. R sq.
1 constant	1.190	.156		7.653	.001	.394
BDI score	.057	.007	0.632	8.661	.001	

The Table 5.6 gives the findings that 39.4% variation in positive emotions can be attributed to different level of depression. The t-value is significant at .001 level. The B-value is .057 is significant. This B-value specifies that 1unit of increase in depression level will lead to .057 units of increase in positive emotions.

Result of Association of negative emotion with colors on four level of depression.

Table 5.7 Descriptive statistics of Negative Emotions on four levels of Depression.

Groups	Negative Emotion (Mean)	Standard Deviation	(N= 115)
Minimal dep.	3.5	0.55	40
Mild dep.	3.06	0.77	16
Moderate dep.	2.84	0.76	19
Severely dep.	3.52	0.59	40

Above Table 5.7, display the mean and Standard Deviation of Negative Emotions on four levels of Depression. The results indicate that Mean value of Negative emotions of severely depressed individuals (M=3.52, S.D=0.59) is higher than mean values on other levels of depression; minimal (M=3.5, S.D=0.55), mild (M=3.06, S.D=0.77 and moderate (M=2.84, S.D=0.76). But there is very little difference between the mean values of Minimal (M=3.5, S.D=0.55) and Severe Depression (M=3.52, S.D=0.59).

Figure 5.3 Graphical Representation of Negative Emotions on four levels of Depression.

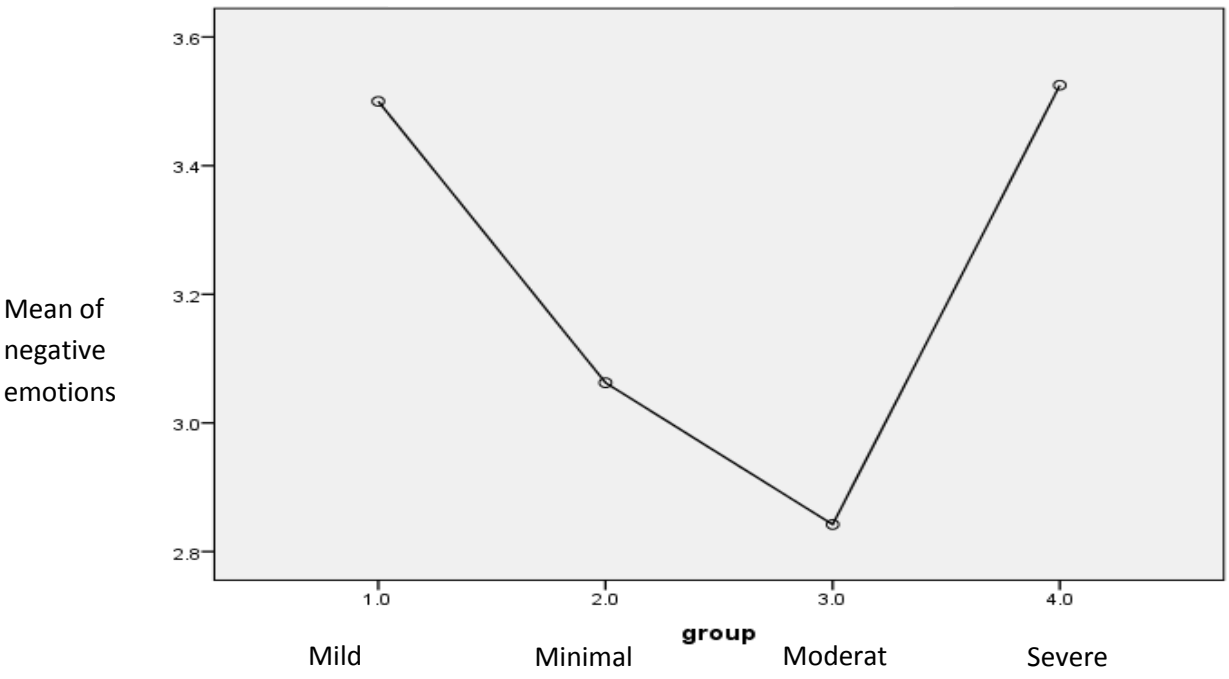


Figure 5.3, is a graphical representation of Table 5.7. This graph represents the mean values of Negative emotions on different levels of Depression.. On X-Axis, lies the levels of Depression and On Y-Axis, lies the Negative emotions. This curve is indicating the association of color preference at Negative Emotions in four levels of Depression. It determines that individuals with minimal and severe level of depression had associated more dark shades with negative emotions as compared to other levels of depression; mild and moderate. Out of this, moderate level of depressed individuals had associated more light shades with negative emotions.

Table 5.8 ONE WAY ANOVA of negative emotion on four level of depression.

Source	Sum of Squares	Df	Mean Square	F	Sig.
Group	8.335	3	2.778	6.787	.001
Error	45.439	111	.409		
Total	1336.000	115			

To calculate the difference between negative emotions and four levels of Depression, ONE-WAY ANOVA, was computed. The F-value ($F_{(3,111)} = 6.787$, $p<.001$) is clearly reflecting the significant difference between negative emotions of four levels of Depression.

Table 5.9 Regression Analysis of Negative Emotions

Model	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	T	Sig.	Adj. R.Sq
1 Constant	3.289	0.142		23.185	.001	-.007
BDI Scores	.002	.006	0.037	.394	.694	

The Table 5.9 gives the findings that 0.7% variation in negative emotions can be attributed to different level of depression. The t-value is insignificant.

Chapter 6

6.1 Discussion

The present aim of the study is to see the effect of level of depression on color choice and to study the association of emotions (positive and negative) on choosing different shade of color by different level of depression.

Hypotheses of the study described below:

H_1 Different level of Depression affects the color choice.

The findings of the study confirmed the hypothesis that there is a difference between individuals the different levels of depression; minimal, mild, moderate and severe on their color choice. Average value of color preference test is higher in severely depressed individuals as compared to color preference of other levels of depression; minimal mild and moderate. It was also found that 86.6% variation in color preferences can be attributed to different levels of depression.

Previous studies have found that undergraduates scoring above 18 on beck's depression inventory tend to choose more dark shade black and brown in the color preference test (Rebecca, 1995). Researchers found that assigning a mood to colors, saturation matters. "A light blue is not associated with a poor mood, but a dark blue is" Whorewell (2010) said. The shade of color is more important than the color itself". Various theories of emotions suggest that emotions acquired a great power and they mostly over win other factors such as thinking and reasoning etc. The way we perceive the world is affected by our emotions. The current study has also found that individuals at various levels of depression mostly selected dark shades. More the level of depression, more dark shades were being selected.

H_2 Individuals with high level of depression will associate dark shades with positive emotions

This hypothesis has also been confirmed. Individuals with high level of depression associated dark shades with positive emotions. Average value of positive emotions of severely depressed individuals was higher than other levels of depression; minimal, mild and moderate. Individual with severely depressed associated positive emotion with shade, individual with moderate

depression associated positive emotion with tone; minimal and mild associated the emotion with lighter color. Findings of the present study are line with Beck (1968) that depressed tend to distort the world, irrespective of a happy or sad moment.

Another study by Jessica (2014) on college students indicated that 92 % students associated brighter color with positive emotion when they were asked to associate their emotion with colors. Torice (1989) found that cool colors are mostly preferred by passive children and active children have often choice for warm colors.

H_3, Individuals with low levels of Depression will associate dark shades with negative emotions.

Third hypothesis has also been confirmed. Participants associated dark colors with negative emotions. It was found that the mean value of Negative emotions of severely depressed individuals is higher than other levels of depression; minimal, mild and moderate. But there was very little difference between the mean values of Minimal and Severe Depression. All four levels of depressed individual associated dark shade with negative emotion. Naz and Kaya (2014) in their study revealed that the principal hues have the highest number of positive emotional responses, than the intermediate hues and the achromatic colors. Another study done by Rose (2010) found that after color light therapy they preferred green as positive and blue as negative color.

6.1 Summary

The present aim of the study was to see the effect of level of depression on color choice and to study the association of emotion (positive and negative) on choosing different shade of color by different level of depression. Based on our aim it was hypothesized that H_1 different level of depression affects the color choice. H_2 individuals with high level of depression will associate dark color with positive emotion and H_3 individuals with all four level of depression will associate dark color with negative emotion. Computed result proves our hypotheses, there is effect of levels of depression on color choice. Different level of depression have different color choices, severely depressed mostly choose dark shade and associated dark colors with positive as well as negative emotion. Whereas minimal and mild have color choice of pure hue and they associated lighter tone with positive emotion and dark shades with negative emotion. Whereas

moderate depressed chose tone from the color chart they associated tones with negative emotion as well as with positive emotion.

6.2 Conclusion

From the above findings it can be concluded that there is a difference between different levels of depression and their color choice among young adults. Severely depressed have tend to choose darker shades in positive as well as negative color choice. They have scored higher average value in color preference, positive and negative emotions as compared to others level of depression. Thus we can predict that emotions can over win our thoughts and perception. Previous studies have also specified the relationship between color and emotions. So we can easily anticipate the emotional being of other person from his or her color preference

6.3 Limitations and future scope

The present study had very few male participants due to which gender difference could not be analyzed. An appropriate standardized measure of emotion can be used in future studies. In addition to level of depression, level of anxiety can also be taken as independent variable. Also Cross culture comparison can be attempted.

6.4 Implications

This study provides bright scope in clinical settings to check depression and mood instability. Colors can be another measure from which we can check the depression level by correlating with BDI test. This study also gives the indication that depression can be treated, by using colors and color combination in different situations. For example: studies have shown green is relaxing and refreshing color and different tones of blue can be calming or depressing.

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