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Differences in Color and Number Preferences of Turkish Children in Varying Stages of Illness

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Abstract

Objective: A person's physiological state contributes to color and number selection, as do sociocultural aspects of childhood socialization. The purpose of the study was to determine the preferences in color and number of Turkish children ages 7-16 in varying states of health. In that way, we aimed to evaluate how these choices reflect the physical and mental status of the children.

Methodology: Data were collected on a convenience sample of 211 subjects. General information about the child's diagnosis, number of days hospitalized, and number of siblings was also obtained along with other projective information. At first, it was questioned how 13 dominant emotions (anger, sadness, honesty, fear, pain, happiness, love, strength, life, work, school, born, and death) were identified by the children. Afterwards, they were questioned their favorite color and numbers. Children were asked to name their favorite color and number, and then select the color they preferred from a set of color squares. The children preferred colors and numbers that were dark blue, blue, yellow, orange, red, pink, green, violet, brown, grey, white, and black, from 0 to 9, in that order.

Results: Significant differences were found in number preferences of children aged 7-9, 10-12, and 13-16 (χ^2: 30.381, df: 18, p: 0.034). There was no significant difference between the responses of the male children and those of the female children. Significant differences were found in color preferences of emergency ill, outpatient ill and hospitalized ill children (χ^2: 34.298, df: 20, p: 0.024).

Conclusions: Using colors and numbers to screen for and/or assess affective states along with physiological changes in children with varying health states may be an initial step.

INTRODUCTION

The fact that colours play a vital role in our feelings and expressions has been widely accepted [1]. The bond between colour and emotion is closely coupled to colour preferences. In particular, colour preferences are linked with whether a colour imparts positive or negative feelings [2]. Colour has significant impact in children's lives as evidenced in their clothes, toys, sports, home accessories lunch boxes. It plays an important role in a child's physiological and psychological perception [3]. Color facilitates a deeper appreciation and interpretation of the world than a simple visual cue. Color and number choice reflects myriad influences. A person's physiological state also contributes to the choice of colors and numbers. Food color alters the perception of aroma and flavor strength. Colors exert a powerful force on physical and mental health and that health professionals ought to know more about them. Although there are a lot of investigations on color preferences of children, limited studies exist about number preferences [4-6]. A colour wheel demonstrating the psychological impact of different colors was developed by Goethe in 1840. He observed that blue imparts a sense of coolness and yellow produces a warming feel. Colour blue was found to have effects like relaxation of muscles, lowering blood pressure and calming restless children in various studies [2-9]. Pink has similar calming effects and has also been utilised in some prisons to control violent inmates.

Colour plays an imperative role in a child's life [3]. The relationship between color and emotion preferences changes with age. The relationship between color and emotions, it is better for young children than for adults [7, 9]. Environmental factors like colours that impart a positive feeling in the child's mind help in reducin anxiety [7]. It has been observed and studied by many clinicians that children's use of colour in art reflects their emotional status, wherein coordination between light, eyes and brain results in normal response to colour [3,9,10]. In 1939 Goldstein claimed that specific colours elicit specific emotional responses. It can be a stress relieving factor to all [3]. Colour can be perceived biologically, emotionally and thus could impart psychological responses [8].

If color and number preferences can be screened, healthcare professionals can play an important role in understanding children's behavior in clinical settings. It was aimed to evaluate the physical and mental status of children in the 7-16 age group with different health conditions by determining their color and number preferences.

METHODS

The study was performed on 211 children aged 7-16 years who applied to Firat University School of Medicine Department of Child Health and Diseases. General information about the child's diagnosis, number of days hospitalized, and number of siblings was also obtained along with other projective information. The children, for the most part, came from middle socioeconomic structure families. Consent forms were obtained from the parents. Color blind patients who could not participate in the study were not included. The subjects were 211 randomly selected children. This study included three replications: one with 7 to 9-year-old, one with 10 to 12-year-old, and one with 13 to 16-year-old subjects. Patient subsets were obtained by subdividing the patients, first by age group, second by sex, and third by health status (acute, chronic, emergency, outpatient, and hospitalized). At first, it was questioned how 13 dominant emotions (anger, sadness, honesty, fear, pain, happiness, love, strength, life, work, school, born, and death) were identified by the children. Afterwards, they were questioned their favorite color and numbers. Children were asked to name their favorite color and number, and then select the color they preferred from a set of color squares. We aimed to evaluate how these choices reflected the physical and mental state of children. 121 acute, 90 chronic patients, 42 emergency, 97 outpatient and 72 hospitalized pediatric patients were used. Acutely ill children were defined as children who were hospitalized for conditions that were unlikely to occur again and were hospitalized only at that time and not otherwise. Chronically ill children were defined as children who were hospitalized for a disease or condition caused by a permanent, irreversible pathological condition, required prolonged supervision or care, or required two or more hospitalizations for the same condition. Each child participating in this study was tested individually. The test room is isolated from external distractions, well lighted and fully ventilated. Children were asked to name their favorite color and number, then select their preferred color among color squares consisting of 12 colors. The child was reassured that there were no right or wrong choice. Expanded Luscher Color Test was used. Luscher Color Test consists of eight basic and auxiliary colors on small squares. The four basic colors in the test are blue, yellow, red, and green. They are considered as psychological priorities. The four auxiliary colors are violet (a mixture of red and blue), brown (a mixture of yellow, red, and black), grey (containing no color at all), and black, which is considered a denial of color [11]. We used four addition colors (dark blue, orange, pink, and white) rather than Luscher Color Test to evaluate emotions in detail. The first selected color on Luscher Color Test was described as the favorite color. The children were asked what color they thought of when the interviewer said anger, sadness, honesty, fear, pain, happiness, love, strength, life, work, school, born, and death. A child at the age of 9 or 10 years fully understands the meaning of the words [4]. When we thought some children could not understand, the meanings of the given words were explained. Data were analyzed by using chi-square test with contimity correction and analysis of variance. Scheffe's procedure was used to identify the ranges at the $p<0.05$ level for the differences in ages. In all statistical tests used, the significance level was $p<0.05$.

RESULTS

Table 1 shows the health status and follow-up styles of children by gender. The mean age of the subjects was 11.4 years (girls 11.4, boys 11.3 years), 10.7 years for the acutely ill, 12.2 years for the chronically ill, 11.4 years for the emergency ill, 10.8 years for the out-patients ill, and 12.2 years in-patients ill. There were significant differences with regard to age between acute and chronic patients (t: 3.856, p: 0.00) and among out-patients, in-patients and emergency unit patients (t: 4.696, df: 2, p: 0.01).

The color and number options of the cases are presented in Tables 2 and 3. The boys and the girls significantly chose the color red for three stimuli in our study. These stimuli were anger, pain, and love. The stimuli that are elicited the same dominant color from the males as they did from the females: anger, honesty, fear, pain, love, life, work, born, and death. Six of the remaining stimuli, evoked a different significant color from the males than they did from the females: sadness, happiness, strength, and school (Table 2).

The most preferred favorite colors were yellow (20.6%), red (19.6%) and blue (16.8%) in girl patients and red (28.8%), yellow (25.0%) and blue (21.1%) in boys. With regard to color preference, there was no difference between sexes (χ^2: 16.055, df:

Table 1: Health status and follow-up styles of children by gender

	Acute n (%)	Chronic n (%)	Total n (%)	Emergency n (%)	Out-patients n (%)	In-patients n (%)
Girls	58 (47.9)	49 (54.4)	107 (50.7)	25 (59.5)	43 (44.3)	39 (54.2)
Boys	63 (52.1)	41 (45.6)	104 (49.3)	17 (40.5)	54 (55.7)	33 (45.8)
Total	121 (57.3)	90 (42.6)	211 (100)	42 (19.9)	97 (46.0)	72 (34.1)

χ^2**:** 0.634, **df:** 1, **p:** 0.426 and χ^2**:** 3.229, **df:** 2, **p:** 0.199

Table 2: The colors reflecting dominant emotions in girls and boys

Concept	Girls Color (%)	Boys Color (%)	Total Color (%)
Anger	Red (36.4)	Red (44.2)	Red (40.3)
Sadness	Yellow (15.9)	Black (18.3)	Black (19.9)
Honesty	White (33.6)	White (25.0)	White (29.4)
Fear	Black (38.3)	Black (43.3)	Black (40.8)
Pain	Red (22.4)	Red (25.0)	Red (23.7)
Happiness	Pink (29.0)	White (21.1)	Pink (24.6)
Love	Red (38.3)	Red (34.6)	Red (36.5)
Strength	Black (30.8)	Red (24.0)	Black (25.6)
Life	White (24.3)	White (19.2)	White (21.8)
Work	Blue (17.7)	Blue (21.1)	Blue (19.4)
School	Yellow (21.5)	Blue (27.9)	Blue (21.8)
Born	White (26.2)	White (30.8)	White (28.4)
Death	Black (47.7)	Black (46.1)	Black (46.9)

10, p: 0.098). As totally patient group, the most preferred colors were red (24.2%), yellow (22.7%) and blue (19.0%), respectively. The least preferred ones are orange in girls and violet in boys. The colors liked best by 7-9 years old were designated red, while the color liked best by 10-12 years old was predominantly yellow. The colors liked best by 13-16 years old were designated blue.

No significant difference was detected in color preference in children aged 7-9 years, 10-12 years and 13-16 years (χ^2: 24.771, df: 20, p: 0.210) (Table 3).

The most preferred numbers were similar in both girls and boys. Those were 5 (29.0% and 21.2%), 8 (16.8% and 20.2%) and 7 (15.0% and 17.3%). No significant differences in number preferences were found based on sex (χ^2: 8.174, df: 9, p: 0.517). The number 0 was the least preference by both girls and boys. Based on totally group, 5 was the most preferred one (25.1%). The number 8 (18.5%) and 7 (16.1%) were following numbers and 0 (0.9%) was the least preferred one. The number 5 was the most preferred one in all groups. There was no significant difference in number preference measured in children aged 7-9, 10-12 and 13-16 (χ^2: 30.381, df: 18, p: 0.034) (Table 4).

With regard to number preference, there were no differences between acute and chronic patients and among out-patients, in-patients and emergency unit patients (Table 1). Red was chosen most often by subjects in chronically, outpatient, and hospitalized ill groups. Yellow was chosen most often by subjects in acutely ill group. Blue was chosen most often by subjects in emergency ill group. The colors red, yellow, and blue were selected more often than any other color by children in the ill groups. There was a significant difference in color preference measured in emergency department, outpatient, and hospitalized ill children (χ^2: 34.298, df: 20, p: 0.024) (Table 5).

When the children are divided into their socioeconomical status those having poor level had more blue preference (30.4%). The color yellow was dominant (26.4%), girls having good socioeconomical status more preferred pink (25.0%). In girls and boys who had middle socioeconomical status, red was dominant preferred color (26.7%). The preferred number was 5 in all three groups (Table 6).

Table 3: Favorite colors by age groups

Favorite color	7-9 years n (%)	10-12 yearsn (%)	13-16 years n (%)	Girls n (%)	Boys n (%)	Total n (%)
Dark blue	0 (0.0)	3 (4.8)	3 (3.7)	2 (1.9)	4 (3.8)	6 (2.8)
Blue	7 (10.3)	9 (14.5)	24 (29.6)	18 (16.8)	22 (21.2)	40 (19.0)
Yellow	18 (26.5)	15 (24.2)	15 (18.5)	22 (20.6)	26 (25.0)	48 (22.7)
Orange	0 (0.0)	1 (1.6)	2 (2.5)	1 (0.9)	2 (1.9)	3 (1.4)
Red	20 (29.4)	10 (16.1)	21 (25.9)	21 (19.6)	30 (28.8)	51 (24.2)
Pink	11 (16.2)	8 (12.9)	5 (6.2)	17 (15.9)	7 (6.7)	24 (11.4)
Green	3 (4.4)	4 (6.5)	4 (4.9)	8 (7.5)	3 (2.9)	11 (5.2)
Violet	1 (1.5)	2 (3.2)	0 (0.0)	3 (2.8)	0 (0.0)	3 (1.4)
Brown	1 (1.5)	2 (3.2)	1 (1.2)	3 (2.8)	1 (1.0)	4 (1.9)
Grey	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
White	5 (7.4)	6 (9.7)	4 (4.9)	10 (9.3)	5 (4.8)	15 (7.1)
Black	2 (2.9)	2 (3.2)	2 (2.5)	2 (1.9)	4 (3.8)	6 (2.8)
Total	68 (32.2)	62 (29.4)	81 (38.4)	107 (50.7)	104 (49.3)	211 (100)

χ^2: 24.771, **df:** 20, **p:** 0.210 and χ^2: 16.055, **df:** 10, **p:** 0.098

Table 4: Favorite numbers by age groups

Favorite number	7-9 years n (%)	10-12 years n (%)	13-16 years n (%)	Girls	Boys	Total n (%)
Zero	0 (0.0)	1 (1.6)	1 (1.2)	2 (1.9)	0 (0.0)	2 (0.9)
One	7 (10.3)	1 (1.6)	1 (1.2)	5 (4.7)	4 (3.8)	9 (4.3)
Two	5 (7.4)	5 (8.1)	4 (4.9)	9 (8.4)	5 (4.8)	14 (6.6)
Three	9 (13.2)	4 (6.5)	3 (3.7)	9 (8.4)	7 (6.7)	16 (7.6)
Four	5 (7.4)	9 (14.5)	5 (6.2)	8 (7.5)	11 (10.6)	19 (9.0)
Five	14 (20.6)	13 (21.0)	26 (32.1)	31 (29.0)	22 (21.2)	53 (25.1)
Six	3 (4.4)	5 (8.1)	8 (9.9)	5 (4.7)	11 (10.6)	16 (7.6)
Seven	6 (8.8)	11 (17.7)	17 (21.0)	16 (15.0)	18 (17.3)	34 (16.1)
Eight	13 (19.1)	12 (19.4)	14 (17.3)	18 (16.8)	21 (20.2)	39 (18.5)
Nine	6 (8.8)	1 (1.6)	2 (2.5)	4 (3.7)	5 (4.8)	9 (4.3)
Total	68 (32.2)	62 (29.4)	81 (38.4)	107 (50.7)	104 (49.3)	211(100)

χ^2: 30.381, **df:** 18, **p:** 0.034 and χ^2: 8.174, **df:** 9, **p:** 0.517

DISCUSSION

Color preferences can be affected by many physical and psychological factors, especially sociocultural structure and environmental factors. The ability to discriminate between colors is developmental, starting from infancy. The proverb 'Pink is for girls, blue is for boys' describes a very visible and widespread aspect of culture. Some color and numbers may be associated with sociocultural characteristics of societies. Infants and toddlers, whose gender cannot be easily determined by their physical characteristics, are identified as boys or girls based on the color of their clothing. Other life experiences, including age, development, race, gender, mood, and health status, can influence color and number preferences. The young children exhibit a definite color association to 13 dominant feelings and numbers from 0 to 9 [4,5,11].

Studies have found a relationship between various genres of music and antisocial behaviours, vulnerability to suicide, and drug use. However, studies reject that music is a causal factor and suggest that music preference is more indicative of emotional vulnerability. A limited number of studies have found correlations between music preference and mental health status [12].

Learning abilities help animals modify their behaviors based on experience and innate sensory biases to confront environmental unpredictability [13].

Children between the ages of 7 and 12 can distinguish color and number preferences (4). The color provides better understanding and interpretation of the world beyond being basic visual clues. The assesment of color vision is important in determining health status. The distinguishing of color, naming and any aesthetic reactions, are functions of the cortex: these abilities are the result of development and education. In addition to development, particularly the perceptual and cognitive aspects of development, such factors as culture, socioeconomic status and environmental factors may also influence color preferences. Perceptual development is important in the child's color identification, naming, and preference. Cognitive factors

Table 5: Color and number preferences by illness and following styles

Preference order	Acute	Chronic	Emergency	Out-patients	In-patients
	Color (%)/Number (%)	Color (%)/Number (%)	Color (%)/Number (%)	Color (%)/Number (%)	Color (%)/Number (%)
1st	Yellow (27.3)/5 (26.4)	Red (28.9)/5 (23.3)	Blue (40.5)/5 (30.9)	Red (25.8)/5 (22.7)	Red (29.7)/5 (25.0)
2nd	Red (20.7)/8 (21.5)	Blue (17.8)/7 (16.7)	Yellow (23.8)/8 (23.8)	Yellow (24.7)/8 (21.6)	Yellow (19.4)/7 (16.7)
3rd	Blue (19.8)/7 (15.7)	Yellow (16.7)/8 (14.4) Pink (14.3)/2 (9.5)	Pink (12.4)/7 (18.5)	Pink (12.4)/7 (18.5)	Blue (19.4)/6 (12.5)
4th	Pink (14.0)/4 (10.0)	White (8.9)/1 (7.8)	Red (11.9)/6 (9.5)	Blue (9.3)/4 (11.3)	Pink (8.3)/8 (11.1)
5th	White (5.8)/6 (9.1)	Pink (7.8)/2 (7.8)	White (2.4)/7 (9.5)	White (9.3)/3 (9.3)	White (6.9)/3 (8.3)
6th	Green (4.1)/3 (7.4)	Green (6.7)/3 (7.8)	Brown (2.4)/4 (7.1)	Green (7.2)/2 (6.2)	Green (5.5)/1 (6.9)
			Violet (2.4)		
			Dark blue (2.4)		

χ^2**:** 34.298, **df:** 20, **p:** 0.024

Table 6: Color and number preferences by socioeconomical status

Socioeconomic status	Females Color (%)/Number (%)	Males Color (%)/Number (%)	Total Color (%)/Number (%)
Good	Pink (25.0)/5 (20.8)	Red, yellow (31)/7 (24.1)	Yellow (26.4)/5 (24.5)
Middle	Red (24.3)/5 (30.0)	Red (29.2)/8 (23.1)	Red (26.7)/5 (25.9)
Low	Blue (30.8)/8 (23.1)	Blue, white (30.0)/5 (30.0)	Blue (30.4)/5 (21.7)
Total	Yellow (20.6)/5 (29.0)	Red (28.8) /5 (21.1)	Red (24.2)/5 (25.1)

χ^2**:** 19.984, **df:** 20, **p:** 0.459 and number for χ^2**:** 16.315, **df:** 18, **p:** 0.571

influence a child's perception of color. A particular perceptual experience reflects an interaction between internal and external deteminants. External determinants include structural characteristics of the physical stimulus situation such as contrast and contextual factors. Internal determinants include central processes involved in sensation, and perceptual thresholds such as needs and developmental factors. Normal children are able to name and distinguish between the primary colors by age 7 [4,5]. With advancing age, the preference for blue gradually decreases, while the popularity of green and red increases [14].

Studies have found significant differences in color preferences of physically well children and those who are ill; in acutely ill and chronically ill children; in physically disabled and acutely ill children; and in children ages 7-9 and 10-12 [4].

There is a significant association present between color preference and emotions in relation to children's age, gender and anxiety level. So by adding attractive colours like blue and pink to the environment and by incorporating colourful equipments could enhance a positive attitude and make the child be at ease. While black and red might impart a negative outlook in their mind [7].

A preference for one color and a dislike for another means something definitive and reflects an existing state of mind, of glandular balance, or of both [3,7,11]. Color choice reflects the interaction between physical stimuli and requirements, developmental factors and sensitivity. Color responses have proved to be representative of the affectivity of individuals based on their emotional stability [4]. The child's state of health may be a key factor in preferences for color, because states of illness may be indicators of psychological and physiological stress. If color preferences are meaningful and scannable; it can play an important role in the process of health professionals understanding the behavior of children cared for in clinical settings. The preferred color consists of a message describing the child's environment. The physical and emotional position can be interpreted by preferred color and numbers [4,5].

The colors in the Luscher Color Test have particular psychological and physiological meaning. The meaning is of universal significance. The preference for one color and dislike for another means something definite and reflects an existing state of mind. It describes psychological preference and physiological requirements [4,5]. Even children as young as 2 or 3 years of age know about gender role stereotypes. Preschool-age children's gender role stereotypes include common cultural expectations and stereotypical responses regarding clothing color (e.g., boys wear blue, girls wear pink). With increasing age, childrens learn that biological characteristics, rather than observable secondary characteristics, are important. Decreased reliance on salient perceptual features (e.g., clothing color or hair length) with development offsets the age-related increase in gender role stereotypes and leads to the lack of an orderly developmental progression in color stereotypes. Preschoolers will pay attention to distinctive physical characteristics of clothing color, and this clothing color influences predictions of other children's behavior. A man wearing a pastel suit or a woman wearing the dark colors characteristic of the business world are subject to similar stereotypes. Clothing color not only distinguishes sexual identity, but also influences other children's perceptions. Color stereotypes are an important component of peer socialization. Most of the time, infants and toddlers, whose gender cannot be easily determined based on their physical characteristics are identified as boys or girls based on the colors of their clothes. Physical and mental state, gender difference, and sense of taste reflect number and color preference. The favorite color of children aged 2, 3 and 4 is red. The most preferred color by 5-year-old children is red, and

the least preferred color is green. Preschoolers preferred yellow and orange. Color preference in food is related to the strong appetite appeal associated with certain foods. In some studies, preschool children preferred yellow and orange. Red, orange and light green are generally the most attractive food colors. It has been reported that there is a shift towards blue, red and green in the preference order of school-age children. In previous studies, school-age children generally preferred red to green. 9 years-old children first chose blue, then red, then green [1,5,11]. Blue is such a popular color among adults [6,9]. This shift was confirmed by our. We found that red (29.4%) was the prefered color of 7 to 9 years old children, followed by yellow (26.5%) and then pink (16.2%); and that grey and dark blue were the least prefered color. Yellow (24.2%) was chosen first by 10 to 12 years old children, followed by red (16.1%) and then blue (14.5%) and that grey was the least prefered color. Blue (29.6%) was chosen first by 13 to 16 years old, followed by red (25.9%) and then yellow (18.5%) and that grey and violet were the least prefered color. With regard to favorite color, there was no significant difference among groups (Table 3).

It is interesting that in all age groups five was the most preferred number. There was no significant difference between the responses of the male children and those the female children. There are cultural differences in regard to number preference. According to Islamic belief, five times of pray including performing ablution is required. We suggest that the preference of the number five may be reflected by this Islamic belief (Table 4). The number zero gives a feeling of negativity due to nothingness. The number zero is therefore chosen as the least.

Color is a secondary characteristic imperfectly associated with sex. The boys and the girls significantly chose the color red for three stimuli in our study. These stimuli were anger, pain, and love. These stimuli have been found anger, pain, love, and happiness in another study. Whereas the first two were obviously negative stimuli, the second two were positive stimuli. There are two types of stimuli. These are emotionally loaded and non-emotionally loaded stimuli. The emotional stimuli were more apt to carry symbolism with which all of the children were familiar. The children were aware of this symbolism and responded uniformly, regardless of gender. The neutral stimuli, which had no symbolic colors attached, evoked responses that significantly distinguished between the sexes. Anger, sadness, fear, pain, happiness, love, born, and death are emotionally loaded stimuli. Honesty, strength, life, work, and school are neutral stimuli. There was not a clear distinction between the boys responses and those of the girls. In fact, nine of stimuli evoked the same response from the boys and the girls. Only some emotional words such as sadness and happiness and some neutral words for instance strength and school were expressed by different colors in girls and boys. The word sadness was expressed by yellow in girls and by black in boys. In totally, the color of sadness was black. Happiness was expressed by pink in girls and white in boys. The color of happiness was established as pink. In girls, strength was attributed to black while red expressed the strength. The word school was expressed by yellow in girls and blue in boys. Death was expressed by black in both girls (47.7%) and boys (46.1%). This was only emotion that was expressed by same color (46.9%). So the color of death that is a negative emotion was accepted as black (Table 2). A 6 years old boy, during an initial hospitalization, has drawn ships of red and blue. On a second admission he has drawn ships of blue on a dark sea. When he returned to the hospital the third time he has drowen brown ships. Then one day he has drawn a large black ship, and two days later he has died. Preference for the color black may be taken as indicating a negative attitude toward life. All patient types, that is acute, chronic, emergency, in-patients and out-patients do not prefer the color black. All are negatively affected by black. Black was selected as the color of fear and death. Black emphasized the sadness in boys and the strength in girls. In both sexes, white was the color of honesty, life, and born. Girls selected pink, the color of beauty in our culture, as the color of happiness while boys preferred white for same emotion. The girls used yellow for school and sadness whereas the boys identified yellow with work. Thirteen dominant emotions were expressed by 4 colors in boys and 6 colors in girls. The girls used yellow and pink as an extra to express their emotion (Table 2). The findings indicate that color preferences may be a means to discriminate physically well children who have adjustment problems from those who are acutelly or chronicaly ill. Three colors seem to be the best discriminators: blue, green, and red. The color matching was one of the strategies that children used to cope with a task in the environment. Certain colors seem to be selected more often by children in varying states of health [4,5]. In painting artists' palettes, the spectrum tends towards the yellow-red range [15,16]. In this study, children's strongest preferences were red (24.2%) and yellow (22.7%), followed by blue (19.0%) and pink (11.4%). The girls most preferred yellow and least preferred orange while the boys most choiced red and least purple. The color purple and orange were the least choiced ones (1.4%). 15.9% of the girls and 6.7% of the boys preferred pink. There was no significant difference between the responses of the male children and those of female children (χ^2: 16.055, df: 10, p: 0.098) (Table 5).

Developmental Pb exposure alters color preferences of adult male zebrafish [17]. Innate color preferences have previously been shown in some butterfly species, and each family tends to display different color preferences. Innate color preferences have been suggested to provide behavioral biases that aid in the initial location or recognition of flowers. However, associative learning comes into play once a butterfly lands on a flower. Butterflies show an innate strong preference for red flowers. Both the number of visits and the time spent probing these flowers were found to be much greater than pink, white and yellow flowers. Butterflies learn to associate colors with sugar rewards. These capabilities may allow them to respond rapidly to different color stimuli. Learning occurs when an animal interacts with the surrounding environment and adapts its behavior based on experience and innate sensory biases. Learning should evolve in unpredictable environments in such a way that behavioral fixed patterns in an individual are appropriate, but not so unpredictable that the individual cannot behaviorally follow their change [13].

With regard to favorite number preference, no difference was observed between the girls and boys. The number five was most preferred by both the girls and boys. Based on the total group, five was the most preferred and zero was the least preferred number (Table 4).

When the children are divided into their socioeconomical status those having poor level had more blue preference (30.4%). Totally, the color yellow was dominant (26.4%), girls having good socioeconomical status more preferred pink (25.0%). In girls and boys who had middle socioeconomical status, red was dominant preferred color (26.7%). The preferred number was 5 in all three groups (Table 6).

Light colors are associated with positive emotions and dark colors with negative emotions. Colors such as pink, blue and yellow attribute to positive emotions (happiness), while red and black attribute to negative emotions (sadness) [7].

It is interesting that both physically ill and disabled patients have preferred blue as favorite color. In our study, as can be expected, emergency patients preferred blue (40.5%) and exhibited their requirement of being relaxed. Child patients have chosen red as first or second color and green as third or fourth preference [4]. Only our emergency cases did not prefer green within sixth choice. All groups apart from this group, green preferred as sixth rank. While children who applied to emergency unit most chosen blue, yellow (23.8%) and pink (14.3%), patients who applied to out-patient units most preferred red (25.8%), yellow (24.7%) and pink (12.4%). There was no difference in regard to the preference of favorite color among in-patients, out-patients and patients who applied to emergency unit. The children who applies to emergency unit want to calm down because he/she has confused thinks and strong aches and to have equilibrium. In-patients most preferred red (29.2%), yellow (19.4%) and blue (19.4%). It is interesting that green was not chosen by the emergency patients. These patients' this choice may be reflect their poor emotional position. On the other hand, they did not choice orange and black which have negative emotions. The experience of illness is especially important for chronic patients. In Turkish society, green represents sacredness, spirit and heaven. Dead person is dressed by white clothes and wrapped by green clothes. Hence we suggest that since green reflects the sense of death it might not be choiced in frequent (Table 5).

In the present study, acute patients choiced yellow, red and blue, while those with chronic complaints preferred red, blue and yellow, retrospectively. In acute patients, the preference of yellow may reflect the sense of unclearity. The patients with chronic complaints may prefer red expressing the expectation of energy and blue reflecting the requirement of tranquillity. Acutely ill patients least choiced black, brown, orange and violet. Chronic patients least preferred orange, violet and dark blue. In both group, these least preferred colors expresses negative emotions. With regard to favorite color, there was no difference between acute and chronic patients (Table 5).

Clinicians have experientially described that the emotional status of a child affects their choice of colour. Blue color is linked with calmness and security, orange stressful and disgusting, yellow with cheery, purple with a sense of nobility. The color red has both positive impacts, such as active, strong, and adoring, and negative impacts, such as hostile, raging and forceful. Green colour has a timid and comforting effect. It too represents both positive and negative feelings. Black color in Japanese subjects has been found to be linked to both negative and positive responses. Anxious children preferred pink as their favorite color to shade happy face whereas non-anxious children preferred blue [7]. As to colors inclined to bad, very large proportion of grayish color existed [18].

There is a significant gender difference in specific color preferences. Girls prefer pink while most of the boys prefer blue to represent positive emotion. This may be due to cultural impact as most of the parents bring up girl babies in a pink environment and boys in a blue background in his/her toys, clothes and room accessories [2,3].

In our study when the children were in positive emotion, a majority of them preferred blue and pink. Alternatively, when the children were in negative emotion, red and black were their choice. Obviously colour preference varies significantly with status of emotion [7].

When blue is chosen in the first position, there is a need either for emotional tranquility, peace, harmony, and contentment, or there is a physiological need for rest. When red is selected in the first position, the individual wants self-activities to bring intensity of experience and fullness of living. Preference for the color black may be taken as indicating a negative attitude toward life. When individuals reject green, that is, place it in a lower position, it may suggest an anxiety to liberate self from the tensions imposed by nonrecognition. They are the results not be affected by gender, race or socioeconomical status in children over 5 years old [4,5]. The people who favor red and yellow are more extraverted than those who prefer blue and green, but the data did not support Luscher's predictions. Color preference was not related to self-descriptions when social desirability was controlled. Moreover, people favoring green and blue were not more introverted than those favoring red or yellow. Children had positive reactions to bright colors (e.g., pink, blue, red) and negative emotions for dark colors (e.g., brown, black, grey). Children's emotional reactions to bright colors became increasingly positive with age, and girls in particular showed a preference for brighter colors and a dislike for darker colors. Boys were more likely than girls were to have positive emotional associations with dark colors [15]. Religious beliefs and sociocultural structure are important factors affceting color preference. In Turkish society, white is the color of dress wore in newborn, marriage and death. For this reason, basically, it reflects purity, naturalness and sadness. The colors of red and white are those of Turkish flag. So red expresses happiness, excitement and energy. On the other hand, it causes to perceive fire, hell and distress. Despite sociocultural differences responses given in Turkish children were similar. Universal colors was dominant more than colors expressing the emotions of children.

Warm colors like orange and yellow tend to score highly for coziness which puts them in leading positions when users' assess lactation rooms [19].

The literature supports that landscape plays a significant role in healing, and that colour plays an important role in landscape. Plants serve as an important part of the ecological corridor landscape and serve functions such as viewing, relieving tension, calming, and absorbing dust. The results show that green, yellow, and blue plants have the highest concentration of interest and should be used as the main colour in landscape scenes. The relatively high concentration of interest in red plants indicates that the subjects are influenced by traditional Chinese culture, which is consistent with the results of [20].

The quest for existential meaning constitutes a universal phenomenon traditionally manifested in official religions (religiosity) or personal modes of transcendence (spirituality). Religiosity and spirituality have been found to be associated with a variety of mental health and illness parameters. In the last decades there is an increasing number of publications with interesting results on the relationship between religiosity and mental health, both on a theoretical and a clinical level. Recent research suggests the presence of clinically important interactions between religious beliefs and mental health, although the exact nature of the associations remains unclear [21]. All of acute, chronic, emergency, outpatient and hospitalized ill patients considerably preferred the number five. Acute patients most preferred 5 (26.4%) and second preferred 8 (21.5%). Acute and chronic ill patients least preferred the number zero. Regarding the number preference, there was no difference between acute and chronic patients. Both emergency patients and out-patients most preferred 5 and 8 (30.9% and 23.8% in emergency patients, 22.7% and 21.6% in out-patients). The most choiced numbers of in-patients were 5 (25.0%) and 7 (16.7%). Regarding the preference of favorite number, no difference was observed among emergency patients, out- or in-patients. So it seems that there is no relationship between preferred number and the situation which the patient had ($p > 0.05$) (Table 5). Certain religiosity dimensions (daily spiritual experiences, values/beliefs) were correlated with lower morbidity, in accordance to previous reports in different populations, whereas "meaning" was correlated with more somatic symptoms [21].

The number and color preferences were not changed according to the duration of hospitalization. As a whole group, the least choiced color was black. Regarding unpreferred color, no difference was observed between groups.

There are several considerations in interpreting the results. Learned color preference could be a factor in children's responses as to color they prefer. The state of health is a critical factor in the choice of color. A longitudinal study of a group of chronically ill children would be desirable to better understand meditation in terms of color preference and experience with illness [4].

It has been shown in this study that color preferences can be discerned among groups of children in varying states of health. The implication of this preliminary study for nursing is that it may be a beginning step in the possibility of using colors to screen and/or assess affective states along with physiological changes in children in varying states of health. The strength of the colors on physical and mental health should be used. The physicians should be more informed about the nature of the colors.

The relation of colour and its effects on emotions is based on the perception of colour and the environment and emotional relationships individuals have experienced [7]. Physicians should be aware of depression and fatigue as co-morbidities. Symptoms of depression also present early in the course of disease and affect cognitive performance [21].

If the ability of ill children to give meaning to themselves and their environment is understood, it can be possible for them to become stronger against their current illness. By understanding the emotional state of the ill child and helping him/her relax, support can be provided in the treatment of the disease. Moreover, the physiological effects of the treatment can be interpreted more objectively.

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