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Introduction

At rst, the literature review of the subject, especially on the sense of relief induced by color temperature and its e ects on individuals was investigated through library resources. It is important to understand how our brains process and integrate multisensory information in order to achieve optimal performance. Since factors related to this subject were diverse and most of them were not directly related to the main purpose of the study, which is reducing energy use, only the aforementioned factors were investigated. en, using resources such as books, articles, theses, and websites, the history of this subject and the works of other authors were analyzed.

e subject was turned into a research through stating goals and proposing questions and hypotheses. Second, a questionnaire was set according to the lighting of a case on the exterior. e respondents were divided into two groups: the rst was an expert group which consisted of B.A. and M.A. students of architecture of Qom University; the second was a general group with ordinary respondents. en, the average of the scores of the questionnaire was calculated in such a way that 5 was for very warm, 4 for warm, 3 for average, 2 for cold, and 1 for very cold (Table 1). e color white with a temperature of 3500 K is known as cold white and the color white with a temperature of 2700 K is known as warm white. Colors below warm white are yellow, orange, and red; colors above cold white are blue and purple. Data analysis shows that the respondents have not paid attention to the lighting of buildings to warm colors throughout cold seasons. Furthermore, the respondents

areas with hot and dry weather. The application of cold colors in such areas can reduce the

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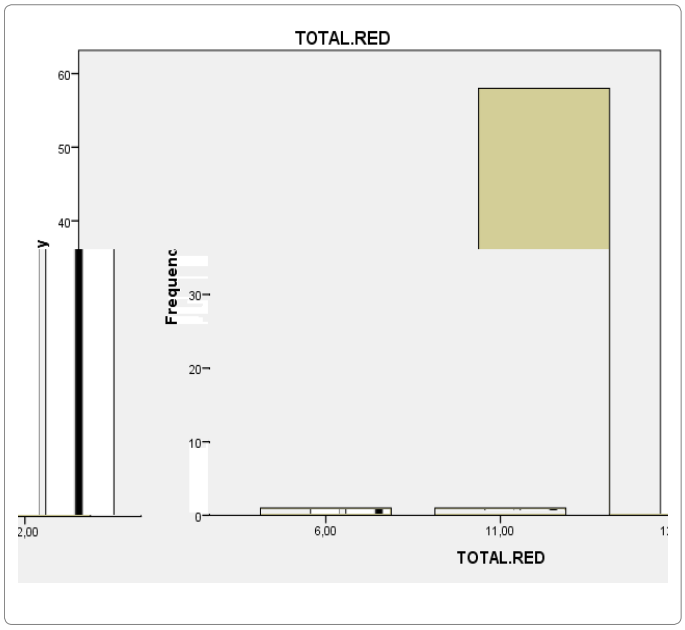

it as white because its surface re ects all visible wavelengths to our eye, and the visible wavelengths are present with almost equal proportions [4]. If we pick only one or a few visible wavelengths and ash them

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e correlations of the two groups of colors are also presented. e average age range of the ordinary respondents was between 25 and 45.

e respondents were from the city of Qom since the case study of the building is in that city. e expert respondents were also from B.A. and M.A. students of Qom Azad University, their ages ranged from 20 to 25. All had normal color vision [11,12].

Frequency analysis

According to Table 2 the whole statistical population of the study consists of 45 ordinary and 19 expert respondents.

Based on the study of the history of the subject, that the color red gives a feeling of warmth (from 1 to 5); this hypothesis is con rmed by the fact that most of the respondents scored it either 4 or 5 [13]. is can be seen in Table 3.

e colors yellow and orange with temperatures between 2000 and 4000 kelvin got scores of either 3 or 4 [14]. Considering Table 4 and the collected data, it shows that 24 pictures with yellow and orange colors and temperatures of 2000 to 4000 kelvin were scored 3 or 4 (Chart 2).

e color green with temperature between 2300 and 4300 kelvin got a score of 3. However, the results showed something di erent; the color was scored between 2 and 4, which means cold or warm. It is interesting to note that green is warmer than blue and colder than red (Table 5 and Chart 3).

e colors blue and indigo with temperatures between 4700 and 6000 kelvin got scores of either 1 or 2. Considering Table 6 and the collected data, the 28 pictures with blue and indigo colors and temperatures of 4700 to 6000 kelvin were scored 1 or 2 (Chart 4).

1	2	3	4	5	Score

Different lighting and color temperatures.

68	41	Ordinary Respondents
31	19	Expert Respondents
100	60	Overall

Data analysis.

4	2	11
96	58	12
100	60	Total

Statistical analysis.

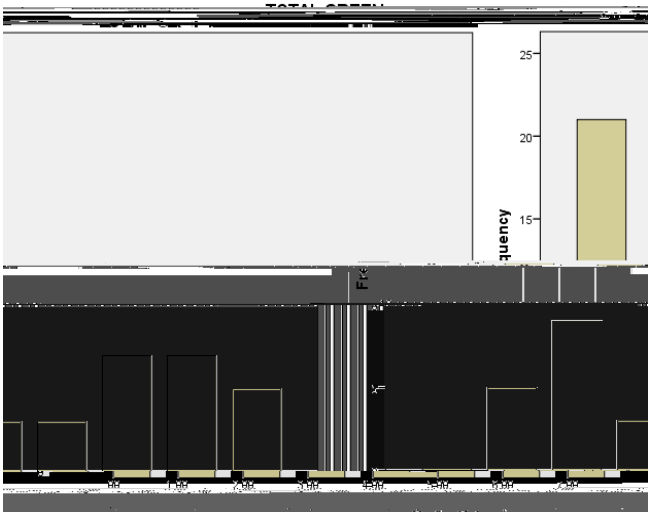
1	1	13
1	1	14
1	1	16
6	4	17
6	4	18
8	5	19
1	1	20
3	2	21
3	2	22
5	3	23
60	36	24
100	60	Overall

The frequency table of yellow and orange spectra.

Bar chart of frequencies of yellow and orange spectra.

35	21	0
8	5	1
15	9	2
5	3	3
5	3	4
11	7	5
11	7	6
8	5	7
100	60	Overall

The frequency table of green spectra.



Bar chart of lighting in green spectra.

e color purple with a temperature of 8000 kelvin received a score of 3 or 4. However, the results showed something di erent; the color was scored cold or very cold although the color has the highest temperature (Table 7 and Chart 5).

e mixed color, the pictures produced with the mixture of colors

in lighting, will be scored as medium. e ndings and analyses presented in Table 8 with 13 pictures con rm this prediction; a score of 3 was recorded (Chart 6).

T2-Sample test

Two independent groups were assigned using T2 test. Only in the color green is there a meaningful di erence between the opinion of the expert respondents and that of ordinary ones [15]. In other words, the experts, according to theories, had a more correct feeling toward the color than did the ordinary respondents. In other colors, however, no signi cant di erences were observed between the opinions of these groups (Table 9).

Correlation

e feelings acquired from the colors red, yellow, and orange have a correlation which is identi ed using the Pearson's Correlation Analysis [16]. e correlation between red and yellow-orange is meaningful on a scale of 0.01. No correlation is observed among other colors by the respondents. ere could be a possible correlation, but the respondents