

# **An experiment investigating the effects of retail greenery and lighting temperature in virtual reality fashion apparel stores**

**Ahmad Saquib Sina**

## **Introduction**

The main objectives of this study are to investigate (a) the effects of biophilic design, (b) lighting temperature (warm vs cool), and (c) four different stimuli, 2 Biophilic (biophilic vs non-biophilic) x 2 lighting temperature (warm vs. cool) on consumers' emotional states (pleasure, arousal), cognitive states (perceived store quality), satisfaction, and purchase intentions. This study will also analyze the mediating roles of emotional states (pleasure, arousal) and cognitive states (perceived store quality).

## **Literature review**

### **The application of retail greenery in biophilic design in the retail environment**

Traditional retail environments are filled with complex stimuli that directly attracts consumers' attention (Joye et al., 2010; Rosenbaum et al., 2018; Lee, 2019). These complex stimuli include so many product information so that they create high information overload. Consequently, high information overload increases cognitive dissonance, mental fatigue and negative WOM. Also, the overly complex environment causes unsatisfactory purchasing behavior, decreases trust and brand loyalty. On the other hand, the greenery application provides cognitively refreshing environment that stimulate consumers' favorable perceptions about the environment. The attention restoration theory (Kaplan, 1995) provides a significant background to understand this phenomenon. This theory states that exposing to the natural environment could recover mental fatigue, motivate effortless brain function, and enhance restoration potential.

### **The interaction effects of lighting and other environmental variables**

A synopsis of prior research suggests that lighting temperatures (warm or cool) have significant interaction effects with other environmental variables. For example, Yang (2015) investigated the interaction effects between lighting temperature and perceived complexity for a hotel guest room. Perceived complexity of the environment has been manipulated to low, medium, and high. As noted by Yang (2015), complexity refers to the number of units and the cohesion between the units. The complexity can be increased by decreasing the cohesion between units and enhancing the number of units. The Yang (2015) study found that warm light creates higher perceived service space and perceived value than cool light under low and high complexity conditions. Retailers can use the warm lighting to heighten perceived service space and perceived value, which in turn influences positive word of mouth and intention to revisit.

## **Hypotheses**

Based on the previous studies, it is apparent that lighting temperature and retail greenery are two important stimuli that will influence consumers' perceptions and responses. Based on the literature review and S-O-R framework, the hypotheses are

H1: Warm lighting produces higher (a) pleasure, (b) arousal, (c) perceived merchandise quality, (d) satisfaction, and (e) purchase intention than cool lighting

H3: Retail greenery produces higher (a) pleasure, (b) arousal, (c) perceived merchandise quality, (d) satisfaction, and (e) purchase intention than non-retail greenery

H4: There will be significant differences between lighting and retail greenery in biophilic design display methods (eight stimuli) on (a) pleasure, (b) arousal, (c) perceived merchandise quality, (d) satisfaction, and (e) purchase intention

H5: Shopping value (utilitarian vs hedonic) will moderate the relationship between lighting temperature and retail greenery in biophilic design on consumers' perceptions and responses

H6: (a) Pleasure, (b) arousal, and (c) perceived merchandise quality mediate the effects of lighting and retail greenery on (d) satisfaction, and (e) purchase intentions

## **Methodology**

### **Experimental design**

This study will conduct a 2(retail greenery in biophilic design vs non-greenery) x 2(lighting temperature: warm vs cool) experimental design. In this study, retail greenery in biophilic design is within-subjects design, while lighting temperature is between-subjects design. Therefore, four stimuli were developed to analyze this study. They were retail greenery-warm lighting, non-greenery-warm lighting, retail greenery-cool lighting, non-retail greenery-cool lighting. Retail greenery is within-subjects design because the Brengman et al. (2012) study also considered retail greenery as within-subjects design in their study. It also minimizes random noise, increases the power of the statistical analysis, and enhances the chances of discovering a true differences among the conditions (Nachimos, 2015). On the other hand, lighting temperature is considered as between-subjects design as it allows shorter sessions than within-subjects design. I used R and python programming for data analysis.

## Stimuli



*Figure one: Greenery in biophilic design and warm lighting*



*Figure 02: Non greenery and warm lighting*



*Figure 03: Greenery in biophilic design and cool lighting*

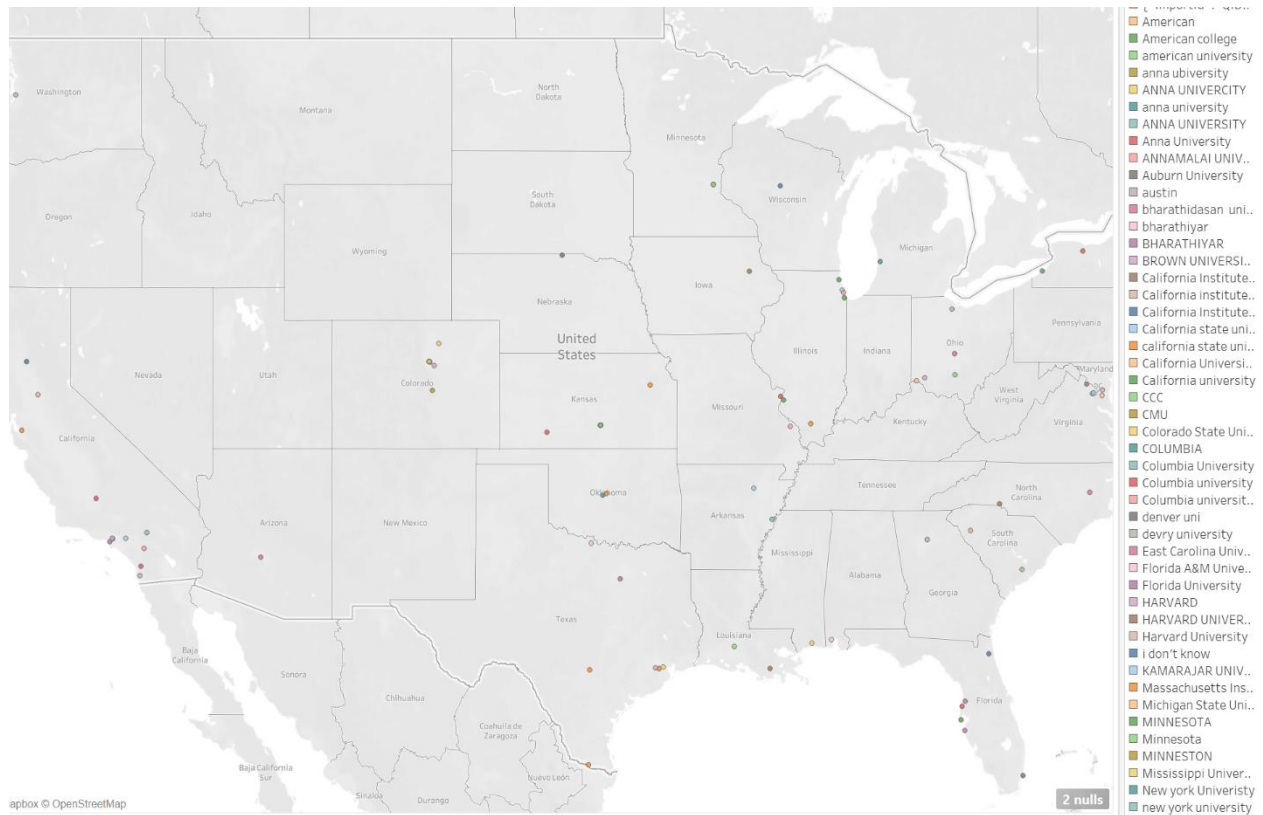


*Figure 04: Non Greenery and cool lighting*

## Results

### Descriptive statistics and demographic characteristics

A total of 295 female undergraduate students from various US universities are participated in the study. From them 144 students have been recruited from University of Minnesota. The remaining 151 students have been recruited through M-turk and they are also female undergraduate students from various US universities. They are from different background and subjects. The subjects and a map have been given





The different university name and subjects are also illustrated in the map

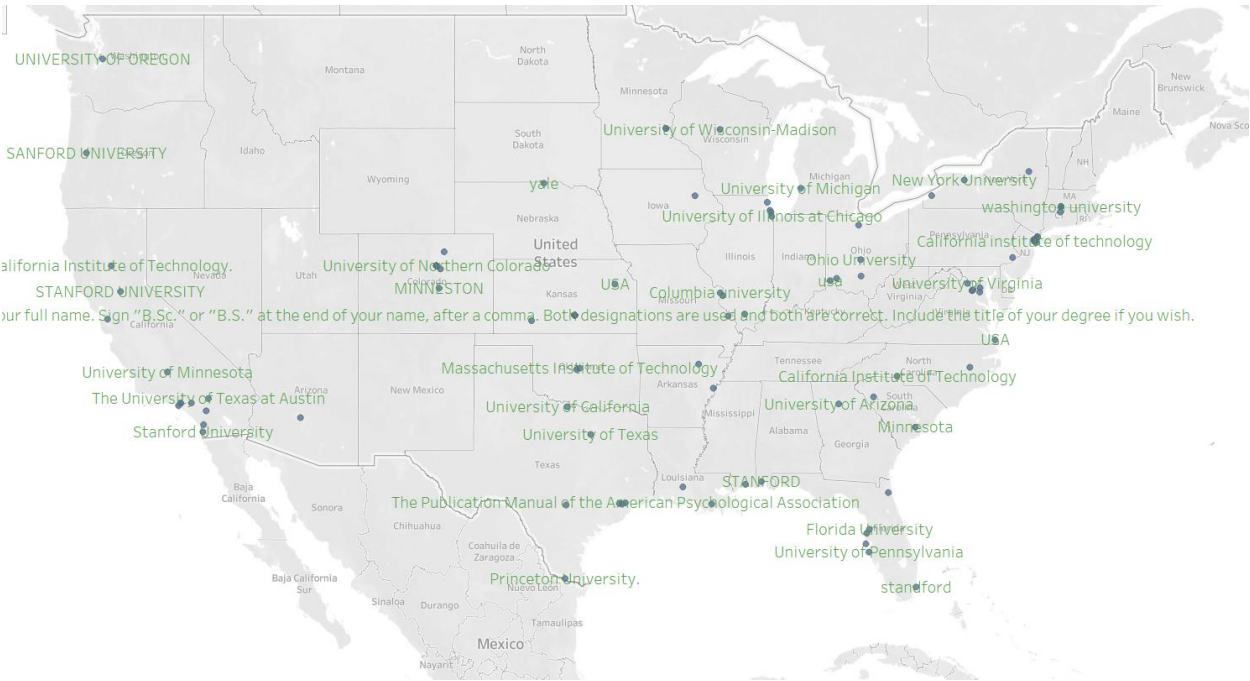


Figure: Different US university names that students participated in the study

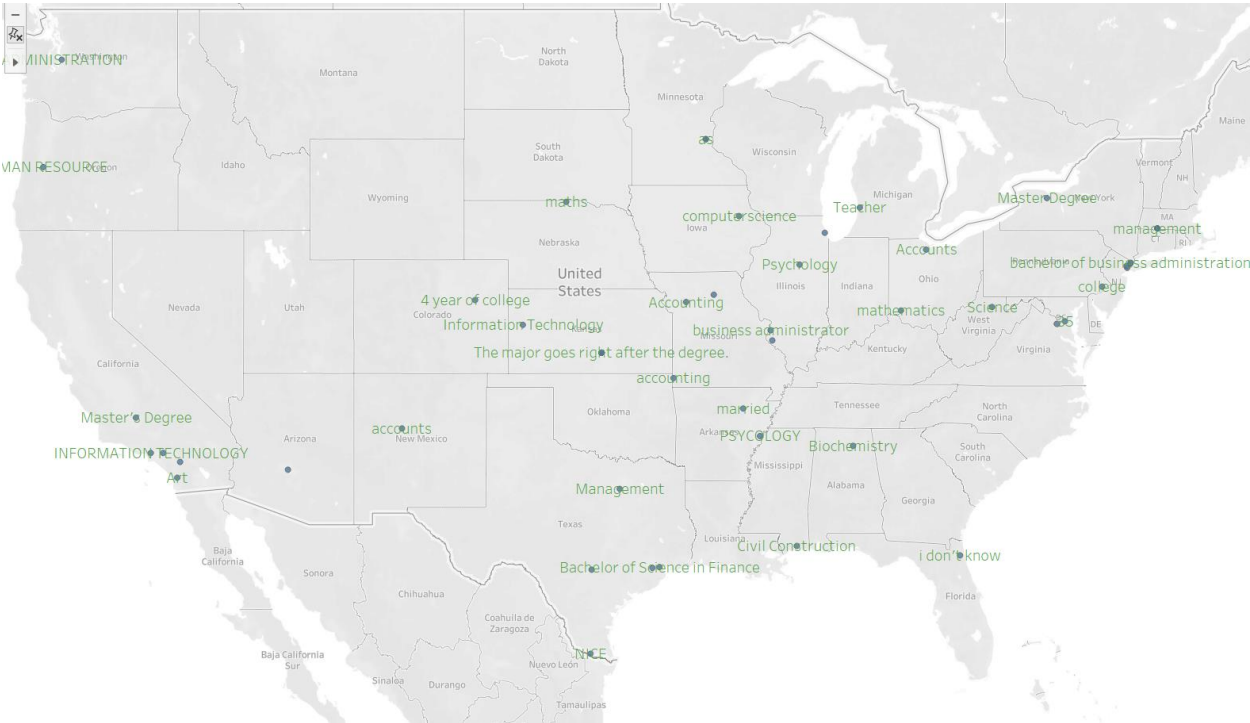


Figure three: Subjects name of US undergraduate female students

Table one: Descriptive statistics for each variable

	Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation
Salary	295	10000	60000 or above	47430	19.699
Pleasure in non - greenery	295	1.00	7.00	3.8020	1.46747
Arousal in non-greenery	295	1.00	7.00	3.2512	1.38157
Richness in non-greenery	295	1.0	7.0	3.043	1.5847
Satisfaction in non-greenery	295	1.00	7.00	3.5478	1.64871
Purchase intention in non-greenery	295	1.00	7.00	3.6736	1.58382
Perceived merchandise quality in non-greenery application	295	1.0	7.0	4.832	1.3008
Pleasure under retail greenery	295	1.00	7.00	4.7866	1.21649
Arousal under retail greenery	295	1.86	7.00	3.9209	1.17290
Richness in retail greenery	295	1.0	7.0	4.3	1.3979
Satisfaction in retail greenery condition	295	1.00	7.00	4.7053	1.40635
Purchase intention under retail greenery	295	1.00	7.00	4.5762	1.40416
Perceived merchandise quality under retail greenery application	295	1.5	7.0	5.339	1.1436



Shopping values	295	0	1	0.62	.457
Valid N (listwise)	295				

**Table two: Frequencies are also given**

#### Family income

	Frequency	Percent	Valid Percent	Cumulative Percent
10000	59	20.0	20.0	20.0
30000	110	37.3	37.3	57.3
60000	126	42.7	42.7	100.0
Total	295	100.0	100.0	

**Table three: Lighting and retail greenery conditions**

	Frequency	Percent	Valid Percent	Cumulative Percent
Cool	153	51.9	51.9	51.9
Warm	142	48.1	48.1	100.0
Greenery	153	51.9	51.9	51.9
Non greenery	142	48.1	48.1	100.0

#### Reliability analysis

Cronbach's alpha has been used to measure the reliability of all instruments. The value of reliability lower than 0.7 indicates poor reliability. If the Cronbach's alpha value is greater than 0.7, it indicates high reliability. Summaries of reliability for each instrument is given

**Table three: Reliability for all instruments**

Variables	Cronbach's alpha
Pleasure in non-greenery condition	0.95
Pleasure in greenery condition	0.947
Arousal in non-greenery condition	0.811
Arousal in greenery condition	0.82

Richness in non-greenery condition	0.702
Richness in greenery condition	0.707
Retail greenery manipulation instruments	0.842
Warm lighting/ cool lighting instruments	0.80
Shopping values	0.895
Perceived merchandise quality under retail greenery	0.918
Purchase intention under retail greenery	0.947
Satisfaction under retail greenery	0.907

### **Manipulation check**

The manipulation check was successful. In the case of manipulation check for retail greenery, we have conducted mixed model ANOVA analysis using SPSS where retail greenery/ non-retail greenery is within-subjects design. The results showed that manipulation check for retail greenery was significant ( $F= 284.03$ ,  $p=0.000$ ). The mean-value for non-retail greenery is 2.799 while the mean-value for retail greenery is 5.982.

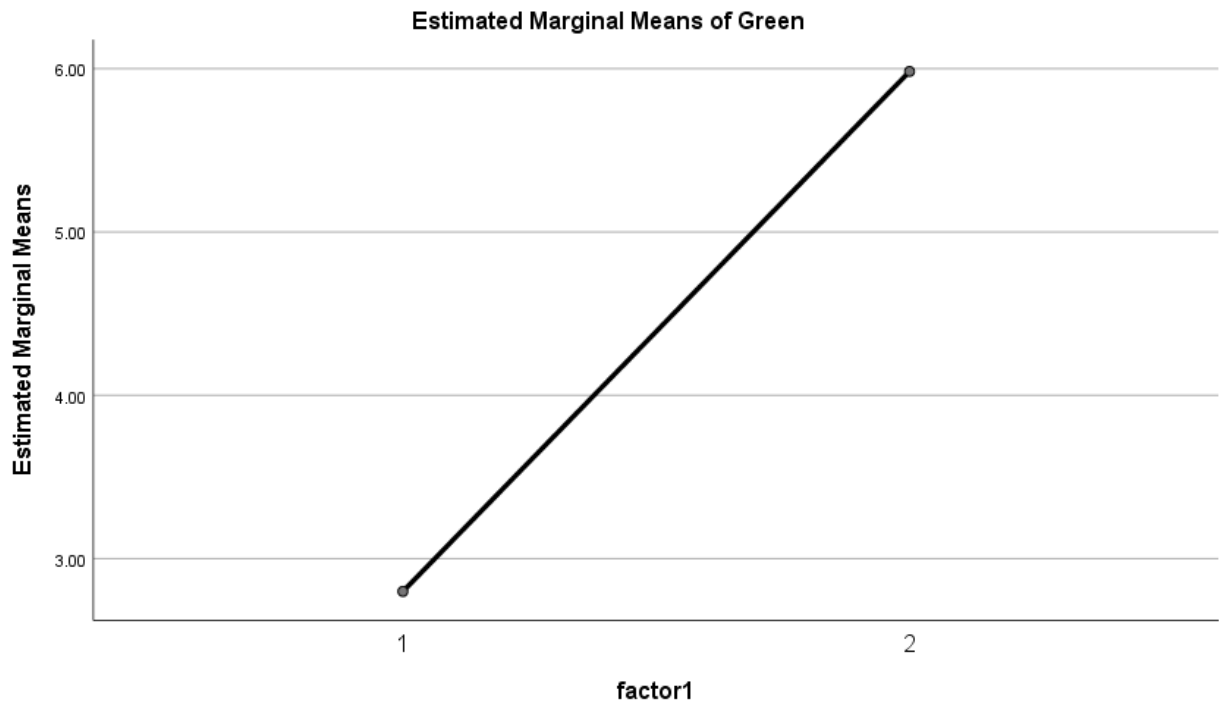


Figure one: Manipulation check for retail greenery where 1 = non-retail greenery and 2 = retail greenery

The manipulation check was also successful for lighting condition. The mixed model ANOVA showed that warm lighting ( $M=5.902$ ,  $p=0.000$ ) creates higher warm conditions than cool lighting ( $M=3.128$ ).

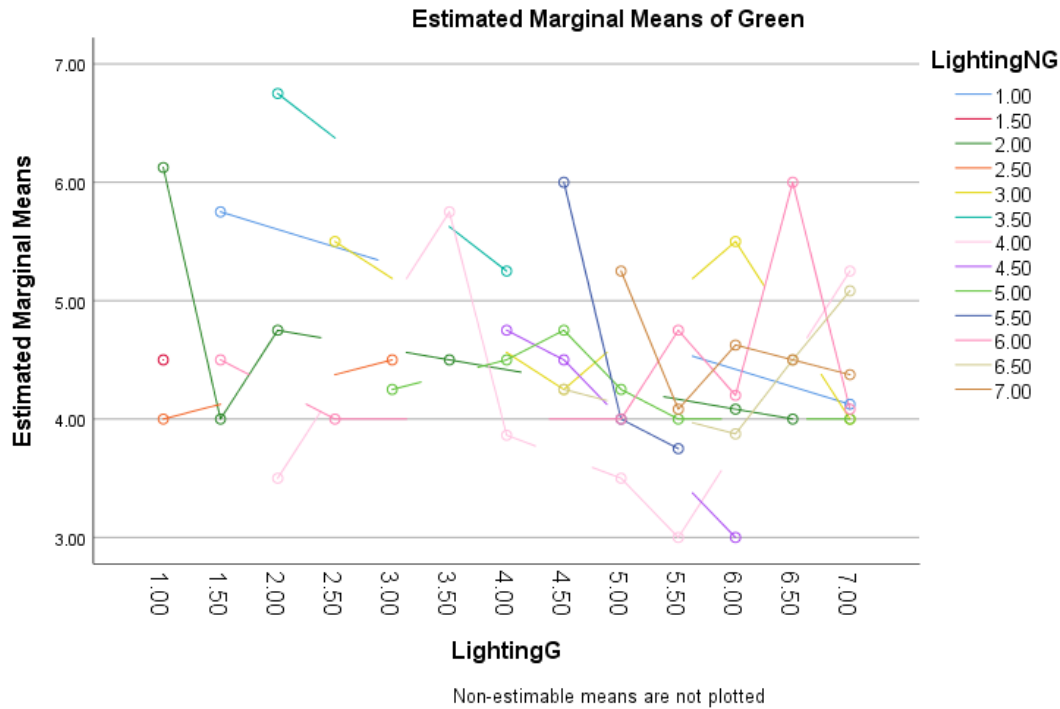


Figure two: The interaction effects between warm and cool lighting conditions .

## Hypotheses testing

The mixed model ANOVA has been conducted to test all hypotheses. In the mixed model ANOVA, the greenery/without conditions are within-subjects' groups, while the lighting conditions (warm/cool lighting) and shopping values (utilitarian/hedonic) are between-subjects' groups. IBM SPSS 26 has been used to report all analysis. SQL is also used for the manipulation analysis.

## Pleasure

Firstly, the impacts of greenery/without greenery applications and lighting conditions on pleasure will be investigated. The hypotheses are that both greenery/without greenery applications and warm/cool lighting conditions have significant differences on consumers'

pleasure. It is also expected that shopping values (utilitarian/hedonic) will moderate the relationship between greenery/without greenery application and lighting (warm/cool) conditions.

### **Descriptive Statistics**

The descriptive statistics of mean and standard deviation for each condition are given.

**Table one: Mean value, and Standard deviation**

	<b>Mean</b>	<b>Std. Deviation</b>
Pleasure in Non-greenery condition	3.855	0.120
Pleasure in greenery condition	4.793	0.106
Cool lighting	4.46	0.145
Warm lighting	4.182	0.139
Cool lighting under non-greenery conditions	3.881	0.174
Cool lighting under greenery condition	5.051	0.153
Warm lighting under non-greenery condition	3.830	0.167
Warm lighting under greenery condition	4.534	0.146
Utilitarian value under non-greenery condition	4.044	0.190
Utilitarian value under greenery condition	4.760	0.167
Hedonic value under non-greenery condition	3.667	0.149
Hedonic value under greenery condition	4.825	0.130

### **Tests of within-subjects' effects**

The mixed model ANOVA showed that greenery and non-greenery conditions have significant impacts on pleasure ( $F=78.011$ ,  $p= 0.000$ ). Participants show higher pleasure in greenery conditions ( $M=4.793$ ) than non-greenery conditions ( $M=3.855$ ). There are also

significant interaction effects between greenery/without greenery conditions and lighting conditions ( $F = 4.827, p = 0.030$ ). Cool lighting creates higher pleasure under greenery applications ( $M=5.051$ ) than non-greenery applications ( $M=3.881$ ). Similarly, warm lighting creates higher pleasure in greenery application ( $M=4.534$ ) than non-greenery application ( $M=3.830$ ). Shopping values also moderate the relationship with greenery/non-greenery applications ( $F=4.336, p=0.039$ ). Findings from the results showed that utilitarian shopping value creates higher pleasure in greenery conditions ( $M= 4.760$ ) than non-greenery conditions ( $M=4.044$ ). The results are also similar for hedonic shopping value. This value generates higher pleasure in greenery conditions ( $M=4.825$ ) than non-greenery conditions ( $M=3.667$ ). There is no significant interaction among retail greenery, lighting, and utilitarian/hedonic shopping value.

**Table two: Tests of within-subjects design**

Condition	F	Significance (p-value)
Greenery/Non-greenery applications	78.011	0.000
Interaction effects between lighting and retail greenery	4.827	0.030
Moderating effects of hedonic value with retail greenery	4.336	0.039
Retail greenery * Lighting* Hedonic shopping values	2.438	0.121

p-value is significant at 0.05.



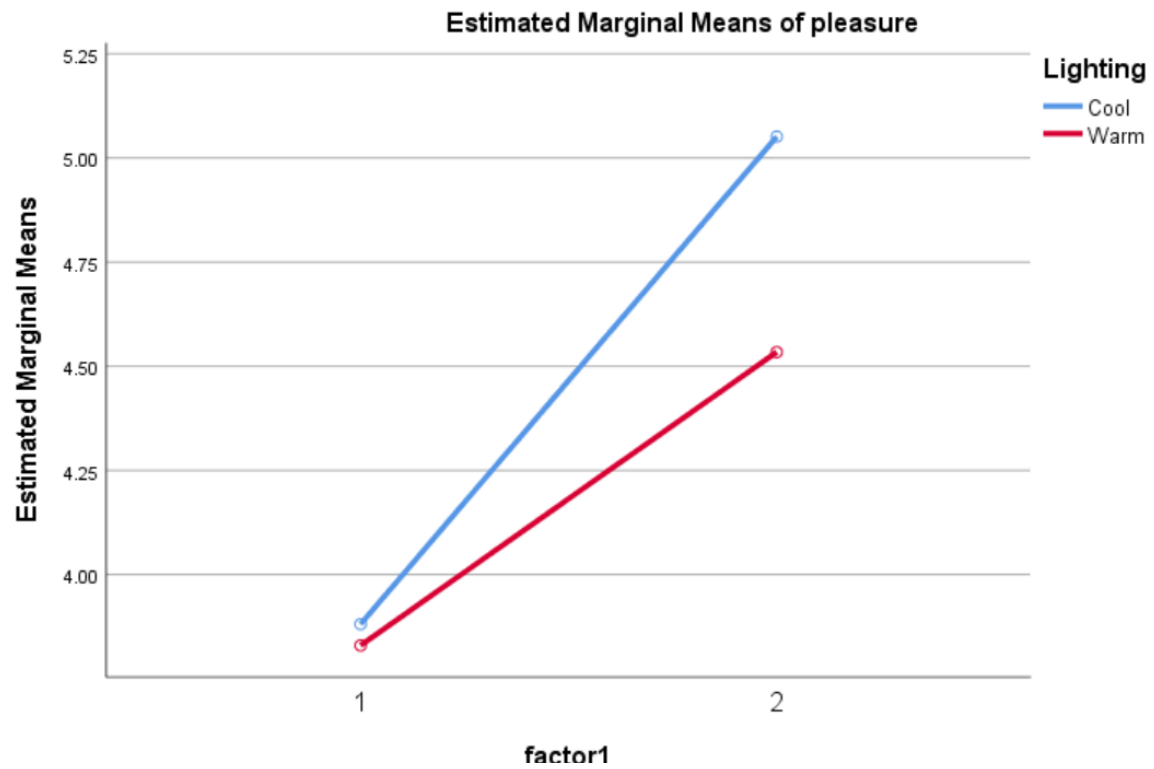


Figure one: The interaction effect between retail greenery and lighting condition, here 1 = non-retail greenery and 2 = retail greenery

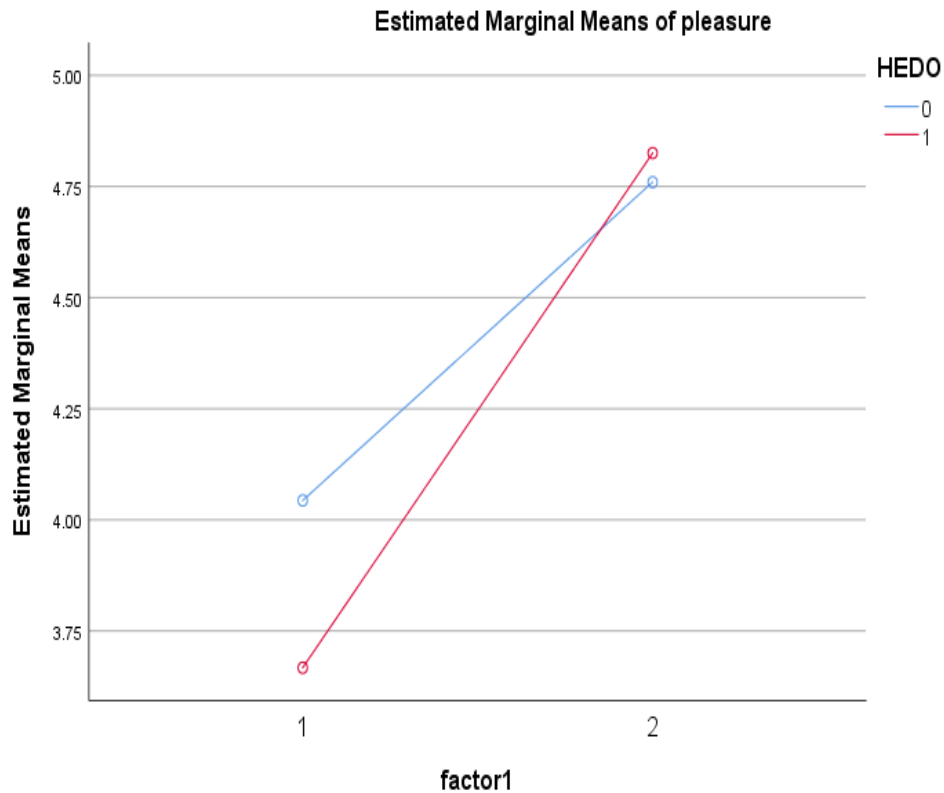


Figure two: The moderating effect between retail greenery and lighting condition, here 1 = non-retail greenery and 2 = retail greenery, blue line = utilitarian shopping value, red line= hedonic shopping value.

### Tests of between-subjects groups

The mixed design ANOVA analysis showed that lighting does not have significant effects on consumers pleasure. Shopping values also show the similar results. In addition, there is no significant interaction effects between lighting (warm/cool) and shopping values (utilitarian/hedonic shopping values).

**Table three: Tests of Between-Subjects Effects**

Measure: Pleasure

Transformed Variable: Average

Source	F	Sig.
Intercept	1863.390	.000
HEDO	.601	.439
Lighting	2.012	.158
HEDO *	.403	.527
Lighting		
Error		

**Assumption checking**

The Leven's test showed that there is no significance that is p value is greater than 0.05 which indicates that the homogeneity assumption is not likely violated.

**Table four: Levene's Test of Equality of Error Variances<sup>a</sup>**

		Levene Statistic	Sig.
PLENG	Based on Mean	1.030	.381
	Based on Median	1.017	.387
	Based on Median and with adjusted df	1.017	.387
	Based on trimmed mean	1.030	.381
PLEG	Based on Mean	2.011	.115
	Based on Median	1.529	.210
	Based on Median and with adjusted df	1.529	.210
	Based on trimmed mean	1.927	.128

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Lighting + HEDO + Lighting \* HEDO

Within Subjects Design: factor1

## Arousal

Like pleasure, the mixed design ANOVA will be used to analyze the impacts of retail greenery and lighting conditions on consumers' arousal. The hypotheses are that retail greenery/without greenery and lighting conditions (warm/cool) have significant effects on arousal. Also, the shopping values will moderate the relationships between retail greenery and lighting conditions on consumers' arousal.

## Descriptive Statistics

The descriptive statistics of mean and standard deviation for each condition are given.

**Table five: Mean value, and Standard deviation**

	Mean	Std. Deviation
Arousal in Non-greenery condition	3.311	0.083
Arousal in greenery condition	3.933	0.088
Cool lighting	3.755	0.103
Warm lighting	3.489	0.099
Cool lighting under non-greenery conditions	3.492	0.120
Cool lighting under greenery condition	4.018	0.128
Warm lighting under non-greenery condition	3.131	0.115
Warm lighting under greenery condition	3.848	0.122
Utilitarian value under non-greenery condition	3.485	0.131
Utilitarian value under greenery condition	3.968	0.139
Hedonic value under non-greenery condition	3.137	0.102
Hedonic value under greenery condition	3.899	0.109

**Table six: Descriptive statistics for the interaction effects of shopping values, lighting conditions and retail greenery**

**HEDO 0 = utilitarian shopping value, 1 = hedonic shopping value, factor 1 retail greenery, and factor 2 = non-retail greenery**

Measure: Arousal

HEDO	Lighting	factor1	Mean	Std. Error
0	Cool	1	4.072	.199
		2	3.494	.187
	Warm	1	3.863	.195
		2	3.477	.183
1	Cool	1	3.964	.160
		2	3.489	.150
	Warm	1	3.833	.148
		2	2.784	.139

### **Tests of within-subjects' effects**

The mixed-model ANOVA analysis showed that retail greenery/non-greenery has significant effects on consumers' arousal ( $F=42.845$ ,  $p=0.000$ ). There is not significant interaction effects between retail greenery and shopping values as well as retail greenery and lighting conditions. However, a three-way interaction effects is apparent among retail greenery, lighting, and shopping values. The results showed that under cool lighting, utilitarian value showed higher arousal in retail greenery application ( $M=4.072$ ) rather than non-retail greenery application ( $M=3.494$ ). Similarly, hedonic shopping value also showed higher arousal in retail greenery condition ( $M=3.863$ ) than non-retail greenery ( $M=3.47$ ) under cool lighting. The similar results have been found for hedonic shopping values. A table is given to illustrate the summary of findings.

**Table seven: Tests of within-subjects design**

Condition	F	Significance (p-value)
Greenery/Non-greenery applications	42.845	0.000
Interaction effects between lighting and retail greenery	1.012	0.316
Moderating effects of shopping value with retail greenery	2.165	0.143
Retail greenery * Lighting* Hedonic shopping values	4.061	0.046

p-value is significant at 0.05.

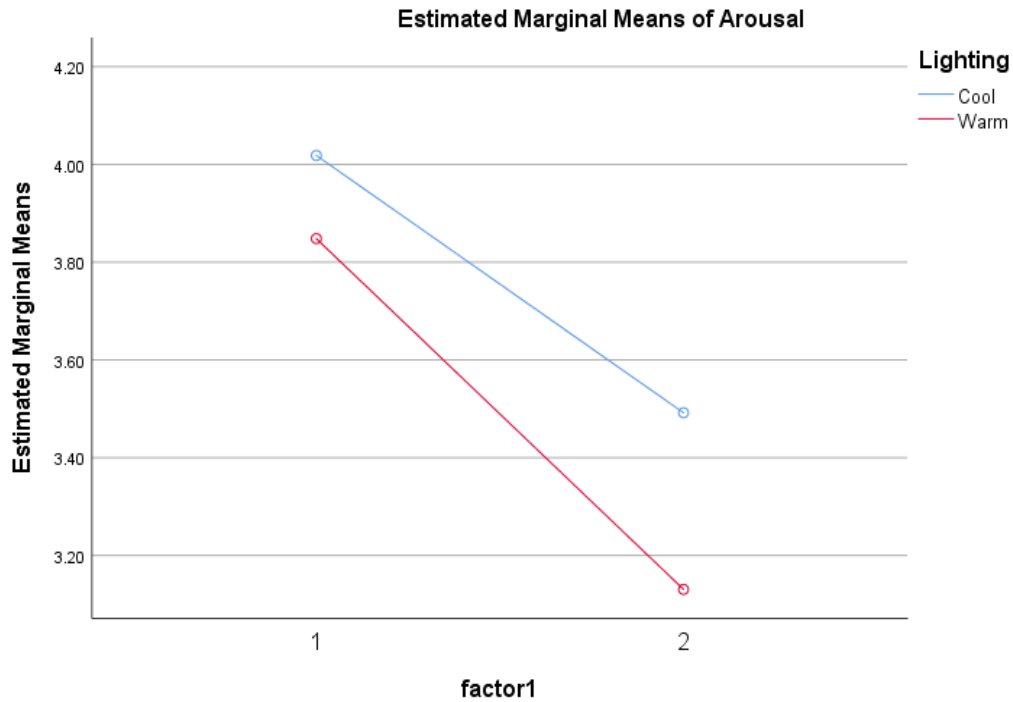


Figure three: The interaction effect between retail greenery and lighting condition, here 1 = retail greenery and 2 = non-retail retail greenery



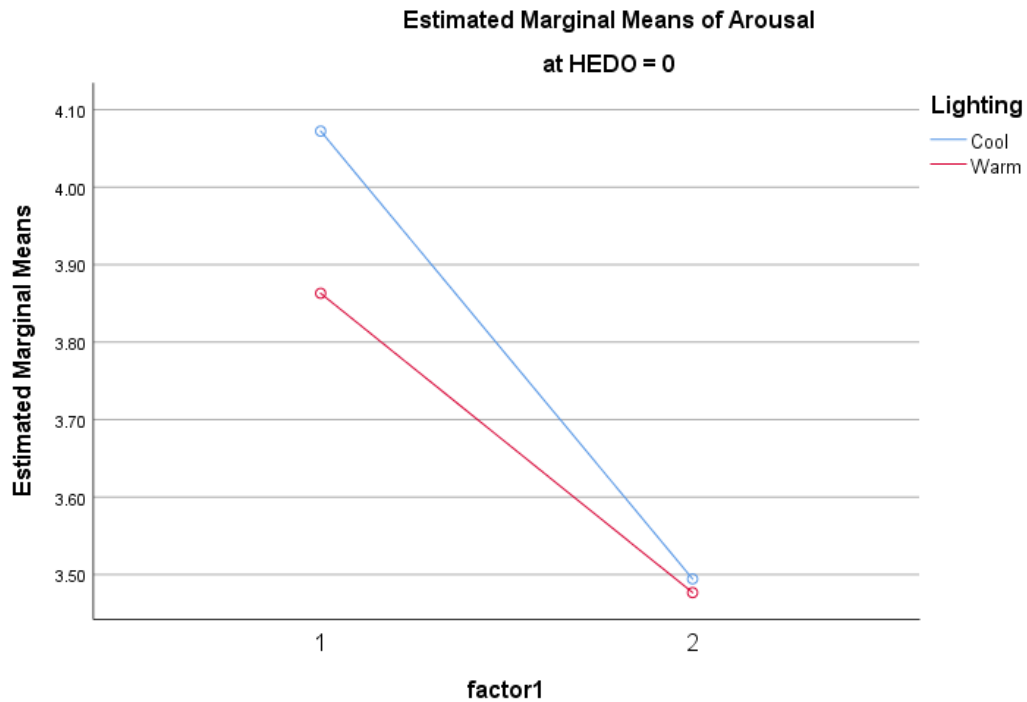


Figure four: The three-way interaction effects among retail greenery, lighting conditions, and shopping values (utilitarian, and hedonic) where HEDO= 0 is utilitarian shopping value

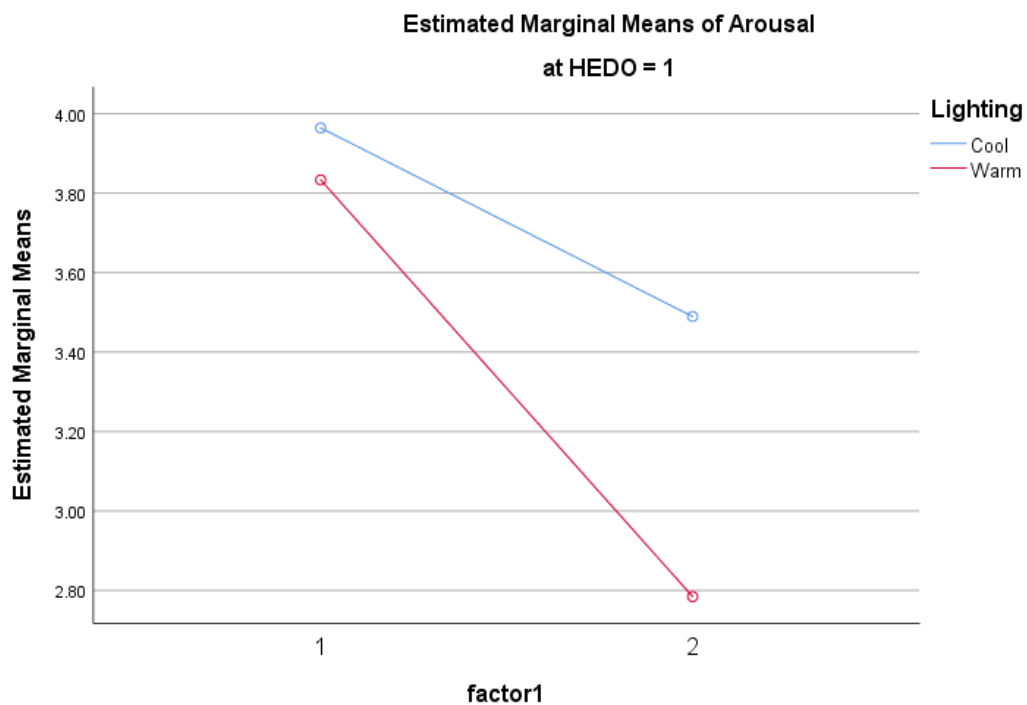


Figure four: The three-way interaction effects among retail greenery, lighting conditions, and shopping values (utilitarian, and hedonic) where HEDO= 1 is hedonic shopping value

## Tests of between-subjects groups

The mixed design ANOVA analysis showed that lighting has marginal significant effects on arousal ( $F=3.461$ ,  $p=0.065$ ). Cool lighting ( $M=3.755$ ) marginally creates higher arousal than warm lighting ( $M=3.489$ ).

**Table eight: Tests of Between-Subjects Effects**

Measure: Arousal

Transformed Variable: Average

Source	Type III Sum of Squares	F	Sig.
Intercept	3447.798	2572.804	.000
HEDO	2.860	2.134	.146
Lighting	4.638	3.461	.065
HEDO * Lighting	1.523	1.136	.288
Error	182.253		

## Assumption checking

The Leven's test showed that there is no significance that is p value is greater than 0.05 which indicates that the homogeneity assumption is not likely violated.

**Table nine: Levene's Test of Equality of Error Variances<sup>a</sup>**

		Levene Statistic	Sig.
AROG	Based on Mean	.355	.785
	Based on Median	.275	.843
	Based on Median and with adjusted df	.275	.843
	Based on trimmed mean	.344	.794
ARON	Based on Mean	.994	.398

Based on Median	1.067	.365
Based on Median and with adjusted df	1.067	.365
Based on trimmed mean	1.135	.337

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + HEDO + Lighting + HEDO \* Lighting

Within Subjects Design: factor1

### Perceived merchandise quality

Perceived merchandise quality is another dependent variable like pleasure and arousal. The mixed design ANOVA has been conducted to analyze the impacts of retail greenery and lighting conditions on perceived merchandise quality.

### Descriptive Statistics

The descriptive statistics of mean and standard deviation for each condition are given.

**Table ten: Mean value, and Standard deviation**

	Mean	Std. Deviation
Perceived merchandise quality in Non-greenery condition	4.850	0.121
Perceived merchandise quality in greenery condition	5.332	0.091
Cool lighting	5.165	0.135
Warm lighting	5.018	0.130
Cool lighting under non-greenery conditions	4.822	0.174
Cool lighting under greenery condition	5.508	0.131
Warm lighting under non-greenery condition	4.879	0.167
Warm lighting under greenery condition	5.257	0.143
Utilitarian value under non-greenery condition	4.912	0.190

Utilitarian value under greenery condition	5.257	0.143
Hedonic value under non-greenery condition	4.789	0.149
Hedonic value under greenery condition	5.407	0.112

### Tests of within-subjects effects

The mixed design ANOVA analysis showed that retail greenery/non-greenery has significant impacts on perceived merchandise quality ( $F=22.319$ ,  $p=0.000$ ). Retail greenery ( $M=5.331$ ) generates higher perceived merchandise quality than non-retail greenery ( $M=4.85$ ). There are also significant interaction effects between retail greenery and lighting ( $F=4.005$ ,  $p=0.047$ ). Cool lighting creates higher perceived merchandise quality under greenery conditions ( $M=5.508$ ) rather than non-retail greenery applications ( $M=4.82$ ). Similarly, warm lighting also creates higher perceived merchandise quality under greenery conditions ( $M=5.527$ ) than non-retail greenery condition ( $M=4.879$ ).

### Table eleven: Tests of within-subjects design

Measure: Quality		
Source	F	Sig.
Retail greenery	22.319	.000
Retail greenery * shopping values	1.799	.182
Retail greenery * Lighting	4.005	.047
Retail greenery* shopping values * Lighting	.701	.404
Error(factor1)		

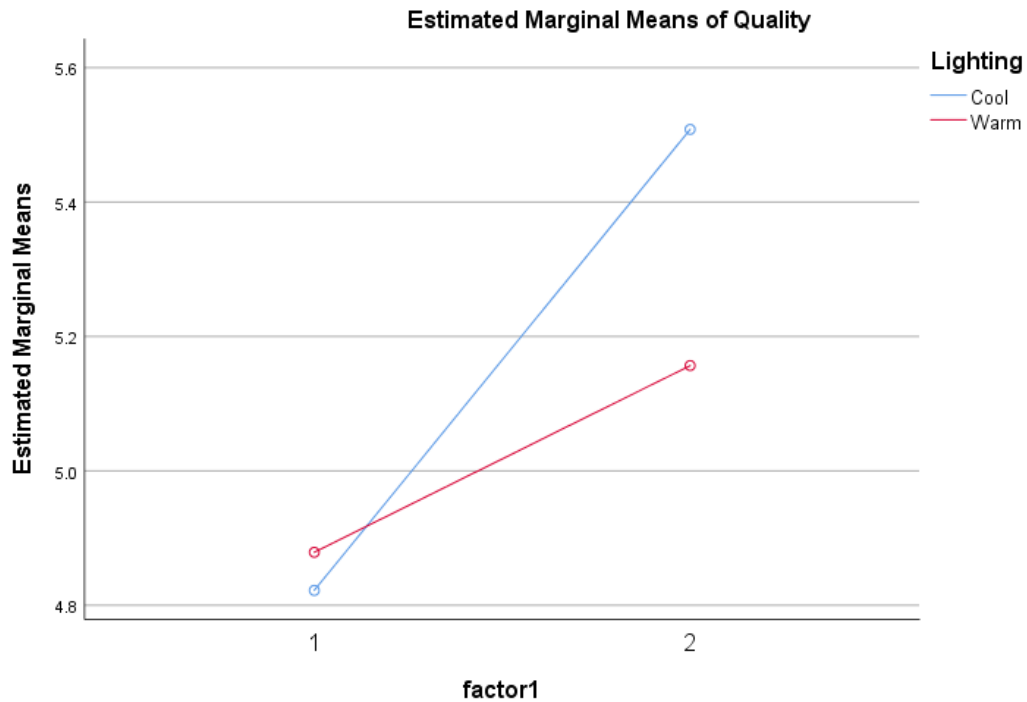


Figure five: The interaction effects between lighting and retail greenery, here 1 = non-retail greenery and 2 = retail greenery

### Tests of between-subjects groups

There are no statistically significant effects of lighting on perceived merchandise quality ( $F=0.619$ ,  $p=0.433$ ). The summaries of results are given:

**Table twelve: Tests of Between-Subjects Effects**

Measure: Quality

Transformed Variable: Average

Source	F	Sig.
Intercept	2952.593	.000
Shopping values	.005	.945
Lighting	.619	.433
Shopping values * Lighting	.592	.443
Error		

**Assumption checking:**

The Leven's test showed that there is no significance that is p value is greater than 0.05 which indicates that the homogeneity assumption is not likely violated/

**Table thirteen: Levene's Test of Equality of Error Variances<sup>a</sup>**

		Levene Statistic	Sig.
PMQN	Based on Mean	1.218	.306
	Based on Median	.946	.420
	Based on Median and with adjusted df	.946	.421
	Based on trimmed mean	1.075	.362
PMQG	Based on Mean	.765	.516
	Based on Median	.656	.581
	Based on Median and with adjusted df	.656	.581
	Based on trimmed mean	.785	.504

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + HEDO + Lighting + HEDO \* Lighting

Within Subjects Design: factor1

## Satisfaction

We have conducted the same Mixed design ANOVA to measure satisfaction as retail greenery/non-greenery are within subjects groups, while lighting and shopping values are between subjects groups. We have also examined the moderating effects of shopping values on retail greenery and lighting conditions.



## Descriptive Statistics

The descriptive statistics of mean and standard deviation for each condition are given.

**Table fourteen: Mean value, and Standard deviation**

	Mean	Std. Deviation
Satisfaction in Non-greenery condition	3.633	0.129
Satisfaction in greenery condition	4.736	0.122
Cool lighting	4.319	0.157
Warm lighting	4.050	0.151
Cool lighting under non-greenery conditions	3.706	0.186
Cool lighting under greenery condition	4.932	0.176
Warm lighting under non-greenery condition	3.560	0.178
Warm lighting under greenery condition	4.541	0.169
Utilitarian value under non-greenery condition	3.950	0.203
Utilitarian value under greenery condition	4.843	0.192
Hedonic value under non-greenery condition	3.316	0.159
Hedonic value under greenery condition	4.629	0.150

**Table fifteen: Descriptive statistics for three- way interaction effects of retail greenery, lighting, and shopping values**

**Table fifteen: Shopping values\* Lighting \* Retail greenery**

Measure: Satisfaction

Shopping values	Lighting	factor1	Mean	Std. Error
Utilitarian	Cool	Non- Retail greenery	3.937	.289
		Retail greenery	5.180	.274
	Warm	Non- Retail greenery	3.963	.284

Hedonic	Cool	Retail greenery	4.507	.269
		Non-Retail greenery	3.475	.233
	Warm	Retail greenery	4.684	.221
		Non -Retail greenery	3.156	.215
		Retail greenery	4.575	.204

### Tests of within-subjects effect

The Mixed design ANOVA analysis demonstrated that Retail greenery has significant impacts on satisfaction. Retail greenery (M=4.736) creates higher satisfaction than non-retail greenery (M=3.633). Also, there are marginal three-way interaction effects among retail greenery, shopping values, and lighting (F=3.371, p=0.069). Under cool lighting conditions, utilitarian shopping value marginally (M=5.180) creates higher satisfaction than hedonic shopping value (M=4.507) in retail greenery than non-retail greenery. Summaries of results are given

**Table sixteen: Tests of Within-Subjects**

Measure: Satisfaction

Source	F	Sig.
Retail greenery	79.520	.000
Retail greenery * Shopping values	2.883	.092
Retail greenery * Lighting	.982	.324
Retail greenery* Shopping values* Lighting	3.371	.069

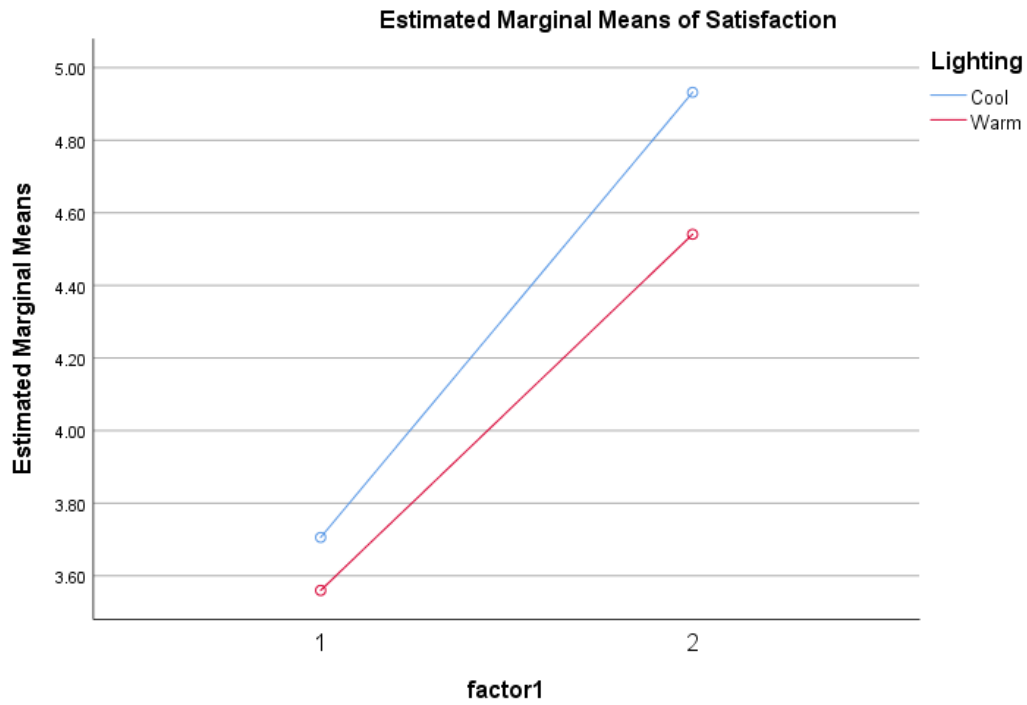


Figure six: Interaction effects between retail greenery and lighting conditions. 1= non-retail greenery, 2 = retail greenery

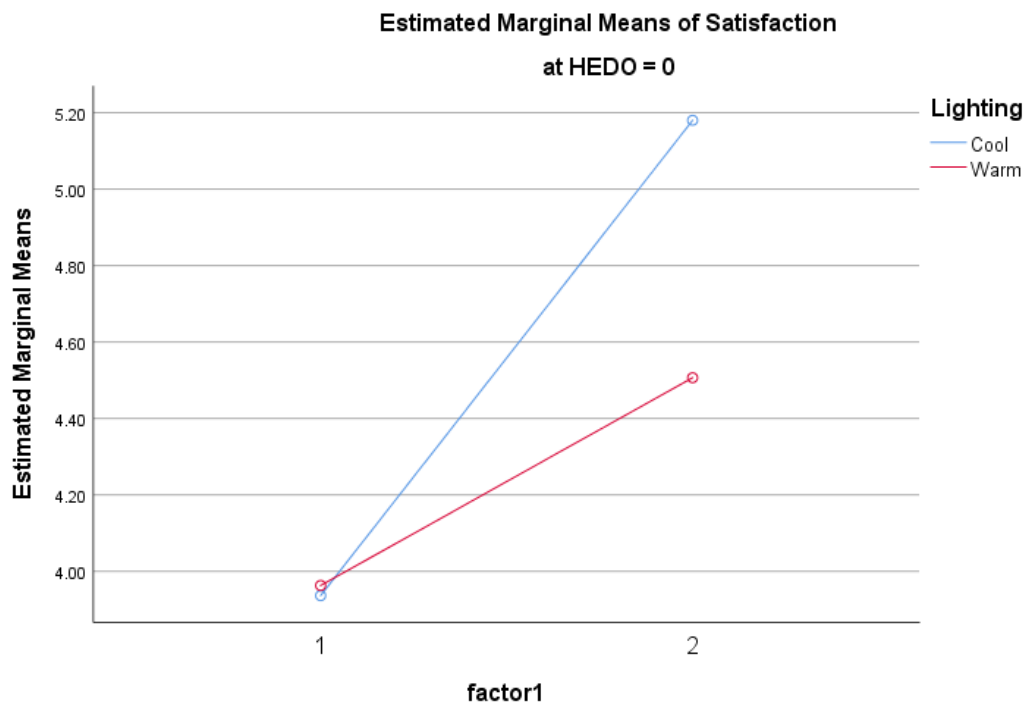


Figure seven: The interaction effects between lighting, retail greenery, and utilitarian shopping value

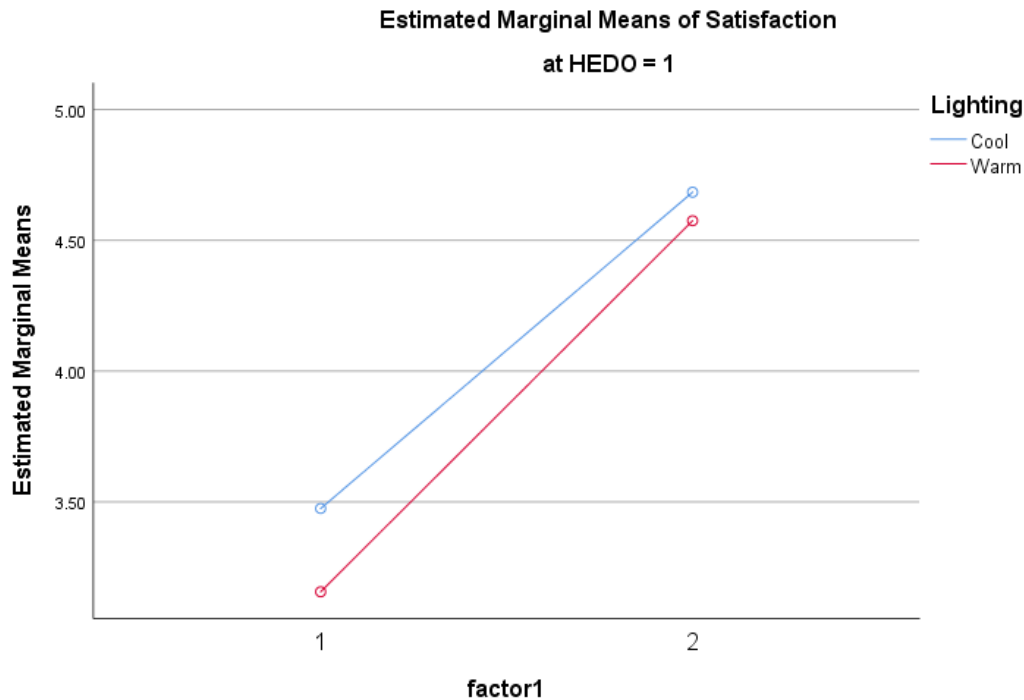


Figure seven: The interaction effects between lighting, retail greenery, and hedonic shopping value

### Tests of between-subjects effects

Tests of between-subjects effects showed that there are marginally significant effects of hedonic values on satisfaction ( $F=3.783$ ,  $p=0.054$ ). Utilitarian shopping value ( $M=4.397$ ) show higher satisfaction than hedonic shopping values ( $M=3.97$ ). Lighting does not have significant effects on satisfaction. Summaries of results are given

**Table seventeen: Tests of Between-Subjects Effects**

Measure: Satisfaction

Transformed Variable: Average

Source	F	Sig.
Intercept	1473.472	.000
Shopping value	3.783	.054
Lighting	1.518	.220
Shopping values * Lighting	.063	.802

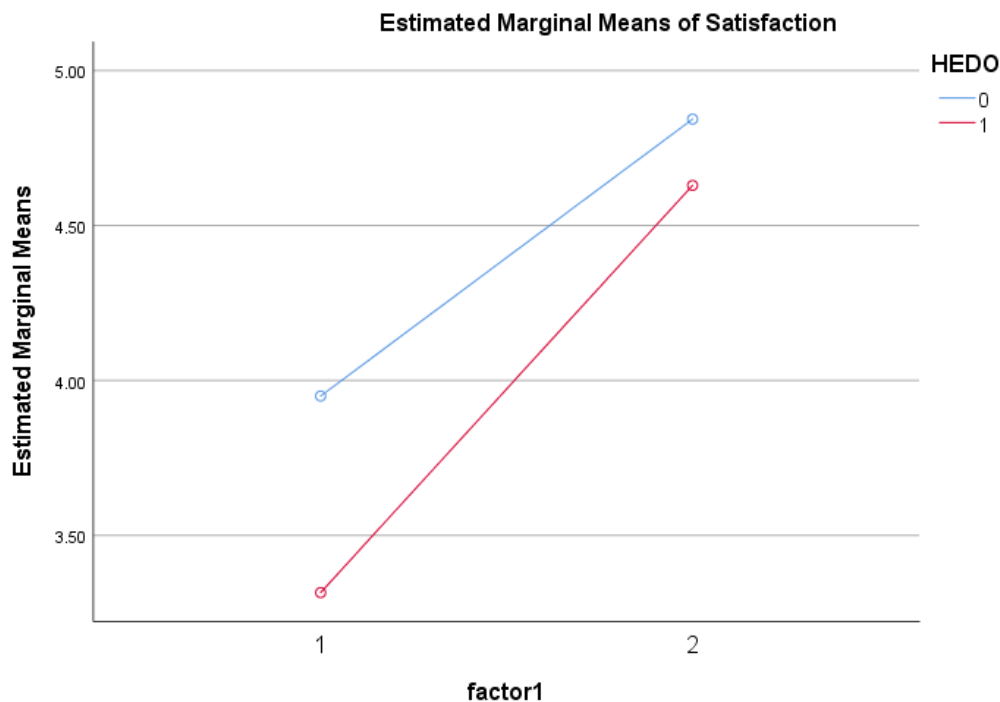


Figure eight: The effects of shopping values on consumers' satisfaction where HEDO 0= utilitarian shopping value and 1 = hedonic shopping value

### Purchase intentions

The effects of retail greenery and lighting have also been analyzed on consumers' satisfaction. Summaries of results are given

### Descriptive Statistics

The descriptive statistics of mean and standard deviation for each condition are given.

**Table eighteen: Mean value, and Standard deviation**

	Mean	Std. Deviation
Purchase intentions in Non-greenery condition	3.750	0.129
Purchase intentions in greenery condition	4.607	0.122
Cool lighting	4.222	0.159
Warm lighting	4.136	0.153

Cool lighting under non-greenery conditions	3.688	0.183
Cool lighting under greenery condition	4.755	0.176
Warm lighting under non-greenery condition	3.812	0.185
Warm lighting under greenery condition	4.459	0.183
Utilitarian value under non-greenery condition	4.059	0.200
Utilitarian value under greenery condition	4.708	0.201
Hedonic value under non-greenery condition	3.441	0.157
Hedonic value under greenery condition	4.506	0.158

### Tests of within-subjects groups

The mixed design ANOVA analysis showed that retail greenery/non-greenery have significant effects on consumer satisfaction ( $F=44.771$ ,  $p=0.000$ ). Retail greenery ( $M=4.607$ ) creates higher satisfaction than non-retail greenery ( $M=3.750$ ). There are no significant effects of other variables.

### Table nineteen: Tests of Within-Subjects groups

Measure: Purchase intention

Source	F	Sig.
Retail greenery	44.771	.000
Retail greenery * shopping values	2.637	.107
Retail greenery * Lighting	2.704	.102
Retail greenery * Shopping values * Lighting	1.691	.196
Error(factor1)		



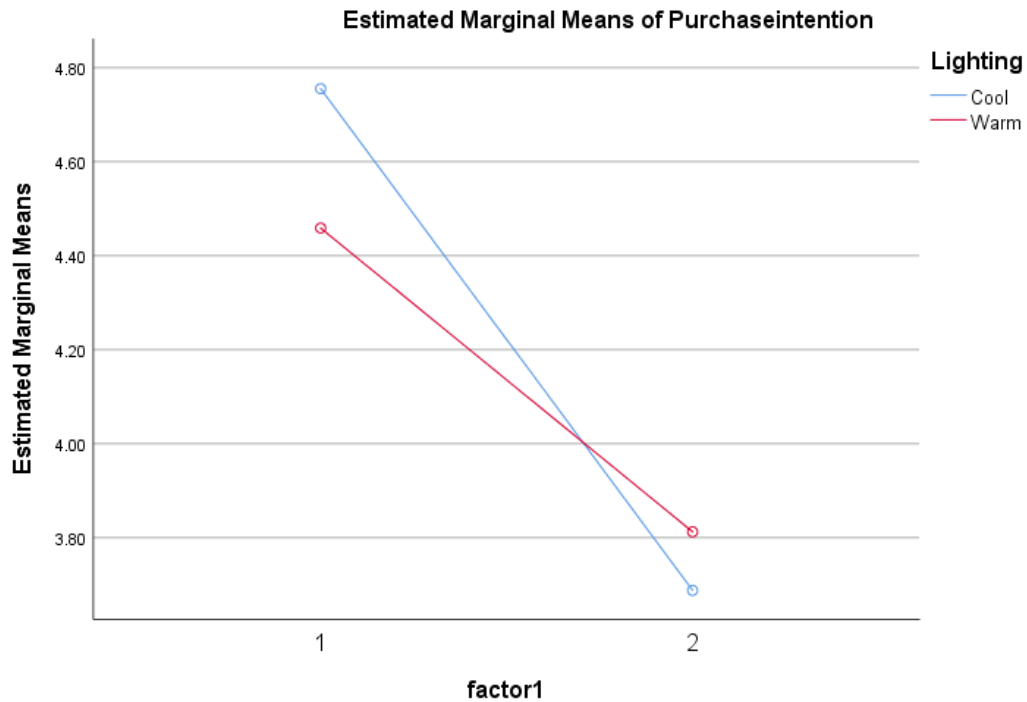


Figure nine: The effects of retail greenery on consumers' satisfaction where 1 = retail greenery and 2 = non-retail greenery

### Tests of between- subjects effects

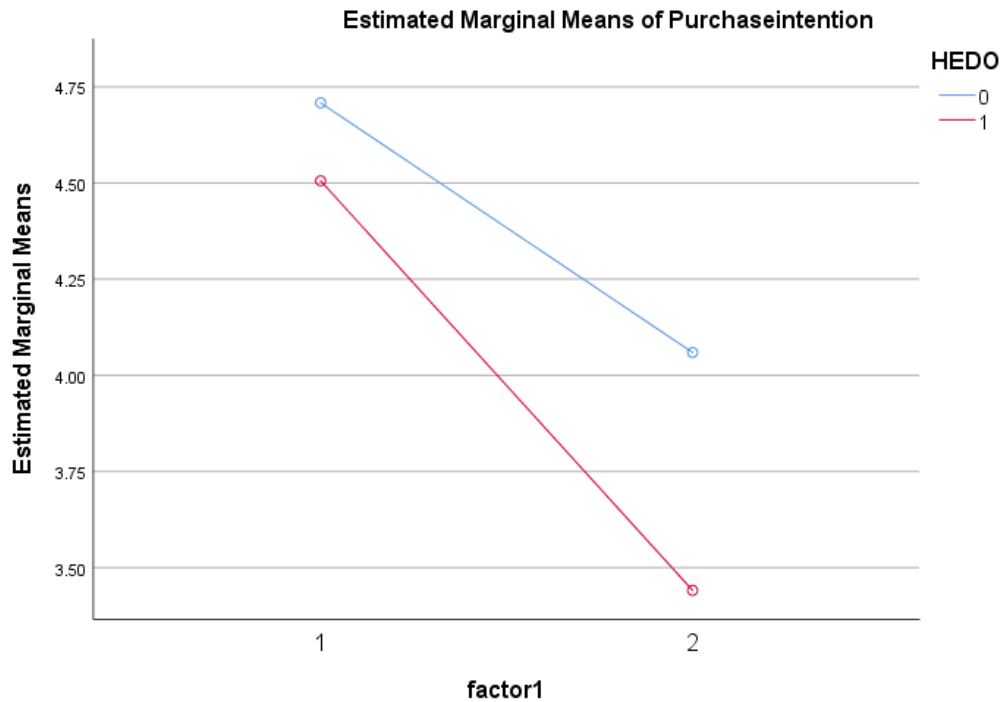
The results showed that shopping values have marginally significant effects on purchase intention ( $F=3.472$ ,  $p=0.065$ ). Utilitarian shopping value ( $M=4.384$ ) shows marginally higher purchase intention than hedonic shopping value ( $M=3.973$ ). Other variables do not have significant interaction effects on purchase intention.

### Table twenty: Tests of Between-Subjects Effects

Measure: Purchase intention

Transformed Variable: Average

Source	F	Sig.
Intercept	1437.797	.000
Shopping values	3.472	.065
Lighting	.152	.697
Shopping values* Lighting	.072	.789
Error		



**Figure ten: The effects of shopping values on satisfaction where 0 = utilitarian shopping value and 1 = hedonic shopping value.**

#### Assumption checking:

The Leven's test showed that there is no significance that is p value is greater than 0.05 which indicates that the homogeneity assumption is not likely violated/

**Table twenty-one: Levene's Test of Equality of Error Variances<sup>a</sup>**

		Levene Statistic	Sig.
Purchase intention in retail greenery	Based on Mean	1.097	.353
	Based on Median	.700	.553
	Based on Median and with adjusted df	.700	.554
	Based on trimmed mean	1.013	.389
Purchase intention in	Based on Mean	.366	.778
	Based on Median	.238	.870

non-retail greenery	Based on Median and with adjusted df	.238	.870
	Based on trimmed mean	.347	.792

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + HEDO + Lighting + HEDO \* Lighting

Within Subjects Design: factor1

### Perceived complexity

The impacts of retail greenery and lighting have also been examined on perceived complexity. Summaries are given

### Descriptive Statistics

The descriptive statistics of mean and standard deviation for each condition are given.

**Table twenty-two: Mean value, and Standard deviation**

	Mean	Std. Deviation
Perceived complexity in Non-greenery condition	3.009	0.094
Perceived complexity in greenery condition	3.367	0.086
Cool lighting	3.115	0.111
Warm lighting	3.261	0.106
Cool lighting under non-greenery conditions	2.896	0.149
Cool lighting under greenery condition	3.365	0.135
Warm lighting under non-greenery condition	3.200	0.169
Warm lighting under greenery condition	3.321	0.128
Utilitarian value under non-greenery condition	2.896	0.149
Utilitarian value under greenery condition	3.365	0.135

Hedonic value under non-greenery condition	3.121	0.116
Hedonic value under greenery condition	3.368	0.106

### Tests of within-subjects contrast

The mixed-model ANOVA analysis showed that retail greenery has significant impacts Perceived complexity ( $F=14.214$ ,  $p=0.000$ ). Retail greenery ( $M=3.367$ ) shows higher perceived complexity than non-retail greenery ( $M=3.009$ ). Other variables do not have any significant impacts on perceived complexity.

**Table twenty-three : Tests of Within-Subjects Contrasts**

Measure: Perceived complexity

Source	F	Sig.
Retail greenery	14.214	.000
Retail greenery * Shopping values	1.367	.244
Retail greenery * Lighting	.642	.424
Retail greenery * Shopping values * Lighting	.053	.818
Error(factor1)		

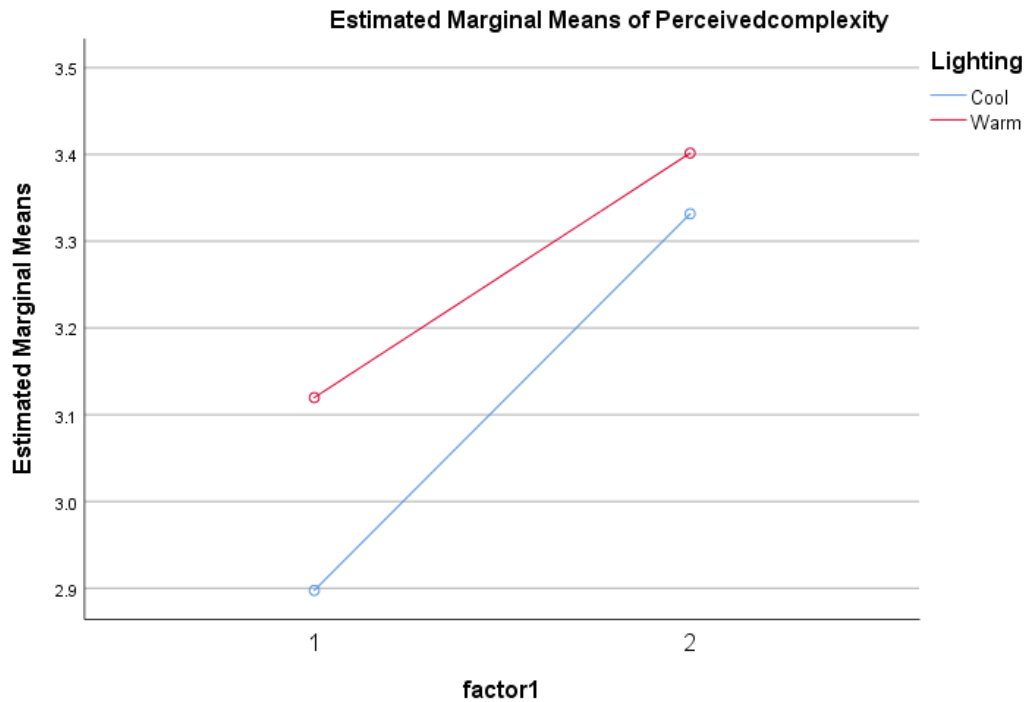


Figure eleven: The effects of retail greenery on perceived complexity

#### Tests of between-subjects effects:

There are no significant effects of lighting and shopping values on purchase intention.

**Table twenty-four: Tests of Between-Subjects Effects**

Measure: Perceived complexity

Transformed Variable: Average

Source	Type III Sum of Squares	Sig.
Intercept	2670.011	.000
Shopping values	.848	.460
Lighting	1.403	.342
Shopping values * Lighting	.004	.960
Error	209.976	

## Assumption checking

The Leven's test showed that there is no significance that is p value is greater than 0.05 which indicates that the homogeneity assumption is not likely violated.

**Table twenty-five: Levene's Test of Equality of Error Variances<sup>a</sup>**

		Levene Statistic	Sig.
Richness in non-retail greenery	Based on Mean	.153	.927
	Based on Median	.145	.933
	Based on Median and with adjusted df	.145	.933
	Based on trimmed mean	.144	.933
Richness in retail greenery	Based on Mean	.119	.949
	Based on Median	.125	.945
	Based on Median and with adjusted df	.125	.945
	Based on trimmed mean	.133	.940

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + HEDO + Lighting + HEDO \* Lighting

Within Subjects Design: factor1