

Impact of Light Distributions on Emotion and Intention to Visit a Fine Dining Restaurant

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Abstract— For fine-dining restaurants, interior lighting is a critical atmospheric factor influencing guests' emotional responses, which can, in turn, influence their positive approach behavior, such as intention to visit. This study extended from the previous research, which suggested that focal lighting with dim and warm ambient lighting can positively influence the intention to visit and is mediated by the relational intimacy of the customer. Based on the SOR model, it aims to investigate the impact of seven non-uniform light distributions on subjective emotions and the intention to visit. It also explored the mediating role of relational intimacy. Some 154 Thai respondents participated in the online survey. The result confirmed that the average subjective responses to each light distribution positively influenced the intention to visit. It also demonstrated a more substantial role of relational intimacy in selecting restaurants to dine with a group of friends or a significant other. Additionally, gender appeared to have some effects on this process.

Keywords— *Fine Dining/ Light Distribution/ Emotions/ Hospitality Lighting/ Visit Intentions / Relational Intimacy*

I. INTRODUCTION

Hospitality industry is one of the oldest industries with the largest employers and is part of a significant portion of many national economies [1]. The Restaurant enterprise is the most important enterprise today and always played an essential role in a thriving society's business, social, intellectual, and artistic life. In Thailand, one of the primary incomes comes from tourism. Thailand has a policy for promoting "Thai kitchen to the world" [2]. Thailand had millions of tourists monthly before the Covid-19 pandemic. Restaurants are about connecting with other people, build a sense of community, or create an experience [3]. An authentic hospitality experience can increase customer satisfaction and business performance. It is expected that luxury food service will be growing because experience over possession is widely preferred, especially between millennials and Gen Z customers. As people change, the fine dining industry changes too. Consumers are not interested in pretentious environments. They rather dine in a relaxed, elegant atmosphere. In Italy, buyers are investing and offering Michelin starred gourmet experience which can engage with all the senses of the customer and at the same time offer a comfortable and welcoming environment [4]. Thrive in the competitive luxury market, the fine dining restaurant operator needs to understand customers' behavior that they expect good quality gourmet and an overall ambiance to satisfy emotional and social needs. Interior lighting is one of the atmospheric elements and contributes significantly to the customers' emotions [5] [6] [7], which can influence positive approach behavior [8]. During the pre-consumption stage of online marketing, the positive behavior includes an intention to visit and select the restaurant to book. However, there is

limited knowledge on how different light patterns, especially under a very low ambient and warm-white lighting of a fine dining restaurant, influence emotions and these behaviors. This study investigated the impact of 7 non-uniform light patterns on the customer's 9 PAD emotions and intention to visit. Additionally, it explored the moderating role of relational intimacy, i.e., dining with friends/family or a romantic partner, on selecting a restaurant to visit. Due to the Covid-19 pandemic, this was an online survey with some 154 Thai participants, aged between 25 and 65 years old. The results filled the knowledge gap on the impact of each light distribution on subjective responses and positive influence on the intention to visit - when not considering a social relationship. However, when asked to select preferred light distributions to have dinner with either a group of friends or a partner, this social relationship seemed to influence the customer's decision strongly. Thus, the results provide insight into choosing suitable light distributions that influence customers' positive emotions and preferences in each restaurant zone.

II. LITERATURE REVIEW

A. Atmospheric elements in restaurant design

Atmosphere affects consumption and behavior. The atmosphere is one of the reasons for people to dine out [7]. The atmosphere will be remembered that will be the key to customer loyalty. Another fact to remember is that not everyone has the same expectation, so the restaurants must make sure whom they like to attract and analyze their characters. The atmosphere should bring out friendliness emotion in people and be attractive and different. The atmosphere is anything that makes an impression. Some of the atmosphere's physical aspects are unusual location, a spectacular view, a combination of color, layout, and non-physical aspects as the attitude of service personnel as exhibited in courtesy, ability, and promptness. Some marketing scholars have studied the ambient factors that influence consumer behavior. The effect of lighting is one of the outstanding and it's an interest to this study. Using structural equation modeling analysis Ryu and Jang found, visual cues such as furniture, color, lighting, and décor, for nonvisual cues like ambiance and employees, all will impact customer pleasure. Ambiance and employees will most impact arousal [9]. Based on research, the mood created in the dining room is the most important in ambient factors, and privacy of seating is the highest in design factors. Many researchers believe that physical layout most necessary condition for customer's behaviors. Birchfield (1988) Mentioned that the quality of interior design and décor would be the significant aspect that makes people think of a restaurant, and they will judge it based on that. An enjoyable atmosphere has a significant impact on hospitality experiences. Individuals often link positive emotions and hospitality experiences with

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environmental factors such as interior design, artifacts, layout, music, lighting, and aroma. Some research shows that a comfortable and enjoyable atmosphere in an environment brings positive and memorable experiences, even if food is not as good as expected. Color and material both are fundamental aspects of interior design and atmosphere. In previous research, it has been proven that lighting is a design solution that is significant and affects perceptions and behaviors [10]. Lighting plays an essential role in atmosphere and design. It is mentioned that the most critical design aspect of a restaurant is the lighting [11] [12].

B. Lighting Design Parameters and Subjective Responses

Among atmospheric elements, lighting is one of the most important aspects of a restaurant [11]. Providing an intimate and private atmosphere is essential, it has been mentioned that a decrease in illuminance leads to an increased sense of privacy. Also using warm-white lighting can get people to stay longer and increase the sense of privacy [13] [14]. Bright lighting cause customers to see a space as having greater spaciousness and further convey feelings of freedom and relaxation. In other researchers, work results implied that participants' pleasures could be increased when illuminance is increased [15]. Three main lighting design parameters ambient light level, light distribution, and correlated color temperature influence emotional responses [8] [13] [14]. Numerous aspects of lighting design, such as luminance levels [10], the underlying color tone of lighting and the distribution of lighting in an interior environment [16] [17] have been studied in prior research. Although many previous studies investigated the relationship between light distributions and emotions, most of them focused on office and retail applications that usually have higher ambient light levels (150-500 lx) [12] [18] than a fine dining restaurant. Moreover, few studies [13] [14] explored a link between the customer's emotion to the lit environment and the approach behavior. Researchers have proven that restaurant lighting can affect the perception of the customer on the service quality and satisfaction level [19] [20]. Proper lighting drives customer loyalty and shows itself in the forms of intention to return, positive word of mouth, and willingness to pay more. It was also shown that positive emotions, pleasure, and arousal are the core psychological mechanisms guiding these effects. Previous researchers have implied that lighting affects customer's perception of ambient intimacy by two lighting factors, luminance level (low vs. high) and lighting distribution (uniform vs. non-uniform) [13] lighting can also be used for the intimacy of a restaurant dining environment by having a dimmed dining atmosphere but lit up at the focal dining table, restaurants will provide a more intimate and attractive space and increasing customer visit intentions [14]. Focal lighting, or task lighting, focuses on an area to support specific function/task purposes. In the restaurant context, focal lighting typically manifests itself in table lighting and general lighting is the overall lighting and can help the dining experience. The perception of consumption is intertwined with intimacy, coziness, and warmth, which all can be called ambient intimacy. By adding focal lighting in a room with a dim ambiance, we can get non-uniform lighting distribution to make the restaurant ambiance more intimate. If the ambiance is bright, using focal lighting will increase the physiological arousal and cognitive alertness and not affect ambient intimacy [13]. When lighting and focal lighting are used right, they can positively affect customers' perception, which makes them perceive the restaurant as more attractive and raise visit

intentions. However, for this the overall ambiance needs to be dim. The go-to strategy for a romantic atmosphere is focal lighting and dim general lighting [14].

Approach intentions are all behavioral intentions directed at an environment, such as the desire to stay, explore, and affiliate [12] [21]. During the pre-consumption stage, purposes such as approach intention will change restaurant attractiveness and visit intention. A well-designed service scape encompasses the evoking power to create positive meaning associations [22]. In a restaurant, all these positive aspects represent ambient intimacy. Attractiveness and visit intentions are tools that can be used to increase approach intentions. Once customers perceive the space as an intimate environment, it can result in the restaurant becoming attractive and of high quality, hence increasing levels of consumer interest.

Another vital lighting aspect is lighting distribution that affects customers' perception of the restaurant. Lighting distribution either is uniform (i.e., lighting distribution maintains constant illuminance in an interior space) or non-uniform (i.e., distributed at the uneven and unequal intensity in different areas of a room). Each type of social interaction and behavior requires different styles of lighting distribution. whereas a non-uniform strategy encourages informal and casual social interactions whereas a non-uniform strategy encourages informal and casual social interactions. Both luminance level and lighting distribution together can produce environmental perceptions and guide individuals' behaviors. For the restaurant, it is not suggested to have high levels of illumination, this type of spaces produce cognitive alertness and task performance for individuals which would be suitable for workspaces [13]. On the other hand, dimmed level of luminance is best with the non-uniform style of lighting distribution to encourage a sense of relaxation and casual intimacy.

Based on prior research, by adjusting luminance level and lighting distribution style over focal and general lighting sources, restaurants could manage users' behaviors and perceptions of ambient intimacy. We can dim the overall general lighting; however, the dining table is an essential part of the experience. Therefore, it would be better to be lit using focal lighting such as a table lamp. As previous research mentioned, these dimmed and non-uniform lighting design styles can encourage social intimacy and casual encounters. Typically, when dining with one's partner, darkness is preferred, and non-uniform lighting increases the ambiance of relaxation and casual intimacy [14].

TABLE I. SOR MODEL

Mehrabian – Russell's SOR Model				
Environmental Stimuli	→	Emotional States:	→	Response
		P: Pleasure A: Arousal D: Dominance		Approach/ Avoidance

Some subjective perceptions explored by previous research include spaciousness, clarity, relaxation, privacy, order, spatial complexity, formality, pleasantness, attractiveness, uniformity, and brightness [8] [17] [23]. They seem to be influenced by light distributions on the overhead (ceiling) and peripheral (walls) fields. For example, a wall-washing technique influences clarity and order [13] [24]. Cove lighting and wall-washing are perceived as more spacious [13] [24]. Uplighting, cove lighting, wall-washing using warm white light, and non-uniform distribution on the peripheral field are perceived as more pleasant [8] [13] [24]. Uplighting, cove lighting, focal lighting under dim and warm lighting are perceived as more private [8] [13] [24]. Finally, uplighting, cove lighting, accent lighting under low ambient, providing non-uniform distribution on the walls, are perceived as relaxing [8] [13] [14] [23] [24]. Wall-washing creates indirect lighting and influences the perception of a brighter space associated with spacious, modern, socializing, promoting physical interactions [14] [24].

Based on the PAD theoretical model by [14] [21], confirmed the relationship between the low ambient light and non-uniform light distribution, i.e., the use of focal VS general lighting, the perceived attractiveness, intimate atmosphere, and the customer's visit intention. This decision making seemed to be moderated by the relational intimacy, i.e., visit with colleagues VS special friends. This result provided insightful evidence that linked lighting attributes to emotion and approach behavior. However, common design practice for a fine dining restaurant employs many lighting techniques to provide non-uniform light distribution. Thus, questions remain on how each light pattern on the overhead or the peripheral plane impacts the customers' emotions and influences positive behaviors during the pre-consumption stage.

III. METHODOLOGY AND RESULTS

The primary tool was the seven images depicting the same restaurant interior with different light patterns, all with 3000 Kelvin warm-white low ambient lighting and a focal glow (accent lighting) on the dining table (30-80 lx) [18]. Based on the survey from international award-winning restaurant design projects in the past five years, the researcher created a restaurant interior used for this study. Each of the seven images had different light patterns based on previous research and award-winning projects.

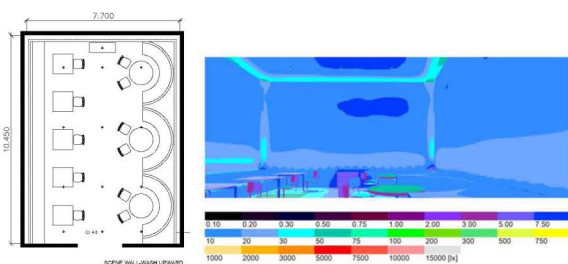


Fig. 1. Layout and false color (LUX level)

Three scenes had overhead lighting (ceiling cove lighting, pendant with diffuse glow, and pendant with directional lighting), while four scenes had peripheral lighting (wall-washing up-light, wall-washing downlight, wall-scone lighting, and wall striping effect). Nine emotions, selected from Mehrabian-Russell's PAD emotional state model [21] [25], included brightness, spaciousness, attractiveness,

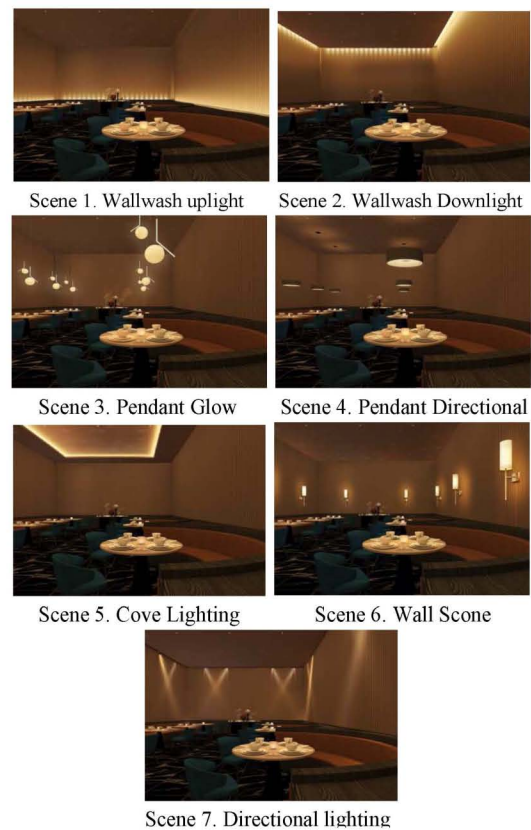


Fig. 2. Perspective scenes

intimacy, relaxation, luxury, pleasantness, welcoming, and formality.

The restaurant perspectives and realistic lighting renderings used Autodesk 3ds Max 2018 and V-Ray. While lighting simulations using DIALUX provided quantitative references that all scenes had a similar range of luminance level, they are not part of the questionnaire.

The screening questions only allowed non-design respondents aged over 25 to participate in the study. Other three parts included 1) Demographic data 2) Seven renderings and each followed by nine 7-Likert scales, and a question about the intention to visit, and 3) Selection of restaurants (i.e., light patterns) to visit with family/friends and a romantic partner. The questionnaire was created using Google Forms (by Google), and a link to the questionnaire was sent via email to potential volunteers who may fit the criteria.

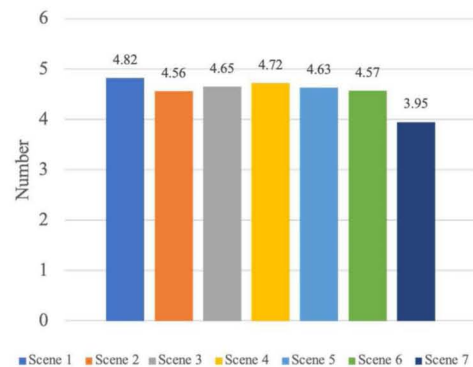


Fig. 3. Total PAD mean values

TABLE II. SOR MODEL FOR THIS STUDY

Mehrabian – Russell’s SOR Model For our study				
Environmental Stimuli	→	Emotional States:	→	Response
Intended lighting arrangement	→	PAD emotion	→	Approach/Avoidance
		Pleasure		
Lighting distribution	→	P1: Dim-Bright	→	Likelihood of visit
		P2: Like-Dislike		
Wall wash upward	→	P3: Relaxed-Tense	→	- How likely would you visit?
Wall wash downward	→	Arousal	→	Purpose of visit
Decorative Pendant (Glow)	→	A1: Large-Small	→	
Decorative Pendant (Directional)	→	A2: Welcoming-Unwelcoming	→	- Who would you visit with?
Ceiling cove light	→	A3: Pleasant-Unpleasant	→	- Partner
Wall sconce	→	Dominance	→	- Friends
Striping effect	→	D1: Luxurious-Simple	→	- Family
Fix Ambient (30-80 Lux on table)	→	D2: Private-Public	→	
3000 Kelvin	→	D3: Formal-informal	→	

One hundred fifty-four respondents participated in the survey. Some 34% and 66% were male and female respectively. The majority (45%) were 25-30 years old, 21% were between 30-45 years old, 22% were between 45-60 years old, and only 11% were over 65. Overall, lighting scene 1 (wall-wash uplight from behind the seating) had the highest average ratings for many emotions, such as spaciousness, relaxation, luxury, and attractiveness, and these perceptions significantly influenced the intention to visit ($p < 0.01$). However, it was not among the top three restaurants that people selected to have dinner with friends or a romantic partner. Some 22.7% of the respondents selected scene 3 (pendant with glowing light) as the first choice for dining with friends, while also 22.7% selected scene 6 (wall scones) for dining with romantic partners.

The average ratings for lighting scene 3 were highest on the perceived brightness, high attractiveness, and welcoming atmosphere. In contrast, the striping effect on the walls received the lowest ratings and seemed to be the least popular choice for both social contexts. For individual differences, ANOVA analysis revealed that age had significant influence on selecting lighting scenes 3, 4, and 6 ($p < 0.01$ and $p < 0.05$). Gender also appeared to impact the choice of restaurant lighting when going with friends ($p < 0.05$).

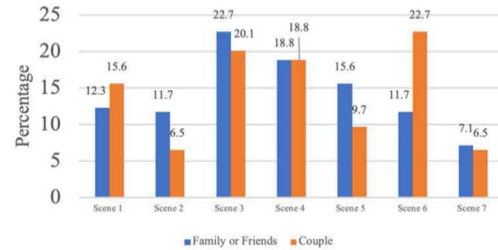


Fig. 4. Purpose of visit and selection of restaurants

A. Likelihood of a visit and Purpose of the visit

We can notice a difference between the likelihood of a visit and the purpose of the visit. That for the likelihood of visit, the highest mean value was scenes 1 and 4. However, for a visit, the most selected scene was scene 3, in which participants visiting with Family and visiting as a couple chose scene 6. Scene 3 was the second choice of participants to visit with their partners. Scene 4 was also chosen as the second option to visit with Family and the third option to visit one's partner. Interestingly, even though scene 1 had a high mean value for the likelihood of visiting, it was not the most participant's first choice to visit with family or partner Scene 3 had the highest number of participants wanting to visit with Family. We can see that scene 3 had a relatively high Brightness mean, and Privacy was quite influential. For scene 6, participants choose it most to visit with a partner. We can see this scene had a high mean value in Brightness, and the most apparent subjective perception in this scene was Privacy. Privacy and Brightness were the emotions that had the most significant impact on the purpose of the visit. This outcome is only based on the highest number of participants and highest number of mean values and influential subjective perceptions.

TABLE III. MEAN FOR EACH SCENE & PAD EMOTION

Light Scenes	Scene 1		Scene 2		Scene 3		Scene 4		Scene 5		Scene 6		Scene 7	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Bright	3.66	0.97	4.22	1.31	5.05	1.21	4.76	1.22	4.32	1.29	4.68	1.35	3.92	1.33
Beautiful	5.03	1.25	4.56	1.27	4.69	1.41	4.77	1.32	4.66	1.37	4.58	1.35	4.01	1.59
Luxury	5.03	1.20	4.68	1.27	4.72	1.46	4.65	1.25	4.66	1.37	4.65	1.39	4.03	1.59
Spacious	5.29	1.17	4.71	1.25	4.48	1.33	4.73	1.17	4.93	1.26	4.59	1.28	4.14	1.43
Relaxing	5.10	1.22	4.60	1.30	4.53	1.32	4.75	1.22	4.70	1.26	4.51	1.34	3.86	1.48
Privacy	4.95	1.30	4.64	1.23	4.61	1.29	4.81	1.17	4.51	1.29	4.56	1.33	4.05	1.37
Welcoming	4.84	1.20	4.60	1.22	4.73	1.23	4.76	1.19	4.60	1.26	4.62	1.26	4.05	1.37
Pleasant	4.72	1.41	4.41	1.44	4.47	1.53	4.53	1.46	4.48	1.43	4.40	1.45	3.64	1.57
Formal	4.74	1.31	4.66	1.24	4.53	1.32	4.75	1.26	4.83	1.31	4.58	1.30	3.87	1.52
Total	4.82	0.89	4.56	0.99	4.65	1.07	4.72	0.99	4.63	1.07	4.57	1.13	3.95	1.26
Reliability	0.88		0.91		0.92		0.92		0.93		0.95		0.95	

B. Age and Gender

The Individual differences in demographic data, age, and gender affect the chance to visit a restaurant. When analyzed by the ANOVA method, it was found that the age of the samples had a significant influence on the likelihood of choosing to use the 4th scene. the age of the respondent has a very significant impact ($p < .01$) on the chance to visit scene 4; and a significant impact ($p < .05$) on the chance to visit restaurants 3 and 6, respectively. For friends or family, the perceived relaxation of lighting scene 7 seems to affect the respondent's decision significantly. For a couple, on the other hand, the perception of privacy (intimate atmosphere) appears to have a statistically significant impact on the selection of the restaurant with wall lamps in scene 6. The perception of formal atmosphere in lighting scene 1 with wall-wash-up light also significantly influences the restaurant's selection.

IV. CONCLUSION AND DISCUSSION

TABLE IV. T-TEST ANALYSIS OF THE SUBJECTIVE RESPONSES FOR EACH SCENE

Light Scenes	Scene 1	Scene 2	Scene 3	Scene 4	Scene 5	Scene 6	Scene 7
PAD	<i>t</i>	<i>t</i>	<i>t</i>	<i>t</i>	<i>t</i>	<i>t</i>	<i>t</i>
Bright	46.77	39.83	51.66	48.16	41.50	42.90	36.31
Beautiful	49.81	44.33	41.20	44.72	42.05	42.02	31.27
luxury	51.74	45.50	39.95	46.15	41.99	41.40	31.31
Spacious	56.06	46.46	41.82	50.13	48.21	44.46	35.83
Relaxing	51.64	43.92	42.47	48.25	46.17	41.45	32.34
Privacy	47.28	46.85	44.35	50.64	43.19	42.49	36.55
Welcoming	49.73	46.42	47.49	49.47	45.35	45.33	36.54
Pleasant	41.49	37.99	36.27	38.33	38.66	37.44	28.57
Formal	44.81	46.44	42.56	46.53	45.67	43.61	31.42

In this context of very low ambient and warm-white lighting, the impact of some light patterns on emotion agreed with previous studies. Test results match with prior research. Wall washing (up/down) is perceived as more spacious [26]. In addition, this type of lighting is seen as Spaciousness because of the bright walls [24] [26] [27]. Also, uplighting and peripheral lighting are perceived as relaxing. Overhead light distribution and focal Lighting impact privacy [14]. Pendant lighting is perceived as bright, Luxury, and Welcoming. In addition, low illuminance on vertical walls causes privacy perception [26]. Overhead light distribution is perceived as more Spacious [24]. In our study Cove Lighting was seen as relaxing, which also matches with prior studies on overhead lighting distribution [26]. It has been said that Spaciousness further conveys feelings of freedom and relaxation [15]. In our study, we have also seen that the overhead top is perceived as welcoming too. Peripheral light distribution, Wall scones in our study are perceived as more spacious, welcoming, and formal. Which other studies have suggested that peripheral lighting distributions can be seen as spacious because of the high intensity on the walls [24] [26] [27]. Peripheral light distribution, the Striping light in our study is perceived as more Private, Welcoming, and bright. Nevertheless, it was also seen as a spacious space. Studies

have suggested that peripheral lighting distributions can be seen as spacious because of the high intensity on the walls [24] [26] [27]. This scene is possible because of the contrast produced on the wall and dimness. It is perceived as private since the walls are still relatively dark. Wall washing lighting upright had the lowest mean for the total brightness. Uplighting was perceived as Pleasant, private, relaxed in other studies [24]. This study had similar results with the mentioned study, scene 1 has the highest mean total PAD mood [26]. Another study talked about that "cove lighting is best for spaciousness" [24], scene 5 Ceiling cove light "spacious" had the highest average score while "brightness" had the lowest score. It was mentioned that "cove lighting was preferred most for relaxation (320 lux)" [26] which can be seen as well that in this study, the cove was perceived as relaxing. A decrease in illuminance leads to an increased sense of privacy, which can be seen in scene 1; people perceived the space as dimmest between all scenes, and as well the privacy is the highest. If using focal lighting correctly can lead to a more attractive space, raise visit intentions. When considering the mean, we can describe the lighting scene 1 (Wall-wash up light) with the highest average ($M=4.52$, $SD=1.470$), followed by scene 4 (Pendant directional) ($M=4.50$, $SD=1.470$) followed by scene 3 (Pendant glow), which because of focal lighting have higher visit intention.

It was found that the lighting distribution had a significant influence on the selection of restaurants. In addition, it was found that visit intention was higher for peripheral lighting distribution. Age had significance in our results. This proves that age has an impact on the likelihood to visit of customers. It also impacts the way they perceive fine dining restaurants. Based on the results, age affects perception of formality and welcoming the most. Gender had significance in our results. This proves that gender has an impact on the visit intention of customers. Gender influenced subjective perceptions such as Pleasantness, like-dislike, feelings of luxury, spaciousness, and welcoming. Gender has a significant impact on the selection of a restaurant to have dinner with family or friends. Subjective perceptions have importance in hospitality and lighting design. Such as relaxation, privacy, formality has a significant impact on visit intention and purpose of visit. Which visit intentions are crucial in getting customers to visit the restaurants and their services. In this study, we have used PAD, pleasure, arousal, and dominance. For pleasure was brightness, like, relaxation; for arousal, it was spaciousness, welcoming, and Pleasantness; lastly, it was a formality, luxurious, and privacy for dominance. Relaxation, privacy, and formality, which are the most significant for visit intentions, are part of dominance and arousal. The purpose of visit in this study was separated into 2, visiting with family and friends or visiting with lover. This helped us to understand how subjective perceptions and distribution of light could be connected to this. Going with friends or family chose scene 3 (pendant glow) the most, followed by scene 4 (pendant directional), the 7th scene had the least number of samples (striping effect). Which means overhead was preferred in this case. As mentioned before, gender was a factor in the purpose of visits with family or friends. The choice for dining with a lover found that the participants chose mainly peripheral and overhead decorative. Likelihood to visit is another essential factor to visit intentions, which was considered in each scene, which was proven that distribution of light had a significant role in choosing a restaurant. As mentioned already, age has a very significant impact on the likelihood of visiting.

Wall-wash uplight was perceived as most spacious and relaxing, similar to the results by Manav [24]. However, the two wall-wash lightings were expected to influence the highest perceived brightness, but the wall-wash uplight seemed to be the dimmest scene and perceived as more intimate. Ceiling cove lighting was perceived as spacious and relaxing, maybe due to darker walls, agreed with other studies [13] [24]. Interestingly, on average, three lighting scenes selected the most for both social relationship contexts (i.e. the diffuse pendant light, the directional pendant light, and wall-scone) are decorative lightings that provide relatively higher luminance sources in the customer's main view than the architectural lighting scenes. The underline emotions associated with these three lighting scenes appeared to be a bright, welcoming, relaxing, and intimate atmosphere. In conclusion, this research filled the knowledge gap on the impact of each light distribution on subjective responses and positive influence on the intention to visit - when not considering a social relationship. However, when asked to select preferred light distributions to have dinner with either a group of friends or a partner, this social relationship seemed to influence the customer's decision strongly. Thus, the results confirmed the mediating role of social conditions on lighting preferences and the customer's behavior, which should be emphasized more in future lighting design research. For practical contribution, the results provide insight into choosing suitable light distributions that influence customers' positive emotions and preferences in each restaurant zone. Finally, due to the limited time, number, and the respondents' background, further study should recruit more participants and explore other factors relevant to the luxury restaurant market, such as cultural differences and income.

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