

Colorpreference is an Evaluation of Our Statements Over Time.

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Abstract: *Comparative analysis of human color preference relations proved to be an important research area within the theory of color dynamics. To sum up the results of these research activities it can be established, that the comparison of the index system of color preferences – containing variations in time of color preference values – and the color scale of the spectrum being constant in time has provided new approximations to evaluate psychphysiology and psychoanalytics of color adaptation. Investigation of the effects of colors on physiology parameters by comparing color preference values has led to the development of an auxiliary tool of color adaptation applying the color preference index system, established by Dr. Antal Nemcsics, as the comparable etalon facilitating analysis of color preference/relaxation reactions observable under different circumstances and human states.*

Keywords: *Index system of color preferences, color dynamics, Coloroid, Antarctic syndrome - desynchronization, color, pattern, harmony*

1 Introduction

Color preference is a bio-aesthetic value, being a function of time, determining human color preference scales of different epoch, age and gender. This phenomenon of human perception proved to be such an important area for color researchers, that scientist have been investigated it from the onset of medieval ages until today. The first color preference investigations may have been conducted around 1890. Researchers of color preferences – [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16] – have provided to the science of color dynamics color preference results facilitating a deeper insight into processes of human color perception both in terms of psychophysics and psychophysiology.

The most comprehensive line of experiences of the world, both in terms of quantity and quality, has been conducted at the Budapest Technical University

under the leadership of Dr. Antal Nemcsics [17]. The sequence of experiences has continued for more than ten years with participation of nearly eighty thousand persons of different ages and gender. Summarized results of these experiments, having gained their final form as color preference scales, provided an opportunity to conduct further experimental studies involving the concept of time as well. The time concept of biological clock in correlation with rules of color spectrum has been analyzed in detail [18] and it has opened a further research direction. For the sake of comprehensibility we try to analyze variations of color preference values, the rules of color spectrum and within this framework the concept of time.

2 Nature and the Human Color Preferences

Color influences of environmental changes in the nature have been the primary factors creating on a subconscious level the time dependent values of human color preferences, by a time dependent system of coloristic zone variations of the color spectrum changing parallel to the color palette of Nature. The human organism namely can be considered in terms of physiology as a system with objectively changing pace, its adaptation capability, on the other side, provides adaptivity to daily, monthly, yearly color preference variations of the environment. Meanwhile, from a psychophysiological aspect, sensorial perception of colors occurs on a subjective way because, according to color adaptation relations the value components of adaptation are different in sequence being a function of adaptation process and of harmony relations of successive colors. This partially explains the fact that the color rhythm regularities of the visible spectrum differ from data system of human color preference. That means, color spectrum remains constant as time elapses, but human color preference is a function of time, it is a value determinant of subjective adaptation during this time related process. Comparison of these color gradation values provides an invaluable psychoanalytic support in correction of human psychophysiological states, using color dynamics picture charts, see Fig. 1.

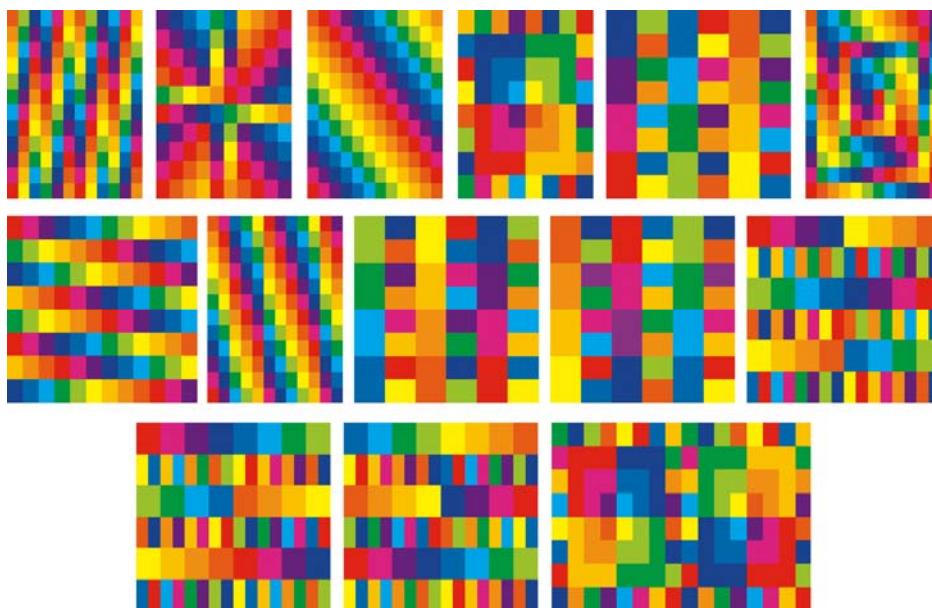


Fig. 1. The Tavrijai University Department of Biophysics and the "Academic Vernadsky" bearing the name of Ukrainian Antarctic research station experiments conducted chromodynamics picture.

3 Color Scale Analysis of the Color Preference Index System of Dr. Antal Nemcsics Compared to Time-Independent Constant Values of Color Spectrum

The preferential value of sensorial efficiency of most saturated surface colors has proven to be the most appropriate starting point when making psychoanalytic research on physical, emotional and intellectual state of humans. It is no mere chance that the LÜSCHER color test [19] comprehensively used all over the world has been compiled also of the most saturated surface colors.

Corresponding to that you can see first the preferential color gradation order related to the 12 most saturated surface colors of the color preference index system of Dr. Antal Nemcsics [20] expressed in per cents, compared to color gradation order of the visible spectrum. Fig. 2 shows men of ages between 3 and 51 years and above that age, respectively. Fig. 3 shows women of ages between 3 and 51 years and above that age, respectively.

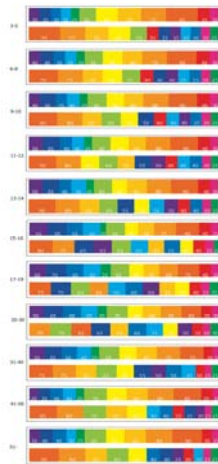


Fig. 2 shows men of ages between 3 and 51 years and above that age, respectively.

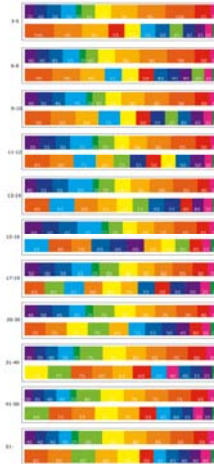


Fig. 3 shows women of ages between 3 and 51 years and above that age, respectively.

The upper bar of each Fig. shows the color gradation order of the visible color spectrum expressed in % of their preferences. The lower bar shows the preferential color gradation order, increasing with age, expressed in %.

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5 Practical Application of Values Compared During Time Dependent Variations of Color Preference

During our vital process being inseparable from sensorial effects of colors we meet numerous psychophysical and psychophysiological factors where subjective effects of colors appear as an objective factor [22]. Based on the biological content of color associations these are cases where the effect of red colors onto physical, the effect of yellow colors onto emotional, the effects of blue colors on intellectual states appear as physiological factors [23][24][25][26][27][21]. During their life humans, in different situations, corresponding to their physiological state, react differently to colors. A frequent color preference phenomenon is when in a space seeming at first sight a to have a pleasant atmosphere, looking around after some minutes our feeling produced by colors of the space changes unfavorably. In

other cases the first, not too pleasant impression transforms itself gradually into a harmonic experience, because the adaptation behavior of our eyes, as a consequence of chromatopsy mechanism, forms the color reaction of our organism into a harmony relation depending on preference. Taking it as our starting point, the color preference variations as a function of time, not only provide the value order of observed harmony experiences but in the meantime they are harmonic correlations of color adaptation, of color preference and of matrix system of the color memories of the brain. Our research program lasting seven years, which has been conducted parallel at the Biology Institute of the Tavria University of Ukraine and at the Ukrainian Antarctic Research Station named „Academic Vernadsky”, has presented numerous questions when investigating color adaptation, color preference and the reaction of the human organism, which, for scientific analysis and systematization purposes, have applied the color preference index system of Dr. Antal Nemcsics - based on the 12 gradation saturated color scales - as a comparable etalon. The color preference and color induced relaxation of experimental persons is shown for different states. The classic variant of the technology consists of a color diagnostic program, electroencephalography and the related adaptation color tables depicting polychromatic harmonic spectra stimulating color sensing receptors.

6 Demonstration of Biological Interaction of Colors by an Experiment Conducted at the Biophysics Institute of Tavria University

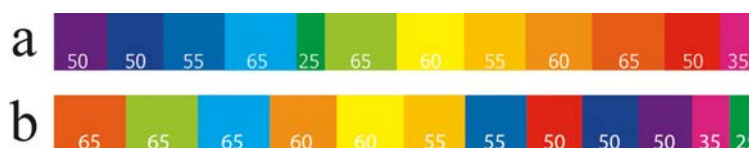


Fig. 4

Fig. 4 demonstrates the color preference of the age corresponding to the age of the experimental person in the color preference scale system of Dr. Nemcsics

a) according to time gradation order of spectrum colors spectrum

b) according to % proportion of the color preference of the person in ascending order.

Age of the experimental person: 18 years, gender: female. State before the experiment: exhausted from computer work, scared tension. Color relaxation time: 15 minutes.

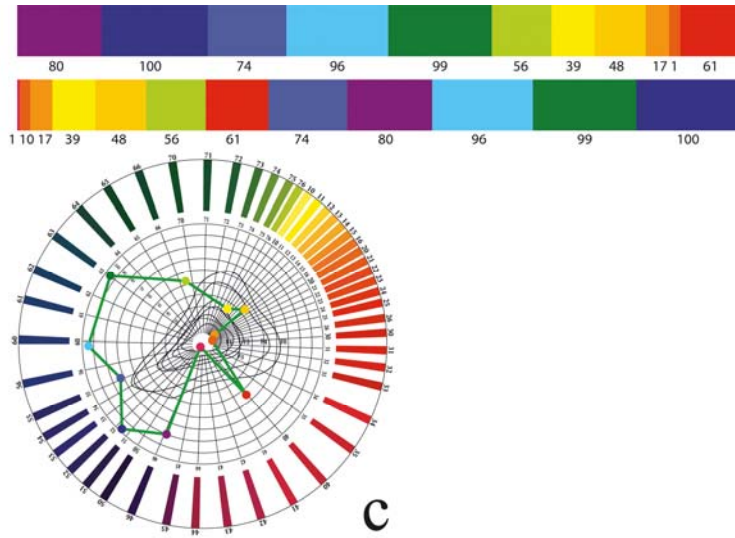


Fig. 5

Fig. 5 shows the comparison dynamics of color preference of the brains color perception, in the circle graph of color preferences related to different human ages, by Dr. Nemicsics, and in color spectrum scales making comparison in % proportions (c).

Taking into consideration the fact that the state of the experimental person can be explained by the exam period, the color dynamic change of the color preference of the brain in the direction of balanced state can be clearly seen [28]

Study of color adaptation, color preference and the reaction of human organism experiment conducted at the Ukrainian Antarctic Research Station named „Academic Vernadsky”

Isolation from the surrounding world, social and sexual deprivation, lack of deteriorating technical influences and long lasting activity at the South Pole region in a monotonous environment provides a unique possibility to study reactions of functional systems of human organism to color spectra. Experimental participants were 29 Ukrainian men of ages between 25 and 50 years having worked at the Ukrainian Antarctic Research Station named „Academic Vernadsky” (Vernadsky - 65°14'43"S; 64°15'24"W) during the studied two years (14 of them had their first year, 15 people of them had their second year at the Antarctic) and 12 Polish men

spending the winter at the Polish Antarctic Station „Arctowski”. The functional state of the organism has been tested by electrocardiography, electroencephalography, thermometry, spirometry, rhythmcardiography and tensiometry. As psychophysiological tests the following were used [19] tests (general feeling, activity, mood), and a computer aided test package evaluating psychomotoric functions and indicators of mental ability to work with the system „Prognoz” (Prediction) [29].

Ages of experimental persons were 30, 40, 43 respectively. Gender: male. States: „ Antarctic syndrome” - desynchronization, sleep disorder, headache, heart rhythm disturbances, depression, lack of color stimuli during the period of Antarctic winter.

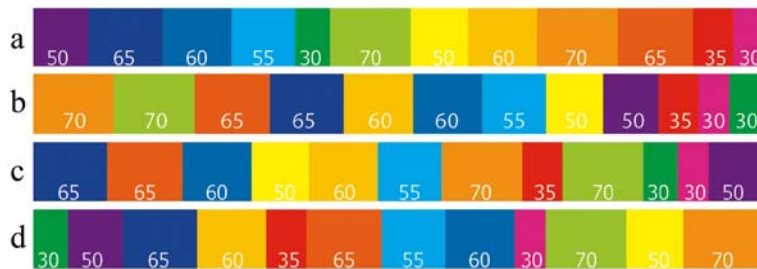


Fig. 8

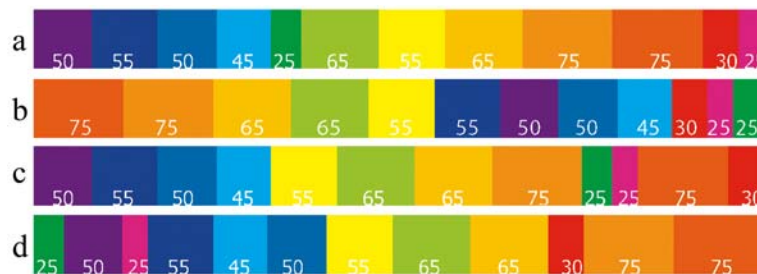


Fig. 9

Fig. 8, 9 show color preferences of the ages of experimental persons in the color preference scale system of Dr. Nemcsics (36)

a) according to time gradation order of spectrum colors

b) according to % proportion of the color preference of the person in ascending order .

Color preference of the experimental person before **(c)** and after **(d)** the color relaxation treatment.

Fig. 8, age: 30 years, state: headache, depression.

Fig. 9, age: 40 years, state: depressive tension.

7 Conclusion

By application of polychromatic color dynamics tables it has been possible for the 85 % of winter inhabitants to normalize blood circulation parameters, to stabilize psychophysiological characteristics, to reach a relaxation effect; at the end of treatments patients sometimes have fallen asleep even. During the research in certain cases the relaxation effect has been not so explicit probably because there was not only the effect of the psycho-emotional state before treatment but the activity of regional environmental factors (meteorological, helio-physical factors) and the specific sensitivity of the organism related to these factors have also contributed to. Experiencing the polychromatic color dynamics tables during the winter period, while psycho-physiological states of the participants were varied, has produced usually a relaxing effect, see [27].

Preferential an adaptation research of the effect of colors exerted on humans, considering the ecological cleanness and the lack of detrimental technical factors has allowed to use the color preference index system of Dr. Nemicsics as an etalon when evaluating color preference and color relaxation results of different human states and circumstances, and, using the color dynamics picture charts, to create an adaptive color medium with positive, evident and measurable effects, which has proven its useful role during numerous years in balancing the human psychoemotional and psychophysiological states in cases of extreme circumstances, depression and computer induced fatigue.

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