Do Psychiatric Disorders Affect Color and Number Preferences?

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ABSTRACT

Objectives: The relationship between psychiatric disorders and color preference has been an interesting area of investigation. Also, the results of previous studies dealing with the relationship between psychiatric disorders and color and number preference have remained controversial. Comparison of the psychiatric patients and healthy subjects with regard to favorite color and number has not been studied in Turkey.

Method: The study group consisted of 464 patients referred to the Ankara Atatürk Education and Research Hospital Psychiatry Clinic and diagnosed with a psychiatric disorder according to the DSM-IV-TR criteria. The control group consisted of 211 healthy subjects. Favorite colors were requested as a selection from the Luscher Color Test. Then, the patients and healthy subjects were told to choose their favorite number between zero and nine.

Findings: The most frequently preferred favorite colors were blue for both the patients and healthy subjects. Blue was preferred significantly more frequently by the control group. Regardless of diagnosis group, blue and red were the most preferred colors for all patients and there was no statistically significant significance among the disorders. Seven was the most often preferred favorite number in both the patient and control groups. Although no statistically significant sex differences in favorite number preference were present in the patient group, males in the control group preferred the number 7 significantly more frequently than did females. Among the different psychiatric disorders, there was no significant difference in either color or number preference.

Discussion and Conclusion: The results of study were similar to those from other studies, suggesting a relationship between color-number preference and sociocultural content. On the other hand, the present study demonstrates that cultural milieu and gender differences are more important than psychiatric diagnosis in color and number preferences.

Keywords: color, number, culture, psychiatric disorder

ÖZET

Psikiyatrik Hastalıklar Renk ve Sayı Tercihlerini Etkiliyor mu?

Amaç: Psikiyatrik hastalıklar ve renk tercihi arasındaki ilişki ilginç bir araştırma alanı oluşturmuştur. Ancak, psikiyatrik hastalıklar ile renk ve sayı tercihi arasındaki ilişkiyi araştıran çalışmaların sonuçları tartışmalıdır. Psikiyatrik hastaların ve sağlıklı insanların renk ve sayı tercihlerinin karşılaştırılması Türkiye'de henüz çalışılmamış bir konudur.

Yöntem: Çalışmaya Atatürk Eğitim ve Araştırma Hastânesi'ne başvuran ve DSM-IV-TR'ye göre bir psikiyatrik hastalık tanısı konulmuş 464 hasta ile 211 kontrol grubu dâhil edildi. Favori renklere Luscher Color testinden seçim yoluyla karar verildi. Sonrasında hastalara 0 ile 9 arasında favori sayılarını seçmeleri söylendi.

Bulgular: Hem hasta hem kontrol grubunda en sık tercih edilen renk mavi idi. Mavi anlamlı olarak kontrol grubu tarafından daha sık seçildi. Tanı grubundan bağımsız olarak tüm hastalar için en sık tercih edilen renkler mavi ve kırmızı idi. Renk tercihi yönünden hastalıklar arasında anlamlı farklılık yoktu. Hasta ve kontrol grubunda en sık tercih edilen sayı yedi idi. Hasta grubunda favori

sayı seçiminde cinsiyetler arasında farklılık yok iken kontrol grubunda yedi sayısını erkek cinsiyet anlamlı olarak daha fazla tercih etti. Psikiyatrik hastalıklar arasında hem renk hem sayı tercihleri açısından anlamlı farklılık bulunamadı.
Tartışma ve sonuç: Mevcut çalışmanın sonuçları renk-sayı tercihi ile sosyokültürel içerik arasında ilişki olduğunu öne süren çalışmalar ile benzerdir. Diğer yandan çalışmamız renk ve sayı tercihinde kültürel etkenlerin ve cinsiyet farklılıklarının psikiyatrik tanıdan daha önemli olduğunu ortaya koymaktadır.
Anahtar Kelimeler: renk, sayı, kültür, psikiyatrik hastalıklar

INTRODUCTION

Color is a primary, nonverbal, and omnipresent aspect of the human environment (Ireland et al. 1992). Following the initial description of "blue and seven phenomenon" by Simon (1971) there has been increasing interest in studies dealing with color and number preference. Simon stated that over 40% of American subjects selected blue when asked to name a color and over 30% selected seven when requested to choose a number between zero and nine (Saito 1999). These phenomena have been confirmed by studies in the USA (Simon and Primavera 1972, Boutwell and Fennel 1974, Holmes and Buchanan 1984, Silver et al. 1988), Australia (Trueman 1979), and Kenya (Philbrick 1976). Nevertheless, in other countries, we could see different results in color preference: the preferred color was red in Holland, Nigeria, Japan, and Congo (Vandewiele et al. 1986), whereas it was black in Senegal (D'Hondt and Vandewiele 1983). In Europian cultures, the Lüscher Color Test [LCT] (Lüscher and Scott 1969) basic inquiry of the first color coming to mind indicated a preference for red over blue (Donnely 1974, Vandewiele et al. 1986). We can observe culturaldifferences in these preferences.

The relationship between psychiatric disorders and color preference has been an interesting area of investigation. Cernovsky and Fernando (1988) reported no significant difference between the color preferences of 20 patients diagnosed with schizophrenia according to the ICD-9 and 24 healthy control subjects. In Cernovsky's study (1986), 67 inpatients treated for alcohol and drug abuse were administered the Minnesota Multidimensional Personality Inventory (MMPI) (Dahlstrom et al. 1972) and LCT. Scores on Lüscher's scales were unrelated to MMPI scores. Ireland et al. (1992) evaluated preference for color density and reported that highly anxious individuals prefer dull colors more than individuals with low anxiety do; it was concluded that brighter color tones may be highly stimulating and thus disliked by anxious individuals. In a recent study, Bobic et al. (2007) found that the color "green" was more preferred and the "red" was preferred less

Tablo1: Favorite Colors According to Group

	Patient (n=464)	Control (n=211)	Total (n=675)
Color	**n(%)**	**n(%)**	**n(%)**
Blue	88(19.0)	64(30.3)	152(22.5)
Red	86(18.5)	40(19.0)	126(18.7)
Green	68(14.7)	29(13.7)	97(14.4)
Pink	49(10.6)	14(6.6)	63(9.3)
Black	49(10.6)	14(6.6)	63(9.3)
Yellow	22(4.7)	8(3.8)	30(4.4)
Brown	20(4.3)	4(1.9)	24(3.6)
Gray	7(1.5)	6(2.8)	13(1.9)
Other	71(15.3)	32(15.2)	103(15.3)
No color	4(0.9)	0(0.0)	4(0.6)

($p<0.05$, $x^2=19.04$)

Tablo2: Percentage of Preferred Colors by Psychiatric Diagnosis

Disorder	Blue	Red	Yellow	Green	Pink	Brown	Black	Grey	Other	No Color
Anxiety	9.1	9.9	3.0	7.1	5.6	2.4	6.0	1.1	8.6	0.6
Mood	7.1	5.8	1.3	5.6	4.5	1.1	2.8	0.2	4.7	0.0
Psychotic	1.1	1.1	0.2	0.9	0.4	0.2	0.4	0.2	0.9	0.0
Somatoform	0.6	0.6	0.0	0.4	0.0	0.2	0.4	0.0	0.6	0.2
Other	1.1	1.1	0.2	0.6	0.0	0.4	0.9	0.0	0.4	0.0
Total sample	19.0	18.5	4.7	14.7	10.6	4.3	10.6	1.5	15.3	0.9
n	88	86	22	68	49	20	49	7	71	4

($p>0.05$, $x^2= 25.03$)

in post-traumatic stress disordered prisoners.

Like color, number preference was also examined in many studies. In Kubovy and Psotka's (1976) investigation, seven was the most frequently chosen number when subjects were asked for the first number coming to mind. This result changed, however, when subjects were asked for a number between 6 and 15. In a study carried out by Vandewiele et al. (1986), different numbers were preferred in four different countries: nine was most frequently preferred in Nigeria, seven in Japan, nine in Congo, and eight in Transkei. In another study performed by Saito (1999), seven was again the most preferred number.

In all of the literature explored, except for the study by Cernovsky and Fernando (1988) on schizophrenic patients and a control group, study groups are carried on either patients or healthy subjects alone. Therefore, whether culture or psychiatric disorder more prominently affects these preferences remains unclear. In our study, we aimed to evaluate the color and number preferences of both a group of Turkish patients with psychiatric disorders and a group of healthy subjects and assess possible factors contributing to any observed differences.

METHOD

Sample

Our study group was consisted of 464 outpatients referred to the Ankara Ataturk Education and Research Hospital Psychiatry Clinic who were diagnosed

Tablo3: Color Preferences According to Sex in Patients and Controls

	*Patient (n=464)		†Control (n=211)	
	Female(n=273)	Male(n=191)	Female(n=115)	Male(n=96)
Color	n(%)	n(%)	n(%)	n(%)
Blue	41(15.0)	47(24.6)	42(36.5)	22(22.9)
Red	54(19.8)	32(16.8)	23(20.0)	17(17.7)
Green	39(14.3)	29(15.2)	12(10.4)	17(17.7)
Yellow	9(3.3)	13(6.8)	0(0.0)	8(8.3)
Pink	38(13.9)	11(5.8)	12(10.4)	2(2.1)
Brown	16(5.9)	4(2.1)	0(0.0)	4(4.2)
Black	32(11.7)	17(8.9)	10(8.7)	4(4.2)
Gray	4(1.5)	3(1.6)	0(0.0)	6(6.3)
Other	37(13.6)	34(17.8)	16(13.9)	16(16.7)
No color	3(1.1)	1(0.5)	0(0.0)	0(0.0)

*($p< 0.01$, $x^2=22.38$)
†($p<0.0001$, $x^2=34.29$)

Tablo4: Preferred Numbers According to Group

	Patient (n=464)	Control (n=211)	Total (n=675)
Number	n(%)	n(%)	n(%)
Seven	60(12.9)	34(16.1)	94(13.9)
Three	47(10.1)	21(10.0)	68(10.1)
Six	34(7.3)	16(7.6)	50(7.4)
Five	24(5.2)	22(10.4)	46(6.8)
Eight	21(4.5)	10(4.7)	31(4.6)
Four	22(4.7)	14(6.6)	36(5.3)
Nine	11(2.4)	16(7.6)	27(4.0)
Two	12(2.6)	6(2.8)	18(2.7)
One	9(1.9)	10(4.7)	19(2.8)
Other	23(5.0)	4(1.9)	27(4.0)
No number	201(43.3)	58(27.5)	259(38.4)

($p<0.0001$, $x^2=34.73$)

with anxiety disorders [obsessive-compulsive disorder, panic disorder, phobic disorder, and generalized anxiety disorder; n=248, 53.4%, mood disorders [major depressive disorder and bipolar disorder; n=154, 33.2%], psychotic disorders [schizophrenia, schizoaffective disorder, and other psychotic disorders; n=25, 5.4%], somatoform disorders [n=15, 3.2%], and other psychiatric disorders [dissociative disorders, adaption disorder, and destructive behavior disorder; n=22, 4.7%] according to DSM-IV-R diagnostic criteria (American Psychiatric Association 2000). The control group consisted of 211 healthy subjects.

After a brief initial interview, suitable subjects were thoroughly informed of the details of the research study. Written informed consent to participate in the study was obtained from the subjects. In accordance with the Declaration of Helsinki, the Local Ethics Committee approved the research protocol.

Procedure

Study stimuli, which consisted of 4 cm square cardboard pieces of eight different colors [blue, green, red, yellow, pink, black, brown, and grey], were placed on a single larger piece of cardboard. The patients were told to select their favorite color or the other color they liked among those presented. The chosen colors were recorded. Then, the patients were told to choose their favorite number or the other number they preferred between 0 and 9; the chosen numbers were recorded. The same procedure was applied for the healthy subjects.

The results were evaluated by using the SPSS Package. Pearson Chi-square or Fischer's Exact Test values were used. A p-value less than 0.05 was considered to be statistically significant.

FINDINGS

The mean ages of the patients and healthy subjects were 38.6±12.8 and 40.2±11.0 years, respectively. There was no statistically significant difference between the groups [p>0.05]. In the patient group, there were 273 females [58.8%] and 191 males [41.2%]; in the healthy subject group, there were 115 females [54.5%] and 96 males [45.5%]. There was no statistically significant difference in gender between the groups [p>0.05, x2=1.11].

The most frequently preferred favorite colors were blue for both the patients [n=88, 19.0%] and healthy subjects [n=64, 30.3%]. Blue was preferred significantly more frequently by the control group [p<0.05, x2=19.04] as evidenced in Table 1.

Color Preferences

Among the psychiatric disorders, anxiety disorders were the first [n= 248, 53.4%] and mood disorders the second [n=154, 33.2%] most frequent diagnoses. Regardless of diagnosis group, blue and red were the most preferred colors for all patients. There was no statistically significant significance among the disorders [p>0.05, x 2= 25.03] [Table 2].

A sex difference in favorite color preferences for blue and pink was statistically significant in both the

Tablo5: Percentage of Patients' Preferred Numbers by Psychiatric Diagnosis

Disorder	1	2	3	4	5	6	7	8	9	0ther	no
Anxiety	1.1	1.5	5.8	2.6	2.8	4.3	6.0	3.2	0.6	2.2	23.3
Mood	0.6	0.9	3.4	1.5	1.5	2.6	5.4	0.6	0.9	1.7	14.0
Psychotic	0.0	0.2	0.2	0.4	0.2	0.0	0.9	0.4	0.2	0.9	1.9
Somatoform	0.2	0.0	0.0	0.0	0.2	0.0	0.4	0.2	0.6	0.2	1.3
Other	0.0	0.0	0.6	0.2	0.4	0.4	0.2	0.0	0.0	0.0	2.8
Total sample	1.9	2.6	10.1	4.7	5.2	7.3	12.9	4.5	2.4	5.0	43.3
n	9	12	47	22	24	34	60	21	11	23	201

(p>0.05, x2=52.05)

patient and control groups [p< 0.01, x2=22.38 and p< 0.0001, x2=34.29, respectively]. While men preferred blue more frequently, pink was preferred more frequently by women in both groups [Table 3].

Number Preferences

Seven was the most often preferred favorite number in both the patient and control groups. It was chosen by 60 patients [12.9%] and 34 healthy subjects [16.1%]. Group differences were statistically significant for the number one [p<0.0001, x2=34.73]; healthy subjects preferred this number more frequently. For the other numbers, no statistically significant difference was found between the patient and control groups [Table 4].

There were no statistically significant differences among diagnosis groups with respect numbers preference [p>0.05, x2= 52.05] [Table 5].

Although no statistically significant sex differences in favorite number preference were present in the patient group [p>0.05, x2=13.94], males in the control group preferred the number 7 significantly more frequently than did females [p>0.05, x2= 17.88] [Table 6].

DISCUSSION

Similar to the findings from studies carried out in other countries (Holmes et al. 1976), our study observed that blue and red were the most frequently preferred favorite colors for psychiatric patients and healthy subjects. All participants stated that spacious feelings

Table 6: Preferred Numbers Ranked by Frequency According to Sex in Patients and Controls

	*Patient (n=464)		†Control (n=211)	
	Female (n=311)	Male (n=125)	Female (n=115)	Male (n=96)
Number	n(%)	n(%)	n(%)	n(%)
Seven	28(10.3)	32(16.8)	13(11.3)	21(21.9)
Three	28(10.3)	19(9.9)	15(13.0)	6(6.3)
Six	19(7.0)	15(7.9)	11(9.6)	5(5.2)
Five	13(4.8)	11(5.8)	14(12.2)	8(8.3)
Eight	13(4.8)	8(4.2)	4(3.5)	6(6.3)
Four	9(3.3)	13(6.8)	8(7.0)	6(6.3)
Nine	9(3.3)	2(1.0)	12(10.4)	4(4.2)
One	5(1.8)	4(2.1)	6(5.2)	4(4.2)
Two	7(2.6)	5(2.6)	4(3.5)	2(2.1)
Other	11(4.0)	12(6.3)	0(0.0)	4(4.2)
No number	131(48.0)	70(36.6)	28(24.3)	30(31.3)

*(p>0.05, x2= 13.94)

† (p>0.05, x2= 17.88)

and being suggestive of the sea were the most common reasons for the blue preference. In addition to these, we suppose that the blue color of the sky as well as the symbolization of the widespread belief in the evil eye by the color blue are the other important factors in this blue preference. Also, the top four colors [blue, red, white, black] have consistently been preferred in Japan when choosing a favorite color from a color chart, as reported in related study of color preference (Saito 1996a). Moreover, blue was the color commonly preferred in many Asian countries in the cross-cultural studies (Saito 1994, 1996a, 1996b). It is possible that there was a cultural significance of the blue color in Eastern countries. Unlikely to the results of Asian studies, green color is the third favorite color in both the patient and control groups in the present study. Kuloglu et al. (2002a) found that green was the most frequently preferred color in their studies and the authors subsequently presumed that this preference for green may emanate from the yearning for nature which is identified with green color or may have been related to esteem of green color in Islam [color of heaven, color of sacred tombs, etc.]. This may be a possible explanation of our finding that was related to green color.

With respect to gender differences, the most often preferred favorite color was "pink" for female participants and "blue" for male participants in both the patient and control groups in our study. This finding supports that Turkish women mostly prefer the color pink while Turkish men might prefer the color blue in their personal needs such as dress, house decorations, and daily use equipment. It is possible that this difference in color preference was related to cultural factors. Presumably the idea prevailing in Turkey "pink color is color for females and blue is for males" may have an important role in this choice. Similarly, Silver and Ferrante (1995) suggested that the pattern of frequencies for preferred color differed as a function of sex and also found that blue was chosen as the most preferred color by both sexes. Also, Radeloff (1990) has found that women were more likely than men to have a favorite color. In expressing the preferences for light versus dark colors, there were no significant differences between men and women; however, in expressing the preference for bright and soft colors, there was a difference, with women preferring soft colors and men preferring bright ones.

In addition, our study highlights new findings with respect to color preference in psychiatric patients. A prior study by Pasto and Kivisto (1956) reported that blue was preferred by inpatient psychiatric cases whereas red was preferred by outpatient cases. In a study carried out by Holmes et al. (1985), the color preferences of 1,143 psychiatric outpatients and inpatients were evaluated using the LCT according to sex and age group. These authors found that yellow is preferred for young, red and blue for middle-aged, and red and yellow for advanced aged patients with various psychiatric disorders.

In a study carried out in Turkey (Kuloglu et al. 2002a), psychiatric patients most frequently [27.6%] chose green as their favorite color; in this study, blue was the second preference [16%]. This green preference was interpreted as follows. Green is an esteemed color in Islam [e.g. color of heaven, color of tombs], especially in that region of Turkey. Patients had perceived psychological diseases as physical rather than psychological, and the majority of these patients had sought help from nonmedical, traditional, religious, and parapsychological means [e.g. via visits to clergy, holy places, or tombs of sacred people] because of their religious interpretations. In the same study, the most frequently chosen numbers were three [13.4%] and seven [11.3%]. The preference for the number three was again interpreted in light of religious beliefs and sociocultural factors. These results were different from findings of the present study. We can explain these differences by considering the differences in the pathways through which the psychiatric patients in our study chose to seek help. In another study carried out in Turkey on a group of university students (Kuloglu et al. 2002b), the favorite color and number were also blue and seven, respectively. In the same study, most subjects said that the color red was the first to come spontaneously to mind. In our study, red was one of the most frequently preferred colors. This may be related to the red color of the Turkish flag.

In the present study, seven [followed by three] was the most frequently preferred favorite number in both the patient and control groups. The mystery of seven and its importance in several cultures is known. In Sufi beliefs, seven is the number of the main messengers, the number of doors to complete the spiritual development of a human being's passion. In Christianity, seven is the number of seals to be opened, the number of churches, and the number of trumpets on the Last Judgment Day. In Judaism, there are seven steps to the Suleiman Temple, seven ranks of creation, seven columns of wisdom, and seven bars in the menorah candlestick. In Buddhism, Buddha walked seven steps just after being born. In China, seven has importance in "born" and "life" as well as various other beliefs.

In a study carried out on Japanese students (Saito 1999), seven was the most frequently preferred num-

ber. This was related to the idea of seven as a lucky number. In our study, the participants who preferred seven generally stated that it was their lucky number.

It has been suggested that the method of inquiry may affect number preference results. In a study carried out by Kubovy and Psotka (1976), seven was the most frequently chosen number when the subjects were asked for the first number coming to mind. However, the result was not the same when the subjects were asked for a number between 6 and 15. In the same study, 77 was not the number of choice when patients were to choose a number between 70 and 79. Vandewiele et al. (1986) found that the most often preferred number was nine in Nigeria, seven in Japan, nine in Congo, and eight in Transkei. Social and cultural factors may also increase the tendency of particular responses of number preference. Boutwell and Fennell (1974) suggested that the dominance of the number 7 in social and cultural factors, such as "7 days of the week" and "lucky number 7," may explain this effect.

CONCLUSION

In conclusion, the results of study were similar to those from other studies, suggesting a relationship between color-number preference and sociocultural content (Donelly 1974, D'Hondt and Vandewiele 1983, Wiegersma and Klerck 1984, Wiegersma and Van der Elst 1988). Additionally, our results also support the "blue and seven phenomenon." To the best of our knowledge, our study is the first in the literature to compare color and number preferences between different kinds of psychiatric patients and healthy subjects. We think that our findings are important, because they underline the sociocultural and religious rather than psychiatric pathological basis of color and number preference.

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