International Journal of Economics and Business Administration
Vol. 3, No. 5, 2017, pp. 45-54
http://www.aiscience.org/journal/ijeba
ISSN: 2381-7356 (Print); ISSN: 2381-7364 (Online)

Understanding the Effects of Spatial Colors on Perceptions of a Hotel Room from a Cultural Perspective

Katja Siamionava[1], Lisa Slevitch[1], Tilanka Chandrasekera[2, *]

[1]School of Hospitality and Tourism Management, Oklahoma State University, Stillwater, USA
[2]Department of Design, Housing and Merchandising, Oklahoma State University, Stillwater, USA

Abstract

Color is one of the most important visual dimensions of the environment as it impacts behaviors and emotions. Additionally, perceptions of color are influenced by cultural backgrounds. The emotional effect of color is particularly important in the hospitality industry because emotions comprise a strong affective component of customer satisfaction. However, no empirical research exists on the role of color in shaping hotel guests' perceptions from a multicultural perspective. The purpose of the current study was to understand the relationship between color attributes and the perception of colors in the hotel room through cultural differences between Eastern and Western cultures. A quasi-experimental factorial study was conducted. Participants were randomly assigned to one of eight 3D models of a hotel room viewed using Virtual Reality Head-Mounted Displays. Data on participants' color perceptions were collected using a survey. The results showed differences in perceptions of color between Western and Eastern cultures. The Eastern culture group had a higher arousal level in the low brightness settings than the Western culture group. Thus, it can be concluded that representatives of the Eastern culture are more sensitive to the brightness of the color than the Western culture group.

Keywords

Hospitality, Virtual Reality, Colour Perception

Received: August 17, 2017 / Accepted: October 9, 2017 / Published online: November 1, 2017

1. Introduction

The color-in-context theory states that effects of color on emotions and behavior are non-conscious and are both biological and culturally learned (Elliot & Maier, 2012). Those effects are primarily attributed to hue, lightness, and chroma: the three major components of color. Emotional responses such as arousal, pleasure, and dominance were reported to be influenced by combinations of hue, saturation, and brightness (Valdez & Mehrabian, 1994). As one of the most important visual dimensions of the environment (Kotler, 1973), color was examined in a variety of settings such as stores, malls, restaurants, offices, and hospitals (Chebat & Morrin, 2007; Dijkstra, Pieterse, & Pruyn, 2008; Kuller, Mikelllides, & Janssens, 2009; Kwallek, Woodson, Lewis & Sales, 1997; Yildirim, Akalin-Baskaya, & Hidayetoglu, 2007). However, little empirical evidence on the influence of color on hotel environment perceptions has been presented (Countryman & Jang, 2006). Among the few existing attempts, most noteworthy were studies by Countryman and Jang (2006) who showed that color had the most significant impact on perception of ambience in a hotel lobby and by Lin (2009) who reported the relationship between color and customer satisfaction was fulfilled through the moderating role of emotions. It should be noted that previous color related research in the hospitality industry has

* Corresponding author
E-mail address: tilanka@okstate.edu (T. Chandrasekera)

been limited to the analysis of color hue and did not include other color attributes such as brightness and saturation (Bogicevic, Bujisic, Choi, Smith, & Li, 2017; Countryman & Jang, 2006; Lin, 2009; Valdez & Mehrabian, 1994).

Emotional response to colors also appears to be influenced by culture due to learned culture specific color associations as was reported by Adams and Osgood (1973), Chebat and Morrin (2007), and Tofle, Schwartz, Yoon, Max-Royale and Des (2004). However, no empirical evidence has been reported on the effects of color and culture in hotel settings. At the same time hotels are places where travelers from different countries stay on a consistent basis, especially in large tourist hubs. Travelers' cultural color associations may impact their hotel perceptions and produce positive or negative experiences. Therefore, it seems important to examine the effects of the three major color components from a cultural perspective and examine how they impact perceptions of a hotel room.

The purpose of the current study was to evaluate the relationships between attributes of spatial colors and guests' perceptions of the hotel room's colors from a cultural perspective. In contrast to the previous color research, color saturation, lightness (brightness), and hue (chroma) were examined. Based on the PAD-scale, three measures of emotional outcomes related to color were pleasure, arousal, and dominance (Mehrabian & Russel, 1974). Significance of this study is two-fold. From a theoretical perspective, the effects of culture and color are examined from a more comprehensive perspective, including all three major components of color. Additionally, to assess participants' emotional response to color attributes, 3D models of hotel rooms with manipulated colors were used along with the use of Oculus Head Mounted Displays (HMD), which allowed the increased level of control over external factors and higher reliability in comparison with the previous studies. From practical perspective, understanding effects of color attributes from a cultural perspective will help hotel managers and designers to enhance hotel guests' experiences through improving the hotel's ambience and, thus, guests' emotional state.

2. Literature Review

Color is a major element of the visual dimension, one of the four major dimensions of the spatial environment that have the most significant influence on an individual along with aural (volume), olfactory (scent), and tactile (softness) dimensions (Kotler, 1973). The LHS model, the most frequently used framework, examines color in terms of its lightness (brightness), hue, and saturation. Hue is attributed to the wavelength of color and essentially is what people usually refer to as color. Saturation, also known as chroma, refers to the intensity of the hue in terms of how different it is from gray (Lewkowitz & Herman, 1993. Lightness/brightness refers to the "white-to-black quality of a color" or the value that is defined as a relative darkness or lightness of a hue (Elliot & Maier, 2012).

Color-related research has been recently systematized within one unifying color-in-context theory explaining all previous research on the topic. Color-in-context theory by Elliot and Maier (2012) provides a broad model which explains color perception and its influence on behavior and the physical state of a person. The theory is based on the premise that each color is associated with some meaning and that people obtain color associations in two major ways: by learning or as a part of the biological "heritage." According to the color-context theory, the response to color is always non-conscious, which means that a person cannot control the emotional and physiological effects of color. Similarly, Elliot and Maier (2012) recognize the existence of reciprocal relations between color perception, behavior, and cognition.

Additionally, color-in-context theory states that emotional reactions to colors may be influenced by the cultural environment when a person learns some culture-specific color association. A number of researchers emphasize a significant role of cultural factors on differences in color perceptions (Adams & Osgood, 1973; Chebat & Morrin, 2007; Tofle et al., 2004). For example, some colors may be disapproved of in some nations because they represent a traditional color of mourning (Adams & Osgood, 1973; Winick, 1963). An example of this is purple and white are traditional mourning colors in some of Asian countries (Winick, 1963). The color that is most commonly disapproved by the majority of nations is black, and a color that is never disapproved of is blue (Winick, 1963). Choungourian (1968) provides evidence that nations exhibit different color preferences. The research on color preferences of 160 undergraduate students from the USA, Lebanon, Iran, and Kuwait showed that red and blue are highly preferred by the US students but were not ranked high by responders from other countries (Choungourian, 1968). At the same time, green was the most preferred color for students from Iran and Kuwait and least preferred by the US responders (Choungourian, 1968). In addition, cross-cultural differences in color associations with such emotions as anger, envy, fear, and jealousy in Germany, Mexico, Russia, and Poland also point to differences among countries. Although the chosen nations shared common associations with jealousy (red) and anger (black), significant differences were found with regard to envy and fear (Ralph, Zaleski, Otto, Reidl, & Tarabrina, 1997). For example, Russians and Germans associated envy with yellow, while the Americans associated it with green

and Mexicans and Poles related envy to purple (Ralph et al., 1997). Furthermore, Ralph et al. (1997) stated that language, mythology, and literature are primary sources of color-emotion similarities and differences (Ralph et al., 1997). Adams and Osgood (1973) showed some cross-cultural similarities in color-meaning associations in their study of 23 teenage male groups in 20 countries. For instance, black was commonly referred as bad, strong and passive; yellow as weak; and blue and green as good (Adams & Osgood, 1973; Tanaka, Oyama, & Osgood, 1963).

Madden, Hewett and Roth (2000) analyzed differences in color perception of 10 colors among 253 undergraduate students representing four cultures (Europe, East Asia, South America, and North America) and indicated no significant differences in color associations for black, red, green, and white. However, significant differences in color preference among cultures were found for blue, brown, gold, orange, purple, and yellow. In general, blue was the most preferred color among all four cultures. Representatives of all analyzed cultures tended to cluster green, blue, and white together assigning to them similar meanings related to peace and calmness. Black and brown were commonly associated with sadness among all cultures and sometimes with masculinity (USA, Austria, Hong Kong). Red color had several differences in meaning across the cultures. The most common association with red was as a hot and active color.

Sakamoto (2013), analyzed differences in color preferences between Eastern and Western cultures, and indicated no significant differences in color preferences between the two cultures. However, Eastern culture representatives showed an important preference toward the black color in products, while Western culture countries had multiple popular colors for products (black, yellow, red, and blue). The literature on cross-cultural differences in color perceptions is to some extent contradictive and further research on this topic is required. A summary of findings regarding color emotion associations is presented in Table 1.

Table 1. The summary of the findings on color associations among cultures.

Meaning	Color	Authors
Peace and calmness	Blue, Green, White	Madden, Hewett, and Roth (2000).
Most preferred	Blue, Black (products), Green	Choungourian (1968); Sakamoto (2013) Madden, Hewett, and Roth (2000).
Sadness	Brown, Black	Madden, Hewett, and Roth (2000).
Death	Purple, White, Black	Winick (1963).
Activity	Red	Madden, Hewett, and Roth (2000).
Jealousy	Red	Ralph, Zaleski, Otto, Reidl, and Tarabrina (1997)
Anger	Black	Ralph, Zaleski, Otto, Reidl, and Tarabrina (1997)
Envy	Yellow, Purple	Ralph, Zaleski, Otto, Reidl, and Tarabrina (1997)
Weak	Yellow	Adams and Osgood (1973)
Strong	Black	Adams and Osgood (1973)

Based on the discussed literature review, the following hypotheses were developed.

H1a: There will be a difference in pleasure levels for Eastern and Western culture groups exposed to hotel rooms with red and blue hue.

H1b: There will be a difference in arousal levels for Eastern and Western culture groups exposed to hotel rooms with red and blue hues.

H1c: There will be a difference in dominance levels for Eastern and Western culture groups exposed to the hotel rooms with red and blue hues.

H2a: There will be a difference in pleasure levels for Eastern and Western culture groups exposed to the hotel rooms with different levels of saturation.

H2b: There will be a difference in arousal levels for Eastern and Western culture groups exposed to the hotel rooms with different levels of saturation.

H2c: There will be a difference in dominance levels for Eastern and Western culture groups exposed to the hotel rooms with different levels of saturation.

H3a: There will be a difference in pleasure levels for Eastern and Western culture groups exposed to the hotel rooms with different levels of brightness.

H3b: There will be a difference in arousal levels for Eastern and Western culture groups in the hotel rooms with different levels of brightness.

H3c: There will be a difference in dominance levels for Eastern and Western culture groups exposed to the hotel rooms with different levels of brightness.

3. Methods

Research Design

Quasi-experimental design was used to collect data in the current study. The goal of the experiment was to assess the impact of color attributes (saturation, brightness, and hue) of the wall color of a hotel room on emotions (pleasure, arousal,

and dominance). Emotional response was measured in terms of pleasure, arousal, and dominance levels utilizing the PAD model (Mehrabian & Russel, 1974). Ethnicity information was collected to provide comparison of color perceptions between Eastern and Western cultures. The experiment also accounted for differences in demographic characteristics of participants in terms of gender, and age.

The Best Western Hotel Chain was used as a sample for hotel room wall color solutions. Two hues (blue and red) were selected based on Google search results for Best Western hotel room designs. Blue and red were found to be among popular colors used in Best Western hotels. These colors were also found to have strong contrasting effects in the previous literature, and thus were of high interest for research in the hospitality industry. Two levels of saturation and brightness were applied to blue and red hue samples obtained from the web search. Consequently, the experiment employed 2x2x2 design with two manipulated hues (red and blue) and two levels of saturation and brightness (high, low).

The current study overcomes the common lack of control of environmental factors by means of the VR technology. In particular, participants were exposed to one of eight 3D hotel room models using Oculus HMDs. Each model had either a blue or red hue, high or low level brightness, and high or low level of saturation assigned to it. The use of Oculus HMDs helped to implement better control over such environmental factors as the illumination of the room and positioning of the elements of the room's interior.

The experiment consisted of the following procedures. First, upon arrival to the experiment lab, participants were asked to read and sign the consent form to indicate their participation in the study. Participants then completed Part 1 of the paper-based survey which contained questions regarding demographic information such as age, gender, ethnicity, etc. Participants were then randomly assigned to one of the eight experimental conditions (virtual models of a hotel room with two hues of wall colors manipulated, two levels of saturation, and two levels of brightness). All participants were properly trained to use Oculus HMD according to official product instructions. Upon completion of the training, subjects were randomly assigned to a 3D hotel room with one of the manipulated color conditions for three minutes.

The time frame for the experiment was determined during the pilot study. Three minutes was the average amount of time pilot study participants needed to form their impression about the model of the room and its colors. No vision calibration equipment was used, but participants with impaired vision were allowed to wear glasses together with the Oculus HMD. After the end of the experiment, participants were asked to complete Part 2 of the survey, which measured their emotional response to colors. The entire experiment process lasted on average 15 minutes.

Sampling

The sample size included 141 participants. Following Cohen (1988), using power of .95, the minimum sample size was determined as 131, thus the obtained number of respondents deemed appropriate. A two-stage sampling strategy was used in the study. First, the convenience sampling took place. Professors and students, their friends and family from a Midwestern university were contacted in person and invited to participate in the study. Written consent was explained from participants prior to the experiment. All participants were included in a lottery with a chance to win one of eight Visa $50 Gift Cards. During the second stage, randomized assignment of treatments was used.

Instrument

The paper-based survey included two main parts. Part 1 of the survey consisted of questions about the participant's demographic information. Participant's ethnicity information was obtained to measure the differences in color perception among subjects from Eastern and Western cultures. Part 2 of the survey was aimed at measuring participants' perceptions of colors Emotional response to the hotel room's color was measured using the PAD scale (Mehrabian & Russel, 1974). The validity and reliability of the scale has been proven across multiple studies (Bellizzi & Hite, 1992; Bradley & Lang, 1994; Chebat & Morrin, 2007; Donovan & Rossiter, 1982; Valdez & Mehrabian, 1994). The 18 dichotomous adjectives scales for the PAD model were adopted from Bradley and Lang (1994) with adjustments offered by Donovan and Rossiter (1982). The scales measured current emotional response to a color in terms of "After looking at the color scheme in the hotel room I feel..." and included the following adjective pairs: 1) pleasure related adjective pairs: unhappy-happy; annoyed-pleased; unsatisfied-satisfied; depressed-contented; despairing-hopeful; bored-relaxed; 2) arousal adjective pairs: relaxed-stimulated; calm-excited; sluggish-frenzied; dull-jittery; sleepy-awake; unaroused-aroused; and 3) dominance related adjective pairs: controlled-controlling; influenced-influential; cared for-in control; insignificant-important; submissive-dominant; restricted-free (Bradley & Lang, 1994; Donovan & Rossiter, 1982). A 7- point Likert scale ranging from one to seven was used to evaluate each bipolar pair (Park & Farr, 2007).

3D models of the hotel room

The 3D model of the hotel room was used for color manipulations. Participants were immersed in the room environment using Oculus HMD. Virtual Reality technology allowed both changing characteristics of the virtual

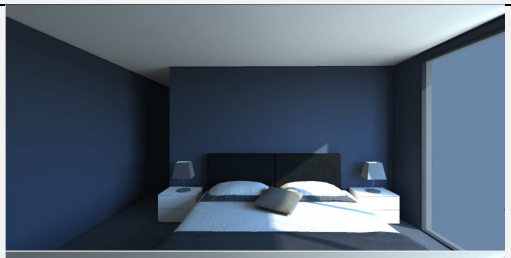
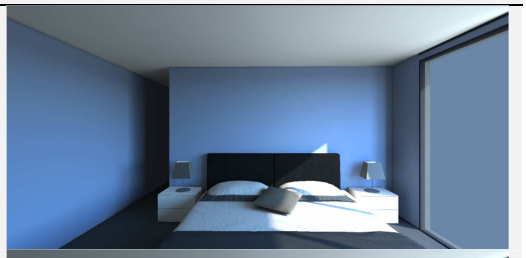
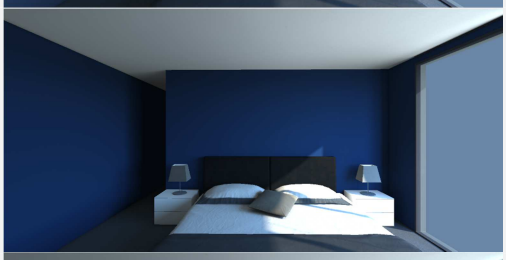
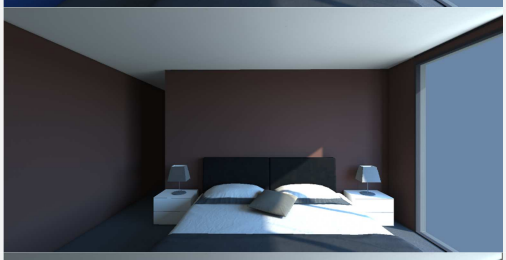
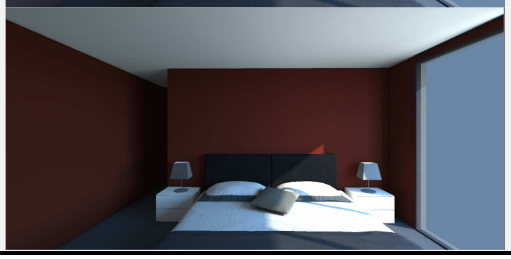
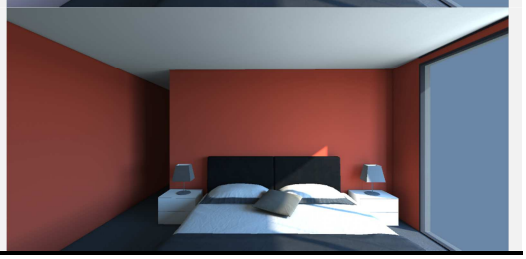
environment easily, as well as fully immersed individuals in a virtual environment. Hence, it reduced the number of external factors that could influence a respondent's emotional state or perception of a color and made the measurement of color perception much more accurate than in the previous studies.

The model of the virtual hotel room was developed using Unity software (Unity 5.4.0 Beta 9). The room consisted of the basic attributes of a typical hotel room: a bed, bedside table with a lamp, closet and an armchair. An image of the basic model of the hotel room is presented in the Figure 1.

Figure 1. The basic 3D model of the hotel room

Finally, eight color conditions were created using average Best Western color parameters and were then applied as wall textures to the basic 3D model of the hotel room. Table 2 contains the screenshots of the eight color conditions applied to the 3D model rooms. The light condition was fixed at the same level in all eight cases.

Table 2. Screenshots of the 3D model environments with color treatments applied.

Color Code	Room Picture	Color Code	Room Picture
BLL		BLH	
BHL		BHH	
RLL		RLH	
RHL		RHH	

Data analysis

The measures of pleasure, arousal, and dominance were the dependent variables, and the measures of the saturation, brightness, hue, and culture were independent variables. ANOVA was conducted to test the hypotheses. Descriptive statistics were calculated for demographic information.

4. Results

Descriptive statistics

In total, 141 responses were obtained and 139 of them were usable. The sample was balanced gender-wise with 76 females (54%) and 63 males (46%). Age distribution was skewed toward younger ages. Approximately 20% of the participants were below 20 years old, 52% were between 20 and 25 years old, 15% were between 25 and 30, 10% were between 30 and 35, and 14% were above 35 years old. With regard to ethnicity, the majority, 84 of the participants (61%), were Caucasian, 28 were Asian (20%), 10 participants identified themselves as Latino/Hispanic (7%), six were Black or African Americans (4%), three were Native American or Alaska Native group (2%), and eight participants identified themselves as another ethnic group (6%). For the purpose of hypothesis testing, participants were broken down into two major groups based on their ethnicity as either representatives of Eastern or Western cultures. The Western culture group (68.8%) included all participants from Europe and America (Greece, Montenegro, Germany, USA, Mexico, Belarus, Ukraine, Russia, Turkey), while the Eastern culture group (20.3%) included participants from Asian countries and the Middle East (India, China, Bangladesh, South Korea, Japan, Pakistan, Saudi Arabia). The remainder of participants were also included in the analysis as the third Other group, 10.9% (Ghana, Libya, Egypt, Madagascar, and participants that described their ethnicity as a mix of other ethnic groups).

Hypothesis testing

The normality assumption was tested for the dependent variables of pleasure, arousal, and dominance to assure that the data met ANOVA assumptions. Anderson-Darling's A-Sq statistic (A-sq=1.92, p-value=0.005) and Kolmogorov-Smirnov's D (D=0.10 p-value=0.01) statistic for the normality test for the pleasure data were significant at the 5% level, indicating pleasure scores were not normally distributed. With regard to arousal scores, Anderson-Darling's A-Sq (A-Sq=0.54) and Kolmogorov-Smirnov's D-statistic (D=0.98) for normality tests were not significant at the 5% level, thus arousal data distribution was not significantly different from the normal distribution. Finally, dominance scores were tested for normality. Anderson-Darling's A-Sq (A-Sq=0.33, p-value=0.25) and Kolmogorov-Smirnov's D-statistic (D=0.05; p-value=0.15) for normality test were not significant at the 5% level, thus dominance scores were normally distributed. ANOVA was used in the study to test the hypotheses for arousal and dominance levels, while the non-parametric alternative tests Kruskal-Wallis and Wilcoxon test were used to test hypotheses analyzing the pleasure levels. Though some of the study results were only significant at the 10% level, they still were acknowledged as marginally significant as was previously done in the studies on color effects by Bottomley and Doyle (2006) and Babin, Hardesty, and Suter (2003).

To test hypotheses 1a-c, ANOVA was conducted to identify possible differences in the perception of hue between cultures. The F-value for arousal in both blue and red treatment groups was small and not significant (Blue rooms: F=0.09, p-value= 0.91; Red rooms: F=0.6, p-value=0.55). Dominance scores, analyzed hue wise, did not show statistically significant differences (Blue rooms: F=0.15, p-value=0.86; Red rooms: F=1.5 p-value=0.23). No significant differences in pleasure levels between blue and red treatments were found (Blue rooms: Chi-Square=2.70, p-value=0.25; Red rooms: Chi-Square=1.62, p-value=0.44). Thus, Hypotheses 1a-c were not supported.

Cultural differences in the perception of hotel room colors with high and low saturation levels, as well as in the rooms with high and low brightness levels were tested. No significant differences in pleasure levels were found among cultures within the low and high brightness treatment groups (Low brightness: Chi-square=2.19, p-value=0.33; High brightness: Chi-Square=0.27, p-value=0.87). At the same time, marginally significant differences in pleasure levels were found among culture groups within color treatments with a low level of saturation (see Tables 3 and 4). The Chi-square value for conditions with a low saturation level was equal to 5.39 and marginally significant at 10% level (p-value=0.06). The Chi-square value among conditions with a high saturation level was equal to 0.62 and was not significant (p-value= 0.73). Consequently, Hypothesis 2a was supported and Hypothesis 3a was not supported.

Table 3. Kruskal-Wallis test results for cultural differences in pleasure scores for high saturation level.

Culture	N	SS	Expected SS	Chi-Square	*P*
Eastern	9	313.00	207.50	0.62	0.73
Western	53	1828.50	1828.50		
Other	6	170.50	207.00		

Table 4. Kruskal-Wallis test results for cultural differences in pleasure scores for low saturation level.

Culture	N	SS	Expected SS	Chi-Square	*P*
Eastern	19	596.00	674.50	5.39	0.06
Western	44	1526.00	248.50		
Other	7	363.00	1562.00		

The distribution of pleasure scores among Eastern (1), Western (2) and Other (3) cultures for the group of treatments with low saturation is presented in Figure 2. The Other group (3) had a significantly higher mean value for pleasure scores. Further analysis of the differences in pleasure levels among cultures included in the Other group should be made to investigate this finding in detail.

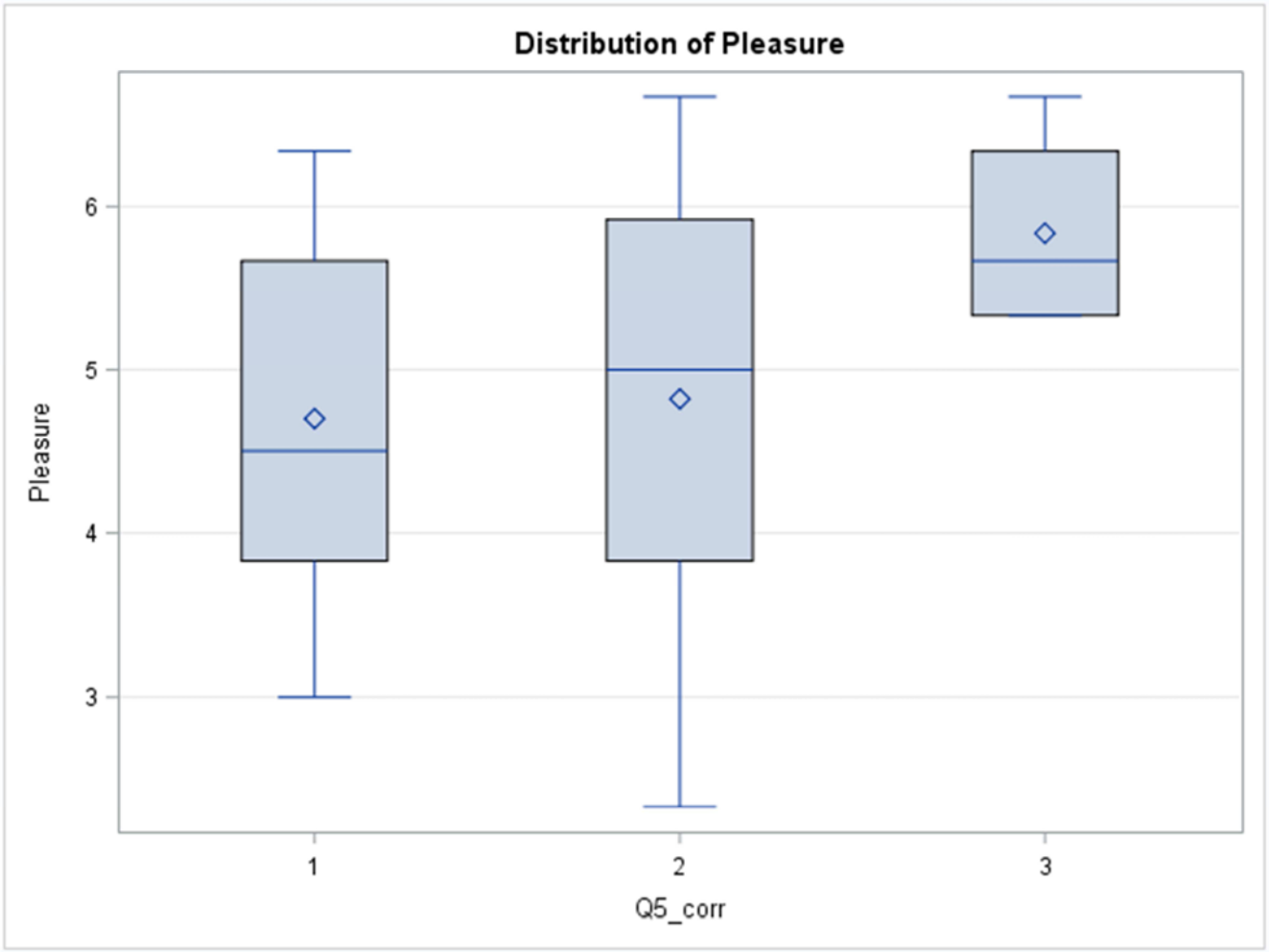


Figure 2. Distribution of pleasure scores among cultures in treatments with low saturation.

With regard to arousal, no differences among cultures were found within treatment groups with low and high saturation levels (Low saturation: F=0.21 p-value=0.80; High saturation: F=1.41 p-value=1.25). However, significant differences were found between Eastern and Western cultures in their arousal levels within treatments with low brightness levels (Low brightness: F=3.32, p-value=0.04; High brightness: F=0.25, p-value=0.77). The ANOVA results for the differences in arousal levels within treatments with different levels of brightness are presented in Table 5 and Table 6.

Table 5. ANOVA results for differences among cultures in treatments with low level of brightness.

	Df	SS	MS	F	*P*
Between groups	2	7.48	3.74	3.32	0.04
Within groups	66	74.44	1.12		
Total	68	81.93			

Table 6. ANOVA results for differences among cultures in treatments with high brightness.

Source	*Df*	SS	MS	F	*P*
Between groups	2	0.60	0.30	0.25	0.77
Within groups	66	79.14	1.19		
Total	68	79.75			

The Tukey procedure indicated the Eastern culture group demonstrated a higher level of arousal when exposed to low brightness colors in hotel rooms than representatives of the Western culture group; however, the result was marginally significant (at the 10% level). This finding can also be visually illustrated in Figure 3, which shows the Eastern culture group (1) had the highest arousal level in high brightness settings, while the Western culture group had the lowest mean arousal score (2). Consequently, Hypothesis 2b was not supported and Hypothesis 3b was supported.

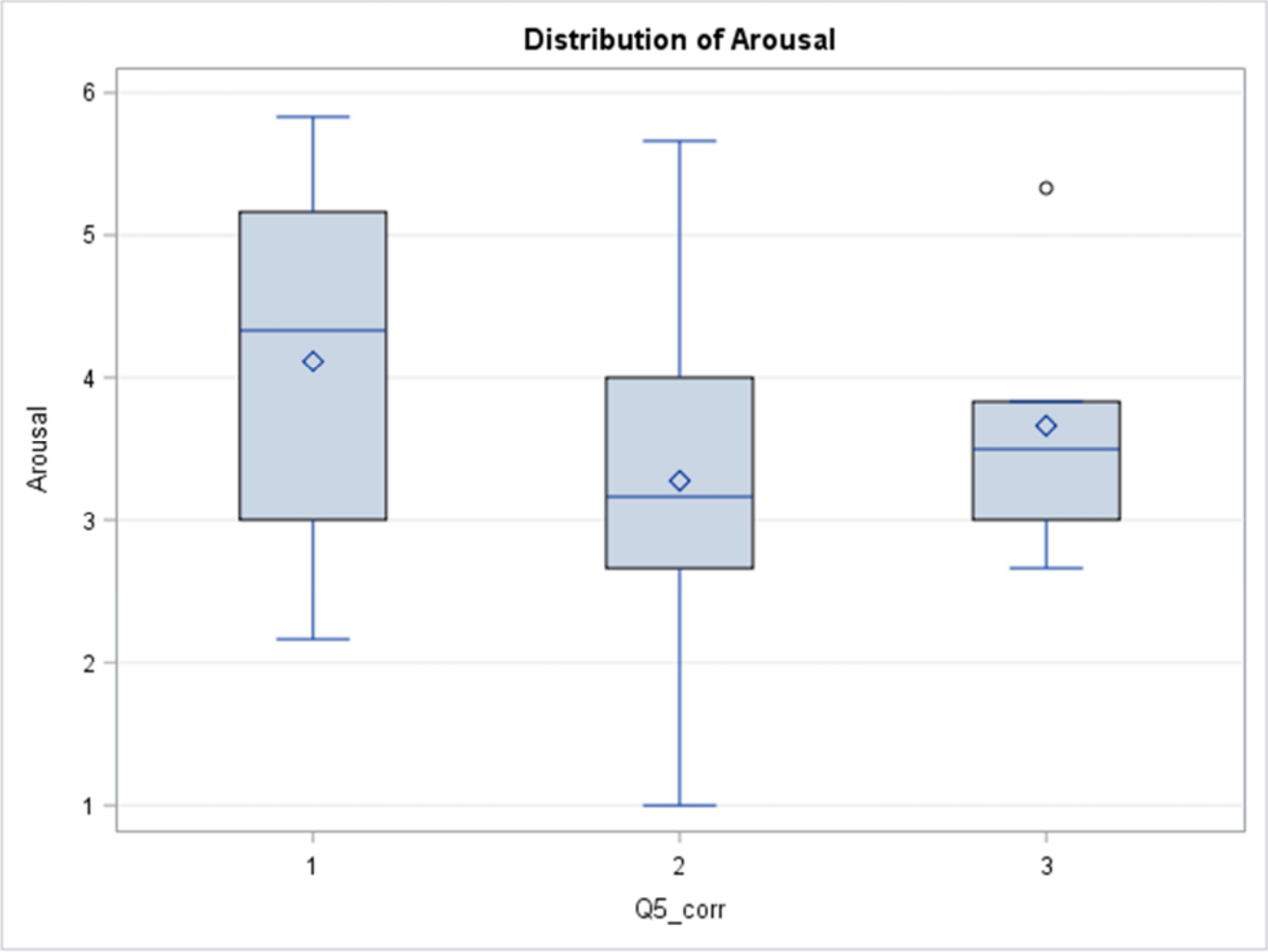


Figure 3. Differences in the response to colors with low brightness levels among Eastern (1), Western (2), and Other (3) cultures

Finally, dominance scores were not significantly different among cultures for both the treatments with a high and low saturation (Low saturation: F=0.49, p-value=0.61; High saturation: F=0.93, p-value=0.40) and for treatments with a high and low brightness (Low brightness: F=0.52, p-value=0.59; high brightness: F=0.54, p-value=0.58). Thus, hypotheses 2c and 3c were not supported.

The summary of results of the study is presented in Table 7.

Table 7. Summary of the results of the study.

Hue		Saturation		Brightness		Results
Blue	Red	Low	High	Low	High	
						The Eastern culture group had a higher arousal level than the Western Culture group in the treatments with low brightness levels. Other group (including participants from Africa and mixed ethnicities) had a significantly higher pleasure level than participants from Eastern and Western cultures in low saturation treatments.

5. Discussion and Applications

Eight color comparisons with two hues (blue and red) and two levels for saturation and brightness were analyzed from a cultural perspective in the current study. The results show no differences among cultures with regard to the emotional effect of a hue. At the same time, the Other group (including participants from Africa and of mixed ethnicities) had

significantly higher pleasure levels than participants from Eastern and Western cultures in the low saturation color treatments. These differences in the perception of low saturated colors among participants of the Other group might imply that participants from the African culture and people of the mixed ethnicities find low saturation environments as more pleasant. This result should be investigated in future studies. Additionally, significant differences between Western and Eastern cultures were found in low brightness environments with regard to arousal levels. The Eastern culture group had significantly higher arousal levels in the low brightness settings in comparison to the Western culture group. In other words, participants of the Eastern culture were more sensitive to the brightness of the color than representatives of the Western culture. This finding might also suggest colors with low brightness levels are associated with high arousal in the Eastern culture.

The findings of this study have several managerial implications. Hotels located in Eastern countries should take into consideration the region-specific arousing quality of colors with low brightness. Additionally, low saturation conditions should be avoided as those produce less pleasing reactions that vary across cultures. By introducing hues with levels of saturation and brightness found to be less arousing and more pleasant in this study, hotel chains can influence the emotional component of satisfaction, contributing to an increase in the overall satisfaction with a hotel stay. Also, the use of blue colors in hotel rooms will appeal to color preferences of a large group of customers and may lead to more enjoyable hotel stay experiences for multiple reasons. In particular, participants considered blue rooms to be more pleasant than red hotel rooms. The relaxing effect of blue colors should be investigated in greater detail by hotels because a relaxing environment is one of the crucial functions of a hotel room. In general, hotels are recommended to collect information about the color preferences of their guests. Hotels can then use this information to either try to assign guests to hotel rooms that match with their color preferences or hotels can add decorative elements of guests' favorite colors to the rooms.

6. Limitations

Limitations of the study are related to the fact that only two hues from those used in the Best Western hotels were analyzed (red and blue). Also color treatments were assigned without consideration of the culture and color preferences and the distribution of treatments within these groups was unequal. Thus, comparisons of the emotional response between these groups might be biased. Additionally, the sample size was not large enough to compare pleasure, arousal, and emotional response within cultures among eight treatments. Instead the treatments were grouped in two groups based on hue, levels of saturation and brightness and tested for differences in each of these sets respectively.

References

[1] Adams, F. M., & Osgood, C. E. (1973). A cross-cultural study of the effective meanings of color. *Journal of Cross-Cultural Psychology, 4,* 135-156. doi: 10.1177/002202217300400201.

[2] Babin, B. J., Hardesty, D. M., & Suter, T. A. (2003). Color and shopping intentions: The intervening effect of price fairness and perceived affect. *Journal of Business Research*, *56*(7), 541-551.

[3] Bogicevic, V., Bujisic, M., Choi, H., Smith, S., & Li, I. (2017). Impact of Computer-Generated Images on LODGSCAPE Perceptions and Visit Intentions, *Journal of Hospitality Marketing & Management, 26* (4), 416-442.

[4] Bellizzi, J. A., & Hite, R. E. (1992). Environmental color, consumer feelings, and purchase likelihood. Psychology & marketing, 9(5), 347-363.

[5] Bradley, M., & Lang, P. J. (1994). Measuring emotion: The self-assessment manikin and the semantic differential, *Journal of Behavior Therapy and Experimental Psychiatry*, *25* (1), 49–59. doi: 10.1016/0005-7916(94)90063-9

[6] Bottomley, P. A., & Doyle, J. R. (2006). The interactive effects of colors and products on perceptions of brand logo appropriateness. *Marketing Theory*, *6*(1), 63-83.

[7] Chebat, J. C., & Morrin, M. (2007). Colors and cultures: Exploring the effects of mall décor on consumer perceptions, *Journal of Business Research*, *60*, 189-196. doi: 10.1016/j.jbusres.2006.11.003

[8] Choungourian, A. (1968). Color preferences and cultural variation. *Perceptual and Motor Skills, 26*(3), 1203-1206. Retrieved from http://www.amsciepub.com/doi/pdf/10.2466/pms.1968.26.3c.1203

[9] Cohen, J. (1988). Statistical power analysis for the behavioral sciences. Hilsdale. *NJ: Lawrence Earlbaum Associates*, *2*.

[10] Countryman, C. C. & S Jang, S. (2006). The effects of atmospheric elements on customer impression: the case of hotel lobbies. *International Journal of Contemporary Hospitality Management*, *18* (7), 534 – 545. Retrieved from http://dx.doi.org/10.1108/09596110610702968

[11] Dijkstra, K., Pieterse, M. E., & Pruyn, A. Th. H. (2008). Individual differences in reactions towards color in simulated healthcare environments: The role of stimulus screening ability. *Journal of Environmental Psychology, 28,* 268–277. doi: 10.1016/j.jenvp.2008.02.007

[12] Donovan, R., & Rossiter, J. (1982). Store atmosphere: an environmental psychology approach. *Journal of retailing*, *58*, 34-57.

[13] Elliot, A. J., & Maier, M. A. (2012). Chapter two: Color-in-context theory. *Advances in Experimental Social Psychology, 45*, 61-125. Retrieved from http://dx.doi.org/10.1016/B978-0-12-394286-9.00002-0

[14] Kotler, P. (1973). Atmospherics as a marketing tool. *Journal of Retailing*, 49 (4), *48.* Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=4673250&site=ehost-live

[15] Kuller, R., Mikellides, B., & Janssens, J. (2009) Color, arousal, and performance: A comparison of three experiments. *Color Research & Application, 34* (2), 141–152. doi: 10.1002/col.20476

[16] Kwallek, N., Woodson, H., Lewis, C. M. & Sales, C. (1997). Impact of three interior color schemes on worker mood and performance relative to individual environmental sensitivity. *Color Research & Application, 22* (2), 121–132. doi: 10.1002/(SICI)1520-6378(199704)22:2<121::AID-COL7>3.0.CO;2-V

[17] Levkowitz, H., & Herman, G. T. (1993). GLHS: A generalized lightness, hue, and saturation color model. *CVGIP: Graphical Models and Image Processing*, *55* (4), 271-285.

[18] Lin, I. Y. (2009). The combined effect of color and music on customer satisfaction in hotel bars. *Journal of Hospitality Marketing & Management,* 19 (1), 22-37.

[19] Madden, T. J., Hewett, K., & Roth, M. S. (2000). Managing images in different cultures: A cross-national study of color meanings and preferences. *Journal of international marketing*, *8* (4), 90-107.

[20] Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. the MIT Press.

[21] Park, N. K., & Farr, C. A. (2007). The Effects of Lighting on Consumers' Emotions and Behavioral Intentions in a Retail Environment: A Cross‐Cultural Comparison. *Journal of Interior Design*, *33* (1), 17-32.

[22] Ralph B. H., Zaleski, Z., Otto, J., Reidl, L. & Tarabrina, N. V. (1997). The colors of anger, envy, fear, and jealousy: A

[23] Sakamoto, K. (2013). Difference in the Color Preference by a Geographical Factor. *World Academy of Science, Engineering and Technology, International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering, 7* (11), 2867-2871.

[24] Tanaka, Y., Oyama, T., & Osgood, C. E. (1963). A cross-culture and cross-concept study of the generality of semantic spaces. *Journal of Verbal Learning and Verbal Behavior*, 2 (5-6), 392-405. doi: 10.1016/S0022-5371(63)80040-7.

[25] Tofle, R. B., Schwarz, B., Yoon, S. Y., Max-Royale, A., & Des, M. E. (2004). Color In Healthcare Environments-A Research Report.

[26] Unity 5.4.0 Beta 9 (2016). [Computer software]. Retrieved from https://unity3d.com/unity/bet

[27] Valdez, P. & Mehrabian, A. (1994). Effects of color on emotions. *Journal of Experimental Psychology: General*, *123* (4), 394-409. doi: http://dx.doi.org/10.1037/0096-3445.123.4.394.

[28] Winick, C. (1963). Taboo and disapproved colors and symbols in various foreign countries. *Journal of Social Psychology*, *59*, 361-368. Retrieved from http://argo.library.okstate.edu/login?url=http://search.proquest.com/docview/60257574?accountid=4117.

[29] Yildirim, K., Akalin-Baskay, A., & Hidayetoglu, M. L. (2007). Effects of indoor color on mood and cognitive performance. *Building and Environment, 42*, 3233–3240. doi: 10.1016/j.buildenv.2006.07.037