DineLight

Lighting and The Dining Experience

By

Dalal A S Y Y Alsharhan

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved October 2017 by the
Graduate Supervisory Committee:
Michael Kroelinger, Chair
Eric Margolis
Jennifer Setlow

ARIZONA STATE UNIVERSITY

December 2017

ABSTRACT

This dissertation focuses on lighting and the dining experience as an experiential phenomenon at upscale restaurant setting. The aim is to better the understanding of the impact of lighting on upscale dining experiences, on a global scale. In addition, special emphasis was given to understand the theatrical approach of lighting in staging the dining experience. This research follows a sequential exploratory, mixed-methods approach, which consisted of a qualitative phase, followed by a quantitative phase. The qualitative phase gathered data in the form of interviews and observations, which was then analyzed using thematic analysis. The second phase involved creating a measure which I term, 'DineLight,' as an instrument to assess correlational relationships between lighting and specific dimensions of the upscale dining experience. The quantitative data was analyzed using a two-tailed Spearman's rank correlation coefficient.

Results revealed that lighting can affect four aspects of the overall dining experience; atmosphere, service, sociality, and food. This research revealed a new perspective when looking at the impact of lighting in a certain context, beyond the atmosphere perception. The results of qualitative data and quantitative data were combined and produced two main reference tables for lighting at upscale restaurant setting; lighting characteristics and approaches, and lighting fixtures. These two tables operate as guidelines for successful lighting practices in upscale restaurants. This research demonstrates the applicability of the 'DineLight' instrument to reveal new insights regarding the upscale dining experience, contributing not just to research in the area of lighting design, but also providing practical applications for restaurateurs and others in this industry.

DEDICATION

I dedicate this work two entities:

First, I dedicate this work to my PhD experience. A PhD, has never been my dream, nor my desire. I considered a PhD just a critical bridge for a life-long journey of self-exploration. I left home not to chase a dream, but to pursue a sense of self. I needed to explore and discover who I was, and I did this by completing this PhD process. Through this process, I struggled with how to balance my excitement of many great ideas, but I have also come to see that while balance is safe and comfortable, it is creativity that thrives in the extreme. THANK YOU for this great journey, and I dedicate this dissertation to this process of self-discovery.

Second, I dedicate this work to my Dad, Anwar Alsharhan. Seeing the pride in your eyes kept me going, to fulfil your dream to raise a great daughter. I dedicate this dissertation to you.

June, 30th, 2017

ACKNOWLEDGMENTS

In the name of God, most gracious, most compassionate, there are numerous individuals to acknowledge for their contributions during the research process and writing of this work.

My Family

For their undying support and love throughout my educational experience. My mom for her prayers, my dad for guidance, my sister Mudhi for listening and helping me through the toughest of times, my sister Mona for missing me and making me smile, my brother Saleh for always being there for me, and my brother in law Saleh, for all making great memories of New York City. Their presence kept me going throughout this journey, even with 12,700 kilometers between us.

My Dissertation committee

My chair, Michael Kroelinger, for his wisdom, support, and encouragement. Also, for being a great mentor and treating me like a daughter. My committee member Eric Margolis, for the guidance he offered in qualitative data collection and analysis. My committee member Jennifer Setlow, for her ability to make things happen and bring balance to the committee, and also being a great teacher of theatre lighting.

My friend, Dr. Norah AlMashaan

For keeping such a true friendship over seven years of distance, supporting me and sending me positive thoughts every single day.

My PhD Mates

Mohsen for being a true friend and brother, supporting me in my toughest times. Omar, for always asking the question, “what the hell we are doing here?” I thank them both for the good moments of suffering and frustration, the laughs at the office, and for continuously inspiring me as we learned from each other and assisted one another throughout this journey.

My Mom, Michelle Walter

For all the love and care she offered.

Technical Supporters

Jaime, for her dedication, flexibility and support. Also, Linle Jiang, for his statistical help and support.

TABLE OF CONTENT

CHAPTER Page

CHAPTER Page

LIST OF TABLES

Table Page

Table Page

LIST OF FIGURES

CHAPTER I INTRODUCTION

Overview

The nature and the anatomy of dining at a restaurant has changed enormously over the years with the rise of the new economic growth "experience economy" (Pine & Gilmore, 1998). Accordingly, goods and services alone are no longer adequate for consumer, and food only in dining out is also not adequate too. We, as diners, are looking for unique, memorable, and even hedonic experiences. Holbrook (2000) has affirmed that people desire experiences that include an intangible quality more than before, and nowadays it seems that hedonic and fantasy consumption is more valued for consumers than product and service consumption. Furthermore, Wood (1994) has emphasized that dining out is a central element of consumer experience that people engage in on regular basis. As an experience, dining should be a memorable occasion that has both utilitarian and aesthetic aspects. Thus, Pine and Gilmore recommended staging the experience as an approach to apply experience economy.

The dining out phenomenon has become more prevailing and the restaurant industry has grown massively worldwide. Survey results of a UK study conducted in 2010 revealed that 77.1% of all participants had visited a restaurant in that year (Capstick, 2011, Cited in De Silva, Elliott, & Simmons, 2013) . In the United States, about 50% of all money spent on food is spent outside the home, and consumers were found to eat at restaurants up to five times a week (Walker, 2015). According to a National Restaurant Association (2017), the total market volume of the dining industry is approximately $799 billion in the United States.

The restaurant sector faces the challenge of intense competition. A commonly held view is that for a restaurant to be successful, it just has to offer good food. In actuality, is much more complicated than that. Restaurants are offering diners beyond their basic need to eat, and turning it into a sophisticated ritual involving hospitality, imagination, satisfaction, graciousness, and warmth (Gunasekeran, 1992)). While, Parsa, Self, Njite, & King (2005) uncovered the importance of food quality as a tangible element to the success of the restaurant, yet this success is not guaranteed, and it relies on the restaurant concept and diners' overall experiences.

Despite the fact that that dining is a large expenditure of our daily life (National Restaurant Association, 2010) compared to other variables, academia has paid little attention to the experience aspects of dining, and especially the intangible elements such as atmosphere. Atmosphere is what creates the concept and experience of the restaurant. This is conceptualized by its developer, and contributed to by its staff and is ultimately experienced by diners. Therefore, a restaurant's atmosphere is the foundation of the dining experience as it sets the stage of the experience. Factors such as music, lighting, artwork and spatial layout align to elicit certain feelings such as: comfort, intimacy and even romance. Diners' perceptions of atmosphere may precede or complement the culinary delights that are anticipated to be enjoyed at the restaurant. In this context, Milliman (1986) argued that *'In some cases the place, or more specifically its atmosphere, is more influential than the product itself in the purchase decision'*. Lin (2004a) explains that public spaces such as hotel lobbies or restaurants can create first and ongoing impressions among customers, helping them gather '*information for the subsequent evaluation of the entire service* organization'.

The importance of designing and sustaining a unique atmosphere has only recently gained growing academic attention, and current research considers atmosphere a major dynamic tool in attracting and satisfying consumers and in increasing financial interest by maximizing income and market share in the hospitality industry (Dubé & Renaghan, 2000; Heide & Grønhaug, 2009; Jang & Namkung, 2009; Magnini & Parker, 2009; Ryu & Jang, 2007). However, as insightful as these studies are, the majority of current hospitality literature continues to focus on the impact of non-environmental factors (such as food quality, service quality, price, and location) on diners' satisfaction and revisit intentions (e.g. Chow et. al., 2007; Hyun, 2010)

Environmental factors that contribute to the restaurant's atmosphere, such as lighting, temperature, food aromas, interior decoration, background music, and layout can provoke diners' positive or negative emotional responses, thus influencing the overall dining experience and diner's intentions to revisit the restaurant. However, our understanding of the specific mechanisms regarding how exactly environmental factors provoke diners' experiences is relatively weak.

An upscale restaurant is a specialized type of restaurant category that invests rather high expenditures to create a superior atmosphere (I. Kim et al., 2011; Kim et al., 2006), therefore, investigating the role of the environmental factors that contribute to this atmosphere is important. In addition, it is essential to understand how those environmental factors interact with each other to elevate the atmosphere of the dining experience. In this research, I examine one significant environmental factor, lighting. Focusing specifically on lighting and the dining experience in upscale restaurant setting is an issue of great value. Lighting is one of the atmospheric tools that can be easily modified in the restaurant and has a major effect to modify the atmosphere in matter of seconds. There seems to be few academic studies on this important facet of experience, and I hope to contribute a better understanding of this phenomenon through this research.

Research Identity

My research interests regarding the impact of lighting as a key factor in upscale dining experience developed as a natural progression while pursing my academic studies. In 2008, I graduated with a degree in Interior Design and worked for couple years in Event Design and Planning. During this time, I observed first-hand how lighting could be a powerful tool in changing the space mood and atmosphere. After that, I came to Arizona State University to do my Master's degree in Design with a concentration in Lighting Design. Throughout the phases of developing my research and reviewing, I realized that retail "atmospherics" was a key topic in marketing research but seemingly lacking in design literature, which pushed me to want to examine retail lighting from design perspective. I wanted to understand what lighting can do, going from the macro level of the retail space to the micro level of the product within a given space. Accordingly, for my thesis study I conducted a cross-cultural comparison of lighting and product perception. Because the study was done comparing two cultures (American culture and Middle Eastern culture), I ended up choosing food products since food is central to both cultures and allowed an interesting dimension for comparison.

After examining lighting, looking at basic micro level - effect of lighting on product perception for my Master's - I wanted to advance to the macro level by looking at the effect of lighting in a particular space for my PhD. My passion for food and cooking guided me to the term "Dinescape" (Ryu & Jang, 2008), which is the dining environment in upscale restaurants. The fundamental question I would continually ask myself, 'why does food seem taste better within certain environments'? How do specific elements of space and design actually alter one's experience and perception of the taste of food and the whole dining experience?

My assumption is that lighting can be such a powerful tool in changing mood and emotions. Another assumption drawn from this is that mood and emotions can affect the way we perceive the environment around us and the way we perceive and taste food. This seems a very logical assumption but there is a deep interconnected psychology of perception underlying this. As such, I wish to base this research on more intellectual assumption to draw a connection between variables.

An in-depth review of academic literature suggests that research in Dinescape - dining environment - is a relatively new aspect of academic research. As, qualitative research has the ability to take a more exploratory approach, I feel this will be critical in expanding current understandings. While it may difficult to disentangle and analyze the entire make up a dining experience and analyze how this affects food quality perception and taste, it is possible to investigate the role of lighting as one critical component of overall atmosphere to understand how lighting can affect in the dining experience. This requires in depth interviews and observations to identify variables than followed by statistical connections between variables discovered. I'm trying to find the 'WHY' and 'HOW' mechanism behind lighting more than the WHAT mechanism. For this reason, I believe qualitative domination in this research followed by quantitative supporting phase is an appropriate approach.

Research Purpose

My purpose is to explore how lighting impacts and specifically "*stage*"[1] the dining experience and explore the most critical factors that contribute to this impact. After this initial exploration, I created a lighting instrument that aided at measuring the performance of lighting in up-scale restaurant setting. The primary research question guiding data collection and analysis is:

How does lighting impact the dining experience at upscale restaurant setting?

Research Objectives

The specific objectives following this research question for this study are:

1. To determine the components of the dining experience based on subject's perspective.
2. To explore the role of atmosphere in impacting the dining experience.
3. To explore the role of lighting as an atmosphere element in impacting the dining experience.
4. To understand how lighting can "stage" the dining experience.
5. To explore and understand the relationship dimensions between lighting and the dining experience at upscale restaurant environment.
6. To explore and identify the specific characteristics of lighting that contribute to the specific aspects of the dining experience.
7. To develop a survey instrument to measure the performance of lighting and thus the impact of lighting in the dining experience at upscale restaurant environment.

Research Significance

Research in restaurant design is a relatively new scientific approach that is gaining interest among academics. Since the physical environment has been shown to influence consumer behavior from a marketing perspective, this study looks at atmosphere and specifically lighting from design perspective. My main goal is to understand how lighting can impact the upscale dining experience. My intent is to create an instrument that operationalize the relationship between lighting and the upscale dining experience. This instrument can be used for future

[1] Stage is defined according to Merriam Webster Dictionary as "A center of attention or scene of action". For more information go to http://www.merriam-webster.com/dictionary/stage.

theoretical and managerial applications such as measuring the impact of upgraded lighting in upscale restaurant setting before and after modeling.

The findings of this study contribute to the goal of interior design that promotes a sustainable quality of life through creating environments that support user's physiological, psychological, and cultural needs. This particular study is concerned with diners' perceptions, needs, desires, and experiences.

Jensen (1999) suggests in his vision that imagination and creativity will be the most valuable source for business innovation and will take over information technology. Understanding creative lighting techniques and strategies used to stage the dining experience, and proposing how it can be applied in the restaurant industry, can be valuable in both academic and management fields.

The findings from this research provides insight into understanding the role of lighting in restaurant environment, and this information can be utilized by other arenas as well. By understanding the interaction of individuals, objects, and lighting, this research t is contributing to other related interior environments such as retail, workspaces, museums, educational facilities, healthcare facilities, and many more.

Besides the interior design role and perspective approached in this research contributes to the literature on the service science and hospitality industry. Along with theoretical contribution, this research provided managerial implications that can be applied to the foodservice industry. Thus, this research creates new role for the expanding topic of restaurant design, restaurant lighting, Servicescapes (Bitner, 1992), and specifically Dinescape (Ryu & Jang, 2008).

Structure of the dissertation

This dissertation consists of six chapters. This introductory chapter provides a background and rationale for the research, the research questions, objectives, and outlines the significance of this study. Chapter Two reviews related literature, establishing key definitions and central concepts such as experience economy and the theatrical metaphor, followed by atmospherics, then covers specifically food perception literature and lighting studies. Following the literature review is the methodology chapter (Chapter Three). In this chapter I discuss the research philosophy and rationale used for selecting exploratory sequential mixed method

approach (i.e. a qualitative stage followed by a quantitative stage, each one adhering to the percepts of their own research paradigms.) The qualitative stage collects data through interviews and observations and approaches the analysis of data through applied thematic analysis and data reduction. This stage along with the literature reviews informs the quantitative stage to develop a survey instrument that operationalize the qualitative results. Chapter Three provides details about how the data is collected and analyzed at both stages. In Chapter Four I present the analyses and results for both qualitative and quantitative phases. A discussion of transition between the two phases of the research is also included. Chapter Five is a full discussion of the findings emphasizing how both phases were integrated together. My final chapter discusses my conclusions (Chapter Six). This is a summary of the dissertation structured around the main contributions to knowledge and addresses each of the research objectives. Chapter Six also discusses the theoretical and managerial implications of the findings and reflects upon the limitations of the of the research and future direction of research.

CHAPTER II REVIEW OF LITERATURE

Overview

The act of dining out is an iconic sociable experience, arising out of ancient campfire cooking and the generous Greek and Roman banquets. The restaurant as an establishment started to be recognized at the 17th century (Pitte, 1999), after the existence of taverns and inns. Yet, the word “restaurant” originally developed in the 16th century for a restorative broth. In 1771, “restaurant” continued to develop to refer to any institution specialized in selling restorative food (Spang, 2000). The early 19th century, witnessed the rise of fancy hospitality venues. Restaurant decoration and furnishings revealed the welfare, and the theatrical majesty was the trend (Glanville & Young, 2002). Then again, the 1930s witnessed some relapse to simplify the restaurant design, and the 1960s signaled an era where not just the wealthy but also the average people had the opportunity to dine in restaurant settings (Pitte, 1999). There is a diversity of eating sites and corresponding experiences, which serves to differentiate between the various restaurant categories such as bistros, brasseries, cafes, diners, casual dining chains, and fine dining.

Contemporary trends suggest that ostentatious design has been upstaged by the food itself; which has become a design aesthetic in itself. According to San Francisco restaurant designer and architect Shawn Alexander; "*Taste is only one of our senses. Restaurant patrons want an authentic experience in an environment that speaks to them and their needs*," (Alexander, 2014).

In order to gain a deeper understanding on this topic, I examined literature from the following fields: food quality and preference, appetite and gastronomy; atmospherics, retail design, and restaurant environment, in particular, Dinescape (Ryu & Jang, 2008). I also assessed literature from the field of lighting; retail lighting specifically, including lighting measures and scales in retail environments. In addition, I examined the notion of ‘experience economy’ (Pine & Gilmore, 1998) and hedonic consumption[2] (Holbrook & Hirschman, 1982); hospitality and

[2] Hedonic consumption “designates those facets of consumer behavior that relate to the multi-sensory, fantasy and emotive aspects of one's experience with products.” (Hirschman & Holbrook, 1982:92)

tourism; environmental psychology, and multisensory perception. While this provided a broad foundation, for the purpose of this dissertation, only key literature in the following fields is discussed: Experience Economy, Theatrical Metaphor, The Physical Environment, Food Quality, Food Quality and Atmospherics, Lighting, and Research Approaches in Lighting and Atmospherics. At the conclusion of this chapter I discuss the apparent gap in current research in the field of restaurant lighting, thus underlying the need to conduct this research project.

Experience Economy

Caplan (1997, p. 3) once stated, "*food is never just food and its significance can never be purely nutritional*". The purpose of dining out can be for pleasure, for a celebratory event, or even the setting of a business meeting. From a marketing and management standpoint, it is acknowledged that a key to endure and excel in the increasingly competitive foodservice industry is to offer unique, differentiated products (in this case food) and service that leads to outstanding experiences that add value for the diners. Experience has become an essential part of companies' marketing strategy and it is also the basis for the emerging concept "experience economy" suggested by Pine and Gilmore in 1998. "Experience economy" is the fourth-economic offering following the agrarian, industrial, and service economy. Pine and Gilmore (1998) argued that in the same manner goods are characterized by tangible features, services are characterized by intangible benefits, and experiences by memorable sensation. They labeled consumers as users for goods, clients for services, and guests for experiences. Therefore, experiences call for being "*staged*," and involve the dramatizing of the service performance. This use of theatrical metaphor endorsed the development of the services-as-drama concept. Yet, Pine and Gilmore (1998) claimed that describing work, as theatre is not a metaphor but a prototype of reality. This kind of theatrical language appears very applicable in the context of hospitality, in particular, the restaurant industry.

Theatrical metaphor

The services-as-drama concept was initially drafted by Schechner's (1977) who introduced performance theory to propose a new model for strategic thinking. He incorporates anthropological and literary analysis of Greek drama and tribal rituals to determine the central

aspects of all performances – drama, scripts, theatre and performance. Building on the experience economy discussed earlier, extraordinary events, land in sacred spaces (Turner, 1974), alienate from daily life, and are managed in line with the rules that allow the individual to explore activities and feelings away from their ordinary daily experience. To Schechner (1977), a '*theatre*' is any space set apart for this purpose, a definition that could include the restaurant setting for a special meal.

Although several authors (Berry, et al., 1985; Gronroos, 1985; Lovelock, 1981) had associated service delivery to drama, Grove & Fisk, 1992 were the first to create an articulated framework for interpreting services management. They proposed a drama-metaphor framework where they characterized the participants as both the actors and the audience, the physical environment becomes the setting and the process becomes the performance. This work is closely related to Bitner, 1992 notion of the '*Servicescapes*', the physical environment that influences perceptions of the service. 'Servicescapes' are the stage setting for the performance. The application of the 'servicescapes' concept and stage management to restaurants and other foodservice environments have been advanced by a number of recent authors (Andersson & Mossberg, 2004; Gustafsson *et al.*, 2006; Hansen *et al.*, 2005; Warde & Martens, 2000) into models of how the setting and service performance work together to create an overall atmosphere. For instance, Harris et al. (2003) argued that in order to understand the dining experience, drama is the key element between the restaurant and the diner, in which the diner is the character with a role to play; this role is revolved around the symbolism of the occasion and the self-image of the individual.

The theatrical metaphor supports the traditional view of foodservice as an art; an art that entails both the creation of talented professionals and the appreciation of skilled diners. The concept of foodservice as a theatrical performance encourages managers to '*put on a show'* – to employ staff (actors), processes (scripts) and physical environment (props and sets) to boost the diner experience. All this combine to create the atmosphere, which Hansen et al., (2005, p. 145) portray as '*the individual emotional total experience throughout the entire meal including social experience, comfort and intimacy'*.

The Physical Environment

Interest in the physical environment dated back to 1973 when Philip Kotler, author and professor in marketing, first introduced the concept "*atmospherics*," to describe the effort to design a consumption environment to produce specific sensations and emotions in the consumer to enhance consumption probability. Since Kotler (1973) first introduced the significance of the store environment in stimulating a customer's desire to purchase; retailers, marketers, and environmental psychologists have recognized the role of the physical environment as a central element in understanding consumer responses (Baker, 1986; Bitner, 1992; Turley & Milliman, 2000). Table (1) represents a summary of the dimensions related to the physical environment in previous' research. However, only the most influential ones are discussed below.

Bitner's (1992) research has been one of the most influential in the field of service marketing. She identified three dimensions of atmospherics, or what she termed the "*Servicescape*:" ambient conditions, spatial layout and functionality, and signs, symbols, and artifacts. Specifically, she referred to ambient conditions as the background characteristics of the environment, such as temperature, lighting, noise, music, and scent.

In a spatial conceptualization of experience creation, the Experiencescape concept is an effective experiential extension of the Servicescape, which acknowledges the dynamics underlying the experience offering. O'Dell & Billing, (2005) represented the Experiencescape as a landscape metaphor for the organized cultural background, that aims to shape and guide the experience of people. In this concept, the experience is shaped by the social interaction between people but its further formed by the material cultural artifacts and physical environment.

Atmosphere plays a crucial role in the success of an upscale restaurant and overall diner satisfaction. In an effort to apply the Servicescapes (Bitner, 1992) concept in restaurant setting, Ryu and Jang (2008) proposed an important new tool, "*Dinescape*" as a measurement scale for the physical environment of upscale restaurants. The Dinescape consists of six dimensions: facility aesthetics, ambience, lighting, service product (table settings in particular), layout, and service staff. Using factor analyses, they removed lighting from the ambience dimension and included it as a separate dimension. However, their measurement of lighting is limited to an

Table 1 An extension of Literature Review on Dimensions Related to the Physical Environment (an extension of Ryu & Jang, 2008 Work)

AUTHOR	TERMINOLOGY USED	DIMENSIONS
Baker (1987)	Atmospherics	Ambient Factors
		Design factors (aesthetic & functional)
		Social factors
Bitner (1992)	SERVICESCAPE	Ambient conditions
		Spatial Layout and functionality
		Sign, symbol and Artifacts
Baker, Grewal, Parasurman (1994)	Store Atmospherics	Ambient factors
		Design factors
		Social factors
Berman & Evans (1995)	Atmospherics	External variables
		General interior variables
		Point of purchase & decoration variables
Stevens, Knotson, & Patton (1995)	DINESERV	Reliability
		Responsiveness
		Empathy
		Assurance
		Tangibles
Wakefield & Blodgett (1996)	SERVICESCAPE	Layout accessibility
		Facility aesthetics
		Seating comfort
		Electronic equipment/displays
		Facility cleanliness
Wakefield & Blodgett (1999)	Tangible service factors	Building design & décor
		Equipment
		Ambiance
Turley & Milliman (2000)	Atmospherics	External variables
		General interior variables
		Layout and design variables
		Point of purchase & decoration variables
		Human variables
Raajpoot (2002)	TANGSERV	Ambient Factors
		Design factors
		Product/service factors
O'Dell & Billing, 2005	Experiencescape	Social interaction
		Material cultural artifacts
		Physical environment
Ryu & Jang (2008)	DINESCAPE	Facility aesthetics
		Ambiance
		Lighting
		Service product
		Layout
		Social factors

assessment of whether or not the lighting creates a warm and welcoming atmosphere. While this was an advancement in studies on atmosphere and lighting, I believed that the role of lighting in a dining environment can be examined more specifically than was addressed in the Dinescape research. I felt their premise could be taken a step further, as what was needed was an accurate measure of the multi-dimensional impact of lighting. This provided the impetus to develop the measure, I term 'DineLight' which builds up upon their foundational research.

However, their measurement of lighting is limited to an assessment of whether the lighting creates a warm and welcoming atmosphere. From this standpoint, I believe that the role of lighting in a dining environment can be more specifically examined than was addressed in the Dinescape research. Their premise could be taken a step further and what is needed is an accurate measure of the impact of lighting, which I adopted in this research.

Robson (1999) argued that human beings take information about the environment and use it to make conscious or subconscious judgments. Lighting is an important variable in this equation. Robson noted that human beings shift constantly between three modes of perception. The first mode is the operational mode, which concentrates on only those elements of the environment that will help us accomplish a task. The second mode is the responsive mode, which is everyday noticing of things around us. The third mode is the inferential mode, which focus our attention on those elements that support our image or knowledge of an environment. However, each mode directs our attention to different stimuli, and the most successful environment provide us with information on all three levels.

The premise of Dinescape discussed above was very informative in driving and determining my research concentration. However, my research seeks to include notions of complexity and perception as addressed by Robson (1999), to more specifically examine the mechanisms involved in how lighting impacts the dining experience.

Food Quality

Food quality is one of the central components of the dining experience (Namkung & Jang, 2007; Sulek & Hensley, 2004). Aforementioned studies have empirically looked into the significance of food quality in restaurant settings. For instance, Clark and Wood (1999) confirmed

that food quality is a main factor influencing diner loyalty in restaurant selection; Susskind and Chan (2000) found that food quality is a main determinant for visiting a restaurant from the diner's opinion; Sulek and Hensley (2004) found that when food quality is put in contrast with other aspects of the restaurant, such as environmental components and service quality, it is the most important factor of diner's satisfaction.

Nevertheless, in a restaurant setting, once the decision to visit a particular restaurant is made, the overall value of the experience may also be created or judged using a combination of environmental and non-environmental factors. Hansen et al. (2005) found that the element of harmony during dining experiences was achieved through *"a balanced physical appearance in the meal, such as food and wine in combination with the interior of the restaurant ... physical structure and artifacts*."

Food Quality and Atmospherics. The influence of context on food cannot be ignored. Indeed, as Marcus Apicius, the top Roman gourmand, once expressed, "*the first taste is always with the eyes*" (Dalby, 2003). According to Finkelstein (1989) , many restaurateurs appear to have accepted that the atmosphere can be as important as – or even more important than – the food component. Conversely, following research by Clark and Wood (1999) debate this concept. These authors found that non-environmental factors, rather than environmental, were identified as being more important with regard to diner loyalty. Although many other researchers seem to be in agreement with Clark and Wood (Reimer & Kuehn, 2005; Wall & Berry, 2007a), they note that a restaurant's atmosphere; ambiance, design and other intangible elements need to be paid attention to as interest in them is increasing among diners. However, this pool of research conducted comparative research addressed as environmental vs. non-environmental. As a result, food quality was looked at in terms of one attribute of many, including environmental factors like lighting and music, rather than examining the effect of environmental factors on perceptions of food quality, which is the approach that I take in my research.

Research aimed at understanding the role and significance of situation on dining experience goes back to 1940s, when the acceptability ratings of food items were shown to be different when consumed on the ground versus an aircraft flight (Green & Butts, 1945). The

impact of setting was explored and developed in studies performed in restaurants and cafeterias, which have shown that identical food is rated differently in different dining settings. Meiselman et al., (2000) served US army combat rations, the Meal Ready to Eat, taken out of their packaging and offered as part of the menu, in both a cafeteria and restaurant setting. Edwards et al., (2003) took this a stage further and served a standard dish, Chicken a la King, a creamy chicken dish with rice, in a variety of locations including a military dining room, residential home and a 4-star restaurant where the dish could be freely chosen from the menu. King et al. (2007) in a confirmatory study, served similar dishes in a central location laboratory, a central location and outlet of a national restaurant chain. In all of these studies, identical meals were served after which diners rated the acceptability of the meal, using a 9- point hedonic scale. In all cases, the factor that differed was the context under which consumption occurred. The results of each of these studies clearly demonstrated a difference in acceptability with a distinct ranking; the 'better' the dining facility, the higher the acceptability ratings. It can be argued that different groups of diners were involved, but the point is that when identical food is served in a different category of dining facility, diners rate the food differently.

Based on the above discussion, many studies have demonstrated the importance of the context in which consumption takes place and how they might be manipulated. Nonetheless, the need to understand exactly how specific environmental factors, in my case, lighting, can influence food quality perception, food acceptability, and the whole dining experience is necessary.

Lighting

Lighting can be one of the most powerful physical stimuli in restaurants, particularly in upscale restaurants. From my own experience, people might correlate bright lighting at fast-food restaurants (e.g., McDonald's) and an association with quick service and relatively low prices. In contrast, the gentle and warm lighting in more refined setting, seems to be perceived as full-service experience and higher prices. Still, there are not yet studies in restaurant lighting that support my observation.

Lighting research within a restaurant setting conveyed that softening the lighting and music led people to eat less, and to rate the food as more enjoyable (Wansink & Van Ittersum,

2012). The same researchers also found that these results challenge the generally hypothesized U-shaped effect of restaurant lighting and music on food consumption, where loud music and bright lights accelerated one's food consumption, and soft music and soft lights decelerated consumption, and even when people stayed longer, they ate less (Wansink, 2004, 2007) . Additionally, it has been reported that harsh or bright illumination decreases the duration of a store visit, while soft or warm lighting generally causes people to linger longer (Summers & Hebert, 2001). However, most of these studies were conducted in retail settings, rather than restaurants settings.

Up until now, this seemed the only type of research done on lighting within restaurants context. Researchers only looked at the impact of lighting on the speed of eating and time spent in the restaurant. Based on my deep literature review, no one has examined the impact of lighting as an atmospheric tool affecting the overall any type of experience in general, and the dining experience in specific. Although some instruments for measuring lighting are available (which will be discussed in detail below), I personally believe it's not applicable to the dining experience.

Research Approaches in Lighting and Atmospherics. There are three main approaches taken by key researchers to measure the impact of lighting within a given environment. These approaches include: 1) the M-R Model 2) Flynn's (1988) Model, and 3) Vogel's (2008) Model, which are summarized in Table (2), and discussed below.

Table 2 Research Approaches in Lighting and Atmospherics

Author	Model/Measure	Field	Philosophy or Concept	Dimension
Mehrebian & Russel (1974b)	M-R MODEL	Environmental Psychology	Based on based on the stimulus-organism-response (S-O-R) paradigm	Approach-Avoidance Behavior
Flynn (1988)	Flynn Model	Lighting and Marketing	Gibson Theory of Perception - Human Impression	Perceptual clarity, spaciousness, relaxation and tension, public versus private space, pleasantness, and spatial complexity.
Vogels (2008)	Atmosphere Questionnaire	Lighting	Perceived Atmosphere	Coziness, liveliness, tenseness, and detachment.

In 1974, environmental psychologists Mehrebian and Russel designed the M-R model, for analyzing the interaction between human behavior and the physical environment. The M-R model suggests individuals react to environments with two general and opposite forms of behavior; approach and avoidance (i.e., either approaching the situation or avoiding the environment altogether). M-R model was based on the stimulus-organism-response (S-O-R) paradigm, which correlated features of the environment (S) to approach-avoidance behavior (R) within the environment, mediated by a person's emotional states (O) evoked by the environment. A number of researchers have used this model in studies on retailing and the service industry (Areni & Kim, 1994; Robert & John, 1982).

Researchers also found that emotional states can be difficult to disentangle from perceived atmosphere. Yet, the effect of environmental variables on perceived atmosphere is expected to be independent from people's emotions. As a result, Vogel (2008) constructed an atmosphere questionnaire composed of atmosphere terms forming 38 semantic differential scales. She concluded that the atmosphere could be described in four dimensions: coziness, liveliness, tenseness, and detachment.

James Flynn is recognized an influential lighting researcher and retail consultant. A major contribution of his work is applying Gibson's (1971) perceptual theory to the field of lighting and concluding that lighting actually impacts the way in which the brain perceives the outside environment. He introduced the element of subjectivity rather than simply the assumption of perception as objective process. Flynn (1988) suggested that there are six categories of human impression that can be influenced or modified by lighting design: perceptual clarity, spaciousness, relaxation and tension, public versus private space, pleasantness, and spatial complexity.

Many researchers have employed these three models to measure the impact of lighting especially in retail and service environment, however, these models are somewhat lacking when applied to a restaurant environment. While these models are informative in terms of assessing lighting as a single element of perceptions of atmosphere, they fail to take into the interactive and multidimensional nature of lighting. By this I mean lighting can impact several elements of perception simultaneous (e.g. quality of food, music etc. which modifies interpretations of the

restaurant's overall atmosphere. I propose that lighting is perceived holistically, where subtle changes in lighting prompt complex and nuanced responses. It is important to have a measure to assess such an important element of atmosphere. Bitner (1992, p.57) claimed, "Managers continually plan, build, change, and control an organization's physical surroundings, but frequently the impact of a physical design or design change on ultimate consumer satisfaction is not fully understood." I believe it is necessary to develop an instrument that can specifically measure the impact and effectiveness of lighting in an upscale restaurant environment. This instrument will also help to understand the mechanisms which actually impact lighting in restaurant settings.

Summary

Based upon the reviewed literature, it is clear that lighting has an essential role in affecting the dining experience in upscale restaurant settings. When Ryu and Jang (2008) proposed the Dinescape as a measurement scale for the physical environment of upscale restaurants, they performed quantitative factor analysis and removed lighting from the ambience dimension and included it as a separate dimension. This affirms the importance of lighting in a restaurant context. However, three main issues were also observed when reviewing literature. First, research on lighting in restaurant context primarily focused on food intake (in terms of calories) and time spent (Wansink & Van Ittersum, 2012) rather than the entire dining experience. Second, the models used to measure the impact of lighting, was mainly measured in retail environments. Third, the literature on lighting for restaurant environments is based on retail lighting. This is problematic because the mechanisms involved in making a purchase or selling a product are likely entirely different than a dining experience in an upscale restaurant. As a result, there is a need to understand how lighting can contribute to the dining experience.

CHAPTER III METHODOLOGY AND PROCEDURE

Overview

This chapter defines clearly the research methodology used in this study. The methodology used was a mixed methods research framework encompassing both qualitative and quantitative methods and measures. The aim of this research was to explore the impact of lighting on upscale dining experience, and develop an instrument that can measure this impact. Therefore, this chapter also explains the construction of the research design that I choose for the purpose of this study and the reasons for this choice. In addition, this chapter outlines in details the specific methods used for data collection and analysis of both the qualitative phase and the quantitative phase. Lastly, I discuss the ethical issues that I followed in the process of this research.

Research Design

This research utilized a mixed methods design (Tashakkori & Teddlie, 2003), to enhance the examination of the research questions (Creswell & Clark, 2011). I employed sequential exploratory strategy, which incorporates the collection and analysis of qualitative data, followed by the collection and analysis of quantitative data (J. W. Creswell, 2002, 2013; J. W. Creswell et al., 2003), so that the results of the first qualitative phase can aid at informing and developing the second quantitative phase (Greene, Caracelli, & Graham, 1989) . In the first phase, I used a qualitative multi-method (interviews and observations) approach to explore the various dimensions of the dining experience that lighting can impact. The second phase, I put together the dimensions identified in the first phase, in order to develop and test the lighting instrument "DineLight" for upscale dining experience and then test this instrument. This sequential approach has been noted to be exceptionally effective when developing and testing an instrument since one does not exist (Creswell, 1999).

Procedural diagram. The visual model of the procedures for the sequential exploratory mixed methods design of this research is presented in Figure (1). The priority in this research design was given to the qualitative method, because the qualitative research represents a fundamental aspect of data collection and analysis in the research, in particular focusing on an in-

depth exploration of variables. The quantitative component follows the qualitative phase and is utilized to evaluate the predicting power of the selected dimensions of lighting in the upscale dining experience. The qualitative and quantitative methods are integrated at the beginning of the quantitative phase while developing the lighting instrument for the second phase. An analytical integration of these took place during the discussion of outcomes in this research.

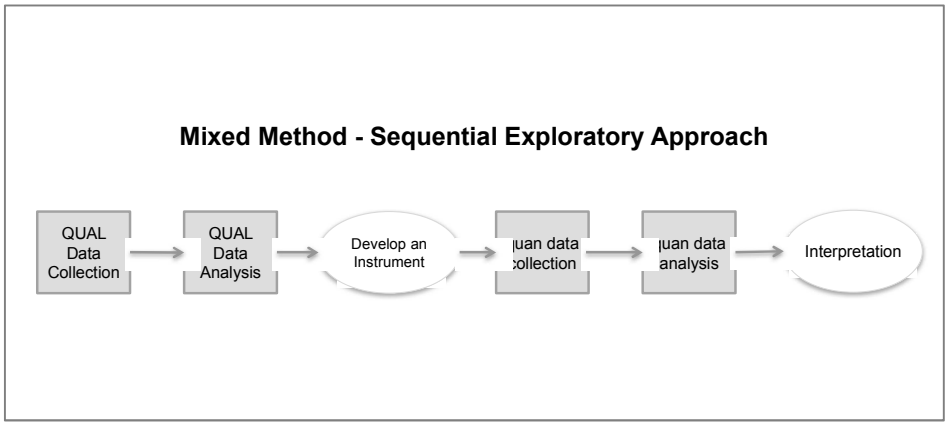

Figure 1 Procedural Diagram; Mixed Method - Sequential Exploratory Approach

Theoretical Lens

Since most exploratory research design starts with qualitative data, a constructivist paradigm in the first component of the study is necessary for valuing several mindsets and profound understanding (Creswell & Clark, 2011) . Fundamentally constructivist paradigm acknowledges positions of subjectivity and intersubjectivity encountered. In qualitative research, data collection is obtained from subjects who are involved regularly within the frame of the research setting, while the analysis of data is grounded on the values that these subjects perceive for their world (Patton, 2015). Essentially, qualitative research is able to comprehend the problem based on multiple contextual factors (Miller, 2000).

In accordance with this, for the quantitative component, I adopted a post-positivism approach toward the statistical tendencies. Post-positivism is an “interpretive perspective that has the elements of being reductionistic, logical, empirical, cause-and-effect oriented, and deterministic based on priori theories” (Creswell, 2012, p. 299; and see also Campbell & Russo, 1999, p. 151). Quantitative research depends on numerical data, and I adopted post-positivist

assertions to build knowledge, such as causation thinking, variables reduction, hypotheses and questions, use of measurement and observation, and theories testing (Mertler, 2015).

Mixed methods research develops knowledge on pragmatic grounds (Maxcy, 2003; Creswell, 2009) and the sequential exploratory nature of this research not only addressed the issue of how lighting impacts dining in an upscale restaurant setting but these findings is used to create an DineLight instrument to measure the impact and performance of lighting in this setting.

Phase I: Qualitative Data Collection and Analysis

The goals for the qualitative phase of this research aimed at understanding three main dimensions. First, context; how lighting can affect the dining experience at upscale restaurant setting. Second, perceptions; how individuals make sense of the role of lighting in the dining experience and what meanings or connections can lighting evoke. Third, interactions; how individuals interact with lighting and how lighting can affect the interaction between both individuals and also with their environment. This last dimension allowed me to examine specific factors that revealed how lighting can affect the different dimensions of the dining experience.

Multi Method Approach. Interviews and observations are two essential methods used in collecting qualitative data. To capture how lighting would impact the dining experience at upscale restaurant, I used both to gain a comprehensive perspective of the experience studied. The use of multiple data sources allowed to validate and corroborate the outcomes of this research.

Interviews. ***Interview Sample.*** The sample of participants providing the data has an impact upon the quality of the final product of the research (Fowler Jr, 2013). To ensure quality of data collection, I considered the following four factors:

- How the upscale dining experience will be captured and conveyed by the sample.
- The type of sampling.
- The sample size required.
- How to recruit participants (e.g. chain referral).

I adopted purposeful sampling (Patton, 2015,), where it is considered non-probabilistic sampling; meaning that not every single individual within a given population participates in the research. The goal was to sample individuals who were relevant to this research study. I

employed maximum variation sampling (Patton, 2015,), which determines in advance, certain criteria to distinguish potential study participants, and then selects individuals that represent a wide range of variations in dimensions of the research interest. This approach aids in maximizing difference at the beginning of the research and it increases the likelihood that the findings reflect different perspectives, which is ideal for this research study (Patton, 2015,).

I developed criteria to ensure the maximum variation in seeking richness of information. Potential participants must not only have dined in upscale restaurants but should be able to articulate their lived experience in this setting. The sample focused on frequent upscale restaurant diners; but also included restaurant servers, restaurant managers, restaurant designers (interior designers and architects), and lighting designers who worked on upscale restaurant projects. Therefore, a multitude of perspectives were examined to increase robustness of data. Table (3) shows the specific criteria for each category. My general criteria attempted to incorporate participants of different ages (21 to 65), with all genders, and experiential perspectives (i.e. job/role) to make sure the sample was as representative as possible of the population involved in the operating of upscale restaurants.

Table 3 Potential Participants Criteria

Participant Category	Criterion
Restaurant Frequent Diners	Age: 21-65, all genders, and visited at least 2 upscale restaurants in the last two months
Restaurant Servers	Age: 21-65, all genders, and worked in upscale restaurant industry for at least 5 years.
Restaurant Managers	Age: 21-65, all genders, and worked in upscale restaurant industry for at least 5 years.
Restaurateur (Restaurant Developers)	Age: 21-65, all genders, and developed at least 2 upscale restaurants and witnessed from concept to design, execution, opening, and operating.
Restaurant Designers (Interior Designers and Architects)	age: 21-65, all genders, and worked on at least two upscale restaurants projects (design or execution)
Lighting Designers	age: 21-65, all genders, and worked on at least two upscale restaurants lighting projects (design or execution)
Restaurant Bloggers	Age: 21-65, all genders, and have been blogging about restaurants for at least two years.

Purposive sample size is often established on the basis of theoretical saturation[3] (Strauss & Corbin, 1998). I aimed at a sample size of 20 participants as a reasonable baseline for my interview data. Although 21 interviews were collected, two interviews were deleted due to unevaluable content, this comes to 19 interviews as the final sample size.

Interview Protocol. The interview[4] questions were open-ended and initially quite general so that the participants could construct the meaning of the dining experience for themselves and shape their own views of how atmospheric cues may have influenced their experiences. The topic of lighting was not directly introduced; rather I waited for participants to mention this. If at halfway point in the interview participants did not broach this topic on their own, then I asked some introductory questions about lighting. Patton (2015) identified six types of questions that can help the subject's participant's respond appropriately, of these, I adopted three types specifically. First, I asked background demographic questions which inquired about education, occupation, and work experience related to the topic. Second, I asked 'sensory' questions which allowed the participant to dive into the sensory experience, in this case dining experience at upscale restaurants settings. Third, I asked 'feelings' questions, aimed to evoke emotions regarding participant's thoughts on an experience. I conducted a pilot trial for this method of questioning using two participants to evaluate the overall flow and structure of questions and the length of the interview. These two interviews were not included in the data analysis.

In addition, I employed photo elicitation; a technique uses photographs as prompts to respond to during the interview (Harper, 2002). I asked participants to show me their own photos of upscale restaurants settings. Then, I supplied "guiding questions" which helped them talk about the photo (Jordan et al., 2009; Harper, 2002; Wang & Burris, 1994).

Interview Procedure. Prior to the start of the interview, participants were asked to sign their informed consent in accordance with IRB regulations (appendix A). I provided a document stating that the participants are guaranteed certain rights, voluntarily agree to be involved in the study, acknowledge that their rights are protected, and that they are instructed that they could

[3] Theoretical saturation refers to the point in data collection when new data no longer conveys further insights into the research question (Lincoln & Guba, 1985; Strauss & Corbin, 1998)
[4] Refer to appendix (x) for the interview questions/protocol.

choose if they would like their identity to remain confidential. Then, I introduced myself and the general purpose of the research. I stated that I am doing dissertation research with Arizona State University regarding the dining experience and atmosphere in upscale restaurants. Participants were informed that it is common practice for interviews to be audio recorded and told that they are free to decline to be recorded if they wish, (no one declined). One-on-one interviews were conducted either face to face in a location convenient for the participant, free of distractions, or through Skype to avoid traveling expenses. The length of interviews averaged approximately one hour, with the shortest interview being 20 minutes, and the longest interview of 126 minutes. In total 1034 minutes of interview data were conducted, recorded, and transcribed.

The interviews were recorded using “AudioNote” software, with backup recording using iPhone technology, as precautionary measure. AudioNote is a software provided by the app store in the Mac OS operating system. AudioNote combines the functionality of the notepad and voice recorded to create a powerful tool that is ideal for the purposes of interviewing in this research.

I transcribed all interviews myself, except for one where I hired a professional to transcribe due to the sound quality of the interview. Participants in this study were not afforded the opportunity to edit the transcription of interviews or the manuscript (i.e. the interpretation of the transcription) as the nature of this study is not sensitive in any manner. The confidentiality of participants was offered to be protected while conducting the interviews, unless they declined, and then their names and experience is used in the description and reporting the results. Luckily enough all the 19 participants agreed to reveal their identity.

All study data, including the interview audio files and transcripts stored in a password-protected, secured online location and will be destroyed after a reasonable period of time. I informed participants that summary data will be disseminated to the professional community, and it might be possible to trace responses back to individuals.

Observations. The aim of the observation is to gain information about the impact of lighting on upscale dining experience and which specific factors of lighting contribute to which aspects of the experience. I immersed myself in the upscale dining experience and observed the

overall physical environment, as well as diners' interactions with their environment. I started with broad observations then focused on answering specific research questions.

Table 4 Observed Restaurants

#	Name	Location	Type of Cuisine	Time minutes
1	Estiatorio Milos	New York	Greek Sea Food	120
2	Sexy Fish	London	Sushi and Sea Food	110
3	Dirty French	New York	French Fusion	136
4	Bagatelle	New York	Mediterranean and French bistro	180
5	Hillstone on City Hall	Scottsdale	Steakhouse	75
6	Olive & Ivy	Scottsdale	California Mediterranean food	93
7	Barton G	Los Angeles	quirky menu with decadent items	116
8	Park Chinois	London	Chinese	152
9	Scalinatella	New York	Italian	136
10	PEACOKS	Kuwait	Chinese	127
11	Madeo	Los Angeles	Italian	107
12	Berri's on Third	Los Angeles	Mediterranean	81
13	Giorgio Baldi	Santa Monica	Italian	110
14	Marea	New York	Italian Sea Food	128
15	Harry Cipriani	New York	Italian	76
16	Nobu	Malibu, CA	Japanese (with Californian influence)	95
17	Nobu Downtown	New York	Japanese-Peruvian	120
18	Geoffrey's	Malibu, CA	West Coast/Californian	125
19	Doughbird	Phoenix, AZ	Modern Italian/American	85
20	Terrazzo	Kuwait City	International	79
21	Reclette, NYC	New York	French	57
			TOTAL	2308

Naturalistic observations took place in the "field" at these upscale restaurants. Employing naturalistic observation allowed me to comprehend the context within which subjects interact in order to create a holistic analysis. I employed participant observations where I sit and eat but did not interact with subjects. The restaurant selection was based on factors such as: restaurant design and atmosphere, and popularity. Other logistical considerations in restaurant selection included: convenience, travel expenses, and access. The observation took place in 21 different

upscale restaurants over five major cities around the world, including: New York, London, Phoenix, Los Angeles, Kuwait City. I collected 38.5 hours of observation data, with an average of 1 hour and 53 minutes. Table (4) shows observed restaurants

The observation was mainly covert (Patton, 2015). I was willing to reveal my identity or intentions if I was questioned, yet no one questioned my presence at any of these places. The benefit of doing covert observation is that it mitigates the fact that subjects may modify their behavior, if they know they are being seen and examined (Patton, 2015). While covert observations sometimes initiate ethical issues, such as violating the principles of informed consent and invading the privacy of those being studied (Patton, 2015), subjects in this study were diners who willingly presented themselves in this particular setting. Additionally, the names and identities of subjects are unknown; therefore, their identities cannot be revealed. Lastly, as I did not directly interact with the subjects observed, thus further protecting the anonymity of individuals.

Qualitative Data Analysis.

Table 5 Source: Adapted from Tesch (2013), Aronson (1995) and Creswell (2002)

Steps	Step Description	Tasks
Step 1	Familiarization with Data	• I obtained a sense of the whole by reading through the transcriptions independently. Ideas that come to mind were jotted down.
Step 2	Generating initial codes	• I selected one interview and asked: “what is this about?” thinking about the underlying meaning of the information.
Step 3	Searching for themes among codes	• Each interview was coded separately; thereafter a list was made of all the topics. • Similar topics were clustered together and formed into columns that are arranged into major topics, unique topics and leftovers.
Step 4	Reviewing themes	• The topics were abbreviated as codes and the codes were written next to the appropriate segment of the text. • I tried organizing scheme to see whether new categories and codes may emerge.
Step 5	Defining and naming themes	• I choose the most descriptive wording for the topics and turn them into categories. • I grouped together topics that related to one another then reduced the total list of categories. • I created a visual form for the structure of categories and themes
Step 6	Producing final reports	• I assembled data from each category in one place and then conduct a preliminary analysis in order to produce the final report

In this first phase, I adopted an exploratory design with the intent of developing and testing an instrument used to measure lighting in the second phase. Analyzing the qualitative

data to best design an instrument begins with looking for common themes brought up in interviews. These themes formed the categories used for the instrument. I achieved this using ‘qualitative thematic analysis,” which involves searching through qualitative data to detect patterns known as themes by organizing and describing data in details (Tesch, 2013, p. 113) . The thematic analysis procedure used inductive descriptive coding techniques and analyzed the data according to this procedure (Tesch 2013:113, Aronson, 1995:1–3, and Creswell, 2002:155–156).

Amalgamation; interviews and Observations. There are few studies investigating lighting within the dining experience and few studies on the topic of lighting that used qualitative research methods. The content of both interviews and observations contains valuable information. My approach was to evaluate the findings from each method analyzing it in detail, then data from both methods were combined to interpret overall findings. The use of thematic analysis, as discussed above, has many advantages for integrating interviews and observation analysis. First, thematic analysis is recognized as a useful tool to use across different methods (Boyatzis, 1998) . Second, thematic analysis offers flexibility and allows for social and psychological interpretation of the data (Braun & Clarke, 2006). Through this process, I was able to assess the reliability of the qualitative data (see McCracken, 1988) . Thus, it seems that qualitative thematic analysis is appropriate for the purpose of analysis of phase I and the nature of amalgam of interview and observation data.

Qualitative Data Interpretation. The interpretation of the data applied the knowledge based on constructivist (Guba & Lincoln, 1982) or participatory (Mertens, 2003) viewpoints. A constructionist framework seeks to capture diverse understandings and multiple realities about a participant’s definition and experiences (Patton, 2015), in the case of my research, the impact of lighting on the dining experience at upscale restaurant environment. I did not seek a singular or universal explanation but rather looked at the particulars of several experiences to gain insight. From a social constructivist standpoint, it is expected that I naturally bring some biases to the research based on my own perceptions and experiences. I disclosed my biases and explained how it may affect the data collection and analysis process (see role of the researcher section).

Multiple perspectives or realities are commonly shown through the use of direct quotes from different participants. Quotes are useful as they may show that participants do not agree on the topic and/or that they have had different experiences; disconfirming evidence (Booth et al., 2013; Denzin & Lincoln, 2011; Miles & Huberman, 1994; Patton 2015; Strauss & Corbin, 1998). In fact, dissonant points of view were entirely acceptable and discussed in the results.

The interpretation began by attaching significance to findings, offering explanations, making inferences, considering meanings, and trying to come to conclusions. According to Patton (2015), there can be three types of conclusions which I found. First, confirming that what is known is in fact supported by the data. Second, disabusing of misconceptions. Third, illuminating important aspects have previously not been known.

The main outcome of this interpretation stage is the development of a visual model of the measurable impact of lighting in the dining experience. This visual model helped in designing an instrument, which was tested and analyzed in the second quantitative phase of the research.

Phase II: Quantitative Data Collection & Analysis

The goal of this second phase is to develop and then test a survey instrument that can measure the impact of lighting on the dining experience at upscale restaurant environment. In this section I discuss the research approach I used, the study setting, the sample, the sampling strategy and the method of analysis.

Approach. A quantitative correlation approach was taken to examine emergent themes regarding the relationships between diners' perception of the dining experience and lighting variation with diverse upscale restaurant settings. This phase utilized quantitative correlation method of information verification regarding all variables, thereby providing the opportunity for comparable future research in this field and related fields. I used self-administrated surveys to collect data regarding perceptions of lighting and the dining experience. I then analyzed the data, looking for statistically significant relationships.

Study Setting. Data collection took place in actual upscale restaurant settings as a field study (uncontrolled experiment). Bitner (1992) emphasized the importance of utilizing several environmental dimensions to achieve an overall perception of the environment. Therefore, data

collection occurred at various upscale restaurants in order to obtain more robust data. The selection of the restaurants was based on respondent's choice of an upscale restaurant. To gain a global perspective, field sites were located in various regions throughout the world such as across the United States, Great Britain, Europe, and the Middle East.

There are four main typologies of restaurants: quick service, midscale, casual dining, and upscale as defined by The National Restaurant Association (NRA). Upscale restaurants provide diners with aspects such as, a full menu, full table service with great attention to personalized service, and high quality food using fresh ingredients (Goldman, 1993; Gordon & Brezinski, 2016; Muller & Woods, 1994; Siguaw, Mattila, & Austin, 1999 as cited in Ryu & Jang, 2008). Ryu & Jang (2008) computed the average check per person for the upscale restaurant segment in 2004 to be $13.09. As I adopted a global perspective in selecting field sites, the menu price at upscale restaurants did vary from location to location, therefore this aspect should be kept in mind, recognizing that average check amounts should not be the only criterion in defining an upscale restaurant. For the purposes of this study, I defined upscale restaurants as those in which the average per-person check is more than $20 and offered a full menu, full table service, quality food made from the scratch, and personalized service (as outlined by Ryu & Jang, 2008). In addition, these upscale restaurant field sites were only visited in the evening during dinner time, as the goal of the instrument I developed was to measure artificial lighting (with no daylight present).

The Sample. The population includes actual diners, both males and females, ranging in age from 18 to 60+ years old. I aimed for a sample size of 300 respondents from which significant statistical calculations can be made in order to generalize results to a larger population. I selected this number in response to a survey of literature suggesting that the sample be based on a reasonable calculated margin of error utilizing the formula of $1/\sqrt{N}$ (DePaulo, 2000; Lenth, 2001; Patel et al., 2003). While 245 individuals responded to the survey, only 106 of these surveys were actual viable for analysis[5]. Having 106 participants for this sample population provides a margin

[5] see details in Chapter 4 below

of error of 9.7% which is well within the commonly accepted realm for research studies of this nature (DePaulo, 2000).

Sampling Strategy. Upon gaining permission from the IRB[6], I applied Snowball sampling to approach actual diners. I sent out the online link for the instrument I developed to all my friends and family and asked them to direct it to their friends too, emphasizing that their participation is entirely voluntary. I also sent out the link to the people I interviewed and asked them also to send the link to their friends. In addition, I posted the link on my personal social media; like Facebook, Instagram, and twitter. No incentives were offered.

The survey was designed to be filled out online and the results submitted back to a central data analysis file. The internet location is: https://www.surveymonkey.com/r/lightscape. Actual diners were asked to rate their dining experience and the lighting condition in an upscale restaurant of their choice using the link above on their cell phones. A consent letter and directions for completing the identified items. Respondents were told that there are no right or wrong answers, and they should fill out the survey on an upscale restaurant including chic casual and fine dining, and it should be at the end of their dining course. The data collection process was completed in 14 weeks. A copy of the instrument along with the cover letter are located in Appendix (D).

Instrument Development Procedures. Instrument development took place in between Phase I and Phase II; where I used qualitative findings to create the survey to be used to obtain quantitative data. The procedure I followed for developing measures is generating initial items that can capture the impact of lighting on the dining experience within upscale restaurant setting. The emphasis in the early stages of item generation is to develop a set of items that reveal each of the dimensions of the dining experience.

I created a preliminary measure based on the items generated. This measure was checked for face validity by members of my committee and pilot testing. Committee members[7]

[6] Institutional Review Board

[7] The use of faculty members as judges of a scale's domain has been frequently used in previous studies (Arnold & Reynolds, 2003; Babin & Burns, 1998; Sweeney & Soutar, 2001; Zaichkowsky, 1985 as cited by Ryu & Jang, 2008)

evaluated the items of each of the dining experience dimensions and were asked to judge the consistency between the item and representation of dimension. Then I performed a pilot test, involving two actual diners, and the feedback given was used to further refine the survey instrument. Overall feedback from committee members and from the pilot test, resulted in eliminating items that were unclear, open to misinterpretation or viewed as not representative of the intended dimensions (see Babin, et al., 1994). Accordingly, the resulting group of items were used to create the final iteration of the survey instrument which was then submitted for IRB approval.

Method of Analysis. After I collected data from the online survey, raw data was downloaded from survey monkey and documented in a spreadsheet. I used SPSS, Statistical Package for Social Sciences, for statistical analysis due to its efficiency in using multiple methods to analyze data. In order to provide a snap shot of the sample from which data is collected, descriptive information including: age, gender, ethnicity, educational level, nationality, marital status, and work status were included. To determine the relationship between the elements of the dining experience and lighting perception, I used correlational tests. The Spearman's Rank Correlation Coefficient Test was appropriate in examining and determining any significant differences among the scores. The results from the analyzed data were used to confirm the themes that emerged in Phase I of this study, and guide future research in the field of restaurant lighting.

Assumptions

While exploring the impact of lighting on the dining experience, several relevant assumptions were made:

1. Subjects in the interview phase are assumed to give honest feedback regarding their experience and perceptions in a safe, neutral environment.
2. The photographs that was used in photo elicitation (either by the subjects or the one I provided) are assumed to be representative of the actual lighting condition.
3. Subjects understood and answered the self-administered questionnaire truthfully and accurately.

4. The chosen subjects assumed to be representative of the specific targeted sample population – upscale restaurant diners, and professionals in the restaurant industry.
5. The instrument used for collecting data, a self-administered questionnaire; accurately measured the perceptions of the diners regarding lighting and the dining experience at upscale restaurant context.

Advantages and Disadvantages of Sequential Exploratory Approach

Many researchers have argued the strength and weaknesses of the Sequential Exploratory Approach. The following table (6) combine the key advantages and disadvantages of Sequential Exploratory Approach according to various leading researchers in this field (J. W. Creswell, Goodchild, & Turner, 1996; John W. Creswell, 2002b; Greene & Caracelli, 1997; Moghaddam, Walker, & Harre, 2003; Morse, 1991).

Table 6 Advantages and Disadvantages of Sequential Exploratory Approach

Sequential Exploratory Approach	
Advantages	Disadvantages
1. An easy to implement for a single researcher since it sequentially progresses from one stage to another. 2. Useful for exploring qualitative data in more detail and depth. 3. Useful when trying to develop an instrument.	1. Requires a significant time commitment to complete. 2. Requires feasibility of resources to collect and analyze both types of data (qualitative and quantitative). 3. Challenging to identify and anticipate the procedures of the quantitative phase, for example when writing the proposal or applying for the IRB approval.

Research Permission and Ethical Consideration

Ethical issues were addressed at each phase in the study. In compliance with the regulations of the Institutional Review Board (IRB), I obtained permission for conducting the research (see Institutional Review Board, 2001). I developed an informed consent form. The form stated that the subjects are guaranteed certain rights, voluntarily agree to be involved in the study, and acknowledge their rights are protected. The confidentiality of subjects was protected by numerically coding each answered/completed survey and keeping the responses confidential. All study data, including the surveys, interview files, and transcripts, was kept in locked in my

office and destroyed after a reasonable period of time. Subjects were told summary data will be disseminated to the professional community.

Role of The Researcher

My relationship with data collection in the qualitative phase took a participatory role due to the "sustained and extensive experience with subjects" (J. w Creswell, 2009, p. 184) . The main goal, and indeed the challenge, was to help the subject being interviewed to bring me into his or her world through what he or she revealed. The argument here is that the quality of the information attained during an interview is also dependent on me as a researcher and my ability to do this.

I have extensive background in lighting including practical experience with lighting installation and my PhD studies at the Design School within Arizona State University. Due to my immersed knowledge and working experience with lighting, I might put the interview conversations at the risk of bias. I attempted to avoid this by allowing the subject to first bring up the idea of lighting. In addition, during the data collection procedure, I might have developed friendly and supportive relations with some subjects. These experiences could introduce a possibility for subjective interpretations of the phenomenon being studied and created potential for bias (as noted by Locke, Spirduso, & Silverman, 2000). However, extensive verification procedures, including triangulation of data sources and thick and rich descriptions of the cases was used to establish the accuracy of the findings.

Chapter Summary

This research used both qualitative and quantitative approaches to explore the impact of lighting on upscale dining experience, and to develop an instrument to measure this impact. I employed sequential exploratory strategy, which includes a qualitative phase followed by quantitative phase. In the first phase, I used a qualitative multi-method approach which include interviews and observations for data collection. The second phase, I composed the dimensions identified in the first phase, in order to develop and test "DineLight" as an instrument to measure the impact of lighting on the dining experience at upscale restaurant setting. All ethical standards were met with careful concern given to the anonymity of participants in the quantitative phase.

This research has discussed in detail the sequential explanatory strategy that was employed and how using such a strategy provides benefits in terms of both breadth and depth of data collection and analysis. Findings based upon these two phases were discussed in detail in Chapter IV.

CHAPTER IV ANALYSIS OF DATA

An extensive review of literature suggests that research in lighting and the dining experience within upscale restaurant context has not been explored in previous research. This research attempts to fill in this gap in academic research. This chapter describes the qualitative findings and the quantitative findings of this research. It also include/describes the transition phase between the two methods, which is developing the DineLight instrument.

Qualitative Phase Findings

Participants' Demographic Characteristics. Overall, participants represented demographic diversity except for gender and age. The majority participants were men; 16 males and only three females. Most of the participants are young adults between the age of 28 and 39, with few of them are middle aged people between 40 and 59 years old. There were no participants who were over 60 years old. As, this research employed a global context, ethnic diversity was well represented. Participants included: 9 Middle Easterners, five North Americans with different ethnicities, two Europeans, two Asians, and one South American. Interestingly, most of the participants are born and raised in one country, educated or trained in another country, and then worked in a third country. Most participants were self-proclaimed avid travelers and frequent diners at upscale restaurants. The data I gathered from participants indicates a global view and exposure.

Most of the participants were either employed full time or entrepreneurs within the Restaurant Industry. Participants represented a highly educated group of individuals as many held a college degree or graduate degree. (Information regarding participants demographic information is found in table (7), and short biographies about each participant is found in appendix C).

While there was an attempt to categorize participants according to their role in the restaurant industry (i.e. designer, blogger, etc.) as outlined previously, in actuality there was considerable overlap as participants who worked in this industry has a background in a number of different roles. For example, Faisal AlNashmi and Zeyad AlObaid who are Kuwaiti chefs, also developed, opened, and managed their own restaurants.

Table 7 Interview Participants List

Category	Name	Experience/Background	Place of Residence	Interview Type	Time (minutes)
Lighting Designer	Peter Veale	Firefly Lighting Design	London, UK	In person	64
	Filip Vermeiren	Inverse Lighting Design, Founder Director	Belgium	In person	60
Restaurateur	Basil Alsalem	Restaurateur and Founder of Gastronomica	Kuwait	In person	126
	Abdullah AlMudhaf	Restaurateur and Founder of 7 restaurants	Kuwait	In person	85
	German Osio	Osio Culinary Group	Arizona, USA	In person	44
Chef	Adlah Alsharhan	Culinary Consultant, and caterer for Kout Food Group	Kuwait	In person	80
Chef and Restaurateur	Faisal Alnashmi	Chef at AlMakan united company group	Kuwait	In person	60
	Zeyad Alobaid	Chef and Restaurant owner	Kuwait	In person	47
Chef and Restaurant Manager	Khaled AlBaker	Stomach Consultant, Chef and Restaurant Manager at Café Meem	Kuwait	In person	45
Architect and Restaurateur	Yousef Alqaoud	Architect and Restaurateur	Kuwait	In person	65
Architect	Abdulaziz AlHumaidhi	AlHumaidhi architects	Kuwait	In person	63
Film Maker	Andrew Gooi	Filmmaker of Food Talkies	born and grew up in Malaysia, then studied, lived, and worked in Arizona, USA.	In person	69
Server	Nathan Pelger	Experienced Restaurant Server	Arizona, USA	Skype	41
Food and Restaurant Blogger	Kevin Chan	Fine dinging Blogger finediningexplorer.com	London, UK	Skype	63
	Salem AlMudhaf	Michelin Star rater, Culinary Traveler	Kuwait	skype	40
	Joshua Lurie	foodgps.com	Los Angeles, USA	Skype	20
	Wes Kauble	Food Poet, Haiku Review	Los Angeles, USA	Skype	33
	Veronique Kherian	Miss Cheese monger	San Francisco, USA	Skype	40
	Isabel B	Tasty AZ	Arizona, USA	In person	49

Likewise, Yousef Alqaoud is an architect by education and practice, is actually designed and opened his own restaurant. Furthermore, Khaled Albaker who is a chef by education and training, is currently working as a restaurant manager. During my data collection phase, I also discovered another category of occupation that evolved during chain referral approach to sampling and data collection. This category was not planned for, yet, I found it necessary for this research, which is interviewing Andrew Gooi who is a documentary film maker of Food Talkies. This film is about stories behind food and chefs. As a result, this sort of overlap and diversity in categories was beneficial to the depth of data gathered.

The Dining Experience. The exploration of the impact of lighting on the dining experience at upscale restaurant setting began with trying to understand what the dining experience is and why diners seek it. Participants revealed great deal about the dining experience. For instance; Salem, who is a Michelin star critic and culinary traveler, said:

> *There is a difference between someone who is hungry and want to eat to fulfil his hanger, and someone who is seeking an experience. If I am hungry, there is a room service, McDonalds, cheeseburger, cheese and bread, or whatever can satisfy me. But what is called an experience, you are not going for the purpose of eating, you are going to explore. Like my recent trips are based on exploring restaurants.*

I realized that the dining experience turned from being a basic necessity of satisfying hunger, to more of a hedonic experience for satisfying a desire. Kevin, a fine-dining blogger, believed people seek experiences because of economic reasons:

> *People got more purchasing power, so they seek for a better living, better food, and better in everything. I guess the more high-end customer where they have purchasing power, they have time to enjoy, and they are probably interested in food in some sense, that's why they are willing to pay more money and spend 3 hours to have a dinner.*

While Basil, a restaurateur, took this a little bit further and adopted the idea of dining as an all-encompassing experience, using it as his company slogan, "The Total Dining Experience." Basil justified his adoption to this slogan because diners are not only paying for the food, but they are also paying for the experience, and he developed his business based on this concept. Many

participants believed that the dining experience is not limited to food as an element of enjoyment, and it is definitely beyond food. Again, Basil differentiated between the two by saying “There is a difference between food operators and experience operators. We are not just serving food, we are serving a whole experience.”

Given the competitive nature of the restaurant industry, several participants suggested that their goal was to provide a unique experience to attract diners. This experience should encompass not just the food, but provide some kind of emotional experience. For example, Peter, a lighting designer, believed that, “the main factor in affecting your dining experience as a guest, is how you feel.” While Adlah, a chef and culinary consultant, provided part of the answer by stressing on the need for, “disruptive innovation,” and she meant by that new and bold experiences, as she described “people strive for something different, for something to punch them in the face.” Other participants believed that while the dining experience can include innovation it should be in line with diner’s current expectations[8]. Andrew, a filmmaker, emphasized the nature of the experience should be something they are comfortable with even when considering innovation. He said:

> *They have to decide where the uniqueness is. Every chef should ask what I want to do with my restaurant, but within what they want to do, there is parameters. Like tables have to be wide enough, or there is a comfort enough of lighting.*

Salem, a Michelin star critic and avid traveler, summarized the two views as he said,

> *There are two kinds of dining experiences. Either one that is extremely creative in food, so they take the culture and the history of the village and then they develop it, or the second type is the classic which is usually mostly in Paris.*

[8] Basil explained, “*each experience has to be unique, and different, and not seen before. I had to focus on the food and the design to be unique on both ends*.” But when I asked Basil about how can you make this experience unique? And how do you actually operationalize uniqueness, he answered*: “People can relate to it, it’s not too different. The food is still something that people know. Like burgers, fries, stuff that everyone knows but the level of quality is different. The basis known but the expectation is higher. The same thing in design. It is not too different but it is different enough to create an experience*.”

The Door to Door Experience. During the exploration of the phenomenon of the dining experience within upscale restaurant setting, I wondered, when does the dining experience start? What are the parameters of the entire dining experience? I believe that such questions help to understand when the entirety of the role of lighting. Many of the participants used the term "*door to door*" to describe the parameters of the dining experience. For instance, Nathan, an experienced server described it, *"Guest experience starts from the second they walk in the door, and you got to make sure that everything is kind of like perfect from the moment they walk into the door, to the moment they leave."* While Wes, LA based blogger, said *"The dining experience starts from the moment I walk in the door, to the moment I leave that restaurant. that's the entire dining experience. So, they make sure that you have a great door to door experience."*

Elements of the experience. All participants agreed that the dining experience is a "whole package," that contains many elements such as food, atmosphere, service, and entertainment with other people. They rationalized that that's why it is called an "Experience". A further explanation comes from my interview with German, a restaurateur, who elaborated more about this special dinging experience beyond the food element, as the following:

> *A consumer, I believe in today's world, is not only looking for food. They are looking for package of ambiance, energy, and obviously good food and good service. They want to dine out, they want to be entertained, they want to have worry-less decisions to make, just be guided by their server. Having a trust relationship with the server, that is a professional of the product they are selling, and having a good energy, a good ambiance, and seeing people and being seen.*

Based upon participants' insights, I created four subcategories to represent the elements of the dining experience. Within these subcategories, I explored how lighting could impact these experiences within upscale restaurants setting. These subcategories are shown in a visual form in figure (2). The overall dining experience starts with atmosphere experience, then service experience, then social experience, and completed by the actual food experience.

Figure 2 Elements of the Dining Experience

First, the atmosphere experience is perceived even before diners enter the restaurant, and can include location, signage, exterior windows looking inside. Participants also referenced atmospheric features inside the restaurants such as, layout, lighting, music, ambiance, interior design, and color. An in-depth exploration of atmosphere experience is discussed in its dedicated section in this chapter.

Second, service experience is perceived since diners walk in the restaurants, from greeting and welcoming, to the waiting area, to interactions with servers, to the perception of cleanliness. Participants suggested that, "*service plays a big role*." These issues of service experience are detailed in its dedicated section in this chapter.

Third, social experience is the interaction between diners and the social vibe of the restaurant. It is perceived since the diners get seated and blend in with the vibe of the restaurant. This social aspect is incredibly vital since dining out is a social activity. Yousef, an architect and restaurateur, stated, *"we go dine out not just to eat, we dine out because it is a social thing."* Later in this chapter, an in-depth exploration of social experience is discussed.

Finally, food experience is the aspect which perhaps held the most divergent views amongst participants. While it is indeed important, it is actually the last thing you experience after the first three experiences; atmosphere, service, and social. Food experience includes not just

the taste of the food itself but, how the food is served, and the presentation of the food. These and other facets of food experience are discussed in accordance to how lighting is affecting it in food experience section of this chapter.

Atmosphere Experience. In an upscale restaurant setting, the restaurant's atmosphere is crucial, "*you need the right setting, or the right environment*," as Kevin, a fine dining blogger stated. An analysis of data regarding atmosphere revealed three main characteristics that make atmosphere important: time, price, and food.

The first characteristic is the time factor. Participants discussed that the dining experience at upscale restaurant setting is a "*multiple hour-long experience*", and thus it needs the right atmosphere and the right environment to afford such length in time. This idea[9] was expressed by Khaled, a chef and stomach consultant as he named himself, who said, *"it's not so much about the food, it's about sitting and relaxing. The right chairs, and the right seating have to complement the lighting and the space."*

The second characteristic is the price factor. The atmosphere should reflect the economy of the restaurant, especially at an upscale restaurant. Therefore, the atmosphere has to reflect the high price charged, Kevin further clarified the details of the relationship between the atmosphere and the economy of the restaurant:

> *They used the best ingredients, best cut of beef, but I guess for a customer's point of view, you won't be able to see the full appreciation from the course of the ingredients, unless you put something more beautiful, and more expensive in the dining room, then they will feel ooh ok I understand why coming to this restaurant is $200 not $10.*

On the other hand, the absence of the right environment can cause dissatisfaction as Kevin noted, *"you don't want them to walk out and feel they been ribbed off from a meal. so, you need the whole setting to be justified."* Adlah, chef and culinary consultant, expressed the same view, "*if you are in an upscale restaurant, you did not want to upset anyone because the bill going*

[9] Detailed discussion on this matter can be found in length of stay section of this chapter.

to upset them.". For this reason, perception of price and atmosphere has to be harmonized. Detailed discussion on this matter can be found at expectation section of this chapter.

The third characteristic is the food factor. Upscale dining has to have "elaborate menu," with food that you likely could not cook for yourself at home. The atmosphere should reflect this elaborate menu, the refined ingredients, the culinary art form, and probably more labor-intensive preparation from kitchen view. On the opposite side, lack of the right atmosphere that reflect the elaborate menu can destroy the appreciation of food. Food perception and food quality will be discussed more in details in the food experience section in this chapter.

My research suggests that in order for the dining experience to be positive, customers' expectations of time, price and food should be met. In looking at these factors it is important to assess how lighting affects both the tangible and intangible qualities, therefore I have divided this discussion of atmosphere perception into these two categories. The intangible level discusses; the role of the senses being part of the ambiance, the interaction between light and music to create ambiance, the effect of expectations on restaurant image, formality of customer apparel (or dress-code) and the moderating role of culture, then finally a discussion of mood and the three dominant moods created in restaurants. The tangible level discusses; the theatrical metaphor of a restaurant, light and the open kitchen concept in terms of maintaining functionality and aesthetic, then finally lighting the bar area within a restaurant. Both intangible and tangible elements impact customer satisfaction, often creating a nostalgic atmosphere which in turn produces a repeated visit.

Ambiance. Ambiance is an important part of atmosphere and can be defined as the intangible characteristics of the atmosphere such as temperature, lighting, music, and scent (Bitner, 1992). As Adlah emphasized, "*ambiance gets in so many things, its cultural, its psychological, its psychological, its physical*" Ambiance may reveal psychological states as Adlah suggested, "*ambiance does not only mean the look of the place. I mean there is psychology behind it.*" Participants also described ambiance as "*mood,*" and "*vibe.*" In addition, ambiance can reflect economic states. Adlah said, "*so depending what category your restaurant is, it decides your ambiance. Because ambiance is connected to the economy of the restaurant.*"

Peter, lighting designer, raised a great question about atmosphere: "*there's a million words that could describe an atmosphere of any space, but how would you measure that*?" Then I asked him, how he, himself would define a successful or effective restaurant atmosphere. He answered:

> *The owners would be more interested in the success of the restaurant, but the designer will be I think – and I somewhat hope– a designer's best creation could be a restaurant that closes within six months. It could be the best design ever, but if the operator hasn't put in good food or good services or something else, wrong location, the design wasn't strong enough to save the restaurant from closing. If there are a financial measure of success, is not a design measure of atmosphere. What are the emotions that people feel when they enter this space?*

Senses. How the senses are engaged can influence the ambiance at upscale restaurant setting, as Adlah, chef and culinary consultant, confirmed the importance of senses to the ambiance as, "*part of the ambiance is our five senses*, *where all these senses interact with each other, without separation.*". All the senses can be evolved as soon as the diners walk in the restaurant. Thus, the design approach to atmosphere and especially the lighting, has to appeal to our five senses, as Basil, a Kuwaiti restaurateur, expressed "*the dining experience should appeal to all five senses. It has the look, it has the taste, it has the smell, it has the sound*."

Light and Music: The Recipe. Music as an element of ambiance stood out in numerous interviews. Many conversations stressed on the importance of music, as Basil commented, "*Music can elevate perception of the design, there is a relationship, we cannot ignore this fact.*" In addition, participants suggested that music at upscale restaurant setting can; eases you into a conversation, dictate the brand name of the restaurant, and affects the turnover rate.

A goal of my qualitative data analysis is to interpret how the individual components of the research weave together, and in this case, the dining experience, music, and light. Abdulaziz, an architect and recently became a playlist creator for upscale restaurants, discussed this weaving process, "*the music will respond to as much as possible, in everything holistically, the mood, the chef, the food, and the atmosphere.*" Participants suggested that matching the elements of the dining experience in general, and the individual components of the atmosphere in specific can

lead to the success of the restaurant; as these elements cannot be separated. Faisal, the chef and restaurateur, termed this weaving knit as "*the dining sound*", as he described it:

> *The hip hop music play at the back, its load music, the sound of glasses just together, the plates, eating with the cutlery, and the noise of people because the music is very load, so automatically the voice of people just go higher, but no one is bothered or annoyed, and everyone is laughing, they are in a good mood with dimmed lights, so it's the whole thing.*

While these interviews have produced interesting statements regarding music at upscale restaurant setting, I tried to focus on lighting, and how lighting can be part of the "*dining sound*". The association of light and music was juxtaposed by many participants. Khaled believed that the combination of light and music has a "*recipe*" that produces energy and vibe, *"The design is modern, with very dark and dim lighting, and top loud 40 music, and LED Lights.*"

Both Basil and Abdullah, Kuwaiti restaurateurs, suggested the ingredients for this light and music recipe. Music and Light shares an inverse relationship; the louder the music, the dimmer the light should goes. Abdullah and German, both restaurateurs, explained in detail how this recipe of music and light work in their restaurant. For instance, Abdullah discussed changes in light and music throughout the day.

> *Each time of the day has its own playlist, because it goes back to the light. Like in the morning you are more calm, because usually there are discussions, or business lunch. So, you won't want something that is really high and loud music or something annoying, because its bright already from the sun. Around dinner, we go candle light. We give you that cozy and homey feel, and music gets a little bit louder because as more and more people walk in, it becomes noisy, so loud music will create barrier between people, so people can talk and chit chat comfortably without anyone can listen to them. so, light and music are very important.*

While German discussed changes in lighting and music throughout the week,

> *As the energy starts picking up progressively throughout the week, we dim the light more as the week progresses, and we turn the music up more. So, on Friday night, the music is going to be five times louder that it is on Monday, and the lights going to be a lot more dimmer on Friday night, than they are on a Monday night. And even on Friday Night, as the night progresses, the light get dimmer and the music get louder. So maybe at five clock we start of at 30% dimming, then six clock we went into 25% dimming, then at seven clock we go down to 22%, then eight clock we go down to 20%, we go do by 15%*

> *lumens of a dimmer, and the music is starting to go up. Then by the time it hits 9 o'clock, the music gets bumpy, and lights are dimmed.*

This recipe appears to be consistent in how participants felt it impacted atmosphere. Basil explained, "*low lighting and low level of music will not work. It is dead. You cannot have that. You need to give it a purpose for the low lighting. Otherwise, it does not make sense.*"

In addition, lighting can affect the perception of noise level in a restaurant. Faisal shared his story about lighting and noise level:

> *Before, because it was bright light and loud music, so the whole atmosphere was very active, and very tense. Diners acted like they are kids on high sugar level. They were very aggressive, and because it's a very bright light, so you can see all the people and everything, and place is crowded, so it's a very strange environment. once we dimmed it down, they became more relaxed.*[10]

Music can certainly influence the dining experience at upscale restaurant settings, however when it is combined with other elements of ambiance, most notably lighting, it can moderate experiences and create a memorable impact.

***Expectation*.** The dining experience does not start when diners first taste their food, in fact, their experience actually begins before they even step foot into the door. First and foremost, expectations set the stage for the experience and serves to moderate the entirety of the dining experience. As participants suggested numerous times, the experience has to live up to the expectation. Atmosphere in general can be an effective tool in influencing diners' expectations. This includes: the restaurant's image, what to wear, price and quality perception, and many more. In the following anecdote, Faisal, chef and restaurateur, of "Table Otto" at Alshaheed Park in Kuwait City, illustrates how important the ambiance is to make the business successful and consistent:

> *When we first opened, we had a trouble. We pursued an image that wasn't us. We wanted to be a good restaurant in the park, but people had the image of table Otto being a fine dining restaurant, so they didn't get in if they were jogging around the park. We had a meeting to solve this issue. We used to have menus that were made of gold, so we threw them away, and we replaced them with menu cards, and we toned the music down. Also, the*

[10] More discussion on noise level can be found at the complaints section of this chapter

> *uniform of the staff toned down the place. Then it became the perfect image that we wanted to peruse, which is the brasserie. People come in lunch time with their families and kids, they sit outside and eat, it was a beautiful vibe. At the end, it's an image that I want to reach.*

Lighting specifically can affect expectation of diners, Basil described how lighting can be used to influence complex ideas not just about the perception of the restaurant, but even down to what diners choose to wear to complement their perception of the restaurant's atmosphere. Accordingly, in this section, I categorize expectation into two different aspects; expectation regarding restaurant class, and expectation regarding dress code. Each aspect is discussed in detail below.

*Restaurant Image***.** Lighting plays a part in diners' expectations of a restaurant's image. German, a restaurateur, shared his opinion from his long experience with lighting as it signifies restaurant class as

> *Lighting will dictate who you are…psychologically, you can have a beautiful build-out restaurant, but if the lighting is not appropriate or too precise, it might give a feel of fine dining, even though the prices of the items at a lower cost, they are accessible, the experience might feel fine dining. So, it might intimidate guests to going in.*

Going more specifically in the mechanism of lighting, participants associated the three main elements of lighting to restaurant image; lighting intensity, lighting distribution, and lighting color temperature.

First, lighting intensity can be directly associated with restaurant image. I discovered that many participants followed the rule of low intensity of light. They believed that lower brightness can create more upscale experience. For example, Nathan, the experienced server, agreed that the intensity of lighting can define the restaurant image as he stated, "*If it's super dark restaurant, it's fine dining. If it's like a super bright, it's kind of less expensive restaurant, like a deli. So, it's almost like a spectrum that says how formal or elegant the restaurant is*." In the same vein, Joshua suggested that it can go on the opposite way as the perused image of restaurant can decide the intensity of lighting *"if you have a moody club restaurant then you might do darker lighting, but if you want a fast-casual restaurant, the light would be brighter, with more vivid colors."* Thus, lighting intensity and restaurant image shares an inverse relationship.

Second, lighting distribution can combine with the intensity of light to create a stronger signification of upscale dining experience. German believed it is a combination of low brightness and focused un-uniformed lighting that can signify a high-end restaurant image, as he explained, "*the dimmer and more precise lighting that you have, the more finest, and more fine dining that you feel*".

Third, lighting color temperature may indicate restaurant image as well. Participants suggested that the warmer the color temperature, the more it signifies more upscale restaurant image, and the opposite. Basil, the restaurateur, expressed, "*casual restaurants are going with cooler lighting.*". Yet, this is more moderated with culture as discussed later in this chapter.

I would like to end this section with German's, restaurateur, story about how intensity, color temperature, and distribution of light changed the perception of restaurant image,

> *When we did central bistro, I spent a fortune on lighting. Every table has directional lighting. It was a nice warm glow. We did it and it felt very formal. Because we wanted to be very dark, everything dark except the tables. The lighting was designed to hit only the table. So, maybe there is a 15-degree light as oppose to 35, 60-degree baffle … so it is more precise, all of the sudden it felt very formal, it felt fine dining.*

Dress code. According to the above discussion of how lighting can reflect restaurant image, lighting also appears to influence the appearance of diners by way of dress code as they show up at the restaurant based on their perception of restaurant image. Participants also suggested an inverse relationship, as the lower the intensity and more focused lighting, the more formal the diners should look. Basil expressed,

> *How people perceive what to wear for a certain place really depends on the lighting and the design. The whole atmosphere sets the mood for how people dress up, the dimmer, the dressier the place will be. The brighter, the less dressy, and there will be more casual.*

As previously mentioned, German, a restaurateur, invested a lot of money in lighting, yet, the lighting did not match the true image of his restaurant. His restaurant is a bistro, but the lighting employed was more in line with lighting used in fine dining restaurants. He noted that this discrepancy caused a good amount of confusion among customers:

> *Central bistro, was a successful restaurant in terms of design but the least successful restaurant in the portfolio. We struggled. We were trying to figure out why is it doing 1 to 2 million dollars less in sales, than in another restaurant as I owned. We were analyzing it, and we had experts' opinions from other restauranteurs. Then we came to the feeling that the concept was very similar to Local Bistro up north in terms of menu wise and price points but the difference was that Central Bistro is built out more upscale. The lighting was very different from Local Bistros. It was more précised, every table individually lit. It was more finesse. So, psychologically, the customers when they arrive to central bistro, they felt out of place if they didn't dress formally, if they didn't dress nice, they felt it's too upscale. Ultimately people felt uncomfortable going in and grabbing a cheeseburger on the menu, and eating it, going in with a short and a T-Shirt. We were confusing, because we were neither fine dining in terms of menu offerings, but at the same time, we were neither casual in terms of ambiance and in terms of looks.*

German concluded that his restaurant went out of business essentially because lighting was not reflecting the right image of the restaurant. Diner'' expectations were not in alignment with the restaurant image. Atmosphere and this caused their overall dining experience to be negative. This demonstrates how powerful lighting can be in affecting the psychology and perception of diners. One important caveat to this is that culture also plays a very important role in the complex relationship between perception, expectation and the use of lighting.

*Opposite opinion; the moderating role of culture***.** During analysis, it appeared that culture can be a strong moderator and can change what is discussed and suggested above; the relationship between lighting, expectation, restaurant image, and dress code. For example, I notice diverse views among participants, as some participants disagreed with the above-mentioned formula of intensity. They suggested that it is not necessarily that dim lighting indicate a fine dining or upscale restaurant image, and there is always an exception. Such a formula can relate to lighting choices attached with cultural experiences. For instance, Abdullah, a restaurateur, demonstrated an example of bright light within fine dining setting as in the French culture:

> *Its La Petite Maison. Its bright, it's not dark. The whole setting is white, so the place, matches the French experience. Although it is the same class as Zuma, but always in La Petite Maison you feel like it's clearly not a lounge or a night club. While in Zuma, you are confused, I am in the middle of what? But I see that La Petite Maison is one of the best implementations of a concept, from food to experience to vibe.*

Figure 3 La Petite Maison. Retrieved October 15, 2017 from http://rafaelfuentes.me/d3st1n0du841/wp-content/uploads/2014/11/salão.jpg, and https://www.hotelsbarriere.com/content/dam/hotels/CAN/cannes-majestic/restaurants-&-bars/Restaurants/bandeau/0119-51.jpg/_jcr_content/renditions/cq5dam.web.1280.515.jpeg

Other participants also recognized the aspect of cultural preferences for lighting color temperature and dining experience. Basil stated, "*Wagamama used cool color temperature, because its Japanese. The Japanese like the cool, and they don't like the warm. They have certain cultural attachment to cool lighting because it is related to Japanese canteens".*

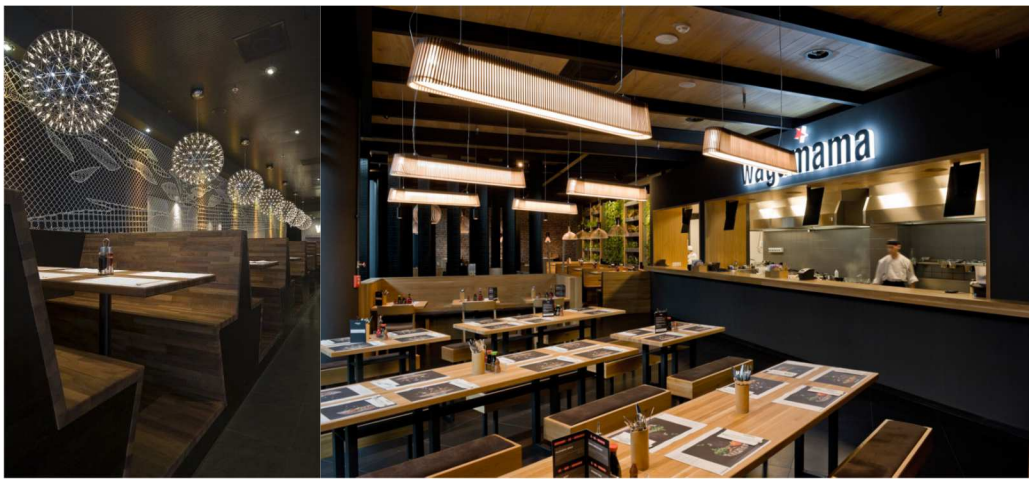

Figure 4 Wagamama Japanese Restaurant. Retrieved October 15, 2017 from https://i.pinimg.com/736x/a6/7c/fd/a67cfd9391d4067ee552fcfa9cdf8bbd.jpg, and http://www.medusagroup.sk/files/attraction/gallery/gsamyh3hpd8.jpg

Based on the discussion above, I suggest that the effect of lighting on expectation can be represented by figure (5). Facets of lighting, including: intensity, distribution, and color temperature can create expectations in diners' minds and shape their perception of the restaurant. This perception is moderated by the culture of the restaurant (which includes cuisine),

and accordingly impacts dress code. If each of these components is in alignment and expectations are upheld, then it will lead to the potential success of the restaurant. If the lighting does not match up with the intended restaurant class, or diners' expectations and subsequent dress code, it could potentially lead to the failure of the restaurant.

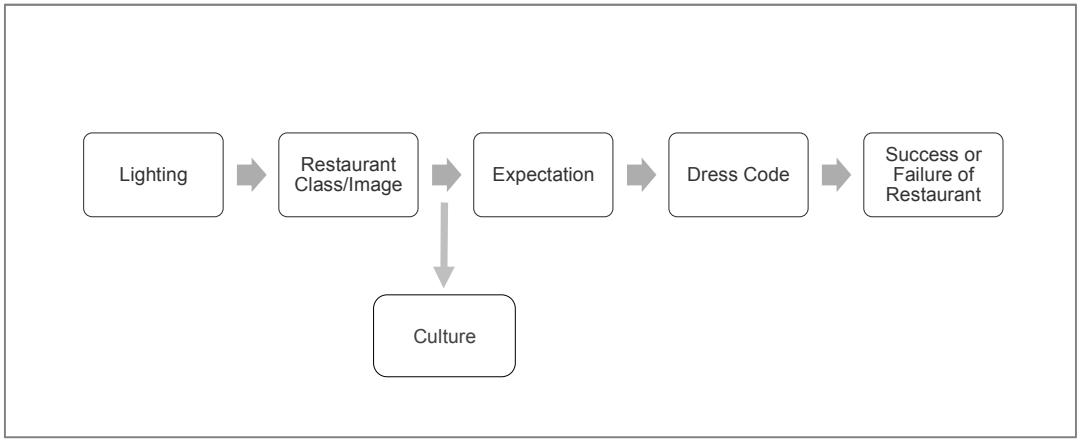

Figure 5 Effect of Lighting on Expectation, Restaurant Class, Dress Code, and Success or Failure

Entrance Lighting. Lighting at the entrance and waiting area of the restaurant is very important for two main purposes. First, diners can walk by the restaurant and be attracted by the entrance. Many participants expressed the need for an attractive and welcoming entrance achieved by lighting. Peter, the London based lighting designer, explained how lighting can be designed for the entrance of an upscale restaurant.

> *We want to create a grand entrance here. We want to be able to see in, so that they decide to come in and dine. Entrances is where you want the wow factor, so you might have more contrast there, so that some iconic artwork or flowers or some architectural elements maybe brought to the fore with lighting.*

Second, waiting area at upscale restaurant entrance can be a space for adapting to new lighting level of the restaurant. This is very crucial especially if the lighting in the restaurant is very dim as this can cause some sensation of blindness. Nathan, the experienced server, expressed, "*When you come in from outside your eyes get adjusted. It happens all the time at dark restaurant. People will come in and literally stand there blinking their eyes, waiting for their eyes*

to adjust." Adlah, chef and culinary consultant, rationalized the application of lighting in the waiting area as:

> *It always starts with the highest brightness once you enter the restaurant, the waiting area. Because they don't want you to go blind all of the sudden. Your eyes have to get used to the darkness. We can see into darkness. If you close your eyes and then open it, getting used to the dilation of the eyes.*

In summary, lighting at the entrance of the restaurant carries two main functions which should be taken into consideration for design. First, lighting is used to draw attention to the restaurant, to entice and welcome diners. Second, the level of lighting intensity should be designed to provide a what can be regarded as a 'buffer zone' for an integration between the exterior lighting level and the interior low lighting level in order to avoid blindness, thus helping diner's eyes to adapt. This area should therefore not be as bright as the exterior lighting but brighter than the actual dining area.

Mood. As stated by Basil "The mood of the place is set by the lighting.**"** Through interview conversations and observations, I am able to confidently propose that restaurant lighting can create different moods. Filip, lighting designer, emphasized the importance of lighting in creating mood within upscale dining experience, "*for high end dining, setting of the mood is very important. And lighting is indeed creating and enhancing this mood and enhancing this setting".* lighting is one of the main atmospheric elements responsible for creating different moods as Adlah expressed, "*Lighting can decide if your restaurant is cozy, or business, or relaxed.*" While Andrew felt strongly about lighting and its role in conveying emotional messages, as he explained his perspective as a filmmaker:

> *If we take away lighting completely in Hollywood, like nobody can make a movie anymore without lights. We will be confused. We will be watching a happy scene, and everything looks moody and sad, like shadows on the eyes, and so I think lighting is absolutely has to be intentional.*

German also shared his perspective as a restaurateur, emphasizing importance of lighting in a restaurant setting, and underlining the role of lighting intensity in affecting the mood of the restaurant as:

> *Lighting has a major effect. You can turn any space into whatever you wanted to be, through lighting. You know you can make it as magical, or you can make it very relaxed by having lower lumens. you can make it more casual by turning the lights up more and having a full brightness.*

Through my observations, I noticed that lighting is one of the most powerful tools used to moderate the mood of a restaurant. The trend now is to use lighting to create multiple moods within the same restaurant, sometimes for different courses of the meal. Participants used many adjectives to describe the moods of a restaurants, and during analyses I found that mentions of three main moods kept reoccurring: cozy mood, romantic mood, and energetic mood. Each mood has its own characteristics along with lighting attachments that is discussed in detail below:

Cozy Mood. Cozy mood is one of the main moods that can be generated in upscale restaurants and desired by diners. Other adjectives were used to describe cozy atmosphere such as; "*relaxing,*" "*homey,*" and "*peaceful.*" Zeyad, chef and restaurateur, described his perfect restaurant for a special occasion as, "*where there is some privacy…The atmosphere was home. It was comfy, it was relaxing.*" The cozy atmosphere is derived from an important concept in hospitality sector, as Abdullah explained:

> *In the hospitality sector, it all depends on the same factors of success, it's all about making the guest feels like he is at home. He feels comfortable enough to set down and chill even after his meal. He feels that the vibe is relaxing, or the atmosphere is really attractive.*

There are many associations of lighting conditions with cozy atmosphere. Participants related cozy atmosphere to warmer color temperatures. In addition, this mood carried a sense of relaxation and ease that was associated with being able to see the food and people next to you. Manipulating brightness using ample lighting can create this effect. Adlah expressed "*lighting also gives you a sense of peace, it brings out the food, and you should be able to see the person next to you*".

*Romantic Mood***.** Romantic atmosphere is one of the essential moods for an upscale restaurant, particularly for special occasions. Romantic atmosphere is mainly associated with, "*date nights*" and "*intimacy.*" Some participants ascribed intimacy to the warmth of the space, as Abdulaziz, an architect, described it, "*sometimes I walk into a place that has not much of intervention but they made sure the soul that the owner wants to convey is warmth and intimacy."*

Participants ascribed intimacy to privacy and creating a personal space, as Andrew disclosed "*intimacy is important as we can set between many people, but you have your own privacy"*

Participants attached low intensity of light to romantic atmosphere. Isabel, a blogger, commented "*for a date night you rather go to a place that has soft, dim lighting."* Khaled also devoted low intensity to intimacy and romantic moments, *"lighting aesthetically influence your mood. If it is dark and well-lit, its more romantic, it's actually where I want to be more intimate."*

*Energetic Mood***.** Creating energy or fostering an energetic mood is popular in a lot of contemporary restaurants. German, the restaurateur, emphasized the role of energetic mood as he suggested,

> *In today's market, I believe that it is probably 50% of the battle is creating energy, creating a good synergy among your customers. I have learned that when we design a restaurant, it is so important that you always have an energetic feel.*

Khaled also agrees with German, and expressed, "*This is what drives the place. They want a nice dark fun loud place, and that works in my opinion.*" I noticed that many participants used other adjectives to describe energetic atmosphere such as "*Alluri atmosphere*", and "*nightclub atmosphere.*"

Participants attached low intensity also to energetic atmosphere. For instance, Faisal described his restaurant St. Almakan in creating energetic atmosphere with low intensity "*always dimmed, it's the vibe that I wanted to create. It's always dimmed. It's fun, its lively.*"

Data suggests that both cozy and energetic atmosphere were associated with dim or low intensity lighting. However, these two moods are generally perceived in opposition to each other. My observations have allowed to theorize how this is possible. First, I believe that when participants discussed an energetic atmosphere they were thinking about a nightclub atmosphere where it is quite dark. Second, from a technical standpoint, distribution of light and color temperature are two other elements of light that can be used to create different lighting moods along with dimmed lighting. I noticed that a cozy atmosphere has a warmer color temperature, and dimmed lighting, but less focused light (uniform distribution). Third, it is important to note that

lighting cannot be separated from other elements of atmosphere, such as music or décor, that together create either an energetic or cozy mood.

Theatrical Influence. With my personal background in lighting and design I anticipated the use of a theatrical approach to lighting in upscale restaurant settings. Although one of my objectives was to note how lighting can be used in the process of staging the dining experience inspired by the notion of experience economy (Pine & Gilmore, 1998), this was never explicitly stated to participants. Yet, to understand how lighting stage the dining experience, we have to understand first how restaurant apply the experience economy and stage the dining experience. The experience economy philosophy suggests adding a degree of involvement with the consumer. Actually, some participants noted that part of the ambiance is adding a degree of involvement, especially in the food making process. Wes, a restaurant blogger, provided a parallel example:

> *It's a typical baked potato soup, but instead of its just coming out in a bowl that you get at Chilies, here it comes out and there at the time, there is a bowl, brioche, and a little bit of bacon and some cheddar, and here comes a server with this glamorous pour in a tea kettle, pouring the baked potato broth into that and it becomes incredible, it takes that soup and elevates it to the next level. So, restaurants go above and beyond with the show of food that it does make a pretty standard steak taste better*

In fact, participants themselves revealed indications of the use of a theatrical approach to atmosphere of the restaurant implied by using terms such as, "*theatre*", "*drama*", "*setting the scene*", "*a movie,*" "*a story.*" Both Peter and Filip agreed that their main job as lighting designers is to add drama to restaurant and to set the scene. Filip also commented, "*I do think the whole scene setting again sort of what we do, and what you call it a theatre is quite important.*" Andrew, a filmmaker, provided an example of a "dramatically lit restaurant:"

> *This restaurant is very simple, everything is minimalist, and dramatically lit restaurant, where it is dark, then there are certain lights that help you see the food, but you don't have to see another people's table. A restaurant that tells a story, kind of to sum it up.*

While, Nathan, the experienced server, confidently used the term "*theatre*" and feels, "*theatre is a great metaphor for restaurant…anyone passionate about restaurants and the dining*

experience, it is perfect metaphor." Nathan explained his perspective as a server to this metaphor:

> *it does kinda feel almost like theatrics. The dining room is the stage, where everything is theatrical, and then everything just played out to make the guest experience. Then when I walk back in the kitchen, it's like being back where all the people are working behind the scenes, with robes and stuff.*

Nevertheless, the theatrical approach to restaurant lighting does not have to create a lot of drama, it can be theatrical in its simplest way. Filip, a lighting designer, stated that it can be as simple as setting the scene. He differentiated between theatre and scene setting by stating that not all restaurants are designed as theatrical, but off course all of restaurants at some level intend to set a scene. Filip offered an example of a less formal restaurant that he designed where his goal was to set the scene but not employ a theatrical approach:

> *This is Clement in NYC, in peninsula hotel. It is a theatre in a sense that we do a setting but it is very bare-down. I mean the background in the end sorts of attracts your attention to the back and you get through it. You have the spotlights on the table that creates sparkle and then there is the decorative lighting over the table, that's basically it. So, it is a very simple design*

Figure 6 Clement Restaurant, New York City. Retrieved October 15, 2017 from https://resizer.otstatic.com/v2/photos/large/24383062.jpg, and https://www.nycgo.com/images/venues/604/clement_color_room_2016__large.jpg, and

Open kitchen. The open kitchen concept is relatively new idea and trending among contemporary restaurants. Participants expressed that open kitchen concept increase their level of involvement and it provide the ability to observe the cooking process, and the ability to ask questions directly to the chefs. Such level of involvement and participation is done intentionally, as chef Faisal noted, "*I love when I cook, I want people to get educated, I want people to see that aspect. So, I have an open kitchen.*"

The open kitchen is another application of experience economy and imposes the concept of theatre and entertainment, as discussed above. Both Basil and Faisal termed the open kitchen concept precisely as a "*Show Kitchen.*" Adlah described it as, "*it's a show, its attractive. There is nothing more attractive than a guy making a pasta, or a guy making noodles in front of you.*" Basil verifies "*Yes, it is a show, the kitchen provides the experience. So, the flames are going out, the movement in the kitchen, the wood fired oven, that's provides a lot of show, live kitchen show."* Peter, lighting designer, provided an example of a show kitchen, the restaurant Benihana. He described the experience as the following:

> *The experience of having it cooked right in front of you is beautiful. You know exactly what you're eating because you see every step in the process being done. You're not going to actually track that bit of chicken and say, OH I want to see its journey to my plate, but that sense of openness, I feel it's very reassuring that I'm somehow more involved in the process, because I'm as a viewer to the theater, I'm paying my seat and I'm being given a show.*

The open kitchen concept offers openness and build up trust among upscale diners. Adlah confessed, "*if I don't see the kitchen, I don't trust it. That's why I don't eat in a place unless I see the kitchen.*" It appeared that the visual component to see the open kitchen is crucial to build this trust. On this ground, I suggest that the open kitchen should be visible to the diner. Peter confirmed, "*I trust my food. I feel good about it, especially if you've seen it being prepared through an open kitchen."* Peter also shared the concept of one of the restaurants he designed:

> *We've just done a restaurant in Marrakech where the main dining area, the wall that divides the kitchen from the main dining area, is mostly glass and, because the woks that cook most of the Chinese food, the flames gives a sense of theater and we don't want to hide that from the guests. It's also very open so they can see their food being prepared.*

Lighting plays an important role in establishing the open kitchen as a center piece for a restaurant. Peter as a lighting designer, and basil as a restaurateur, both suggested lighting should be used to highlight the open kitchen and make it visible from a distance. Yet, participants also noted that maintaining the function and aesthetic of an open kitchen can be quite challenging.

The kitchen – between function & aesthetic. The lighting criteria for an open kitchen appears to be complicated and contradictory, and demand balancing between creating attention to the kitchen, maintaining mood and atmosphere in the dining area, and meeting required level of light for function in the kitchen area.

Basil, the restaurateur, recommended, "*I want to see the kitchen but I don't want to see 60*60 cool lights and the kitchen stuff, and details that should not be seen by the guests.*" Peter also emphasized meeting the required lumens for function as he said,

> *The chefs need very good lighting, but a chef wouldn't want you to dim the lighting in a kitchen because then it becomes dangerous… that could cause a problem that can appear very bright for people having a nice romantic meal for two that are looking straight at the kitchen.*

Accordingly, lighting for an open kitchen design should be related to the dining area. Basil felt that the lighting of the kitchen should not detract from the dining experience and it would be a mistake to attempt to make the dining area brighter to accommodate the highlighted kitchen:

> *If we had made the dining area bright, I would lose the focus on the kitchen. There are many restaurants like that. there is an open kitchen but we cannot recognize it, and diners don't see it, like ooh is the kitchen is there? because the lighting in the dining area is brighter than the kitchen or equal to it. In that case. I will not care really much of what is happening in the kitchen. It is very important the balance between kitchen and the dining area. Here is where the lighting program is very important in highlighting certain areas versus another area, creating a mood.*

One solution to balance lighting between the open-kitchen and the dining area is "*zoning*" the kitchen area to different intensity levels. Peter suggested, *"sometimes you have to break it down into zones so that not all the kitchen lighting dims, but some of it dims that's closest to the front of the house area.*" Another solution suggested is adding a layer of frosting to diffuse and filter the lighting spelling to the dining area.

In summary, open kitchens have become an iconic feature of many contemporary upscale restaurants. A general approach to illuminate the open kitchen successfully is to highlight the kitchen with relatively brighter light than the dining area, making it visible from distance. To make

the kitchen standout, the dining area should be dimmer, to avoid competing with the open kitchen. Techniques such as zoning and frosting can be used to create a successfully lit open kitchen.

The Bar. The bar area within a restaurant works very similarly to the open-kitchen concept, and in some restaurants, the bar is incorporated as a focal point to the restaurant. The bar area can be the heart of the restaurant, where participants described it as "*a center point, [and] a main feature*." Other participants emphasized the role of bar in creating energy in the restaurant. German shared a story of energy at one of his restaurants:

> *We made the mistake, we did it old fashion, where we separated bar from the dining. So, we created two ambiances. We have the ambiance from the bar, which was more energetic, more happening, more fun, louder, and more people watching. But the dining is more quiet. So, we realized that everybody wants to sit in the bar, but nobody wants to sit in the main dining area or the banquette. So, moving forward, every single restaurant we ended up deciding after that was designed as a perfect square so that the bar is in the restaurant, and the restaurant is in the bar, and the energy from the bar over flow to the dining room, and you could see every corner of the restaurant, you can see everybody from any seat that you were seating, and that has been successful. We realize that the energy you get from the bar over-spilling in the dining room, enhances your experience.*

Same as the open kitchen, lighting designers suggested that a general role to light the bar is to make it the brightest part of the restaurant to it stand out. Yet, participant suggested two different and contradictory approaches to achieve that. For instance, Peter explicitly explained his approach to light the bar as, "*no direct lights, atmospheric up lighting and the bar is the brightest thing. So, you do want to attract people to the main hub, the points of interest*." While Abdullah has a contrasting criterion, since he uses direct light for defining personal zones, "*even the bar with all those lights come in, so each light for one person to sit, one light over each person. So indirectly indicate to people the instruction to where you set.*"

Participants had different views as to how to light the bar area in a restaurant. I can confidently say, it depends on the type of restaurant and how each restaurant intends for the bar to be perceived and function. While the bar is generally considered the center of attention and a source of energy, lighting designers seem to have more flexibility to use their creative approaches to achieve this.

***Lighting Fixtures*.** Lighting fixtures or specifically chandeliers have an imperative part in the lighting design for upscale restaurants. Basil, a restaurateur, stated, "*We did fabricate and customize the lighting fixtures just for our project and we paid 60,000$.*" Having spent this exorbitant amount of money on lighting fixtures it is clear that light fixtures can be a crucial component in defining the lighting experience. First, lighting fixtures can affect the overall dining experience. Second, lighting fixtures can be iconic of culture and or style. Third, lighting fixtures can affect perceptions of price and quality of a restaurant.

First, lighting fixtures can influence the overall dining experience, and add flavor to it. Abdullah, restaurateur, stated, "*These fans and chandeliers, we added them as part of the experience.*" Basil also confirmed that lighting fixtures can provide an additional dimension of experience, "*there is also the exposed incandescent light bulbs, we were first to use them in Kuwait. People used to see it and say wow what is that lighting with different shapes.*" Abdullah theorized as to why these fixtures are such effective elements of the experience, "*Chandeliers can create shadows in the space. Here in the picture, look at the shadows, it creates more interest and it doesn't make you bored. it's not plain and solid, with lighting you can do a lot of things."*

Second, lighting fixtures can be iconic and can denote a particular culture or style. Adlah provided an example of how lighting fixtures can reflect the culture of the restaurant cuisine, "*restaurants started to put side lamps or standing lamps, with like card paper covering on it, because that gives you that the perfect soft light. you see it a lot in romantic restaurants and in French bistros.*" Wes, a blogger, provided an example of style. He stated, "*you walk into this kind of industrial dining room with a big gigantic ceiling and they have these glass chandelier; they are statement pieces.*"

Third, lighting fixtures can affect both price perception and quality perception of the restaurant. Kevin, fine dining blogger, suggested that especially at upscale restaurants, the interior design and the dining experience should be vindicated, "*everything has to justify why it can be expensive...There is a nice chandelier in the dining room, off course … they will say why it's an expensive meal, but I see why you where expensive.*" while with Veronique, fine details of

the lighting fixture matters, as she commented "*when I see lighting fixture that I really like at a restaurant, this is a sign that someone has thought out of the details of the restaurant, and what they like to convey.*" Wes felt that attention to carefully selected fixture shows attention to detail which reflects on the overall character of the restaurant, "*with these glass chandeliers, I'm in for a treat, because look at the attention they paid to the details of this interior design.*" Peter provided a particularly comprehensive example of the restaurant Za Za Bazar that he designed, and it is being known for its sophisticated lighting fixtures. He was showing me the pictures of the restaurant while he was explaining:

> *This is just accenting dragon on the wall, that kind of ripples there. We have Chinese pendants and Moroccan pendants. We have basic globes there and we have parasols that are upside down, with a basic lamp. We've got lines of light, but all the lanterns lead to the middle. There's like some posts in the middle with lights on themselves and they act as the center of all the energy and all the pendants, a cloud here, a cloud there, that the lines of light are kind of very discretely focusing the eye.*

Figure 7 Za Za Bazar, UK. Retrieved October 15, 2017 from http://www.harpersigns.co.uk/wp-content/uploads/2014/10/View-from-Gallery2-1100x733.jpg, and https://www.mystery.co.uk/wp-content/uploads/2014/11/ZAZA-1135x560.jpg

Nostalgia; The Repeated Visit. The repeated visit is the indicator for successful and persistent business in the restaurant industry. Basil explained,

> *We look at repeated customers. We don't care that we have long lines waiting at the door, it is not the business that we are looking for. We are looking for those people who are coming back, which means that they are satisfied with their experience. This is a sustainable business model new flow of people is not. If I got people in, I need to keep them. And to keep them, the experience is very important.*

Participants acknowledged that efforts were constantly being made to achieve repeated customers. Abdulaziz, the architect, explained, "*if a person wants to come back to a certain place, he has to enjoy the space.*" it seems that this repeated visit is attached to the diners' memory. Therefore, a memorable atmosphere can be a factor for success. Abdullah, a Kuwaiti restaurateur said,

> *The atmosphere is one of the key things that you remember when you leave the restaurant. The experience starts with you from the beginning, then it carry's on, and this is what you usually are going to remember. You are not going to remember the food, but you are going to remember the place.*

The theme of "*nostalgia*" was repeatedly mentioned by several participants to describe such memorable experiences. Nostalgia is embedded in the dining experience, as Faisal suggested, "*The nostalgia, is within the dining experience. These all things affect the experience that you get from a place, because you are having a big attachment to the place, a nostalgic attachment.*" Lighting can have a huge role in creating a nostalgic atmosphere as described above. For instance, Nathan, an experienced server explained:

> *The lighting plays into my nostalgia for the place a lot, especially during the Christmas season. and that just dim light and the smell of food, and smell of wine also, it just plays into my nostalgia that I have for it. and just kind of the dim lighting has the image or the feeling of like warmth*

Lighting can create a nostalgic atmosphere that can be attached to diners' memorable experience of dining at a restaurant. Such pleasant memories can prompt return visits from diners, and these return visits are indicators of a successful business.

Service Experience. "*If the lighting is dim, automatically we will associate it with better service.*" **(***Basil, 2016).* There appears to be a strong relationship between lighting and overall service perception. In this section, I will discuss three key findings regarding how lighting can affect the service experience at upscale restaurants. First, lighting can affect server performance. Second, lighting can affect diners' satisfaction and even their potential to lodge complaints during dining. Third, lighting can affect perceptions of the cleanliness of a restaurant.

***Server Performance*.** One of my goals in this research was to explore how lighting can affect server performance as other studies have shown that changes in lighting can affect individual mood and performance in other places of employment ((Boyce, 2014; Hoffmann et al., 2008; Huang, Lee, Chiu, & Sun, 2015)). Servers work long hours and are expected to provide extraordinary service to the diners. My presumption was that lighting could possibly affect server performance and thus service delivery at upscale restaurant setting. Khaled, chef and restaurant manager, stated "*Lighting sets the tone, and the mood … it affects mood either positively or negatively. If it is a quite dinner place, I expect dim lighting and the staff will be very calm, very polite, and very nice."* Likewise, lighting can affect servers' sleep patterns. Isabel, a blogger, suggested:

> *The influence that light has on your system at a whole like on your circadian rhythm. People that are exposed to something that resembles daylight at night, has trouble falling asleep, and the other way around, being in the dark all day, like they never see the sun, how that can affect their sleep patterns, and their stress level maybe. So, it has a connection like hormonally, maybe like mood or psychological levels.*

I would have liked to explore this issue of light and server performance more thoroughly; however, I was not able to interview other than one server. Nathan, the server, along with other participants who held different roles in the restaurant industry stated that they never had any complaints from the servers about the lighting. German, a restaurateur, said:

> *We have a computer that puts every statistic so I know exactly what my staff is doing. But I never related that with lighting per say. Are they not as productive with low or bright light? … there is room for mistakes with the sound, but with lighting, I don't think so, but it might happen though.*

Similarly, Khaled, chef and restaurant manager, made a point, "*I never noticed it and I never had a problem with it. Because I was never in and out enough, that affects me negatively or positively. It never crossed my mind.*" Based on participants' responses there does not be a strong correlation either way to support or refute the idea that lighting can affect servers' moods.

Furthermore, servers are given minimal consideration when professionals are designing lighting at upscale restaurant settings. Filip, lighting designer, admitted, "*we look at it from the*

user perspective." Obviously, designing lighting according to diners (who are the end users) perception is a priority, as Kevin, fine dining blogger, confirmed "*the smoother from a customer point of view, the better the job that they have done.*" Peter, a lighting designer, also added: *"We would consider servers secondary after the guests."*

The perspective of the server was only really considered when examining the functional efficacy of their job. Basil considered lighting and server efficacy only if, "*it is a hazard to work in".* Peter Explained "*we have to make sure that they could do their job. If they can't do their job, it's probably going to affect the guest experience.* Peter further explained:

> *You may have points of sales and counters where food has to be prepared or drinks have to be prepared or even just a waiter station where they get glasses on their way from the bar or the kitchen to the table and you want to make sure that they've got more than enough ample light to do their job, but that doesn't adversely affect the customer's feeling in the space*

Server's transition between the dining area and the kitchen also emerged as an important aspect when designing light and server performance. I asked Nathan, as he is the only server interviewed, if lighting affected any aspects of function at his work, especially with respect to the transition between the kitchen and the dining area. While he did not feel it had any significant detrimental effect, he did note that, "*going from the dining room to the kitchen, it's like going from incandescent to fluorescent, in the kitchen everything looks green and blue, and everyone looks sick*".

Peter, lighting designer, explained, "*They could be carrying their plates really in a 500-luxe corridor and suddenly go into a 20-luxe restaurant and walk into something because their eyes haven't adjusted."* In addition, Basil explained "*meaning that they get overly bright light in their face, then they move into dark environment, then they will not see their path*." Peter emphasized that as a solution, transition areas can be utilized to adjust server's eye to the lighting levels.

The transitional area is important not only because this serves as a space where the servers' eyes can adjust to the differences in lighting levels, but it also acts as a type of barrier, blocking the light from spilling over into the dining area, which would affect the diners' experience.

Both of the lighting designers I interviewed stated that this transitional area had to be addressed appropriately. Filip, expressed:

> *We want a transition anyway because the last thing you want is that somebody open the kitchen, though it's a moody dining, and so fluorescent light or whatever light floods in so we always try to create a transition, and get the light levels this intermediate.*

Similarly, Peter stated that he may take notice if:

> *The door opens between the back of the house and front of the house and suddenly, a huge blast of light goes in someone's face and they're enjoying a nice romantic meal for two, we would want to try to do our best to prevent that happening …. where you might also want to think of the workers, staff, is in the back of the house areas; kitchen, prep rooms, staff rooms, locker rooms, where they need ample light to do their job, but again hopefully it doesn't affect the front of the house experience.*

As a solution, Peter suggested

> *Are there any real functional areas that absolutely have to have lots of light, can they be the furthest from the front of house?" Anyway, it's obviously not true in an open kitchen because they're obviously next door to each other, but can you have a very gentle transition where bright is 20 meters from front of house?*

Nevertheless, in today's restaurants the nature of transition has changed, it can be as simple as a window pass. Faisal, chef and restaurateur, commented "*the difference between the dining and the kitchen is just a counter, they don't really get in. Basically, it's, a service window, so the food transition through the service window.*"

At the end, I also learned that for some restaurants, part of providing a good service required servers have to carry portable light sources. German revealed, *"part of the uniform for the servers is to have mini flash lights."* This mini flash light has several reasons as German expressed *"to be able to provide the lights for the customers but also to be part of their work, when they check in their station, they shine the lights."*

Complaint Levels. Lighting can affect diner's complaints level at upscale restaurant settings. Particularly, intensity of light can play a big role. As Faisal, chef and restaurateur,

admitted, "*we decided to change the lighting and once we dimmed it down, I noticed something that I was very shocked from, which is complaints…. complaints started dropping.*"

Interestingly, this can be explained as the bright light creating an unsettling quality for diners which put them on edge. Faisal explained, "*it was bright light and loud music, so the whole atmosphere is very active, and very tense.*" Under this alerting condition, Faisal described his diners as "*it's like they are kids on high sugar level. They were very aggressive.*" Kevin, fine dining blogger, described what happened to him as,

> *I do realize for a brighter dining room, or during lunch service, we tend to ask more questions to the waiter…if it is a brighter dining room, you are more in a working mood, and then we will give the waiter a very hard time.*

Faisal, chef and restaurateur, described the nature of complains he got before dimming the light, "*they complained about the food, like why your food is late, and why you bring that item first, why…why?*" Also, Kevin described the situation when the light is bright as:

> *When I eat with some foodies or food critiques in the same dining table, we will discuss about each plate, we examine and talk about how we liked each component of the dish, and then how we liked the dish overall, but the discussion tends to be longer and in more details and more intensive when its bright*

Additionally, the high brightness appears to affect diners' temperament and ability to wait. Faisal expressed, "*before it was like every two minutes, please come, and the place is very packed up, so the servers are under pressure.*" Then after Faisal dimmed the lighting, he noticed, "*15 minutes go by and no one call the server, because they like the atmosphere.*"

Most participants agreed that dimmed light has the potential to make diners more relaxed and less inclined to be critical or make complaints. Kevin expressed*, "when its dimmed, we don't go very far, the concentration level is lower, and it makes you more relaxed, that's why you are not critical in the food though.*"

Cleanliness. Lighting can affect the perception of cleanliness. Kevin said, "*if they don't have the right lighting, I do worry about the hygiene level as well."* However, I was wondering from this comment how we can define the "*right lighting.*" To me, it seems to suggest the level of

brightness. Yet, participants expressed contradicting views. Some participants expressed that they have negative perceptions of cleanliness with dimmed lighting. Kevin said, "*so for those restaurants, they need to be brighter, at least I need to feel comfortable and in a clean environment.*" Additionally, Abdulaziz, the architect, shared his concerns:

> *Space that is very badly done like most night clubs, but have this really crazy orchestrated scenario, spot light here and spot light there, on certain elements make it look like a very sexy space. Turn on the light at 4 am, and it looks dirty, and nothing is finished properly. I think at the end light is extremely important.*

On the other hand, some participants believed dimmed lighting is positive as it hides imperfections. Faisal described the case before he changed the lighting in his restaurant as, "*it was super bright, to a degree that people can see all the disadvantages and the imperfections of the whole place, like if some food is on the floor*." I believe that the consensus among the participants would be that dimmed lighting is recommended. Faisal expressed, "*usually they have dimmed lighting because it hides a lot of mistakes, and plus they set a good atmosphere.*"

While a dimmer environment is optimal from a diner's experience, it is essential to also use appropriate lighting when cleaning the restaurant. Upscale restaurants are held to a very high standard of cleanliness; therefore, lighting controls are used to provide the proper lighting for cleaning purposes. Nathan expressed:

> *at the one restaurant that I work on most recently, we don't serve lunch, we were not open for lunch. And we would go in at 3 pm and all the lights will be bright so we could put the attention to details and see all the details in our tables, with the lights all the way up. That way we could see everything.*

Social Experience. Social experience is the third experience that diners are exposed to at upscale restaurant setting. Apparently, lighting has a big role in controlling the social experience and the social interaction within this setting. In this section, I discuss five important aspects regarding how lighting can affect the overall social experience at upscale restaurant setting. I outline Social Experience as: First the social experience starts with using light to attract and satisfy potential diners. Second, I talk about how lighting can affect interaction between

diners, which I termed ‘Social Light’. Third, discussion of how lighting can create privacy and this privacy is moderated by cultural norms. Fourth, I discuss how lighting affects time perception and the length of the stay. Finally, in the last section I discuss how lighting affects taking pictures to post on social media and how this growing cultural phenomenon has become an important aspect of the dining experience.

***Potential Diners*.** In any restaurant setting it is difficult to please all diners, however an upscale restaurant serves an even more discerning clientele so every detail, such as the pleasing music or appropriate lighting, is a major concern. There are so many elements that can in fact become barriers to potential targeted diners. Basil suggested, “*lighting, design, location, direction, branding, all defines who comes to the place. I cannot filter people by saying ooh you are welcomed to enter and the other one not.”*

Lighting can be one of the elements used in attracting the potential diners, as Basil suggested “*lighting is an important component also but it depends on the who, not the design itself*” as basil explain. Then he provided an example of his restaurant Slider Station:

> *One of the reasons why it is successful, because I’m catering to a very specific market, each target market will have different set of expectation for a place, I have to design based on the target market. Who is my target? How do they like to experience food or being in a restaurant? How can I design for them?*

Analysis of my interview data suggests that the general age and gender of a restaurant’s clientele can affect lighting design and this can vary according to the time of the day and day of the week.

Lighting can be used as a tool to filter customers according to age. Participants suggested that there are restaurants that appeal to more younger diners while there are restaurants that appeal more to older diners. Participants also suggested that younger diners prefer dimmed lighting, while diners in an older demographic (e.g. age, as noted by participants) can have special considerations to their vision and needs higher level of lighting. Nathan, the server, shared his experience in the first restaurant he worked in:

> *It was just like very dim lighting. I could say that all the walls were kind of like wooden, so it is very like almost old school, like a mafia restaurant I would say. The restaurant is located right next to sun city which is where the all old people live in the west of valley. So, people would come in and they will say like they can't see. One time my mom walked in the front door, and she walked straight into a chair because she can't see*

On the other hand, Basil provided a great example of how lighting can cater to older diners in the new concept for his restaurant Coco Room:

> *Coco room will be more accessible for the segment we are targeting for. It's for older ladies and mothers above the age of 35. This segment they need accessibility, parking, and quick access. Plus, they need good lighting. So, we have to change the lighting program for that space. It's a new space, with lighter materials, wood, with white colors, but it will serve our targeted segment the whole day. This segment will not change from breakfast, to lunch, to dinner. So, we are trying to attract the same crowd the whole time. So, lighting has to be well measured because the space is bright, lots of light grey shades, and light wood. So, the reflection of the light will be higher from dark spaces. Therefore, the lighting will be definitely warm. We don't have cool light. But it will be distributed in such a way that they won't feel like they cannot see the food. They want to see the details of the food even at night especially this segment. Because this is how they prefer to see it. But it doesn't mean it's very bright like a ballroom or a stadium. It has to have the right kind of light, but it is a different approach to lighting.*

Gender also appeared to have an impact on lighting design and preferences. German, a restaurateur, observed, "*I know a lot of women do not like a bright bar, they always like it to be dimmer, its more romantic, its more intimate, and you know you feel comfortable.*" While this may be an interesting avenue for inquiry, the idea of gender and lighting only came up in this one interview. As Saldaña (2015), notes that in qualitative data, the number of frequencies of a concept is not necessarily a reliable indicator of its importance or significance. Therefore, I chose to pursue this observation at this time.

Demographics of diners (i.e. age and gender) can vary either by time of the day or day of the week within the same restaurant. Several restaurateurs suggested that lighting, and specifically lighting control (which will be discussed later) can create different experiences based on the demographics of targeted potential diners, thus can cater the atmosphere to those different demographics. For German, the potential diners at Sumo Maya is changing over the week more so than the day, so he shared his experience catering lighting to his diners:

> *We understand depending on the night of the week, who we are going to target…For example, in Sumo Maya, depending on the night of the week, I would tell you who is my customers. So, Sunday through Tuesday, my customer is more mature crowd, Paradise Valley, maybe from 40 to 65 years old, 70 years old. Wednesday starts to become more young professionals in their 40s, young attorneys, young professionals. And then Thursdays it gets little bit younger. Then Fridays and Saturdays it's a mix of crowd where definitely more energetic, its younger, it's that sexier vibe. So, depending on the night, we have settings for the lighting.*

In summary, it is important to understand the potential market and who the target clientele is for a restaurant. Demographics such as age and gender, can vary over the course of the day and evening so it is crucial to take this into account when using lighting to create an overall desired atmosphere to fit these different demographics. This all can be achieved by the help of lighting controls which is discussed later in this chapter.

The Social Light. Lighting can affect the social experience within upscale restaurant setting. I termed this idea the "social light." Social light happens at two general levels; "within" and "between" tables. "Within table" socializing is the social activity that happens between diners accompanying each other. They know each other and are seated within the same table. "Table to Table' socializing happens between diners who don't know each other, and not seated at the same table. Several participants referred to this experience as "being seen." Both socializing levels are discussed in detail below

At the most basic level, in order for socializing within table to occur, diners need to see faces of the other diners accompanying them. Adlah, chef and culinary consultant, expressed, "*lighting gives you a sense of peace, it brings out the food, and you should be able to see the person next to you."* Khaled, chef and restaurant manager, expressed his need to see the face and the body language of other diners and shared his thoughts as:

> *It is important to have light to see. I want to see your face and what I am eating. Sometimes you have to whisper and you cannot be very loud. I want to read your face and your expression. If I see you, I will know if you are having a good time, you are smiling and I smile.*

Therefore, the minimum requirement for social light is to see faces at a particular table, not necessarily the other tables. Adlah expressed, "*you don't have to see the people sitting at the*

table next to you, but you have to see the person next to you." However, this does not mean that the restaurant should be excessively bright, as this might actually negatively affect social interactions. Abdullah felt, "*the dimmer the light, the more you provide comfort for people to talk. The more the place looks like a stadium, it will be difficult to focus on whoever you are having this meal with and talk with him/her."* However, Zeyad, chef and restaurateur, believed the opposite, "*If the lighting is too bright, it makes people very hyper. If its dim, it makes them more calm, and not much social."* This statement while very interesting, requires further investigation to assess its validity.

Some participants suggested that lighting intensity affects socializing according to group size: the larger the group, the brighter the light should be, and vice versa. Khaled expressed, *"I don't like to go to a place that is not well lit, and I can't see. Unless I'm on a date. But in general, just to go out with friends, I don't like the dark place."* In general, if it is two people (whether a romantic couple or platonic couple) it is more preferable to have dimmed light, as the interaction for a group of two usually tends to be more romantic or intimate in nature.

Basil had a similar opinion, and noted that seeing faces and fostering social activity within bigger group could be more challenging. He explained, "*everyone wants to have a conversation and talk to everyone within the family group. If the lighting is too dark, and everyone wants to see the faces within the family group, it gets affected. So, it affects the group size.*" Basil provided a theory on group size and lighting, "*The darker and more dim, I think the smaller the groups might be. Because going out in bigger groups, everyone is checking on the other within the group. So, if it is dark, they cannot do that communication.*" Basil provided another anecdote to support his theory:

> *For example, girls they love to go out for breakfast, because it is bright and everyone can see each other, the music is low and relaxing, so they can interact. At night time, it is difficult in this setting, they might go but not in big group, like group of 4 or 6, but 8 it will be very difficult. They might choose somewhere, where it is much more relaxed. So, it affects group sizes, more than socializing aspect.*

In some contemporary restaurant, socializing “table to table” (or across tables) is encouraged. Table to table socializing can be moderated by lighting, but overruled by cultural norms. Both Filip and Basil alluded to this type of socializing within restaurant context using the phrase: “*to be seen.*” Zeyad believed that lighting can affect this socializing process as, “*if the brightness is high, it makes people be seen more,*” and Basil confirmed “*the brighter, the more socializing, the more communication.*” Filip felt the best approach to facilitate the “*to be seen*” experience is to place a spotlight on the table, (as discussed below at the focused beam section of this chapter)

***Privacy and Cultural Norms*.** Lighting emerged to be affect privacy perception at upscale restaurant setting and this privacy perception is moderated by cultural norms. Lighting can affect privacy perception by creating personal boundaries and define personal space. Creating personal space or “*personal territory*” (Altman, 1975) is necessary in a restaurant setting, especially crowded restaurants and bar area within restaurants. Abdullah, a restaurateur, expressed, “*even the bar with all those lights come in, so each light for one person to sit. So indirectly indicate to people the instruction to where to sit.” which* I suggest that this approach is related to lighting distribution and complexity. Lighting intensity can also play a role in creating privacy. Kevin, fine dining blogger, expressed, “*if it’s too bright then you don’t get the sense of privacy, then you see clearly the table next to you, then you can’t have the sense of privacy.*”

The idea of privacy considered here does not mean isolation. It should be a goal to maintain the privacy of a couple or group, while also allowing for the ability to be sociable with others to create a larger sense of belonging within the restaurant setting. Filip termed this phenomenon, “*privacy with a sense of community.”* Balancing privacy and the sense of belonging is central to the social interaction of diners within upscale restaurant setting. Filip further recommended:

> *It is a sort of mixture between creating privacy in a sense that you are in a community around this table as well as actually you are in this restaurant, and I guess there is always sometime an element of we are here part of all these people who are here.*

However, it is crucial to note that privacy along with this "*sense of community*" is moderated by culture, as Basil commented, "*socializing is relative to culture.*" Abdullah, also considered cultural norms when he designed his Indian cuisine restaurant. He tried to display an understanding of the culture. He stated, "*In Indian restaurants usually there is good space of privacy …. and this is also adds to the experience.*" However, it is critical to remember that culture is not static and can change with time. Basil shared an example of how light interacted with changing cultural perspectives, "*Saudi people is very conservative, they don't like dark places. We changed the whole perception, we made it a little bit darker, its dimmer, it's not as bright as they are used too.*" Abdullah supported this idea by stating "*I think people are changing and advancing, and they don't have any issues and problems with that, as long as you don't overcome some logical boundaries, and slowly introduce it, not all of a sudden.*"

At the end, lighting can boost the sense of privacy needed in a restaurant setting, and it is moderated by cultural norms. Yet, culture in our modern day is dynamic and can change. Restaurants can introduce new design ideas, especially in lighting, but within an acceptable range.

***Length of Stay*.** The interview data suggests there is a relationship between lighting and the length of time a diner spends at a restaurant. Participants suggested that lighting can affect the decision to stay at the restaurant or not, and affect the flow of people and the turnover rate. This relationship is controlled specifically by the intensity of light, and the perception of bright versus dim.

Some participants talked about high brightness and associated it with fast pace restaurants where shorter stay is required. Joshua, a blogger, said, "*if the light is too white or bright, or florescent, that make me want to leave faster.*" Abdulaziz rationalized this relationship:

> *Part of the reason why places like McDonalds and others, the lighting isn't so flattering because they don't want you to stay. They want a quick turnover. So, they don't want it to be nice and cozy with soft lights. No. it's very bright, so you eat and go.*

On the other hand, other participants provided an opposite example of low brightness and associated it with slow pace restaurants and longer stays. Veronique expressed *"I think that lower lights invite people to stay longer over their meal, I like the darker feel in the evening because, I like spending a long time at dinner."* While Nathan voiced his view as a server with a long work experience history:

> *I feel like if it is darker, it's kind of just yea its laid back. It almost like it decreases the element of time because people just want to forget about time … time is just not an issue and it almost feels like its tide to how the restaurant is*

In order to ensure sufficient quality of data, I asked Nathan to describe the speed and flow of where he works currently at the airport, so he explained "*right now where I work, its super-fast pace. people want to order and then want to have their food in 3 minutes, and then leave*". Later he compared it to his long experience in fine dining "*but when I worked in a fine dining places, people will sit down and sometimes they would literally be there for 2-3 hours*". Nathan explained that in the current restaurant at the airport, time is the essence, and it is the most critical factor for diners at the airport. As a validation, I asked him to imagine, how people will react if the lighting is dimmed at the airport restaurant, and he answered

> *I feel like it has that effect on me. But I'm trying to think if the guests. I mean, it would be an interesting experiment to see if the guests were to mellow out and think less about time and just enjoy their food more. I would have to think that they would.*

Lighting in terms of intensity (i.e. bright vs. dim), and color temperature can be used to influence a diner's length of stay. Basil summarizes this best saying:

> *The more dim and warm, the more relaxed or more timed that I don't have to rush. The brighter and cooler the lighting, the more rushed people goes in. The dimmer the lighting, the less rushed, and the less rushed means more service, and the brighter the lighting, means it is a quicker service*

Photos and Social Media. With today's smart phone cameras, people photograph everything, providing a record of every aspect of their lives and especially the food they eat. Yousef expressed, "*people like to document things and memories, and especially the new*

generations obsessed with the selfies and 90% of people who sit here, look around and start to snap, so we made our restaurant an interactive space". Along with the explosion in popularity of social media, the nature of the dining experience has changed. Adlah astutely remarked, "*now food get into Instagram before it gets into your stomach.*" Therefore, taking pictures of food became a vital element in the dining experience.

Andrew and Isabel described their experience as "incomplete" without being able to take picture of their food while dining out. Isabel expressed,

> *For me as a blogger, if I go to a restaurant and I can't take a good picture of my food, I don't enjoy it as much. I cannot share. I am unable to translate my experience in a picture, I want to show you what I had and I want to make it look so good, that you want to try it. So, if I am not able to fulfill that desire, it's like if I didn't eat the food, like my experience as a blogger is not complete.*

It appears that photographing according to restaurant bloggers is very fundamental to the meaning behind the entire experience. However, photographing is not limited to bloggers, as Isabel explained, *"I would say pretty much anyone with Instagram account or social media platform. It is a big trend right now to share what you eat."* On the other hand, photographing is not necessarily for sharing in social media, but also to capture a memory, as Wes, a blogger, explained, "*This absolutely look beautiful, so that I can take a picture of it, other people even if they don't use social media, they will love seeing a dish that just pops out of the plate.*"

Participants also suggested that photographing goes beyond being part of the dining experience, and can extend to a marketing strategy and a form of advertisement. Therefore, a lot of restaurants put effort to adopt and encourage the trend of photographing the food. It is a modern-day reiteration of 'word of mouth' advertising.

In upscale restaurants, the element of visual presentation of the food is very important, and therefore readily lends itself to the phenomenon of diners' photographing their food. Andrew called this phenomenon as "*photogenic restaurants*" and "*photogenic table.*" He rationalized, "*those will only do good for restaurants that has photogenic food. Beautiful food, it's a wasted marketing strategy if they don't think about it that way.*" Nathan also agreed with Andrew, and he expressed:

> *For fine dining, the one thing that I really think of, it emphasizes more the visual presentation of the plate, because that what they are showing off, and usually with someone post that to Facebook, and say where they are at. So, it is kinda of a promotion to the restaurant.*

There is an inherent desire to share images of "*Photogenic food*" and this is very beneficial to any type of restaurant. Andrew expressed, "*so when you have many people here, you have like 20 people in 1 hour posting about your restaurant. That's a trend. This is an opportunity."* Andrew also emphasized the role of website reviews *"how many people on yelp look at pictures before they say yeah let's go to that restaurant.*" While, Khaled shared this story as he had an entire event based on sharing pictures, "*Today, I had a pop out with Yoza. she has 300,000 followers on Instagram and she decided to do a pop out. She brings in a lot of people on Saturdays and Tuesdays. They came for taking a picture."*

Lighting can be the main factor in supporting the process of photographing and providing a quality picture. Isabel explained,

> *If the picture looks good and appetizing, and lighting plays a big role on that, then people want to try the food…I think it is something that restaurants are starting to pick up, and as things move on with social media, I think everyone has to belong to that. especially, like the lighting.*

Lighting is important to take a successful picture. Adlah, chef and culinary consultant, noted, "*lighting plays a big difference also on the shadows and light and how does your food translate through the picture.*" Participants emphasized the role of colors in the picture. Adlah continued, "*I can make you a black and white picture but it's not going to be as yummy as a bright one, like a chrome color or something like that.*" Nathan related his experience in photography during college, "*The hardest thing to shoot on camera is food. when you take a picture, it is difficult to get the lighting right, to make that food look as truly does in real life, delicious."*

Many bloggers confirmed that when choosing a restaurant, they do consider the lighting of the restaurant as part of this decision. They look for places that are not too dark and places that do not have colored light as this may affect the picture quality. For bloggers, who use visual media, lighting can be even more important than the taste of the food.

However, when faced with challenging lighting environments, bloggers have developed some solutions. One solution is to carry an extra portable light with them as Isabel does[11] (shown in figure 8). Other solution is that some bloggers move around looking for a good lighting spot to take picture of the food as Kevin expressed, "*some of the food bloggers they go crazy, if they want to take photo, they take the plate away to a brighter area to take photos. It's annoying"*

During some of my observations, I also attempted to take photos of the food I tried. One particular occasion I visited Terrazzo, a restaurant designed and owned by Yousef. I took several photos and upon reviewing these photos I realized that the photos did not reflect the actual aesthetic or quality of the food. Those whom I shared the photos with said that they did not wish to try the food, which was actually very delicious. I gave this feedback to Yousef during my interview stated that his restaurant uses LED lighting. From my observations, it appears to be "low CRI" LED. Yousef also confirmed that he has gotten some complaints about the quality of the pictures taken at his restaurant by diners*, "Can I tell you the complains that we all the time? We don't look good at pictures and the food cannot be photographed.*

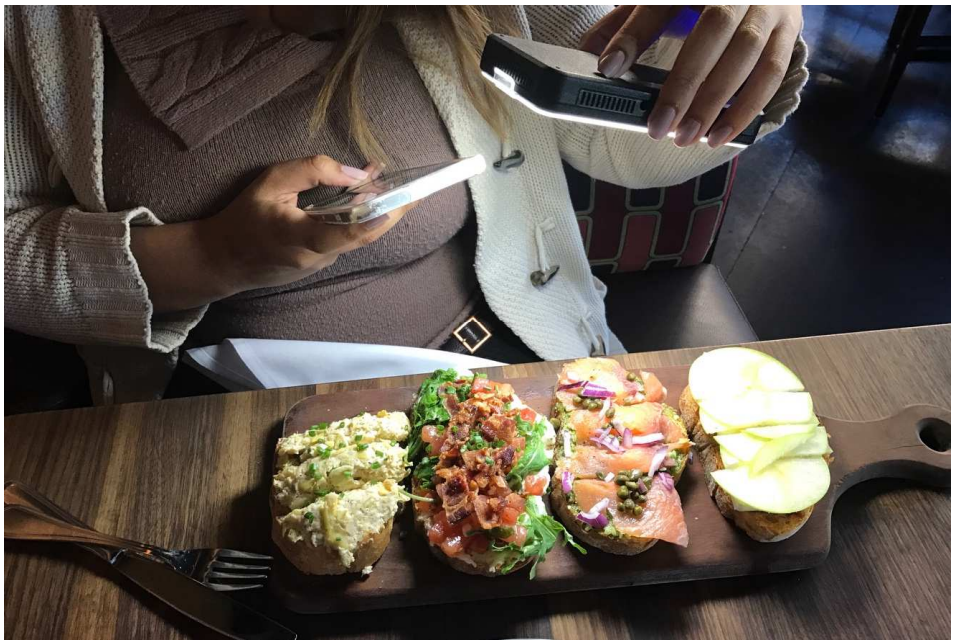

Figure 8 Isabel employing a portable light source to photograph food.

[11] I took this photo while interviewing her at a restaurant. She wanted to photograph her food for her blog but the light quality at the restaurant was not sufficient for photography. Consequently, she brought up her portable light and used it to adjust the lighting for the photo.

This demonstrates that lighting can directly affect the quality of the picture taken, which in turn can affect the image of the food and people's desire to visit the restaurant. The ability to take good photos of one's food should be recognized as an essential part of our contemporary dining experience.

*The debate: photos vs. ambience***.** Bloggers recognizable that lighting is key for photographing, but this topic seems controversial between restaurateurs and bloggers. One side of participants stressed on the importance of investing in proper lighting to produce good pictures. They suggested that investing in good lighting can actually save money when compared to traditional marketing techniques. Andrew, a filmmaker, explained:

> *If they say it's not worth it for us to spend $3000 to install these lights on the sides and make your food look good, they could easily spend $10,000 a year in marketing team to come and do a photo shoot to take photos of their food that they could share. But still at the end of the day, the marketing team not going to constantly share pictures of this restaurant. Its people, people talking that going to get other people in the restaurant. I think it's important to get that experience somehow, or put a corner off where it has a decent lighting you know. I have actually seen people who take their dish and going there, take a picture of it.*

Interestingly, the participants who were actually restaurateurs seemed to have a very different point of view. Most had never thought about picture taking as part of the dining experience, or even considered adjusting lighting based on that. Abdullah expressed, "*we never considered changing our light for people to take pictures, especially of the food.*" Basil also stated, "*I will not change the lighting of the space, because the people want to take a picture or two.*"

The restaurateurs instead suggested that it is more important to adjust lighting to create a desired atmosphere rather than for the purpose of taking photos. German expressed, "*I'm always adjusting the lights so that they are optimum to the ambiance, I never thought about, is the picture going to come out better or not?*" Diners' perception of food is relative to the ambiance of the restaurant and this is more than the pictures. Basil suggested that lighting in photos can be altered or enhanced but what is of utmost importance is the atmosphere and experience in the

restaurant. However, Wes as a blogger, actually shares the restaurateurs' opinion as he expressed

> *When you think about the percentage of people who at the restaurant taking pictures of food, its minimal compared to the full audience that comes in. I mean food bloggers where a whole crowd but at best you are talking about maybe 10% of diners in the restaurant are taking pictures of food, and its 10% more than it was 20 years ago because we all have phones with cameras. But, if I were a restauranteur, I am much more concerned about the ambiance and the vibe for everybody else. As a food blogger, I can more win for lighting straight and it definitely affects my passion,*

also, to support the second view, other participants felt that social media role in marketing food is not influential anymore. Abdullah, restaurateur, expressed, "*I believe that taking pictures of food unless it's a unique and different, because the content online it's over and it is saturated with all types of pictures."*

Both bloggers and restaurateurs did seem to agree that the use of a portable, external light source, or the use of flash photography could be employed to take good pictures, if better lighting is required. German expressed, "*I would assume that the flash within the camera should make that sufficient.*" While Food bloggers found that daytime photos look better than nighttime photos, and they would go out at lunch time to take better quality of pictures. For any kind of food photography, their preference is to use daytime lighting, because there is a bit of warmth, at the lower end of kelvin scale. So, for this reason, some of bloggers go out during the day to be able to take good photos. Veronique stated:

> *I definitely like natural light. and I tend to eat out during the day time because I need to take pictures, so that's like very particular to being a blogger I think. I could carry a flash around with me, but I think it is just too much, it's a little weird.*

Food photography by both amateurs (i.e. diners) and professionals (such as bloggers) have become an essential part of the dining experience at upscale restaurants This is primarily due to the presences of cameras on cell phones and the popularity of social media. Good photos which capture the aesthetic of the food are important as they can be used as a marketing strategy to attract diners. However, it up to debate as to how much lighting for photographs should be

considered in relation to the lighting used to create the desired ambiance for the restaurant experience itself.

Food Experience. In this section, I discuss four important themes that emerged during the coding and analysis of interview and observation data. First, I begin with the importance of visual perception in the dining experience. As a counterpoint, I include a brief analysis of absence of vision in the dining experience; a dine in the dark restaurant. Second, I discuss the relationship between atmosphere and food in relation to perception of food quality and food character, governed by harmony between atmosphere and food. Third, I explain the effect of lighting on the ability to read the menu; The Menu Episode. Lastly, I focus on the relationship between light and food, in relation to quantity of light, quality of light, and uses of light.

Importance of Visual Perception of Food. Vision is the first and potent sense within the realm of the dining experience. Kevin simply stated, "*before you put any food in your mouth, you need to see it from your eyes first, so that's why they make sure the plate looks beautiful, right color, and it should look great before you eat it.*" Abdulaziz, the architect, emphasized vision as a sensual experience, "*you pick up with your eyes first, then other senses come in. So, light is very critical element to this process*".

Since my objective is to focus on the role of lighting, I wondered, could either lighting or atmosphere can change diners' perceptions of how food tastes? Adlah answered *"Its perception of the food, not the actual taste,* that makes a difference. *When they tell you the eyes eats first, this is true." In order to get a better understanding of this part, I looked at the opposite side, where the case of lack of vision, as discussed below.*

Dine in the Dark. While most would agree that seeing our food is crucial to how we experience the taste of food, some restaurants have played with the idea of depriving that our strongest sense. Dining in the dark is a dining experience where the element of lighting is eliminated completely. Six participants had tried dining in the dark and we discussed their feelings and insights regarding this experience. The following are phrases that participants used to describe their experience: "*it was strange,*" "*it was a very terrible experience,*" "*weirdest experience,*" "*dis-harmonized experience,*" "*felt claustrophobic,*" "*scared,*" and many had "*mixed*

feelings." The negative association with this experience was shared by all six participants, and appeared from the lack of visual sense. Adlah explained:

> *It blocks you from a lot of your senses, which in fact you are not concentrating so much on the food. Although the point from it is the opposite, because you don't have any other distraction, you concentrate on the food. Now as human beings, we do not like to plunge in things that we don't know what we are having, because it's like the deprivation of senses, the deprivation chamber.*

Participants expressed their need to use their sense of vision. They commented: "*I do like to see what I am eating,*" and "*I have to see what I eat,*" and "*you need to have your eyes impressed.*" Not being able to see your food, makes it difficult to develop expectations or anticipation for the food. Wes expressed, "*being not able to see does really affect how your opinion of it.*"

Those participants who viewed their dine in the dark experiences as negative, felt the only upside was perhaps that dining in the dark enhanced their senses and made them concentrate more on the taste of the food. Wes expressed, "*not being able to see your food makes you really focus on the texture, the smell, like all that senses makes you much more mindful of all that as well.*" He continued "*you definitely recognize the taste of the food more, because you are basically blind.*" Yet, Kevin believed, "*if it is completely dark, it helps you with that concentration.*" Adlah also confirmed, "*it made me concentrate on the food once I found it.*"

Nonetheless, most participants found it to be an unnerving experience. Kevin said, "*the food part is not about the taste though*", because "*you still lost the appreciation of the craving, and the color of the food. You still lost the enjoyment from seeing the food before you eat it.*"

Kevin, fine dining blogger, felt that the role of atmosphere is equally powerful but that, "*atmosphere can destroy the appreciation of the food*." I think one of the central discoveries in this research occurred when I raised the question, does atmosphere affect the actual taste or the appreciation of the food? Adlah, chef and culinary consultant, summed it up best saying, "*atmosphere can change the perception of food, not the actual taste*."

Based upon participants' comments regarding their dining in the dark experiences, it appears that viewing one's food and lighting can certainly affect food appreciation. This

appreciation actually begins prior to tasting the food, and taste appears to be affected by the anticipation of eating food that is visually appealing.

***Atmosphere and Food*.** Analyses of interview and observation data pointed toward an association between perceptions of atmosphere and perceptions of food. I observed that these two elements share a sophisticated relationship, where atmosphere can not only affect the perception of food quality, but where the food also reflects the character and philosophy of the restaurant's atmosphere. Ideally, this is a harmonious and balanced relationship. This relationship is represented by figure (x) below:

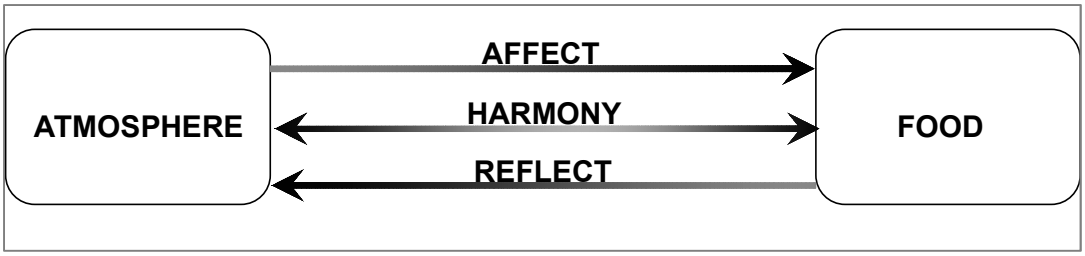

Figure 9 The Relationship between atmosphere and food

*Harmony of food and atmosphere***.** No matter what the relationship between food and atmosphere, either affect or reflect, harmony between the two is necessary. Harmony is literally represented by this question *"is the food at the right setting?"* I posed this question to several participants, and all agreed that harmony between the food and atmosphere was important to a successful restaurant. For example, German answered with a clarification, "*the dishes must match the décor, the décor must match the dishes … and it is primarily a package that a consumer is looking for.*" Also, Adlah commented, *"the ambiance has to match the food. If the ambiance is sultry and sexy, the food has to be sultry and sexy."* Likewise, Basil, restaurateur, felt:

> *If the design is too simple, you would expect that the food is simple as well. If it is overly complicated and you put a lot of effort into it, you will expect the food to match that as well. It is not as straight forward and simple as an equation.*

A challenge to achieving harmony early in the design process, is that often the specific food items on the menu are not yet determined. Filip, lighting designer, commented *"we don't know exactly what the food is? But we know what type of cuisine it is."* The culture of the cuisine can actually be adequate inspiration for good lighting design, as the culture of the cuisine will determine the food.

***Atmosphere and Food Quality*.** Atmosphere perception can also affect perceptions of food quality. Wes, a blogger, expressed, "*atmosphere kind of sets you up to hope that the food going to be great.*" Other participant suggested that authenticity of the materials used in the restaurant affect food quality perception. Basil related it to authenticity as he explained:

> *Authenticity of the design plays a big role in the authenticity of the food. it could be very simple and very cheap but I'm using real materials, real wood not plastic or printed wood effect on it. These do affect the perception of the quality of the food, not how intricate or how expensive the materials are but how honest and authentic the materials are. That's why for example if there are fake flowers you will expect the place to be cheap with low quality.*

Figure 10 Katsuya Restaurant, Los Angeles. Retrieved October 15, 2017 from http://media.culturemap.com/crop/0f/a7/600x600/Katsuya_Houston_private_dining_room.jpg, and http://roboshayka.ru/images/katsuya-sushichefs.jpg

I suggest that this relationship can actually be reversed: maintaining a good atmosphere can elevate the perception of food quality. Most participants believed that atmosphere and service is easier to control and maintain in terms of consistency during the dining experience, rather than the element of the food itself. Andrew explained:

> *So, I see those chefs who do really well, are chefs who maintain good customer service and maintain that consistent environment, so that its more forgiving in the food. So, If the food quality goes down a little bit, they don't suffer and loose customers. Because if they don't have that and their food starts to deteriorate, they going to lose their customers entirely.*

Wes presented a good example of how atmosphere can change our perception of the same food menu:

> *Example of* where *atmosphere changes everything is here in Los Angeles; a sushi place called Katsuya. the original Katsuya is your typical sushi bar, kind of wood tables and good lighting. There is a beautiful bar and the fish is fantastic. It's absolutely incredible. There is another Katsuya that they opened few years ago that was designed by Philippe Starck, the interior designer. At that place, when you walk in, you feel like in a night club, you feel like almost like it's the W hotel. Everything is glass, and everything is black, with red lighting, and you pay more for the fish, they charge higher prices. But you see like you are having a much more special dinner even though it's the exact same fish.*

Atmosphere and food character. It appeared from the data that atmosphere of the restaurant can reflect the food character and philosophy. Faisal, chef and restaurateur, felt:

> *The design is very important because it's another character that you show. The design shows your personality towards the design world and how different art forms[12] can be combined. So, the design that we show again it does really resemble the character of the food. it's very industrial.*

Character can be as specific as the type of lighting installed because this can reflect the culture and philosophy of the food. Faisal noted, *"even the strobe lighting that you show, the neon lighting that you show, this sets a standard."* Fillip, lighting designer, demonstrated how he reflected the essence of street food into his lighting design for the restaurant Wahaka "*they do Mexican food, and they are very much about street food. We tried to have down lights that's nicely chaotic. It is a bit rough and ready. Yes, street food more sort of chaotic I guess*".

Yousef, architect and restaurateur, also expressed how he reflected his food philosophy and character into design of his restaurant:

[12] In this he means décor and food as art forms

> *The food is very honest. So, we choose to go with this concept of glass box. If you look around you, its literally a glass box with only back bone, which is the wall. The food is very textured, there are many details in terms of spices, and ingredients were very important to us. When we started to conceptualize about this place, we wanted it to be a living organism, so we cater with this idea, how we create a living space, either at day or at night? we have a lot of reflected materials, we have a lot of light reflecting materials, we have a lot of things that make you feel like you want to touch them, it looks detailed. For example, the mosaic is depending on how we switch on or dim off the lights, and you even can see the reflection of the staff when they walk, so it's a living space, you look outside, you see people, and you see the reflection of the water, you look up the ceiling, and you can literally see 90% of the people and what they are eating, and what they are doing on their tables. Again, that I'm going to be reflective with this, but no gimmicks, its honest food, and its honest design, you just look around, you will see everything. and it also plays into the concept*

It is clear that there is a symbiotic relationship between atmosphere perception and food perception. Atmosphere affects perceptions of food, and the food can reflect the character and philosophy of the atmosphere.

***Reading the Menu*.** Through my field research observations, I established that the part of the dining experience that involves reading the menu is actually an important part of the overall dining experience, especially in regard to lighting. If it is too dark than it can make it difficult to read the menu and this interrupts the flow of the dining experience. Participants shared their views on this part of the dining experience. Joshua, a blogger, expressed his disappointment, "*that happened to me recently-- pretty extreme. I really couldn't even see the menu."* Some participants even described it as a "*distracting experience*." Consequently, some diners used their flashlights to be able to read the menu. Kevin, fine dining blogger, described his undesirable experience especially within upscale context "*it's too dark, to see the menu I need to use my phone, I think that's terrible*."

As a result, if it is difficult to read the menu, this can affect the reputation of the restaurant. Some participants suggested that using flash light might be cumbersome and not desirable for diners. For instance, Peter explained;

> *I would say it's a compromise like handling them a flashlight…It is something that I'd be scared about, because I think if they go on TripAdvisor, they'll probably write, it's so dark I had to use my phone to see the menu.*

Interestingly, I observed a lot of restaurants that offered digital menus, especially at restaurants located in Kuwait. However, Khaled, chef and restaurant manager, commented "*I hate iPad menu.*" Khaled revealed that reading the menu is an essential sensual part of the dining experience, "*I read before I see the food. When I read the description, it gets my senses going. So, I start to build excitement, I get savory. So, it is important to read the menu.*" The purpose of reading the menu allows the diners to engage their imaginations in anticipation of the food they will consume. Yet, as much as the menu episode is a sensual experience as it is described above, most participants consider it a functional issue.

Both of the two lighting designers I interviewed admit they do not specifically consider this aspect of the dining experience. Peter argued, "*I wouldn't want to say we're the biggest sinners – but sometimes in the challenge to create the right atmosphere, some of the function goes, i.e. reading.*" Filip also declared, "*I'm not going to say that we are never done a design where actually it's pretty dark and you need to get your mobile phone to read the menu. it's dark but again its part of the environment*."

Some participants felt atmosphere should take precedence over function. Peter, lighting designer, said "O*ne person could see it as a failure but in order to properly light those – your menu on the table, if it's such a challenge and it's going to ruin the atmosphere.*" Basil thinks that darkness is not a "*failure*," rather than an experience, "*it's too dark but why they are coming back, there is something different about the experience … it is of a value because it's kind of an experience, it is dark.*" Accordingly, I believe the goal is a balance between aesthetics and function. Basil echoes this sentiment by emphasizing his two primary goals; creating a desired mood and reading the menu. He states, *"You need to see the food and the menu.*" While, German also suggested balance is important:

> *I think it always has to be a balance. In my restaurants, we try to have just the right amount of light so that you could see the menu, and you can see the food, and you can see your table. But at the same time, we do light the energy where it's not wrong.*

Peter suggested that this should be considered when restaurant is in the stages of design, and such questions should be raised *"Who is the demographic? What's the age group this restaurant is targeting for? because the older they are, the less light their eyes can see. Therefore, the more help they'll need in functional tasks, such as reading the menu."* I discuss more about diner demographics in further detail at the conclusion of this chapter. Wes, a blogger, describes the following experience of going out to dine with his parents:

> *they are over the age of 50, it does become an issue, and I can see the frustration on their eyes, because they feel old, and you don't want to feel like that when you go out to eat. Like you can't intelligently read the menu, and you have to get out your phone and have the flash light shining on it and all that, that's never fun.*

Figure 11 Michelle reading the menu

Figure (11) above shows Michelle, in her 60s, dining at the *Bub J.G. Melon* restaurant in New York City. It is obvious from the back window that it was daytime, and there was natural light was present in the restaurant. However, Michelle was not able to read the menu with both the natural light and the supplementary artificial light provided. She had to use the flash light on her cell phone in order to be able to read the menu.

Lighting and Food. Whether a restaurant is focusing on selling the food or the atmosphere, food is still generally the central aspect of the dining experience. Nathan stated, "*the ultimate product is how the food looks on the plate."* Accordingly, the job of a lighting designers is, as Filip described, "*we color things in. We go to the basic concepts and we design the lighting accordingly …and yes the lighting setting is defined by the food.*" Khaled described the impact of light on food perception:

> *If the food comes and you can't really see it because it's dark, and the color of the food looks boring, and different than the actual food, you will lose your appetite. It might taste the most amazing thing in the world, but if it doesn't look good, you don't want to eat it. So sometimes light can negatively or positively affect that thing.*

Abdulaziz, an architect, described the impact of light on food, as similar to dressing rooms in retail stores:

> *when you try out your dress in a store that has amazing lighting, you suddenly look good. But when you go home, you put it in, in a very bad lighting, you say I don't look good anymore. It's the same thing with food, when you see food in a correct light, the colors are intensified, the mixes of the palette, color of the plate, the background of the table, you know it I all should be done in proper lighting. It is possible that the color of the food might change when you put the wrong kind of lighting. For example, the greens look brown, and then automatically your mind translate it as a taste. So, I think that can definitely enhance it or break.*

In an attempt to simplify and discuss individual factors associated with the effect of lighting on food perception, I address three main aspects: quantity, quality, and uses of light. Each of these topics requires an investigation into how it impact food acceptability and food appreciation. Food acceptability is a concept that was introduced since 1950s to examine the effect of atmosphere on food perception (Peryam & Pilgrim, 1957; Pilgrim, 1957). Refer to the literature review chapter of this dissertation, p.x. and I also discussed this idea further in my data analysis, in this Chapter below.

Quantity of light and food. Quantity of light is illustrated by Intensity of light, and it is one of the lighting characteristics that can affect food perception. Isabel stated, "*so definitely the amount of light on the food can affect the dining experience*." Analyses of interview data revealed

two major effects of intensity of light on food perception. First, intensity of light can affect the experience of food appreciation. Peter stated, "*your food can't be in darkness.*" Wes confirmed, "*you want people to be able to see their food.*" Peter again thinks that diners shouldn't be wondering about "*what am I eating here? I can't see the bones of my chicken.*" So, he suggested, "*an element of functionality that needs to be analyzed in order for you to feel like, I trust my food, I feel good about my food*".

Second, intensity of light can affect the aesthetic aspect of the food as it creates "*sparkle*" (Filip, 2016). Andrew confirmed, "*sometimes the chef wants to do something that's make the food look shine."* Yet, intensity can affect food acceptability rather than food appreciation. For instance, higher brightness can increase the diner's mental awareness and, so when the light is dim, Kevin observed, "*you are less critical, you are much more easy to like, and more positive, because you are less critical.*"

Quality of light and food. Quality of light can affect food perception. In particular, "*color*" is what represent quality of light. "*In terms of the perception of the food, I think the color of the food matters*" (Abdullah, 2017). Adlah emphasized the role of lighting in providing perceptions of quality pertaining to color as, "*you cannot have amazing colors and shit lighting. Because we see through light, it's a chain.*" Yet, the term "*color*" has two main terms in lighting glossary; color rendering and color temperature. Participants had difficulty expressing the right technical terms since most did not have a background in lighting and sometimes confused color temperature and color rendering. However, as I was coding interview data, I was able to construct the meaning of what they have said, and thus I categorized and coded based on what they meant rather than what they said.

Filip, lighting designer, described color rendering of light as the, "*appetite of lighting."* Khaled explained, "*in the visual sense, color. You need your eyes to get impressed, and lighting changes your perception of color. Sometimes it doesn't match to what you actually want it look like.*" Khaled revealed this happened a lot,

> *When the food is prepared and you see it in the kitchen, it is beautiful, very colorful dish. Once you send it out, it just looks very dull. So, your perception changes. It looks bluer than it should be, or not as red as it should be, or*

> *darker than it should be. It should be bright fresh red color or pink, but it looks darker and purple.*

Color temperature of light and how this affects food perception was also a topic established by participants. Many participants preferred warm color temperature. Basil explained, "*there is something with warm color temperature that affects the perception of the food.*" There were some participants that did not like warm color temperature. For instance, Kevin complained about the color of lighting in some restaurants as, "*some of the restaurants are too yellow. The lighting is too yellow, then the food doesn't look good, especially because its long 2-3 hours dining.*" Yet, such a preference of color temperature among diners depend on so many factors, such as concept of the restaurant, age and gender of the diners, culture, and many more. To be more determinant, further studies is needed.

Uses of light. Uses of light is termed in lighting glossary as Lighting Distribution. Andrew, from his experience as a filmmaker of food talkies, revealed a very important information that affect lighting distribution and food perception,

> *chefs like to plate their food flat, very little vertical elements to their food. So, their steak and their fish are so shiny shiny on the very top, when you put it underneath this light, it doesn't look appetizing, it just looks oily and glossy.*

Interview data confirmed that lighting distribution is always overlooked in relation to food presentation. In order to reflect the character of food through lighting and atmosphere, Andrew provided this general advice "*if you have sophisticated food, you want to show your food, and you go for drama. you go from that kind of story. if you are going for a happy food and a happy environment, then you go for less contrasting lighting.*" Meaning that sophisticated food needs more un-uniformed and complex distribution of light, while happy simple food needs more even and uniformed lighting.

Lighting distribution is also responsible for creating two main effects; contrast and reflection. Contrast is discussed more in details in the lighting section of this chapter. Yet, Filip was a proponent of using high contrast. He described the effect of low contrast on food perception as, "*if you would use diffused light, it will look like it's been dead for ages.*"

Another use of lighting, which very often ignored is reflection of light. Reflection happens mainly with food plates. Adlah, chef and culinary consultant, explained,

> *if you noticed fine dining places, most of the time they use white plates because of the lighting…Because white plates reflect more light on the food, so you are looking at your food through a third-generation light…Its reflection. It's bouncing. Exactly. Bouncing the light is very important to make you high end restaurant or low-end restaurant."*

Lighting can affect food perception at two levels, in terms of both food appreciation and food acceptability. Food acceptability is an established term (Leitzmann & Oltersdorf, 1985; H. L. Meiselman, Hirsch, & Popper, 1988; Herbert L. Meiselman, 2008; Pilgrim, 1957), while food appreciation is a term which I have developed through this dissertation research. Three aspects of light can affect food perception and thus appreciation and acceptability: quality of light, quantity of light, and uses of light.

Lighting Experience. I structured my interviews so that I only revealed that I am looking at lighting specifically as an atmospheric tool in the upscale restaurant setting toward the end of interviews so that participants may touch on the topic of lighting as they felt appropriate. Once I explained this to participants, most made it clear to emphasize the role of lighting to the dining experience. For example, Basil, a restaurateur, commented, "*lighting wraps up everything. It links everything together."*

I was interested to know how much restaurateurs invest in lighting. Basil commented, "*I tried to have 20% of the design focused on the lighting. Like a lot of restaurants do the lighting after that. Actually, it is essential in the design stage because the distribution and how it looks.*" German also commented:

> *I just had a meeting with my lighting designer. As we are growing the company and we are building more, we are putting a tremendous amount of emphasis on sound, acoustics, and the lighting. …. I spent maybe 5 times amount of money that we should, but at the end, we got the right lighting, the right light bulbs, the right glow, tint, the right location.*

Such an investment in lighting is evident of the role of lighting in affecting the dining experience. Therefore, understanding how lighting can affect the dining experience will help lighting designers and restaurateurs devote design expenditures.

Based upon analyses of interview data, I created six key themes which I discuss in detail in the following sections of this chapter. First, I discuss the two main approaches to lighting design in an upscale restaurant setting, being background, and the focused beam. Second, I look at the variety of light sources used, including LED as a sustainable light source, colored lighting, and the effect of candle light. Related to this is the third theme, the use of lighting controls in the dining experience. The fourth theme I discuss is the concept of contrast in lighting, and its effect in an upscale restaurant setting. The fifth theme I address is the importance and effects of vertical lighting. Finally, I conclude with the best examples of light, and how various participants described the ideal lighting for an upscale dining experience.

Approaches to Restaurant Lighting. Two main approaches to design light and plan the layers of light had emerged during interview analysis and observations. These two approaches are based on the goal of restaurant itself. Each approach corresponds with a particular goal. If the goal is to highlight the atmosphere of a restaurant, then the lighting will focus on the background. If the goal is to highlight the food itself, then the focused beam approach to lighting should be used. These two approaches are discussed in detail below.

*Lighting Approaches to Atmosphere Perception: The Background***.** In my observations, I looked deeply into how lighting was designed and where it was focused. I came to the realization that in many restaurants, lighting was focused on the background or the perimeter walls. I felt like this lighting approach boosts mood and the sense of atmosphere. I also noticed when the intent of the restaurant is to sell the atmosphere, more than the food, then lighting is used to make the parameter walls standout more prominently. I asked the opinion of participants and lighting designer Filip commented, "*we light a lot of background, its more about scene setting, its more about lighting the space in.*" Yet, in my personal observations I this approach makes diners will appear in silhouette, and as Filip explained, "*the back-lighting compromises seeing the front.*" Filip continues his explanation of this approach as:

> *there is a lot of creating the environment where typically they may have sort of shelves, bottles, jars or whatever. You light it and it just part of the background. It's not that you sell per say that jar with whatever pickle thing is. No, it's sort of you sell the idea of this environment, you create a mood, and you set the scene actually. It's a bit like creating a sense I guess. The*

> *dynamic of a space is important, focusing attention. So, we sort of create an environment.*

While both lighting designers I interviewed discussed aspects of background and lighting, they did not specifically elaborate on how they incorporated elements of this in a systematic or established manner.

*Lighting Approach to Food Perception: The Focused Beam***.** I also observed another approach to lighting within a restaurant which is lighting focused on the table, or what I termed "*the focused beam.*" This approach is mainly effective if the restaurant concept is more food centered rather than atmosphere centered. This approach is mainly focusing the lighting on the table so the food will stand out. Peter, a lighting designer said, "*we've done restaurants where we have accented each table, because we know that the food is going to look absolutely fantastic and the food is actually the star of the show more than the restaurant."* Abdullah, a restaurateur, simply portrayed the effect of focused beam approach as, "*you see the light as all the place is dimmed but the tables are popping up.*". I asked Andrew about his perspective on 'focused beam' lighting because as a filmmaker, he has a unique perspective:

> *I think about it like a film. When you are watching a film, if there are many people in the shot, the camera will focus on the one person that is talking or the person that you want to focus the expression on. I feel like the same with food, you focus on because you want to draw the eye to the food, right. You don't want them to be distracted, tasting a flavor. So, you don't want them to look at that, or what is outside in that window, you want them to focus on their table.*

The 'focused beam' approach is evidently very effective. Peter refers to it as "*the spotlight on the table approach,"* and suggested there are two main reason that makes this approach effective. First, it creates "*sparkle,*" and captures attention, Peter clarifies:

> *when you come to your table and no light is there, it's like the white cloth with glasses, looks a bit flat. if you do the spotlight on the table, it creates a sparkle and it drags the attention, and both people and food all will look fabulous. So, the spot on the table is definitely the bling bling element.*

Second it creates contrasting effect. This contrasting effect is brighter at its center and darker toward the background. Peter explained it as:

> *If you have this bright spotlight on the table. The background sort of disappears, and instead it reflects up and creates like light, it's like of you are around a bonfire. You know when you do a camp fire, it lights up your faces, the background becomes really dark. In a sense, it is a sophisticated version or an urban version of sitting around the camp fire.*

However, the focused beam approach does come with two key challenges. The first challenge is that this approach can cause glare, as Basil explained,

> *it's very direct and it affects eye level. People who are sitting, they're eating the food but usually accompanied with other people, so they are going to be looking at the walls, and looking at other people. There will be a lot of glare in this position.*

If this approach is not implemented right, it will annoy diners, "Basil noted, "*if there is a glare in the eyes, this will disturb the people, and they make them uncomfortable with the experience.*" Yet Basil recounted a solution, "*in slider station, we tried to push the halogen light inside the pipe, so it provides focused lights but without causing glare. We try to illuminate the direct lighting sources and focus on the indirect.*"

The second challenge is lack of flexibility associated with this approach. Filip, lighting designer, claimed, "*the spotlight on the table approach only works if the tables are pretty much fixed.*" Yousef tried to apply this approach into his restaurant and quickly abandoned it. He complained, "*I tried it, but I wasted so much space just for that.*" Hence, Filip recommended:

> *It works perfectly when you have Banquet seating because you know the table can only be moving left or right. So, let's say if you have a very open space and then the tables can move flexible. Though, if we put them together for big parties then the spotlight on the table approach doesn't work.*

In order for the focused beam approach to be successful, I offer two main recommendations. First, always consider the color of the table setting in order to control reflection. Filip expressed:

We always assume it is light color, but sometimes we have a black table cloth, or black plates, and that changes a lot of things. A lot of these things you don't know, you only know in the end actually. So, this affect the lighting decisions and illuminance outcome.

Second, always consider the type of light source. Specifically, many participants mentioned the issues with the shift toward LEDs. Lighting Designers and Restaurateurs felt that LED fall short in providing a good color rendering. As a solution, Lighting Designers, try to keep the Halogen over the tables only. Further discussion of this topic can be found in the section called Light Source later in this chapter.

Although this approach is focused on table, lighting designers recommended, it is good to light the table but not to put the restaurant itself in a dark void, and this can be achieved by building layers of light. Wes, LA based blogger, offered a great example of applying the focused beam approach that summarizes all the above discussed factors. He discussed Lazy Bear restaurant in San Francisco:

When you sit down, your food is lit like its lunch time. They have these lights way high up in the ceiling. These great white lights shine down at the table and illuminate just the table to be perfect. So, you can see every little detail of the food, which they care so much about. But as soon as you back away from your chair and get up, you are into like a night club type vibe, it's really cool. It's the perfect example of what you are trying to sauce out, which is how can lighting affect every little element, it's crazy.

Figure 12 Lazy Bear Restaurant, San Francisco. Retrieved October 15, 2017 from https://d37219swed47g7.cloudfront.net/media/images/reviews/lazy-bear/banners/1457562526.47.jpg, and https://thebitterfranciscan.files.wordpress.com/2015/01/img_20150114_204253.jpg

Light Source. In this section, I discuss three types of light sources in relation to the dining experience in an upscale restaurant setting. I discuss LED vs Halogen as light sources, colored light sources, and candle light.

LED vs Halogen. One of the main goals of lighting design is to promote a sustainable lifestyle. The development and use of LED lighting has done much to encourage sustainability. As we discussed issues with lighting the food previously, some participants felt that this type of light source is not as aesthetically pleasing or created the same type of ambiance as traditional lighting sources. Basil said, "*I think LED in restaurants, is very difficult proposition."* Abdullah echoed this sentiment stating*, "LED, unless it's a really high quality, it doesn't look good, unless it's really well thought off*".

Many participants complained about issues with Color temperature of LED. It was one of the main issues discussed among participants. Basil said, "*LED light has problem with having the right temperature. The warm temperature is not correct. The LED in terms of wavelength it's not natural white.*" Other participants complained about LED light and dimming issues. Filip explained, "*We used high color rendering lamps in restaurants and especially when you try to dim it, it just flat, it flickers, and it doesn't change the color. it doesn't provide the sparkle, and it looks grayish"*

In addition, participant complained specifically about the dimming process of LED in accordance to color temperature. For example, Basil complained "*the LED lighting does not dim to temperature. It dims at a constant temperature. This is a major issue, I can reduce the lux but the temperature doesn't get changed.*" Abdullah agreed, "*it's harder to control when dimming the LED.*"

As a solution, Filip expressed a preference for conventional light sources like Halogen, "*the technology proves what I mean is halogen is not necessarily the perfect source, but actually I still think for over food itself it is the best*". Filip felt that Halogen lighting still provided the best source of light, "*we are still trying as much as we can to keep halogen over the tables. The thing that lights directly the food just because I still think it is the better source."*

However, participants did suggest ways to determine which type of lighting was best as many struggled with the idea of using LED lighting because it is a sustainable source, with Halogen an unsustainable light source that is more aesthetically pleasing. Filip suggested "*I think you need to choose what is important for which function you try to get out of the lighting.*" Filip

encouraged, "*try to use the right source for food,*" as he noted it is the ultimate product of the dining experience. He explained further, "*we kept all the light that is not over food were LED for energy reasons. So, we could keep actually all the halogen over the tables.*" Basil suggested, *"I wouldn't use LEDs, unless in places where I want standard lighting and it doesn't change over the day, its only for certain affect I can use it for."*

Colored lighting. Most participants felt that attempts to use colored lighting like blue, red, or green or any other color was ultimately unsuccessful in an upscale restaurant setting. Adlah bolded stated, "*colored lighting does not work in upscale dining.*" This is primarily because it affects food perception and food color. Isabel, a blogger, described an experience in a restaurant that used colored light, "*the room was all blue, the light was blue, only the center has like a focused light, but I couldn't experience my food as much.*" However, some participants noted that colored light can be used in areas where light does not reflect back on food. Adlah commented, *"unless you are highlighting something in the background because it is not interfering with your peripheral vision. When I'm eating, there is nothing reflecting back on me, and it will soften everything and it will bring out.*"

Basil was a participant who felt using colored lighting could be a bold way to make a statement about the dining experience, specifically the atmosphere experience. Basil stated, "*so these things have to balance between being unique, being striking and being sustainable*[13]*. Restaurateurs sometimes do not understand the relationship between this and that. I want to be unique, but I want people to come back again.*" Basil then provided his opinion about a burger restaurant in London called "Meat Liquor:"

> *The design of this restaurant is disturbing. It's all graphics and blood, and it's very strange, and too grungy, and the main lighting is red neon light. Ok fine the experience is strange. The first time I went there and eat, I never had this experience, but I will not back again.*

[13] Basil means sustainable in terms of business, a successful business.

Figure 13 Meat Liquor Restaurant, London, UK. Retrieved October 15, 2017 from https://alessandrabrian.files.wordpress.com/2012/06/meatliquor-3.jpg, and https://www.noplacelike.it/wp-content/uploads/2014/07/Meat-Liquor-Bar.jpg

Basil himself built a whole restaurant concept on color changing light, and he explained his unsuccessful experience with Burger Boutique as, "*when we used color changing LED, it was very striking. From customer perspective, it's impossible that while I'm dining the colors are changing.*" Basil then decided to change the entire concept of his restaurant Burger Boutique, and he never used colored lighting again. He believed that such experience with colored lighting is unique but not for a repeated visit that guarantee a successful/sustainable business.

Candle light. Candle light proofed to bring warmth and interaction to an upscale restaurant setting. The majority of participants expressed their preference to candle light. Abdullah, a restaurateur, stated:

> *Candles play a big role, especially the movement of light. It gives warmth to the place and it doesn't make it dull. Even when there is a breeze, the candle light reacts with that breeze. The shadows from the light also.*

Candle light seems to be ascribed to more luxurious and intimate spaces. Adlah stated, "*I feel it will set you apart, the candle light will turn it to fine dining, this is what I feel like.*" Filip also used it as the main source of light in a resort like restaurant, "*there is no light in the table and just candle light. But it also part of what it needs to be. It's like a candle dinner."*

Controlling Light. Controlling light is a mean of creating and moderating atmosphere in restaurants. As the experience factor becomes increasingly important, so too is it important to be able to use lighting to enhance and modify the dining experience. Lighting can be used to intensify colors of light and thus create different moods. The importance of controlling light and

having different settings exist even before the digitization of lighting control, manual control and dimming methods were used in restaurants, as Nathan said:

> *It's funny, when I see all the light switches on dimmers over the years from all four these restaurants I worked in, there is always a little marker. There is like a little sharpie drown to where that dimmer switch should be.*

Participants mentioned another use for lighting controls; shifting light between day and night. Many participants expressed that the atmosphere should be different during the day than during the night, as Adlah, chef and culinary consultant, stated, "*lighting is huge huge huge factor because lighting at lunch time is different than the lighting at night time … at daytime you want natural light.*" Yet, the need for lighting controls to shift between day and night seems to be moot. Some participants agreed on its importance and applied it, and other didn't. For Example, German Osio, an international restaurateur, used new control technology that imitates current daylight and weather condition and reproduces it inside the restaurant:

> *One of the things that we are doing now in Houston, at Sumo Maya, is putting very complex lighting control mechanism. The lights are manufactured by Philips, in which each light is essentially a theatrical light where you have the option of up to 38,000 colors. You can completely program all the lights through a computer, so that it gives you the right ambiance and correct lighting at the right time of the day. We are going to program it with a dial of the sun. So, as the day progresses, it's going to make adjustments to the computer so that the lighting is perfect. So, maybe during the day, it might be set to mimic the natural sunlight. If its grey and bloomy outside, it will detect it and it will make adjustment to the lighting. Then as the night progresses, the light starts shifting more toward like a yellowish orange amber light. So, it is warmer and more intimate. But everything it's going to be programmed where it's not going to have human interactions. It's a lot of programming, and a lot of making sure that everything is perfect. But once it functions, its beautiful because you don't have to touch it anymore and everything is automated*

On the other hand, Filip, international lighting designer, believed that lighting control is not needed during the day because less drama and less contrast is required during the day. Filip stated:

> *The daylight, basically softened it all, and it becomes more like a less contrast space…it's like a natural thing, daylight goes down, and then artificial light takes over but in a good way. I think because of the approach is that we laid it by contrast, we never tried to give an even light level*

There are countless options available to provide lighting control options, however, lighting designers should understand the restaurant's goals, and in particular the desired experience for diners, in order to employ controls successfully. Peter emphasized what lighting designers and restaurateurs should understand before choosing the lighting control.

> *How bright do you want it? How do you want to control the lighting? Where do you want your control panels? Do you want a time clock? because there's lots of ways of controlling the lighting scheme. It can be very sophisticated, or It can be very simple. So, that's where we would go to not just the architects, but the operators for those kinds of questions.*

Both lighting designers I interviewed, Filip and Peter, explained how the process of setting up lighting. They expressed their opinion based on their prolonged practice in this field. As Filip noted, because the restaurant atmosphere (whether applying the background approach or the focused beam approach) is considered a scene setting. Based on the practice, Peter explained "*a practical issue that you have to do it in the day as well as in the night*". Therefore, it is recommended that when installing the lighting, at the beginning of the process "*set it up roughly in a set of a night time, and then you try to balance them out … you always try to get one table at least set up".* And then he recommended that *"we do scene setting when the restaurant is complete*"

Understanding how lighting functions both during the day and the night will help decision makers such as lighting designers, interior designer, architects, and restaurateurs to decide how to design and implement lighting control, and how this all will affect the overall dining experience.

Contrast. Contrast is an important term that emerged during interviews. Peter defined contrast as "*creating accenting,".* Peter further explained the lack of contrast as:

> *I don't think we would have done a great job if everything had been lit to the same luxe levels because nothing would stand out. If we just suspended pendants everywhere, the walls, ceiling, and floor, all would all be lit in an even manner*

There are two main uses of contrast; contrast create hierarchy in the space and therefore define importance, and then contrast lead the attention of the eyes of diners and therefore guide their movement through the restaurant. This exactly wrapped up by Filip, lighting designer, quote, "*contrast is very important in spaces where there is like hierarchy. And that's sort of work in different levels, it is part of the movement through a space.*"

Hierarchy. Lighting distribution, or the direction of light is responsible for creating "*hierarchy*" in the space. Adlah explained this hierarchy using light as, *"you have to decide where you want your strongest lighting, where you want your lightest lighting*? Abdullah, a restaurateur, explained his approach to hierarchy as:

> *In light, you always want to highlight the food, people, art, or anything that worth taking a picture of, either it's that hanged artwork, or the board that we write on every day. To highlight what you want to see and hide the mess, so people will forget.*

*Attention***.** Contrast can draw attention to a space and guide diners' perceptions of what they see in the restaurant. Peter suggested that it is important to ask or decide:

> *Where do I focus my eyes on? Where do I want the people to go? What do I want the people to see on first viewing? That's what we have to analyze and get right and agree with the interior designers. what are our priorities here? what do we want to show people to lure them in?*

While Andrew provided a theory based on his filmmaking background, "*the brighter the participant, the darker the background, you create more contrast. So, the happier the content, the less contrast it is, because it is well lit.*" Peter then offered the example of a restaurant he designed recently:

> *We've done an Indian restaurant in London where the very back of the restaurant, you've got a water feature, but we want to see that from the front. There's a corridor that leads to the dining areas left and right and so that, along with just the April menu on the front, those are the two things that we accent. It's quite simple and the dining experience and the walls and that are slightly secondary to those features.*

Both hierarchy and attention is actually related, as Filip, a lighting designer, expressed, "*hierarchy in terms of where you focus your attention*." All the discussed above about contrast simple can be achieved by creating "*layers of light"* as Peter expressed, and he further explained "*you sometimes have to break down a restaurant project into several areas and your lighting solution and how it affects the interior is going to be very different in each area*". Therefore, each area of the restaurant is distinct by contrasting light.

***Vertical Lighting*.** One special direction of light that emerged and was always been ignored is vertical lighting. Filip emphasized the vertical lighting as, *"it is partially to do with scene setting…I think the most flattering light is light come from ideally several angles, but more vertically rather than from the top."* Filip described the effect of this vertical light as, *"it is not just making the food look great, but actually making the person you are eating with look great."*

***Preference of Light*.** A key issue I discussed with participants was their preferences for night time lighting at upscale restaurant settings, as it is dominated by artificial light. The majority of participants preferred dim-dark, with warm color temperature, and candle light to bring warmth and intimacy. They unanimously felt that fluorescent light should not be used in upscale restaurant settings. Basil justified this preference as he explained:

> *I think that cold light naturally is related to daytime, and our brain works at that level of expectation. People get used to it at night, the natural way of lighting, even historically, it is warm, like firelight and candle light. All those different kinds of light sources, in our DNA is related to night time lighting. This is ingrained in our build up as humans, of what a night time light should look like. Even the clouds at night we see it warm, because of the moon... but cold light is related to daytime, the indirect light from the sky. So, we can relate to this temperature during the day.*

At the end of every interview, I asked participants to describe the best lighting for the dining experience at upscale restaurant setting. I choose five examples that reflect the different perspectives of participants. Isabel, as a blogger, described the best example of lighting being from "White Chocolate Grill":

> *the way they are designed its atmosphere, to me that is restaurant that has the best lighting. It is dim and dark, but they have like light that is close to your table, you can see the menu, and you can see your food, and it is great for*

photographing the food. It's amazing. I don't have to use my light when I am there. The way it is designed, I think it is the most clever way. Because the food is like perfectly lit, but still you feel like the atmosphere is like private and cozy and it give you that feel.

Adlah, a chef and consultant, described the best lighting as:

You need soft light that makes you look beautiful, the food look beautiful, and everything around you look beautiful, where it doesn't kill the color that you are trying to bring out. it's very important. don't you see when they make a movie, they have the light gage. Because even your skin makes a difference on how people perceive you in that light.

Abdulaziz, an architect, stressed on capturing the quality of light:

Light to me, wither it's a light of a night club at night that gives you the atmosphere and an emotional charge, or light of a location that is full of sunlight all day long. It's about capturing quality of light that you need to translate to convey that experience at that time. Lights definitely makes or creates the space. A Space that looks amazingly well done and full of flood lighting up there is going to ruin the entire experience. I think at the end light is extremely important.

Peter, a lighting designer, felt the elements of lighting themselves added importance to the dining experience:

I think one aspect of the restaurant probably intensity is the key. Where do we need the bright spot? Where do we need the dark spot? Where might we want shadows? We sometimes like things in silhouette. We've done that quite few times. So, I think intensity first. Second is the quality of the light or the color of the light. If you use very cheap LED source, it's not going to give people a quality feel, you maybe get flickering. There's nothing worse than that. Number three, I think is how the lighting plays with the interiors. I think the materials, because that brings in texture, shadow, silhouette, things like that. If you've got glossy materials or glass, do you really need to light that? We're just going to get nasty reflections and if you light the glass, it's going to go straight throug, mirrors, obviously things like that. So, materials are third.

Filip, also a lighting designer, described the best lighting approach as:

To see your food, color rendering is important. To create the ambiance then it is contrast and direction of light is important. Actually, direction of light is something a lot of people forget, and it is one of the things I still can't get my head around. It is basically if you want to do a moody lighting, uplighting always seemed to work. I think it is because you light a surface without

actually the light falls on your head. But I think direction of light is something that quite often overlooked as in all designs, so it is something much more difficult to also grasp or describe. So, I think to create a mood, I would say contrast and the direction of light.

Qualitative Results Section Summary. This section discussed the qualitative results from interview and observation data. It explored the effect of lighting on the dining experience at upscale restaurant setting. Lighting can affect the four main aspects of experience being: Atmosphere experience, Service Experience, Social Experience, and Food Experience. After that I discussed specifically the lighting experience where special consideration about lighting in an upscale restaurant setting should be considered. Based upon these qualitative findings I developed the Lightscape instrument, which will be discussed in the next chapter.

Transition Phase: The Instrument

The instrument employed in this study was developed from both the literature reviewed and the results of the qualitative data analysis. I termed this instrument 'DineLight.' DineLight was designed to assess the impact of lighting on the dining experience at upscale restaurant setting. The instrument consists of four main sections; Demographics, The Dining Experience, The Lighting Experience, and ends with Overall Satisfaction and Behavioral Intention.

The first section of the instrument gathers demographic information. There is a total of 16 items in this section. The first seven items inquire about the respondent's demographics such as gender, age, ethnicity, nationality, education, marital status, and work status. The other nine items relate to the nature of the respondent's visit to the upscale restaurant such as; name of the restaurant, location of the restaurant (city and country), day of the week (weekday vs weekend), number of people accompanying the respondent, and the type of occasion. Four of those nine items were added to regulate the study setting such as; if the restaurant is considered upscale, if they are present at the restaurant, if it is dinner time, and daylight availability.

The second section of the instrument is focused on perceptions of the dining experience at an upscale restaurant setting. Based on the qualitative data analysis, I divided the dining experience into four elements; Atmosphere Experience, Social Experience, Service Experience, and Food Experience. A total of 39 items in this second section to rate the four elements of the

dining experience were evaluated with five points Likert scale; ranging from 1 (no strength; strongly disagree) to 5 (major strength; strongly agree), with an option of N/A for non-applicable.

The third section of the instrument focuses on the lighting perception and I divided it into three sub-sections. The first sub-section focuses on perception of the lighting characteristics and consists of ten items used to measure the following lighting characteristics: Brightness, Correlated Color Temperature, Lighting Spatial Distribution, Amount of Color and Color Saturation, Contrast, Complexity, and Visibility of the Lighting Fixtures. These variables were measured using five points Semantic Differential Scale for measuring lighting impression developed by John E. Flynn, et al. (1979). The second sub-section focuses on the overall lighting comfort, and addresses the two approaches I propose are necessary for restaurant lighting; the background, and the focused beam with a total of four items. The third sub-section focuses on the perception of lighting fixtures (iconic, authentic, stylish, attractive, and high quality) with a total of five items.

The fourth and final section of the survey focuses on the satisfaction and behavioral intention. It contains eight items evaluated again in a 5-points Likert scale; ranging from 1 (no strength; strongly disagree) to 5 (major strength; strongly agree), with an option of N/A for non-applicable. The content of items varies from overall satisfaction of the dining experience and their intention to return back and recommend the restaurant, and goes specifically into the satisfaction with overall atmosphere and the overall lighting condition.

Generally, the survey has a total of 82 items, and estimated to be completed in 15-20 minutes. For the test to be consistent and have statistical power, all the scale, both semantic differential and Likert scale, are unified to five points, to maintain consistency. The choice of five points instead of seven points, came from pilot testing, were the instrument looked visually complex for respondents, so I simplified it five points.

Quantitative Phase Findings

Overview. The purpose of the quantitative phase of this research is to investigate main research question of how does lighting impact the dining experience at upscale restaurant setting. This phase used self-administered survey answered by actual diners at upscale restaurant

environment. Descriptive and correlation analyses were used to explore the relationship between lighting and the elements of the dining experience. These analyses address the following objectives outlined at the start of this research:

- To explore and understand the relationship dimensions between lighting and the dining experience at upscale restaurant environment.
- To explore and identify the specific characteristics of lighting that contribute to the specific aspects of the dining experience.

This section of Chapter IV discusses the procedures, followed by demographic characteristics, and the correlation results.

Data collection procedure. Starting in June of 2017 link of the online survey was sent out to more than 300+ people using snowball sampling approach. By the September 2017, 247 actual diners responded to the survey. 106 respondents were disqualified because they didn't follow the limitations of the study given to them and therefore they were prohibited from answering the survey. Thirty-three respondents, who were qualified, actually did not complete the survey and thus this data could not be used. In addition, two completed surveys were eliminated because it was determined that these were actually fast food restaurants (although restrictions and directions were provided on the first page of the survey). Accordingly, the total sample number used in analyses were N = 106, with an average time spent to answer the survey as 12 minutes and 11 seconds.

Demographic Characteristics. Demographic data were reported by the survey respondents and gathered online. Tables for the demographic characteristics are presented in table (8). The majority of survey respondents were female (69.81%), and 29.25% were male, and only 1 respondent (0.94%) chose not to report their gender. The majority of respondents, 60.38%, reported an age group of 30-44, 33.96% were reported an age group of 18-29, and 4.72% reported an age group of 45-59. Only one respondent (0.94%) reported the age group of over 60. This survey was not administered to individuals under the age of 18.

Table 8 Demographic Characteristics

Sample Characteristics	N = 106	%		N = 106	%
Gender			**Marital Status**		
Female	74	69.81%	Never Married	56	52.83%
Male	31	29.25%	Married/Living with Partner	43	40.57%
Other	1	0.01	Divorced/Separated	7	6.60%
Age			Widowed	0	0.00%
Under 18	0	0.00	**Ethnicity**		
18-29	36	33.96%	Caucasian	7	6.60%
30-44	64	60.38%	Latino/Hispanic	0	0.00%
45-59	5	4.72%	Middle Eastern	93	87.7%
60+	1	0.94%	African/African American	0	0.00%
Work Status			Caribbean	0	0.00%
Employed Full-time	75	70.75%	Asian	5	4.72%
Employed Part-time	4	3.77%	Mixed	1	0.94%
Retired	0	0.00	Other	0	0.00%
Unemployed	5	4.72%			
Student	22	20.75%	**Nationality**		
Educational Level			Kuwait	83	78.30%
High School or Less	5	4.72%	Saudi Arabia	9	8.49%
Vocational/Technical School	0	0.00%	USA	7	6.60%
Some College	3	2.83%	UAE	2	1.89%
Bachelor Degree	57	53.77%	Russia	1	0.94%
Master Degree	26	24.53%	Iraq	1	0.94%
Doctoral Degree (PhD)	14	13.21%	Iran	1	0.94%
Professional Degree (MD, etc.)	1	0.94%	Spain	1	0.94%
other	0	0.00%	Indian	1	0.94%

The majority of respondents reported Middle Eastern as their ethnic (87.74%), 6.60% reported they are Caucasian, 4.72% Asian and only one respondent (0.94%) reported mixed ethnicity. There were no respondents that identified as Latino/Hispanic, African/African American, or of Caribbean ethnicity.

Respondents were asked to report their nationality. Most respondents reported they are Kuwaiti (78.30%). While, 8.49% were from Saudi Arabia and 6.60% from the United States. Two

respondents (1.89%) are from the United Arab Emirates. One respondent was from India, one from Russia, one from Iran, one from Iraqi, and one from Spain, each one represents (0.94%) of the total sample.

The majority of respondents have advanced education. Among survey respondents, 53.77% completed a Bachelor Degree. A large portion of the respondents reported some level of graduate degree, with 24.53% holding a Master Degree, 13.21% holding a Doctoral Degree (PhD), and one respondent (0.94%) holding a professional degree (MD). Few respondents reported high school or less (4.72%), and some college (2.83%), and no one reported vocational or technical school[14].

Marital status varied among the sample. The majority of the sample (52.83%) reported 52 they are never married, while 40.57% were married or living with a partner. Only 6.60% of respondents reported they are divorced or separated. No respondent reported widowed status.

The majority of sample responded as being engaged in full time employment at 70.75%. Students comprised 20.75%. Part time employment only constituted 3.77% of the sample, and 4.72% were unemployed. No respondents were retired.

Respondents were asked to report if they completed the survey while they still present in the restaurant setting or not. The majority of respondents 57.55% reported they were present, while, 42.45% reported 'No,' but felt they have a good memory of the restaurant that they have visited recently. The one who just answered No, was disqualified and did not fill out the survey. Respondents filled out the survey collecting data on 77 different upscale restaurants among 15 countries around the world and 28 cities. Nearly half of the respondents (49.06%) answered the survey at Kuwait City upscale restaurants. While, 25.47% of respondents choose upscale restaurants in 9 cities around USA (Phoenix, New York, Los Angeles, Atlanta, Orlando, Columbus, Minneapolis, College Station, and Seattle). Respondents also choose restaurants in Europe with UK (5.66%) in both London and Manchester, 2.83% in Marbella, Spain, 1.89% in Germany at both Berlin and Hannover, 1.89% in France at Paris and Cannes, 1.89% in Turkey

[14] This is likely due to the fact that vocational or technical degree terminology is not a common term in Kuwait, and the sample is dominated by Kuwaitis.

(Alacati, and Bursa). One respondent (0.94%) filled the survey in Tallinn, Estonia, and another respondent (0.94%) choose Sarajevo, Bosnia. Other major cities in the Middle East were also included, like United Arab Emirates (4.72%) in both Dubai and Abu Dhabi. Then one respondent (0.94%) each for Riyadh, the capital of Saudi Arabia, Beirut the capital of Lebanon, and Cairo the capital of Egypt. One respondent (0.94%) selected an upscale restaurant at Hyderabad in India, and one respondent (0.94%) selected an upscale restaurant at Mexico City, Mexico.

Table 9 Nature of Visit

Type of Visit	N	%		N	%
Restaurant Country			**Day of the Week**		
Kuwait	52	49.06%	Weekday	58	54.72%
USA	27	25.47%	Weekend	48	45.28%
UK	6	5.66%	**People Accompanying**		
UAE	5	4.72%	Only me	2	1.89%
Spain	3	2.83%	1 person	36	33.96%
Germany	2	1.89%	2 - 3 People	42	39.62%
France	2	1.89%	4 - 6 People	20	18.87%
Turkey	2	1.89%	7 or more	6	5.66%
Saudi Arabia	1	0.94%	**Occasion**		
Estonia	1	0.94%	Romantic Dinner	12	11.32%
Lebanon	1	0.94%	Friends Dinner	45	42.45%
Egypt	1	0.94%	Family Dinner	45	42.45%
India	1	0.94%	Business Dinner	2	1.89%
Mexico	1	0.94%	Other	2	1.89%
Bosnia	1	0.94%			

In addition, respondents were asked to provide information about the nature of their visit, summarized in Table (9). Approximately half of the respondents (54.72%) visited the restaurant on weekdays, while the other half (45.28%) on weekends. Overall, respondents dined in groups, with 39.6% reporting two to three people accompanying them. Of the total respondents, 33.96% reported only one person accompanying them, meaning they were a group of two in total. Larger groups were reported as 18.87% and dined with four to six other people, while 5.66% dined with seven or more people. Only two respondents (1.89%) reported they were by themselves.

The two primary occasions reported were a dinner with friends (42.45%) and family dinner with family, (also 42.45%). Of the total sample, 11.32% responded it was romantic dinner.

Only two respondents (1.89%) were there for a business dinner. Of the total sample, 1.89% reported other occasions being a luncheon, and on one occasion it just an individual meal.

Analytical Tests Conducted. The goal of this phase of the research was to provide a better understanding of the phenomenon of lighting perception in relation to the dining experience at upscale restaurant settings using a non-experiment correlation design. A correlational analysis was used to interpret quantitative responses based on information collected from actual diners in upscale restaurant settings. Correlational analyses assess the extent to which two variables or more co-vary, where changes in one variable are reflected in changes in the other (Creswell, 2009). Responses to survey questions were used to explore, identify, and critically analyze the implications of factors related to dimensions of dining experience and lighting characteristics. Perceptions of lighting were drawn from these responses, while the quantitative data furnished the study with actual statistical information that concretely supported the existence of any relationship between lighting and dining experience. This data was analyzed to determine whether or not, and to what degree did a relationship exist between two or more quantifiable variables (see Gay, Mills, & Airasian, 2011).

The variables addressed in correlational analyses explored the relationship between lighting and the dining experience, which included atmosphere, social, service, and food factors, in upscale restaurant setting. Conducting a qualitative phase prior to this quantitative phase, which in fact informed this quantitative phase, supported the limitations of the results generated. Correlational testing identified associations between the variables of:

A. Dimension of the dining experience (atmosphere perception, service perception, social perception, food perception)
B. The lighting experience, categorized by lighting characteristics, lighting comfort, lighting approaches, and perception of lighting fixtures.

The data was analyzed using a two-tailed Spearman's rank correlation coefficient with a standard alpha level (or significance value) of 0.05 as a measure of moderate significance, and 0.01 as a measure of strong significance. In other words, if the “sig” value was less than 0.05, the

difference was deemed to be moderately statistically significant. While If the "sig" value was less than 0.01, the difference was deemed to be strong in its statistical significance.

Correlation Findings. This section discusses the findings of correlational analysis conducted between the four dimensions of the dining experience (Atmosphere Experience, Service Experience, Social Experience, and Food Experience), and Lighting.

Atmosphere Experience. This section discusses the findings of correlational analyses conducted between atmosphere experience and lighting. It focuses on atmosphere perception, noise and music perception, space perception, open kitchen and bar perception.

Atmosphere perception. The DineLight instrument tested lighting assessing ten different atmosphere perceptions. These perceptions are discussed as the following: welcoming atmosphere, romantic atmosphere, upscale atmosphere, cozy atmosphere, peaceful atmosphere, appealing atmosphere, energetic atmosphere, nostalgic atmosphere, authentic atmosphere, and dramatic atmosphere. The results of the analyses using Spearman's rho are summarized in tables below.

Table 10 Spearman's rho Correlation between Lighting and Welcoming Atmosphere

Spearman's rho						
Welcoming Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Colorful	.244*	.021	106	2.87	1.096
M =4.09	Radiance	.271**	.005	106	3.12	.973
SD =1.019	Focused	.225*	.021	106	2.97	1.125
	Comfortable Lighting	.360**	.000	106	3.94	1.031
	Authentic Fixture	.226*	.020	105	3.36	1.102

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Welcoming atmosphere and lighting was evaluated through the item that stated, "*Lighting creates a welcoming atmosphere.*" A Spearman's rank correlation coefficient was computed to assess the relationship between welcoming atmosphere (M = 4.09, SD = 1.019) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Radiance (Dull-Radiant) (M = 3.12, SD = 973), r_s = .271, n = 106, p = .005. Overall, increase in diner's perception of welcoming

atmosphere is reported with an increase in perception of radiance at upscale restaurant settings.

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .360, n = 106, p < .001. Overall, increase in diner's perception of welcoming atmosphere is reported with increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Amount of Color (Colorless-Colorful) (*M* = 2.87, *SD* = 1.096), r_s = .244, n = 106, p = .021. Overall, increase in welcoming atmosphere perception is reported with increase in perception of colorfulness at upscale restaurant settings.
- There was a moderate positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .225, n = 106, p = .021. Overall, increase in diner's perception of welcoming atmosphere is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .226, n = 105, p = .020. Overall, increase in diner's perception of welcoming atmosphere is reported with increase in perception of authentic fixtures installed at upscale restaurant settings.

Table 11 Spearman's rho Correlation between Lighting and Romantic Atmosphere

Spearman's rho						
Romantic Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Contrast	.191*	.049	106	2.99	.971
M =3.89	Comfortable Lighting	.472**	.000	106	3.94	1.031
SD =1.290	Focused on Table	.308**	.001	106	3.17	1.305
	Focused on Walls	.278**	.004	106	3.15	1.308
	Attractive Fixture	.362**	.000	106	3.63	1.115
	Quality Fixture	.486**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Romantic atmosphere and lighting was evaluated through the item that stated, "*Lighting creates a romantic atmosphere.*" A Spearman's rank correlation

coefficient was computed to assess the relationship between romantic atmosphere (M = 3.89, SD = 1.290) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .472, n = 106, p < .001. Overall, increase in diner's perception of romantic atmosphere is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (M = 3.17, SD = 1.305), r_s = .308, n = 106, p = .001. Overall, increase in diner's perception of romantic atmosphere is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Perimeter Walls of the Restaurant (M = 3.15, SD = 1.308), r_s = .278, n = 106, p = .004. Overall, increase in diner's perception of romantic atmosphere is reported with an increase in perception of focusing the light on the perimeter walls of the restaurant.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .362, n = 106, p < .001. Overall, increase in diner's perception of romantic atmosphere is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (M = 3.52, SD = 1.409), r_s = .486, n = 106, p < .001. Overall, increase in diner's perception of romantic atmosphere is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Contrast (Low Contrast – High Contrast) (M = 2.99, SD = .971), r_s = .191, n = 106, p = .049. Overall, increase in diner's perception of romantic atmosphere is reported with an increase in perception of high contrast at upscale restaurant settings.

Table 12 Spearman's rho Correlation between Lighting and Upscale Atmosphere

Spearman's rho						
Upscale Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Visibility of Fixtures	.210*	.030	106	3.43	1.069
M =3.98	Comfortable Lighting	.344**	.000	106	3.94	1.031
SD =1.130	Stylish Fixture	.225*	.021	106	3.63	1.157
	Attractive Fixture	.343**	.000	106	3.63	1.115
	Quality Fixture	.341**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Upscale Atmosphere and lighting was evaluated through the item that stated, "*Lighting creates an Upscale atmosphere.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Upscale atmosphere (*M* = 3.98, *SD* = 1.130) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .344, n = 106, p < .001. Overall, increase in diner's perception of upscale atmosphere is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .343, n = 106, p < .001. Overall, increase in diner's perception of upscale atmosphere is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .341, n = 106, p < .001. Overall, increase in diner's perception of upscale atmosphere is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (*M* = 3.43, *SD* = 1.069), r_s = .210, n = 106, p = .030. Overall, increase in diner's perception of upscale atmosphere is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.

- There was a moderate positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .225, n = 106, p = .021. Overall, increase in diner's perception of upscale atmosphere is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.

Table 13 Spearman's rho Correlation between Lighting and Cozy Atmosphere

Spearman's rho						
Cozy Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Color Temperature	.204*	.036	106	3.59	1.076
M = 3.88	Comfortable Lighting	.243*	.012	106	3.94	1.031
SD = 1.110	Attractive Fixture	.223*	.022	106	3.63	1.115
	Quality Fixture	.218*	.025	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Cozy atmosphere and lighting was evaluated through the item that stated, "*Lighting creates a Cozy atmosphere.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Cozy atmosphere (*M* = 3.88, *SD* = 1.110) and lighting perception. The following results were generated:

- There was a moderate positive correlation with perception of Color Temperature (Cool-Warm) (*M* = 3.59, *SD* = 1.076), r_s = .204, n = 106, p = .036. Overall, increase in diner's perception of cozy atmosphere is reported with an increase in perception of warmer color temperature of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .243, n = 106, p = .012. Overall, increase in diner's perception of cozy atmosphere is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .223, n = 106, p = .022. Overall, increase in diner's perception of cozy atmosphere is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .218, n = 106, p = .025. Overall, increase in diner's perception of cozy

atmosphere is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.

Table 14 Spearman's rho Correlation between Lighting and Peaceful Atmosphere

Spearman's rho						
Peaceful Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Comfortable Lighting	.508**	.000	106	3.94	1.031
M =3.96	Focused on Table	.305**	.001	106	3.17	1.305
SD =1.050	Iconic Fixture	.195*	.045	106	3.20	1.206
	Stylish Fixture	.288**	.003	106	3.63	1.157
	Attractive Fixture	.313**	.001	106	3.63	1.115
	Quality Fixture	.374**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Peaceful atmosphere and lighting was evaluated through the item that stated, "*Lighting creates a Peaceful atmosphere.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Peaceful atmosphere (*M* = 3.96, *SD* = 1.050) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .508, n = 106, p < .001. Overall, increase in diner's perception of peaceful atmosphere is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (M = 3.17, SD = 1.305), r_s = .305, n = 106, p = .001. Overall, an increase in diner's perception of peaceful atmosphere was reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .288, n = 106, p = .003. Overall, increase in diner's perception of peaceful atmosphere is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .313, n = 106, p = .001. Overall, increase in diner's perception of peaceful atmosphere is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.

- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .374, n = 106, p < .001. Overall, increase in diner's perception of peaceful atmosphere is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .195, n = 106, p = .045. Overall, increase in diner's perception of peaceful atmosphere is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.

Table 15 Spearman's rho Correlation between Lighting and Appealing Atmosphere

Spearman's rho						
Appealing Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106 M = 4.06 SD =1.068	Comfortable Lighting	.293**	.002	106	3.94	1.031
	Iconic Fixture	.205*	.035	106	3.20	1.206
	Stylish Fixture	.269**	.005	106	3.63	1.157
	Attractive Fixture	.279**	.004	106	3.63	1.115
	Quality Fixture	.253**	.009	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Appealing atmosphere and lighting was evaluated through the item that stated, "*Lighting creates an Appealing atmosphere.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Appealing atmosphere (*M* = 4.06, *SD* = 1.068) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .293, n = 106, p = .002. Overall, increase in diner's perception of appealing atmosphere is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .269, n = 106, p = .005. Overall, increase in diner's perception of appealing atmosphere is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.

- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .279, n = 106, p = .004. Overall, increase in diner's perception of appealing atmosphere is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .253, n = 106, p = .009. Overall, increase in diner's perception of appealing atmosphere is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .205, n = 106, p = .035. Overall, increase in diner's perception of appealing atmosphere is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.

Table 16 Spearman's rho Correlation between Lighting and Energetic Atmosphere

Spearman's rho						
Energetic Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Brightness	.307**	.001	106	2.66	1.041
M = 3.37	Colorful	.236*	.015	106	2.87	1.096
SD = 1.382	Radiance	.259**	.007	106	3.12	.973
	Specular	.321**	.001	106	2.80	1.345
	Stylish Fixture	.195*	.046	106	3.63	1.157
	Attractive Fixture	.203*	.037	106	3.63	1.115

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Energetic atmosphere and lighting was evaluated through the item that stated, "*Lighting creates an Energetic atmosphere.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Energetic atmosphere (*M* = 3.37, *SD* = 1.382) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Brightness (Dim-Bright) (*M* = 2.66, *SD* = 1.041), r_s = .307, n = 106, p = .001. Overall, increase in diner's perception of energetic atmosphere is reported with an increase in brightness of lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Radiance (Dull-Radiant) (*M* = 3.12, *SD* = 973), r_s = .259, n = 106, p = .007. Overall, increase in diner's perception of energetic atmosphere is reported with an increase in perception of radiance at upscale restaurant settings.
- There was a strong positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .321, n = 106, p = .001. Overall, increase in diner's perception of energetic atmosphere is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a moderate positive correlation with perception of Amount of Color (Colorless-Colorful) (*M* = 2.87, *SD* = 1.096), r_s = .236, n = 106, p = .015. Overall, increase in energetic atmosphere perception is reported with increase in perception of colorfulness at upscale restaurant settings.
- There was a moderate positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .195, n = 106, p = .046. Overall, increase in diner's perception of energetic atmosphere is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .203, n = 106, p = .037. Overall, increase in diner's perception of energetic atmosphere is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.

Table 17 Spearman's rho Correlation between Lighting and Nostalgic Atmosphere

Spearman's rho						
Nostalgic Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 105	Glairiness	.228*	.019	105	3.35	1.051
M = 3.12	Iconic Fixture	.232*	.017	105	3.20	1.206
SD = 1.446	Authentic Fixture	.254**	.009	10	3.36	1.102
	Stylish Fixture	.294**	.002	105	3.63	1.157
	Quality Fixture	.257**	.008	105	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Nostalgic atmosphere and lighting was evaluated through the item that stated, "*Lighting creates a Nostalgic atmosphere.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Nostalgic atmosphere (*M* = 3.12, *SD* = 1.446) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .254, n = -----, p = .009. Overall, increase in diner's perception of nostalgic atmosphere is reported with increase in perception of authentic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .294, n = 105, p = .002. Overall, increase in diner's perception of nostalgic atmosphere is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .257, n = 105, p = .008. Overall, increase in diner's perception of nostalgic atmosphere is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Glairiness (Glare – Non-Glare), (*M* = 3.35, *SD* = 1.051), r_s = .228, n = 105, p = .019. Overall, increase in diner's perception of nostalgic atmosphere is reported with a decrease in lighting glare at upscale restaurant settings.
- There was a moderate positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .232, n = 105, p = .017. Overall, increase in diner's perception of nostalgic atmosphere is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.

Table 18 Spearman's rho Correlation between Lighting and Authentic Atmosphere

Spearman's rho						
Authentic Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 105	Comfortable lighting	.309**	.001	105	3.94	1.031
M =3.32	Authentic Fixture	.246*	.012	104	3.36	1.102
SD =1.297	Attractive Fixture	.325**	.001	105	3.63	1.115
	Quality Fixture	.380**	.000	105	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Authentic atmosphere and lighting was evaluated through the item that stated, "*Lighting creates an Authentic atmosphere.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Authentic atmosphere (*M* = 3.32, *SD* = 1.297) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .309, n = 105, p = .001. Overall, increase in diner's perception of authentic atmosphere is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .325, n = 105, p = .001. Overall, increase in diner's perception of authentic atmosphere is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .380, n = 105, p < .001. Overall, increase in diner's perception of authentic atmosphere is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .246, n = 104, p = .012. Overall, increase in diner's perception of authentic atmosphere is reported with an increase in perception of authentic fixtures installed at upscale restaurant settings.

Table 19 Spearman's rho Correlation between Lighting and Dramatic Atmosphere

Spearman's rho						
Dramatic Atmosphere		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Radiance	.195*	.045	106	3.12	.973
M =3.25	Focused	.219*	.024	106	2.97	1.125
SD =1.408	Comfortable Lighting	.259**	.007	106	3.94	1.031
	Focused on Walls	.293**	.002	106	3.15	1.308
	Iconic Fixture	.290**	.003	106	3.20	1.206
	Authentic Fixture	.214*	.028	105	3.36	1.102
	Stylish Fixture	261**	.007	106	3.63	1.157
	Attractive Fixture	.352**	.000	106	3.63	1.115
	Quality Fixture	.370**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Dramatic atmosphere and lighting was evaluated through the item that stated, "*Lighting creates a Dramatic atmosphere.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Dramatic atmosphere (*M* = 3.25, *SD* = 1.408) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .259, n = 106, p = .007. Overall, increase in diner's perception of dramatic atmosphere is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Perimeter Walls of the Restaurant (*M* = 3.15, *SD* = 1.308), r_s = .293, n = 106, p = .002. Overall, increase in diner's perception of dramatic atmosphere is reported with an increase in perception of focusing the light on the perimeter walls of the upscale restaurant.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .290, n = 106, p = .003. Overall, increase in diner's perception of dramatic atmosphere is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = 261, n = 106, p = .007. Overall, increase in diner's perception of dramatic atmosphere is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.

- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .352, n = 106, p < .001. Overall, increase in diner's perception of dramatic atmosphere is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .370, n = 106, p < .001. Overall, increase in diner's perception of dramatic atmosphere is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Radiance (Dull-Radiant) (*M* = 3.12, *SD* = 973), r_s = .195, n = 106, p = .045. Overall, increase in diner's perception of dramatic atmosphere is reported with an increase in perception of radiance at upscale restaurant settings.
- There was a moderate positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .219, n = 106, p = .024. Overall, increase in diner's perception of dramatic atmosphere is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .214, n = 105, p = .028. Overall, increase in diner's perception of dramatic atmosphere is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.

Music and Noise Perception. DineLight instrument have tested lighting with music and noise perception perceptions. These perceptions are discussed as the following: loud music, and noise level. The results of the analysis of Spearman's rho correlation are summarized in tables below.

Table 20 Spearman's rho Correlation between Lighting and Loud Music

Spearman's rho						
Loud Music		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Focused	.200*	.040	106	2.97	1.125
M =3.06	Complexity	.194*	.047	106	3.25	1.096
SD =1.542						

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Perception of Load Music and lighting was evaluated through the item that stated, "*The background music is loud.*" A Spearman's rank correlation coefficient was computed to assess the relationship between perception of Loud Music (*M* = 3.06, *SD* = 1.542) and lighting perception. The following results were generated:

- There was a moderate positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .200, n = 106, p = .040. Overall, increase in diner's perception of loud music is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Complexity of Lighting Distribution (Complex-Simple) (*M* = 3.25, *SD* = 1.096), r_s = .194, n = 106, p = .047. Overall, increase in diner's perception of loud music is reported with a decrease in perception of complexity of lighting distribution at upscale restaurant settings.

Table 21 Spearman's rho Correlation between Lighting and Noise Level

Spearman's rho						
Noise Level		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Comfortable Lighting	.218*	.025	106	3.94	1.031
M =3.76	Focused on Walls	-.224*	.021	106	3.15	1.308
SD =1.384						

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Perception of Noise Level and lighting was evaluated through the item that stated, "*Noise Level is unpleasant.*" A Spearman's rank correlation coefficient was computed to assess the relationship between perception of noise (*M* = 3.76, *SD* = 1.384) and lighting perception. The following results were generated:

- There was a moderate positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .218, n = 106, p = .025. Overall, increase in diner's perception of unpleasant noise level is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a moderate negative correlation with perception of Lighting Focused on the Perimeter Walls of the Restaurant (*M* = 3.15, *SD* = 1.308), r_s = -.224, n = 106, p = .021. Overall, increase in diner's perception of unpleasant noise level is reported with a decrease in

perception of focusing the light on the perimeter walls of the upscale restaurant. So, focusing the light on the perimeter decreases perception of noise.

*Space Perception***.** DineLight instrument have tested lighting with space perception perceptions. These perceptions are discussed as the following: spaciousness, privacy, cleanness, distinctive background, distinctive iconic and architectural elements, wow impression. The results of the analysis of Spearman's rho correlation are summarized in tables below.

Table 22 Spearman's rho Correlation between Lighting and Spaciousness

Spearman's rho						
Spaciousness		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Glairiness	.260**	.007	106	3.35	1.051
M =3.64						
SD =1.354						

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Perception of Spaciousness and lighting was evaluated through the item that stated, "*The restaurant looks spacious*." A Spearman's rank correlation coefficient was computed to assess the relationship between perception of Spaciousness (*M* = 3.64, *SD* = 1.354) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Glairiness (Glare – Non-Glare), (*M* = 3.35, *SD* = 1.051), r_s = .260, n = 106, p = .007. Overall, increase in diner's perception of spacious space is reported with a decrease in perception of glare at upscale restaurant settings.

Table 23 Spearman's rho Correlation between Lighting and Privacy

Spearman's rho						
Privacy		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Brightness	-.278**	.004	*106*	2.66	1.041
M =3.40	Color Temperature	.209*	.032	*106*	3.59	1.076
SD =1.277	Comfortable Lighting	.364**	.000	*106*	3.94	1.031
	Focused on Table	.199*	.040	*106*	3.17	1.305
	Iconic Fixture	.201*	.039	106	3.20	1.206
	Authentic Fixture	.203*	.038	105	3.36	1.102
	Stylish Fixture	.255**	.008	106	3.63	1.157
	Attractive Fixture	.278**	.004	106	3.63	1.115
	Quality Fixture	.270**	.005	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Perception of Privacy and lighting was evaluated through the item that stated, "*Lighting creates privacy*." A Spearman's rank correlation coefficient was computed to assess the relationship between perception of privacy (M = 3.40, SD = 1.277) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .364, n = 106, p < .001. Overall, increase in diner's perception of privacy is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (M = 3.63, SD = 1.157), r_s = .255, n = 106, p = .008. Overall, increase in diner's perception of privacy is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .278, n = 106, p = .004. Overall, increase in diner's perception of privacy is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (M = 3.52, SD = 1.409), r_s = .270, n = 106, p = .005. Overall, increase in diner's perception of privacy is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a strong negative correlation with perception of Brightness (Dim-Bright) (M = 2.66, SD = 1.041), r_s = -.278, n = 106, p = .004. Overall, increase in diner's perception of privacy is reported with a decrease in brightness of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Color Temperature (Cool - Warm) (M = 3.59, SD = 1.076), r_s = .209, n = 106, p = .032. Overall, increase in diner's perception of privacy is reported with an increase in perception of warmer color temperature of lighting at upscale restaurant settings.

- There was a moderate positive correlation with perception of Lighting Focused on the Dining Table (*M* = 3.17, *SD* = 1.305), r_s = .199, n = 106, p = .040. Overall, increase in diner's perception of privacy is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a moderate positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .201, n = 106, p = .039. Overall, increase in diner's perception of privacy is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .203, n = 105, p = .038. Overall, increase in diner's perception of privacy is reported with an increase in perception of authentic fixtures installed at upscale restaurant settings.

Table 24 Spearman's rho Correlation between Lighting and Cleanness

Spearman's rho						
Cleanness		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Visibility of Fixtures	.249*	.010	106	3.43	1.069
M = 4.58	Specular	.218*	.025	106	2.80	1.345
SD = .804	Comfortable Lighting	.292**	.002	106	3.94	1.031
	Iconic Fixture	.309**	.001	106	3.20	1.206
	Stylish Fixture	.359**	.000	106	3.63	1.157
	Attractive Fixture	.353**	.000	106	3.63	1.115
	Quality Fixture	.315**	.001	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Perception of Cleanness and lighting of the restaurant was evaluated through the item that stated, "*The restaurant looks clean*." A Spearman's rank correlation coefficient was computed to assess the relationship between perception of cleanness (*M* = 4.58, *SD* = .804) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .292, n = 106, p = .002. Overall, increase in diner's perception of cleanness is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .309, n = 106, p = .001. Overall, increase in diner's perception of cleanness is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .359, n = 106, p < .001. Overall, increase in diner's perception of cleanness is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .353, n = 106, p < .001. Overall, increase in diner's perception of cleanness is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .315, n = 106, p = .001. Overall, increase in diner's perception of cleanness is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (*M* = 3.43, *SD* = 1.069), r_s = .249, n = 106, p = .010. Overall, increase in diner's perception of cleanness is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .218, n = 106, p = .025. Overall, increase in diner's perception of cleanness is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.

Table 25 Spearman's rho Correlation between Lighting and Distinctive Background

Spearman's rho						
Distinctive Background		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *105*	Focused on walls	.395**	.000	*105*	3.15	1.308
M =*3.68*	Stylish Fixture	.193*	.049	*105*	3.63	1.157
SD =*1.267*						

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between attention to Distinctive Background Walls of the restaurant and lighting was evaluated through the item that stated, "*The background walls are distinctive.*" A Spearman's rank correlation coefficient was computed to assess the relationship between perception of distinctive background walls (*M = 3.68*, *SD = 1.267*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Lighting Focused on the Perimeter Walls of the Restaurant (*M* = 3.15, *SD* = 1.308), r_s = .395, n = 105, p < .001. Overall, increase in diner's attention to distinctive background walls is reported with an increase in perception of focusing the light on the perimeter walls of the upscale restaurant.
- There was a moderate positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .193, n = 105, p = .049. Overall, increase in diner's attention to distinctive background walls is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.

Table 26 Spearman's rho Correlation between Lighting and Iconic and Architectural Elements

Spearman's rho						
Iconic and Architectural Elements		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Radiance	.195*	.046	106	3.12	.973
M =*3.78*	Focused on Walls	.420**	.000	106	3.15	1.308
SD =*1.359*	Iconic Fixture	.205*	.035	106	3.20	1.206
	Authentic Fixture	.327**	.001	106	3.36	1.102
	Stylish Fixture	.262**	.007	106	3.63	1.157

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between attention to Iconic and Architectural Elements in the restaurant and lighting was evaluated through the item that stated, "*Iconic and architectural elements such as artworks and flowers are distinctive*." A Spearman's rank correlation coefficient was computed to assess the relationship between perception of Iconic and Architectural Elements (*M* = *3.78*, *SD* = *1.359*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Lighting Focused on the Perimeter Walls of the Restaurant (*M* = 3.15, *SD* = 1.308), r_s = .420, n = 106, p < .001. Overall, increase in diner's attention to distinctive iconic and architectural elements is reported with an increase in perception of focusing the light on the perimeter walls of the upscale restaurant.
- There was a strong positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .327, n = 106, p = .001. Overall, increase in diner's attention to distinctive iconic and architectural elements is reported with an increase in perception of authentic fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .262, n = 106, p = .007. Overall, increase in diner's attention to distinctive iconic and architectural elements is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Radiance (Dull-Radiant) (*M* = 3.12, *SD* = 973), r_s = .195, n = 106, p = .046. Overall, increase in diner's attention to distinctive iconic and architectural elements is reported with an increase in perception of radiance at upscale restaurant settings.
- There was a moderate positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .205, n = 106, p = .035. Overall, increase in diner's attention to distinctive iconic and architectural elements is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.

Table 27 Spearman's rho Correlation between Lighting and Wow Impression

Spearman's rho						
Wow Impression		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Brightness	-.216*	.026	106	2.66	1.041
M =*3.72*	Focused	.237*	.014	106	2.97	1.125
SD = *1.102*	Complexity	-.216*	.027	106	3.25	1.096
	Specular	.266**	.006	106	2.80	1.345
	Comfortable Lighting	.322**	.001	106	3.94	1.031
	Focused on Walls	.220*	.024	106	3.15	1.308
	Iconic Fixture	.405**	.000	106	3.20	1.206
	Authentic Fixture	.366**	.000	105	3.36	1.102
	Stylish Fixture	.476**	.000	106	3.63	1.157
	Attractive Fixture	.533**	.000	106	3.63	1.115
	Quality Fixture	.414**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Perception of impression of Wow in the restaurant and lighting was evaluated through the item that stated, "*I felt "WOW" when I entered the space."* A Spearman's rank correlation coefficient was computed to assess the relationship between perception of wow (*M = 3.72*, *SD = 1.102*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .266, n = 106, p = .006. Overall, increase in diner's sense of wow is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .322, n = 106, p = .001. Overall, increase in diner's sense of wow is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .405, n = 106, p < .001. Overall, increase in diner's sense of wow is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .366, n = 105, p < .001. Overall, increase in diner's sense of wow

is reported with an increase in perception of authentic fixtures installed at upscale restaurant settings.

- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .476, n = 106, p < .001. Overall, increase in diner's sense of wow is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .533, n = 106, p < .001. Overall, increase in diner's sense of wow is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .414, n = 106, p < .001. Overall, increase in diner's sense of wow is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Lighting Focused on the Perimeter Walls of the Restaurant (*M* = 3.15, *SD* = 1.308), r_s = .220, n = 106, p = .024. Overall, increase in diner's sense of wow is reported with an increase in perception of focusing the light on the perimeter walls of the upscale restaurant.
- There was a moderate negative correlation with perception of Brightness (Dim-Bright) (*M* = 2.66, *SD* = 1.041), r_s = -.216*, n = 106, p = .026. Overall, increase in diner's sense of wow is reported with a decrease in brightness of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .237, n = 106, p = .014. Overall, increase in diner's sense of wow is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.
- There was a moderate negative correlation with perception of Complexity of Lighting Distribution (Complex-Simple) (*M* = 3.25, *SD* = 1.096), r_s = -.216, n = 106, p = .027.

Overall, increase in diner's sense of wow is reported with an increase in complexity of lighting distribution at upscale restaurant setting.

*Kitchen & Bar Perception***.** DineLight instrument have tested lighting with Kitchen and Bar Perceptions. These perceptions are discussed as the following: Attention to Open-Kitchen, Show Kitchen, Attention to Bar. The results of the analysis of Spearman's rho correlation are summarized in tables below.

Table 28 Spearman's rho Correlation between Lighting and Attention to Open-Kitchen

Spearman's rho						
Attention to Open-Kitchen		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Focused	.249**	.010	106	2.97	1.125
M = *2.61*	Specular	.261**	.007	106	2.80	1.345
SD = *1.998*	Comfortable Lighting	.265**	.006	106	3.94	1.031
	Iconic Fixture	.322**	.001	106	3.20	1.206
	Stylish Fixture	.275**	.004	106	3.63	1.157
	Attractive Fixture	.249**	.010	106	3.63	1.115
	Quality Fixture	.310**	.001	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Attention to the Open-Kitchen in the restaurant and lighting was evaluated through the item that stated, "*Lighting draws attention to the open-kitchen*." A Spearman's rank correlation coefficient was computed to assess the relationship between attention to open-kitchen (*M = 2.61*, *SD = 1.998*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .249, n = 106, p = .010. Overall, increase in diner's attention to open-kitchen is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .261, n = 106, p = .007. Overall, increase in diner's attention to open-kitchen is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .265, n = 106, p = .006. Overall, increase in diner's attention to open-kitchen is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .322, n = 106, p = .001. Overall, increase in diner's attention to open-kitchen is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .275, n = 106, p = .004. Overall, increase in diner's attention to open-kitchen is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .249, n = 106, p = .010. Overall, increase in diner's attention to open-kitchen is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .310, n = 106, p = .001. Overall, increase in diner's attention to open-kitchen is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.

Table 29 Spearman's rho Correlation between Lighting and Perception of Show Kitchen

Spearman's rho						
Show Kitchen		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Focused	.320**	.001	106	2.97	1.125
M =*2.34*	Specular	.315**	.001	106	2.80	1.345
SD = *1.917*	Comfortable Lighting	.271**	.005	106	3.94	1.031
	Focused on Table	.255**	.008	106	3.17	1.305
	Iconic Fixture	.349**	.000	106	3.20	1.206
	Authentic Fixture	.242*	.013	105	3.36	1.102
	Stylish Fixture	.251**	.009	106	3.63	1.157
	Attractive Fixture	.276**	.004	106	3.63	1.115
	Quality Fixture	.372**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between perception of Show Kitchen in the restaurant and lighting was evaluated through the item that stated, "*The open-kitchen look like a show.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Perception of Show Kitchen (*M = 2.34*, *SD = 1.917*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .320, n = 106, p = .001. Overall, increase in diner's perception of show kitchen is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .271, n = 106, p = .001. Overall, increase in diner's perception of show kitchen is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .271, n = 106, p = .005. Overall, increase in diner's perception of show kitchen is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (*M* = 3.17, *SD* = 1.305), r_s = .255, n = 106, p = .008. Overall, increase in diner's perception of show kitchen is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .349, n = 106, p < .001. Overall, increase in diner's perception of show kitchen is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .251, n = 106, p = .009. Overall, increase in diner's perception of show kitchen is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.

- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .276, n = 106, p = .004. Overall, increase in diner's perception of show kitchen is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .372, n = 106, p < .001. Overall, increase in diner's perception of show kitchen is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .242, n = 105, p = .013. Overall, increase in diner's perception of show kitchen is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.

Table 30 Spearman's rho Correlation between Lighting and Attention to Bar

Spearman's rho						
Attention to Bar		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Glairiness	.194*	.046	106	3.35	1.051
M =*2.79*	Focused	.352**	.000	106	2.97	1.125
SD =*1.881*	Comfortable Lighting	.294**	.002	106	3.94	1.031
	Iconic Fixture	.409**	.000	106	3.20	1.206
	Authentic Fixture	.290**	.003	105	3.36	1.102
	Stylish Fixture	.246*	.011	106	3.63	1.157
	Attractive Fixture	.276**	.004	106	3.63	1.115
	Quality Fixture	.267**	.006	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Attention to the Bar in the restaurant and lighting was evaluated through the item that stated, "*Lighting draws attention to the bar.*" A Spearman's rank correlation coefficient was computed to assess the relationship between attention to the Bar (*M = 2.79*, *SD = 1.881*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Focused Distribution of Lighting (Unfocused-Focused) (*M* = 3.94, *SD* = 1.125), r_s = .352, n = 106, p < .001. Overall, increase in diner's attention to the bar is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .294, n = 106, p = .002. Overall, increase in diner's attention to the bar is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .409, n = 106, p < .001. Overall, increase in diner's attention to the bar is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .290, n = 105, p = .003. Overall, increase in diner's attention to the bar is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .246, n = 106, p = .011. Overall, increase in diner's attention to the bar is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .276, n = 106, p = .004. Overall, increase in diner's attention to the bar is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .267, n = 106, p = .006. Overall, increase in diner's attention to the bar is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Glairiness (Glare – Non-Glare), (*M* = 3.35, *SD* = 1.051), r_s = .194, n = 106, p = .046. Overall, increase in diner's attention to the bar is reported with a decrease in perception of glare of lighting at upscale restaurant settings.

Social Experience. This section discusses the findings of correlational analyses conducted between social experience and lighting. The DineLight instrument assessed perceptions of social experience as following: food photography, diners' photography, faces at my table, faces at other tables, conversation within table, and conversation between tables. The results of the analysis of Spearman's rho correlation are summarized in tables below.

Table 31 Spearman's rho Correlation between Lighting and Food Photography

Spearman's rho						
Food Photography		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Colorful	.208*	.033	106	2.87	1.096
M =*3.35*	Radiance	.328**	.001	106	3.12	.973
SD =*1.408*	Focused	.380**	.000	106	2.97	1.125
	Contrast	.254**	.009	106	2.99	.971
	Visibility of Fixtures	.319**	.001	106	3.43	1.069
	Specular	.393**	.000	106	2.80	1.345
	Comfortable Lighting	.403**	.000	106	3.94	1.031
	Focused on Table	.470**	.000	106	3.17	1.305
	Iconic Fixture	.255**	.008	106	3.20	1.206
	Authentic Fixture	.232*	.017	105	3.36	1.102

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Satisfaction with Food photography taken at the restaurant and lighting was evaluated through the item that stated, "*I am satisfied with the lighting quality for taking pictures of my food.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Quality of Food Picture (*M* = *3.35*, *SD* = *1.408*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Radiance (Dull-Radiant) (*M* = 3.12, *SD* = 973), r_s = .328, n = 106, p = .001. Overall, increase in diner's satisfaction of taking picture of the food is reported with an increase in perception of radiance at upscale restaurant settings.
- There was a strong positive correlation with perception of Focused Distribution of Lighting (Unfocused-Focused) (*M* = 3.94, *SD* = 1.125), r_s = .380, n = 106, p < .001. Overall, increase in diner's satisfaction of taking picture of the food is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Contrast (Low Contrast – High Contrast) (M = 2.99, SD = .971), r_s = .254, n = 106, p = .009. Overall, increase in diner's satisfaction of taking picture of the food is reported with an increase in perception of high contrast at upscale restaurant settings.
- There was a strong positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (M = 3.43, SD = 1.069), r_s = .319, n = 106, p = .001. Overall, increase in diner's satisfaction of taking picture of the food is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Specular effect of Lighting (high reflection), (M = 2.80, SD = 1.345), r_s = .393, n = 106, p < .001. Overall, increase in diner's satisfaction of taking picture of the food is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .403, n = 106, p < .001. Overall, increase in diner's satisfaction of taking picture of the food is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (M = 3.17, SD = 1.305), r_s = .470, n = 106, p < .001. Overall, increase in diner's satisfaction of taking picture of the food is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (M = 3.20, SD = 1.206), r_s = .255, n = 106, p = .008. Overall, increase in diner's satisfaction of taking picture of the food is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of amount of color (Colorless-Colorful) (M = 2.87, SD = 1.096), r_s = .208, n = 106, p = .033. Overall, increase in diner's satisfaction of taking picture of the food is reported with an increase in perception of colorfulness at upscale restaurant settings.

- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .232, n = 105, p = .017. Overall, increase in diner's satisfaction of taking picture of the food is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.

Table 32 Spearman's rho Correlation between Lighting and Diner Photography

Spearman's rho						
Diners Photography		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Brightness	.241*	.013	106	2.66	1.041
M =*3.37*	Colorful	.218*	.025	106	2.87	1.096
SD =*1.369*	Radiance	.334**	.000	106	3.12	.973
	Focused	.295**	.002	106	2.97	1.125
	Contrast	.206*	.034	106	2.99	.971
	Visibility of Fixtures	.314**	.001	106	3.43	1.069
	Specular	.392**	.000	106	2.80	1.345
	Comfortable Lighting	.398**	.000	106	3.94	1.031
	Focused on Table	.398**	.000	106	3.17	1.305
	Iconic Fixture	.262**	.007	106	3.20	1.206
	Authentic Fixture	.257**	.008	105	3.36	1.102
	Attractive Fixture	.221*	.023	106	3.63	1.115
	Quality Fixture	.208*	.033	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between Quality of diners' photo taken at the restaurant and lighting was evaluated through the item that stated, "*I am satisfied with the lighting quality for taking pictures with people companying me*." A Spearman's rank correlation coefficient was computed to assess the relationship between Quality of People's picture (*M = 3.37 SD = 1.369*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Radiance (Dull-Radiant) (*M* = 3.12, *SD* = 973), r_s = .334, n = 106, p < .001. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with an increase in perception of radiance at upscale restaurant settings.
- There was a strong positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .295, n = 106, p = .002. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (M = 3.43, SD = 1.069), r_s = .314, n = 106, p = .001. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Specular effect of Lighting (high reflection), (M = 2.80, SD = 1.345), r_s = .392, n = 106, p < .001. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .398, n = 106, p < .001. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (M = 3.17, SD = 1.305), r_s = .398, n = 106, p < .001. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (M = 3.20, SD = 1.206), r_s = .262, n = 106, p = .007. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Authentic Lighting Fixture (M = 3.36, SD = 1.102), r_s = .257, n = 105, p = .008. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Brightness (Dim-Bright) (M = 2.66, SD = 1.041), r_s = .241, n = 106, p = .013. Overall, increase in diner's satisfaction

of taking picture of the people companying them is reported with an increase in brightness of lighting at upscale restaurant settings.

- There was a moderate positive correlation with perception of amount of color (Colorless-Colorful) (M = 2.87, SD = 1.096), r_s = .218, n = 106, p = .025. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with an increase in perception of colorfulness at upscale restaurant settings.
- There was a moderate positive correlation with perception of Contrast (Low Contrast – High Contrast) (M = 2.99, SD = .971), r_s = .206, n = 106, p = .034. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with an increase in perception of high contrast at upscale restaurant settings.
- There was a moderate positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .221, n = 106, p = .023. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Quality of Lighting Fixture (M = 3.52, SD = 1.409), r_s = .208, n = 106, p = .033. Overall, increase in diner's satisfaction of taking picture of the people companying them is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.

Table 33 Spearman's rho Correlation between Lighting and Faces at Diner's Table

Spearman's rho						
Faces at Diner's Table		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Brightness	.227*	.019	106	2.66	1.041
M = *4.16*	Uniformed	-.208*	.033	106	3.01	1.183
SD = *1.122*	Visibility of Fixtures	.278**	.004	106	3.43	1.069
	Specular	.237*	.015	106	2.80	1.345
	Comfortable Lighting	.431**	.000	106	3.94	1.031
	Focused on Table	.389**	.000	106	3.17	1.305

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the ability to see faces within diner's table at the restaurant and lighting was evaluated through the item that stated, "*I can see faces of diners at my table clearly.*" A Spearman's rank correlation coefficient was computed to assess the relationship between

Seeing faces within diner's table (*M* = *4.16*, *SD* = *1.122*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (*M* = 3.43, *SD* = 1.069), r_s = .278, n = 106, p = .004. Overall, increase in diner's ability to see faces within their table is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .431, n = 106, p < .001. Overall, increase in diner's ability to see faces within their table is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (*M* = 3.17, *SD* = 1.305), r_s = .389, n = 106, p < .001. Overall, increase in diner's ability to see faces within their table is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a moderate positive correlation with perception of Brightness (Dim-Bright) (*M* = 2.66, *SD* = 1.041), r_s = .227, n = 106, p = .019. Overall, increase in diner's ability to see faces within their table is reported with an increase in brightness of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .237, n = 106, p = .015. Overall, increase in diner's ability to see faces within their table is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a moderate negative correlation with perception of Uniformness of Lighting Distribution (Uniform – Non-Uniform) (*M* = 3.01, *SD* = 1.183), r_s = -.208, n = 106, p = .033. Overall, increase in diner's ability to see faces within their table is reported with an increase in uniform lighting distribution at upscale restaurant settings.

Table 34 Spearman's rho Correlation between Lighting and Faces at other Tables

Spearman's rho						
Faces at other Tables		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = *106*	Brightness	.273**	.005	106	2.66	1.041
M =*3.70*	Glairiness	-.252**	.009	106	3.35	1.051
SD =*1.189*	Radiance	.194*	.047	106	3.12	.973
	Uniformed	-.254**	.009	106	3.01	1.183
	Visibility of Fixtures	.229*	.018	106	3.43	1.069
	Specular	.272**	.005	106	2.80	1.345
	Comfortable Lighting	.428**	.000	106	3.94	1.031
	Focused on Table	.282**	.003	106	3.17	1.305
	Attractive Fixture	.213*	.028	106	3.63	1.115
	Quality Fixture	.230*	.018	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the ability to see faces at other diner's table at the restaurant and lighting was evaluated through the item that stated, "*I can see faces of diners at other tables clearly.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Seeing diner's faces at other tables (*M* = *3.70*, *SD* = *1.189*) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Brightness (Dim-Bright) (*M* = 2.66, *SD* = 1.041), r_s = .273, n = 106, p = .005. Overall, increase in diner's ability to see faces at other tables is reported with an increase in brightness of lighting at upscale restaurant settings.
- There was a strong negative correlation with perception of Uniformness of Lighting Distribution (Uniform – Non-Uniform) (*M* = 3.01, *SD* = 1.183), r_s = -.254, n = 106, p = .009. Overall, increase in diner's ability to see faces at other tables is reported with increase in uniform lighting distribution at upscale restaurant settings.
- There was a strong positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .272, n = 106, p = .005. Overall, increase in diner's ability to see faces at other tables is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .428, n = 106, p < .001. Overall, increase in diner's ability to see

faces at other tables is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (M = 3.17, SD = 1.305), r_s = .282, n = 106, p = .003. Overall, increase in diner's ability to see faces at other tables is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a strong negative correlation with perception of Glairiness (Glare – Non-Glare), (M = 3.35, SD = 1.051), r_s = -.252, n = 106, p = .009. Overall, increase in diner's ability to see faces at other tables is reported with an increase in glairiness of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Radiance (Dull-Radiant) (M = 3.12, SD = 973), r_s = .194, n = 106, p = .047. Overall, increase in diner's ability to see faces at other tables is reported with an increase in perception of radiance at upscale restaurant settings.
- There was a moderate positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (M = 3.43, SD = 1.069), r_s = .229, n = 106, p = .018. Overall, increase in diner's ability to see faces at other tables is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .213, n = 106, p = .028. Overall, increase in diner's ability to see faces at other tables is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Quality of Lighting Fixture (M = 3.52, SD = 1.409), r_s = .230, n = 106, p = .018. Overall, increase in diner's ability to see faces at other tables is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.

Table 35 Spearman's rho Correlation between Lighting and Conversation within Table

Spearman's rho						
Conversation within Table		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Radiance	.277**	.004	106	3.12	.973
M =4.21	Focused	.201*	.038	106	2.97	1.125
SD =1.110	Visibility of Fixtures	.292**	.002	106	3.43	1.069
	Specular	.247*	.011	106	2.80	1.345
	Comfortable Lighting	.467**	.000	106	3.94	1.031
	Focused on Table	.281**	.004	106	3.17	1.305
	Attractive Fixture	.222*	.022	106	3.63	1.115

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the ease of conversation within diner's table at the restaurant and lighting was evaluated through the item that stated, "*Lighting is sufficient for conversation with my table partners.*" A Spearman's rank correlation coefficient was computed to assess the relationship between conversation within diner's table (*M* = 4.21, *SD* = 1.110) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Radiance (Dull-Radiant) (*M* = 3.12, *SD* = 973), r_s = .277, n = 106, p = .004. Overall, increase in diner's ease of conversation within their table is reported with an increase in perception of radiance at upscale restaurant settings.
- There was a strong positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (*M* = 3.43, *SD* = 1.069), r_s = .292, n = 106, p = .002. Overall, increase in diner's ease of conversation within their table is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .467, n = 106, p < .001. Overall, increase in diner's ease of conversation within their table is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (*M* = 3.17, *SD* = 1.305), r_s = .281, n = 106, p = .004. Overall, increase in diner's

ease of conversation within their table is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.

- There was a moderate positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .201, n = 106, p = .038. Overall, increase in diner's ease of conversation within their table is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .247, n = 106, p = .011. Overall, increase in diner's ease of conversation within their table is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a moderate positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .222, n = 106, p = .022. Overall, increase in diner's ease of conversation within their table is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.

Table 36 Spearman's rho Correlation between Lighting and Conversation Between Tables

Spearman's rho						
Conversation Between Tables		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Focused	.261**	.007	106	2.97	1.125
M =3.18	Specular	.359**	.000	106	2.80	1.345
SD =1.420	Comfortable Lighting	.292**	.002	106	3.94	1.031
	Stylish Fixture	.202*	.038	106	3.63	1.157
	Attractive Fixture	.240*	.013	106	3.63	1.115
	Quality Fixture	.225*	.021	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the ease of conversation between diner's tables at the restaurant and lighting was evaluated through the item that stated, "*Lighting is sufficient for conversation between tables.*" A Spearman's rank correlation coefficient was computed to assess the relationship between conversation with diners at other tables (*M* = 3.18, *SD* = 1.420) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .261, n = 106, p = .007. Overall,

increase in diner's ease of conversation with other tables is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Specular effect of Lighting (high reflection), (M = 2.80, SD = 1.345), r_s = .359, n = 106, p < .001. Overall, increase in diner's ease of conversation with other tables is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .292, n = 106, p = .002. Overall, increase in diner's ease of conversation with other tables is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Stylish Lighting Fixture (M = 3.63, SD = 1.157), r_s = .202, n = 106, p = .038. Overall, increase in diner's ease of conversation with other tables is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .240, n = 106, p = .013. Overall, increase in diner's ease of conversation with other tables is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Quality of Lighting Fixture (M = 3.52, SD = 1.409), r_s = .225, n = 106, p = .021. Overall, increase in diner's ease of conversation with other tables is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.

Service Experience. This section discusses the findings of correlational analyses conducted between service experience and lighting. It focuses on two main sections: service aspects, and function aspects.

Service Aspects. The DineLight instrument assessed lighting and service perception. These perceptions are discussed as the following: waiting time to be seated, waiting time for food, visual

communication with the server. The results of the analysis of Spearman's rho are summarized in tables below.

Table 37 Spearman's rho Correlation between Lighting and Perception of Waiting Time to be Seated

Spearman's rho						
Waiting time to be seated		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Authentic Fixture	.241*	.013	105	3.36	1.102
M =4.31						
SD =1.253						

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the perception of waiting time to be seated at the table in the restaurant and lighting was evaluated through the item that stated, "*The waiting time to be seated at my table was reasonable*." A Spearman's rank correlation coefficient was computed to assess the relationship between perception of waiting time to be seated at the table (*M* = 4.31, *SD* = 1.253) and lighting perception. The following results were generated:

- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .241, n = 105, p = .013. Overall, increase in diner's perception of waiting time to be seated is reported with an increase in perception of authentic fixtures installed at upscale restaurant settings.

Table 38 Spearman's rho Correlation between Lighting and Perception of Waiting Time to Get the Food

Spearman's rho						
Waiting time for Food		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Uniformed	.238*	.014	106	3.01	1.183
M =4.38	Authentic Fixture	.209*	.033	105	3.36	1.102
SD =.920						

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the perception of waiting time to get the food and lighting was evaluated through the item that stated, "*The waiting time to get the food was reasonable.*" A Spearman's rank correlation coefficient was computed to assess the relationship between perception of waiting time to get the food (*M* = 4.38, *SD* = .920) and lighting perception. The following results were generated:

- There was a moderate positive correlation with perception of Uniformed (Uniform - Non-uniform) (*M* = 3.01, *SD* = 1.183), r_s = .238, n = 106, p = .014. Overall, increase in diner's

perception of waiting time to get the food is reported with a decrease in uniform lighting distribution at upscale restaurant settings.

- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .209, n = 105, p = .033. Overall, increase in diner's perception of waiting time to get the food is reported with an increase in perception of authentic fixtures installed at upscale restaurant settings.

Table 39 Spearman's rho Correlation between Lighting and Visual Communication with the Server

Spearman's rho						
Visual Communication with Server		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Visibility of Fixtures	.244*	.012	106	3.43	1.069
M =4.41	Comfortable Lighting	.427**	.000	106	3.94	1.031
SD = .913	Focused on Table	.202*	.038	106	3.17	1.305
	Authentic Fixture	.262**	.007	105	3.36	1.102
	Quality Fixture	.219*	.024	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the perception of visual communication with the server at the restaurant and lighting was evaluated through the item that stated, "*Lighting is sufficient to visually communicate with the server*." A Spearman's rank correlation coefficient was computed to assess the relationship between visual communication with the server (*M* = 4.41-, *SD* = .913) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .427, n = 106, p < .001. Overall, increase in diner's ability to visually communicate with the server is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .262, n = 105, p = .007. Overall, increase in diner's ability to visually communicate with the server is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (*M* = 3.43, *SD* = 1.069), r_s = .244, n = 106, p = .012. Overall,

increase in diner's ability to visually communicate with the server is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.

- There was a moderate positive correlation with perception of Lighting Focused on the Dining Table (*M* = 3.17, *SD* = 1.305), r_s = .202, n = 106, p = .038. Overall, increase in diner's ability to visually communicate with the server is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a moderate positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .219, n = 106, p = .024. Overall, increase in diner's ability to visually communicate with the server is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.

Function Aspects. The DineLight instrument assessed lighting and function aspects of the service experience. These perceptions are discussed as the following: the ability to read the menu, using a flash light to read the menu, and the ability to see the food. The results of the analysis of Spearman's rho correlation are summarized in tables below.

Table 40 Spearman's rho Correlation between Lighting and The Ability to Read the Menu

Spearman's rho						
Reading the Menu		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Brightness	.305**	.001	106	2.66	1.041
M = 4.05	Focused	.264**	.006	106	2.97	1.125
SD = 1.319	Visibility of Fixtures	.388**	.000	106	3.43	1.069
	Specular	.281**	.003	106	2.80	1.345
	Comfortable Lighting	.421**	.000	106	3.94	1.031
	Focused on Table	.425**	.000	106	3.17	1.305
	Attractive Fixture	.194*	.046	106	3.63	1.115
	Quality Fixture	.205*	.035	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the ability to read the menu at the restaurant and lighting was evaluated through the item that stated, "*Lighting is sufficient to read the menu*." A Spearman's rank correlation coefficient was computed to assess the relationship between reading the menu (*M* = 4.05, *SD* = 1.319) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Brightness (Dim-Bright) (*M* = 2.66, *SD* = 1.041), r_s = .305, n = 106, p = .001. Overall, increase in diner's ability to read

the menu is reported with an increase in brightness of lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (M = 3.94, SD = 1.125), r_s = .264, n = 106, p = .006. Overall, increase in diner's ability to read the menu is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (M = 3.43, SD = 1.069), r_s = .388, n = 106, p < .001. Overall, increase in diner's ability to read the menu is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Specular effect of Lighting (high reflection), (M = 2.80, SD = 1.345), r_s = .281, n = 106, p = .003. Overall, increase in diner's ability to read the menu is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .421, n = 106, p < .001. Overall, increase in diner's ability to read the menu is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (M = 3.17, SD = 1.305), r_s = .425, n = 106, p < .001. Overall, increase in diner's ability to read the menu is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a moderate positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .194, n = 106, p = .046. Overall, increase in diner's ability to read the menu is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Quality of Lighting Fixture (M = 3.52, SD = 1.409), r_s = .205, n = 106, p = .035. Overall, increase in diner's ability to

read the menu is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.

Table 41 Spearman's rho Correlation between Lighting and Using the Flash Light to Read the Menu

Spearman's rho						
Flash Light to read the menu		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Brightness	-.209*	.032	106	2.66	1.041
M = 1.71	Visibility of Fixtures	-.277**	.004	106	3.43	1.069
SD = 1.331	Focused on Table	-.201*	.039	106	3.17	1.305

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the need for flash light to read the menu at the restaurant and lighting was evaluated through the item that stated, "*I needed a flash light to read the menu*." A Spearman's rank correlation coefficient was computed to assess the relationship between using flash light to read the menu (*M* = 1.71, *SD* = 1.331) and lighting perception. The following results were generated:

- There was a strong negative correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (*M* = 3.43, *SD* = 1.069), r_s = -.277, n = 106, p = .004. Overall, increase in diner's need for flash light to read the menu is reported with a decrease in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a moderate negative correlation with perception of Brightness (Dim-Bright) (*M* = 2.66, *SD* = 1.041), r_s = -.209, n = 106, p = .032. Overall, increase in diner's need for flash light to read the menu is reported with a decrease in brightness of lighting at upscale restaurant settings.
- There was a moderate negative correlation with perception of Lighting Focused on the Dining Table (*M* = 3.17, *SD* = 1.305), r_s = -.201, n = 106, p = .039. Overall, increase in diner's need for flash light to read the menu is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.

Table 42 Spearman's rho Correlation between Lighting and Seeing the Food

Spearman's rho						
Seeing the Food		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Radiance	.208*	.033	106	3.12	.973
M = 4.26	Focused	.223*	.021	106	2.97	1.125
SD = 1.026	Visibility of Fixtures	.380**	.000	106	3.43	1.069
	Specular	.240*	.013	106	2.80	1.345
	Comfortable Lighting	.442**	.000	106	3.94	1.031
	Focused on Table	.385**	.000	106	3.17	1.305
	Iconic Fixture	.225*	.020	106	3.20	1.206
	Authentic Fixture	.227*	.020	105	3.36	1.102
	Attractive Fixture	.262**	.007	106	3.63	1.115
	Quality Fixture	.337**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between the ability to see the food at the restaurant and lighting was evaluated through the item that stated, "*Lighting is sufficient to see the food*." A Spearman's rank correlation coefficient was computed to assess the relationship between seeing the food (*M* = 4.26, *SD* = 1.026) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (*M* = 3.43, *SD* = 1.069), r_s = .380, n = 106, p < .001. Overall, increase in diner's the ability to see the food is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .442, n = 106, p < .001. Overall, increase in diner's the ability to see the food is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (*M* = 3.17, *SD* = 1.305), r_s = .385, n = 106, p < .001. Overall, increase in diner's the ability to see the food is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .262, n = 106, p = .007. Overall, increase in diner's the ability to see the food is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.

- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .337, n = 106, p < .001. Overall, increase in diner's the ability to see the food is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Radiance (Dull-Radiant) (*M* = 3.12, *SD* = 973), r_s = .208, n = 106, p = .033. Overall, increase in diner's the ability to see the food is reported with an increase in perception of radiance at upscale restaurant settings.
- There was a moderate positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .223, n = 106, p = .021. Overall, increase in diner's the ability to see the food is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .240, n = 106, p = .013. Overall, increase in diner's the ability to see the food is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a moderate positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .225, n = 106, p = .020. Overall, increase in diner's the ability to see the food is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .227, n = 105, p = .020. Overall, increase in diner's the ability to see the food is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.

Food Experience. This section discusses the findings of correlational analyses conducted between food experience and lighting. The DineLight instrument assessed perception of food as following: food acceptability, food appreciation, appetizing food, food attractiveness, food

freshness, food quality. The results of the analysis of Spearman's rho correlation are summarized in tables below.

Table 43 Spearman's rho Correlation between Lighting and Food Acceptability

Spearman's rho						
Food Acceptability		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Visibility of Fixtures	.262**	.007	106	3.43	1.069
M = 4.65	Specular	.203*	.037	106	2.80	1.345
SD = .662	Comfortable Lighting	.433**	.000	106	3.94	1.031
	Focused on Table	.228*	.019	106	3.17	1.305
	Iconic Fixture	.379**	.000	106	3.20	1.206
	Authentic Fixture	.220*	.024	105	3.36	1.102
	Stylish Fixture	.333**	.000	106	3.63	1.157
	Attractive Fixture	.350**	.000	106	3.63	1.115
	Quality Fixture	.351**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between food acceptability and lighting was evaluated through the item that stated, "*The food looks acceptable*." A Spearman's rank correlation coefficient was computed to assess the relationship between Food Acceptability (M = 4.65, SD = .662) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (M = 3.43, SD = 1.069), r_s = .262, n = 106, p = .007. Overall, increase in diner's perception of food acceptability is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .433, n = 106, p < .001. Overall, increase in diner's perception of food acceptability is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (M = 3.20, SD = 1.206), r_s = .379, n = 106, p < .001. Overall, increase in diner's perception of food acceptability is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (M = 3.63, SD = 1.157), r_s = .333, n = 106, p < .001. Overall, increase in diner's perception of

food acceptability is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.

- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .350, n = 106, p < .001. Overall, increase in diner's perception of food acceptability is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .351, n = 106, p < .001. Overall, increase in diner's perception of food acceptability is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .203, n = 106, p = .037. Overall, increase in diner's perception of food acceptability is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a moderate positive correlation with perception of Lighting Focused on the Dining Table (*M* = 3.17, *SD* = 1.305), r_s = .228, n = 106, p = .019. Overall, increase in diner's perception of food acceptability is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .220, n = 105, p = .024. Overall, increase in diner's perception of food acceptability is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.

Table 44 Spearman's rho Correlation between Lighting and Food Appreciation

Spearman's rho						
Food Appreciation		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Color Temperature	.212*	.029	106	3.59	1.076
M = 4.67	Comfortable Lighting	.360**	.000	106	3.94	1.031
SD = .597	Iconic Fixture	.230*	.018	106	3.20	1.206
	Stylish Fixture	.196*	.045	106	3.63	1.157
	Attractive Fixture	.235*	.015	106	3.63	1.115
	Quality Fixture	.235*	.015	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between food appreciation and lighting was evaluated through the item that stated, "*I appreciate the food*." A Spearman's rank correlation coefficient was computed to assess the relationship between Food Appreciation (M = 4.67, SD = .597) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .360, n = 106, p < .001. Overall, increase in diner's perception of food appreciation is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Color Temperature (Cool - Warm) (M = 3.59, SD = 1.076), r_s = .212, n = 106, p = .029. Overall, increase in diner's perception of food appreciation is reported with an increase in perception of warmer color temperature of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Iconic Lighting Fixture (M = 3.20, SD = 1.206), r_s = .230, n = 106, p = .018. Overall, increase in diner's perception of food appreciation is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Stylish Lighting Fixture (M = 3.63, SD = 1.157), r_s = .196, n = 106, p = .045. Overall, increase in diner's perception of food appreciation is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .235, n = 106, p = .015. Overall, increase in diner's perception of food appreciation is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Quality of Lighting Fixture (M = 3.52, SD = 1.409), r_s = .235, n = 106, p = .015. Overall, increase in diner's perception of food appreciation is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.

Table 45 Spearman's rho Correlation between Lighting and Appetizing Food

Spearman's rho						
Appetizing Food		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Color Temperature	.214*	.028	106	3.59	1.076
M = 4.52	Comfortable Lighting	.395**	.000	106	3.94	1.031
SD = .720	Iconic Fixture	.247*	.011	106	3.20	1.206
	Authentic Fixture	.241*	.013	105	3.36	1.102
	Stylish Fixture	.229*	.018	106	3.63	1.157
	Attractive Fixture	.265**	.006	106	3.63	1.115
	Quality Fixture	.228*	.019	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between perception of appetizing food and lighting was evaluated through the item that stated, "*The food is appetizing.*" A Spearman's rank correlation coefficient was computed to assess the relationship between Appetizing Food (M = 4.52, SD = .720) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .395, n = 106, p < .001. Overall, increase in diner's perception of appetizing food is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .265, n = 106, p = .006. Overall, increase in diner's perception of appetizing food is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Color Temperature (Cool - Warm) (M = 3.59, SD = 1.076), r_s = .214, n = 106, p = .028. Overall, increase in diner's perception of appetizing food is reported with an increase in perception of warmer color temperature of lighting at upscale restaurant settings.
- There was a moderate positive correlation with perception of Iconic Lighting Fixture (M = 3.20, SD = 1.206), r_s = .247, n = 106, p = .011. Overall, increase in diner's perception of appetizing food is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.

- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .241, n = 105, p = .013. Overall, increase in diner's perception of appetizing food is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .229, n = 106, p = .018. Overall, increase in diner's perception of appetizing food is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .228, n = 106, p = .019. Overall, increase in diner's perception of appetizing food is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.

Table 46 Spearman's rho Correlation between Lighting and Food Attractiveness

Spearman's rho						
Food Attractiveness		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Focused	.294**	.002	106	2.97	1.125
M = 4.58	Visibility of Fixtures	.276**	.004	106	3.43	1.069
SD = .674	Comfortable Lighting	.469**	.000	106	3.94	1.031
	Focused on Table	.212*	.029	106	3.17	1.305
	Iconic Fixture	.334**	.000	106	3.20	1.206
	Authentic Fixture	.202*	.038	105	3.36	1.102
	Stylish Fixture	.233*	.016	106	3.63	1.157
	Attractive Fixture	.323**	.001	106	3.63	1.115
	Quality Fixture	.324**	.001	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between perception of food attractiveness and lighting was evaluated through the item that stated, "*The food is attractive*." A Spearman's rank correlation coefficient was computed to assess the relationship between Attractive Food (*M* = 4.58, *SD* = .674) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Focused Distribution of Lighting (unfocused-focused) (*M* = 3.94, *SD* = 1.125), r_s = .294, n = 106, p = .002. Overall, increase in diner's perception of attractive food is reported with an increase in perception of focused distribution of lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (M = 3.43, SD = 1.069), r_s = .276, n = 106, p = .004. Overall, increase in diner's perception of attractive food is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (M = 3.94, SD = 1.031), r_s = .469, n = 106, p < .001. Overall, increase in diner's perception of attractive food is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (M = 3.20, SD = 1.206), r_s = .334, n = 106, p < .001. Overall, increase in diner's perception of attractive food is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .323, n = 106, p = .001. Overall, increase in diner's perception of attractive food is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (M = 3.52, SD = 1.409), r_s = .324, n = 106, p = .001. Overall, increase in diner's perception of attractive food is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Lighting Focused on the Dining Table (M = 3.17, SD = 1.305), r_s = .212, n = 106, p = .029. Overall, increase in diner's perception of attractive food is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a moderate positive correlation with perception of Authentic Lighting Fixture (M = 3.36, SD = 1.102), r_s = .202, n = 105, p = .038. Overall, increase in diner's perception of attractive food is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.

- There was a moderate positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .233, n = 106, p = .016. Overall, increase in diner's perception of attractive food is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.

Table 47 Spearman's rho Correlation between Lighting and Food Freshness

Spearman's rho						
Food Freshness		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Radiance	.244**	.012	106	3.12	.973
M = 4.58	Visibility of Fixtures	.266**	.006	106	3.43	1.069
SD =.792	Specular	.198*	.042	106	2.80	1.345
	Comfortable Lighting	.485**	.000	106	3.94	1.031
	Focused on Table	.313**	.001	106	3.20	1.206
	Iconic Fixture	.310**	.001	106	3.20	1.206
	Authentic Fixture	.262**	.007	105	3.36	1.102
	Stylish Fixture	.292**	.002	106	3.63	1.157
	Attractive Fixture	.358**	.000	106	3.63	1.115
	Quality Fixture	.394**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between perception of food freshness and lighting was evaluated through the item that stated, "*The food looks fresh."* A Spearman's rank correlation coefficient was computed to assess the relationship between Food Freshness (*M* = 4.58, *SD* = .792) and lighting perception. The following results were generated:

- There was a strong positive correlation with perception of Radiance (Dull-Radiant) (*M* = 3.12, *SD* = 973), r_s = .244, n = 106, p = .012. Overall, increase in diner's perception of fresh food is reported with an increase in perception of radiance at upscale restaurant settings.
- There was a strong positive correlation with perception of Visibility of Lighting Fixtures (Non-Visible - Visible) (*M* = 3.43, *SD* = 1.069), r_s = .266, n = 106, p = .006. Overall, increase in diner's perception of fresh food is reported with an increase in visibility of lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .485, n = 106, p < .001. Overall, increase in diner's perception of fresh food is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.

- There was a strong positive correlation with perception of Lighting Focused on the Dining Table (M = 3.17, SD = 1.305), r_s = .313, n = 106, p = .001. Overall, increase in diner's perception of fresh food is reported with an increase in perception of focusing the lighting on the table at upscale restaurant settings.
- There was a strong positive correlation with perception of Iconic Lighting Fixture (M = 3.20, SD = 1.206), r_s = .310, n = 106, p = .001. Overall, increase in diner's perception of fresh food is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Authentic Lighting Fixture (M = 3.36, SD = 1.102), r_s = .262, n = 105, p = .007. Overall, increase in diner's perception of fresh food is reported with an increase in perception of authentic lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (M = 3.63, SD = 1.157), r_s = .292, n = 106, p = .002. Overall, increase in diner's perception of fresh food is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (M = 3.63, SD = 1.115), r_s = .358, n = 106, p < .001. Overall, increase in diner's perception of fresh food is reported with increase in perception of attractive lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Quality of Lighting Fixture (M = 3.52, SD = 1.409), r_s = .394, n = 106, p < .001. Overall, increase in diner's perception of fresh food is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Specular effect of Lighting (high reflection), (M = 2.80, SD = 1.345), r_s = .198, n = 106, p = .042. Overall, increase in diner's perception of fresh food is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.

Table 48 Spearman's rho Correlation between Lighting and Food Quality

Spearman's rho						
Food Quality		Correlation Coefficient	Sig. (2-tailed)	N	Mean	Standard Deviation
N = 106	Specular	.208*	.032	106	2.80	1.345
M = 4.51	Comfortable Lighting	.340**	.000	106	3.94	1.031
SD = .796	Iconic Fixture	.218*	.025	106	3.20	1.206
	Authentic Fixture	.199*	.042	105	3.36	1.102
	Stylish Fixture	.290**	.003	106	3.63	1.157
	Attractive Fixture	.367**	.000	106	3.63	1.115
	Quality Fixture	.426**	.000	106	3.52	1.409

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The connection between perception of food quality and lighting was evaluated through the item that stated, "*The food looks high quality."* A Spearman's rank correlation coefficient was computed to assess the relationship between Food Quality (*M* = 4.51, *SD* = .796) and lighting perception. The following results were generated:

- There was a moderate positive correlation with perception of Specular effect of Lighting (high reflection), (*M* = 2.80, *SD* = 1.345), r_s = .208, n = 106, p = .032. Overall, increase in diner's perception of food quality is reported with an increase in specular lighting (high reflection) at upscale restaurant settings.
- There was a strong positive correlation with perception of Comfortable Lighting (*M* = 3.94, *SD* = 1.031), r_s = .340, n = 106, p < .001. Overall, increase in diner's perception of food quality is reported with an increase in overall perception of comfortable lighting at upscale restaurant settings.
- There was a strong positive correlation with perception of Stylish Lighting Fixture (*M* = 3.63, *SD* = 1.157), r_s = .290, n = 106, p = .003. Overall, increase in diner's perception of food quality is reported with increase in perception of stylish lighting fixtures installed at upscale restaurant settings.
- There was a strong positive correlation with perception of Attractive Lighting Fixture (*M* = 3.63, *SD* = 1.115), r_s = .367, n = 106, p < .001. Overall, increase in diner's perception of food quality is reported with increase in perception of attractive fixtures installed at upscale restaurant settings.

- There was a strong positive correlation with perception of Quality of Lighting Fixture (*M* = 3.52, *SD* = 1.409), r_s = .426, n = 106, p < .001. Overall, increase in diner's perception of food quality is reported with increase in perception of high-quality lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Iconic Lighting Fixture (*M* = 3.20, *SD* = 1.206), r_s = .218, n = 106, p = .025. Overall, increase in diner's perception of food quality is reported with increase in perception of iconic lighting fixtures installed at upscale restaurant settings.
- There was a moderate positive correlation with perception of Authentic Lighting Fixture (*M* = 3.36, *SD* = 1.102), r_s = .199, n = 105, p = .042. Overall, increase in diner's perception of food quality is reported with an increase in perception of authentic fixtures installed at upscale restaurant settings.

Chapter Summary

This chapter discussed the findings of this mixed-methods approach to research. It contained three main sections; Qualitative Findings, The Instrument (the transition phase), and finally, the Quantitative findings.

The first section, qualitative findings, represents the majority of this research. I discussed the nature and the parameters of the dining experience. Next, I discussed the impact of lighting on the four components of the dining experience: Atmosphere Experience, Service Experience, Social Experience, and Food Experience. The first section concludes with a discussion of two main approaches of restaurant lighting observed, and also mentions technical aspects and preferences for lighting.

The second section, the transition, described the development of the DineLight instrument, one of the main findings in this research. The discussion focused on the components of the instrument and how these were chosen, constructed, and developed.

The third section, quantitative findings, discusses the data derived from implementing the DineLight instrument. The discussion of the findings focused on the characteristics of the sample

used, as well as the impact of lighting on the items generated to represent the different components of the dining experience using Spearman's rho, testing for ranked correlations.

CHAPTER V DISCUSSION

Overview

This chapter presents the results of data analysis from Phase I (qualitative data) and Phase II (quantitative data) of my research. Results suggest that particular lighting characteristics and approaches can influence certain dimensions of the dining experience. These ideas are summarized in two reference tables which highlight lighting characteristics and lighting fixtures (Table 49 and Table 50). I introduce a new concept, an assessment instrument I created called, "DineLight," which provides a means to better understand the interaction between lighting and the dimensions of the dining experience at upscale restaurant contexts.

The specific objectives that I addressed at my research were:

1. To determine the components of the dining experience based on subject's perspective.
2. To explore the role of atmosphere in impacting the dining experience.
3. To explore the role of lighting as an atmosphere element in impacting the dining experience.
4. To understand how lighting can "stage" the dining experience.
5. To explore and understand the relationship dimensions between lighting and the dining experience at upscale restaurant environment.
6. To explore and identify the specific characteristics of lighting that contribute to the specific aspects of the dining experience.
7. To develop a survey instrument to measure the performance of lighting and thus the impact of lighting in the dining experience at upscale restaurant environment.

The Dining Experience

The first phase of my research started with a qualitative exploration into the upscale dining experience. This exploration focused on dining at upscale restaurants as it encompasses a far more complex and multifaceted, experiential phenomenon than other types of restaurants. Much of the research on experience and dining focuses on fast-food type restaurants; whereas the experiential aspects of upscale restaurants receive less attention in the literature (B. J. Babin, Lee, Kim, & Griffin, 2005) .

My exploration revealed that the upscale dining experience can be described as a “door to door” ritual; starting from the moment the diners step foot into the restaurant, until the moment they leave. It embodies four major elements, or I what I call “experiences:” 1) atmosphere experience, 2) service experience, 3) social experience, and 4) food experience, with diners encountering them in that respective order. My research builds on previous research on hospitality that proposed a model for the dining experience that included three aspects which are: food quality, service quality, and atmosphere quality (see Wall & Berry, 2007b ;Ladhari, Brun, & Morales, 2008; Jang & Namkung, 2008; Jang & Namkung, 2009). These studies emphasize food (or taste) as the most important and useful in predicting behavior (Glanz, Basil, Maibach, Goldberg, & Snyder, 1998 ; Namkung & Jang, 2007). Andersson and Mossberg (2004) suggested a fourth element in the dining experience, the social element, or idea of “social desirability” which I also included in my study.

Role of Atmosphere

The results of the qualitative phase of this research found the role of atmosphere to be a critical part of the overall dining experience. This included building expectations, creating an image, affecting mood, and numerous other aspects. This reinforces findings from the research field of environmental psychology suggesting that well-designed physical environments can arouse feelings of excitement, pleasure, or relaxation (Mehrabian & Russell, 1974a; Russell & Pratt, 1980) and changes of these environments can either improve or destroy these feelings (Wakefield & Blodgett, 1999) . Other studies in also indicated that atmosphere can create an intended image (Booms & Bitner, 1982) , can affect perceptions of service quality related to reliability, assurance and responsiveness (Wakefield and Blodgett, 1999), and can affect behavior such as repeated visits and encouraging word of mouth reviews (Mano & Oliver, 1993; Russell & Pratt, 1980).

My qualitative findings suggest three main characteristics of the dining experience that make atmosphere important at upscale restaurant setting.

The first characteristic is time spent at the restaurant. The upscale dining experience is generally a multiple hour phenomenon, meaning that the atmosphere should afford the length of

the dining experience. Wakefield and Blodgett (1996) developed a typology of service environments associated with time; suggesting that the importance of atmosphere increases when consumers spend an extended period of time observing and experiencing the physical environment.

The second characteristic is price. My qualitative findings indicated that atmosphere should reflect the high price charged at upscale restaurants. This supports research done by Andersson and Mossberg (2004), who found that as the cost of the meal increases, so does the customer's expectations of an overall positive experience. Both my results, and their results confirm that in the case of very expensive meals, diners' expectations are extremely high, and minor complications during the dining experience can rapidly result in customer dissatisfaction.

The third characteristic is food. Atmosphere should reflect the elaborate menu and the food quality offered in the restaurant in order to increase food acceptability and food appreciation. Food acceptability is a common term used for food rating in contexts of physical environments (see Meiselman, Hirsch, & Popper, 1988, Meiselman et al., 200); Meiselman, 2008, Edwards et al., 2003). However, food appreciation is a term that I suggest. Pilgrim, (1957) attempted to define food acceptability as, "consumption with pleasure" while Leitzmann and Oltersdorf (1985) defined food acceptance as, "the psychological process of selecting a food to ingest (or to purchase with the intention of ingesting)." I believe that those two definitions somewhat lacking because they are behavior centered rather than perception and emotion centered. For this reason, I suggest the term "food appreciation," for examining the impact of atmosphere on food perception, emphasizing the role of perception in appraisal.

Findings from this study clearly suggest that lighting can affect the three main characteristics; time perception, price and quality perception, and food quality perception, that make atmosphere important to the dining experience. Therefore, it is critical that we examine the role of lighting in overall upscale restaurant experiences.

Role of Lighting

It is important to understand how lighting is used in previous research and their perspective on lighting, in order to understand its role in the dining experience. Lighting is considered an

ambient element of the atmosphere. Ambiance is an intangible part of the atmosphere that include (music, light, temperature, scent), and can generally be easily controlled in a service encounter. A pleasing ambiance can create a multi-sensory experience, meaning that multiple senses including taste, sound, scent, tactile impressions and images are all incorporated in the experience (Hirschman & Holbrook, 1982).

I am suggesting a new perspective that extends beyond this established perspective of viewing lighting as an element or a tool of atmosphere. Previous research regarded lighting as merely a component of atmosphere (Flynn, 1988; Flynn et al., 1979; Ryu & Jang, 2008; Vogels, 2008), deciding the relative importance of each element individually (e.g. music, atmosphere, food, service), as if they are competing with each other. I am looking at lighting as an atmospheric element that affects other elements in the dining experience. I view the impact of lighting focusing on the inter and intra relationship between other elements that make up the atmosphere and make up the dining experience, where lighting itself impacts atmosphere.

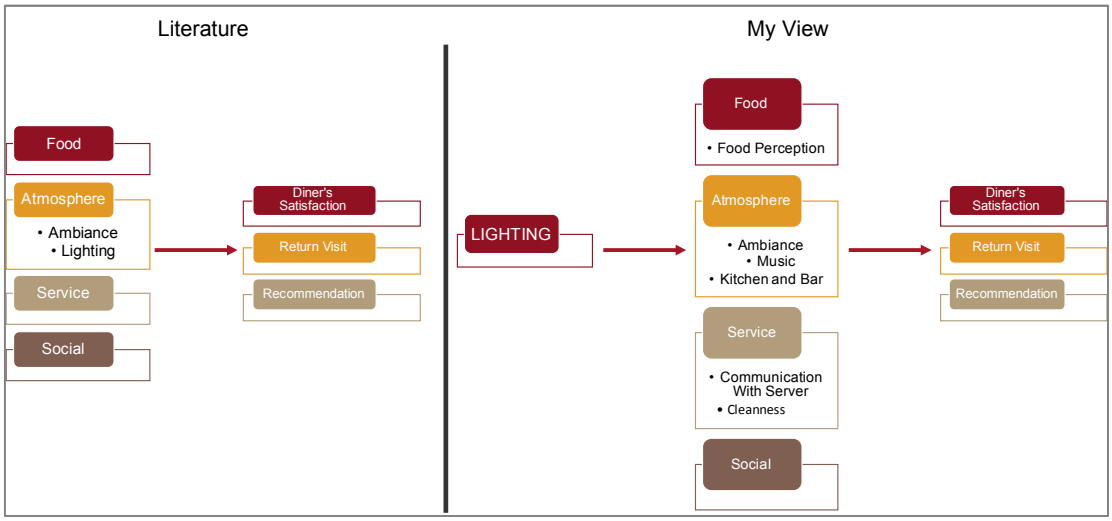

Figure 14 Views of Lighting between Previous Studies and The Current Study

Figure (14) shows the difference between the view of lighting as represented by previous studies, and my view of lighting as supported by this research. My approach suggests elements of any experience should be measured in terms of interaction and not as discrete components in comparison with other elements. For example, in many studies, food was said to be the most important element in the dining experience compared to atmosphere and service (Glanz et al.,

1998; Namkung & Jang, 2007) . I agree that the food is the ultimate “product” to engage a diner’s perception, but what diners do not necessarily realize is the atmosphere (or as in the case of this research, lighting specifically) affects our very perception of food. Poor and uncomfortable lighting might translate to low-quality food that does not appear fresh when this may not actually be true. Most diners would not articulate or even realize perhaps, that this is because of poor lighting, they may just assume the food is bad.

In 2004, Lin adopted theories of Gestalt Psychology to explain this concept. Lin rationalized that people appraise the atmosphere based on various environmental stimulus. The combination and interaction of these stimulus form a full picture of the atmosphere that can be received through our sensory systems to form a mental picture, which then stimulates an emotional response.

Lighting and Staging the Dining Experience. The concept of staging in the service encounter evolved from experience economy (Pine and Gilmore, 1998)). Pine and Gilmore (1998) suggest that services or experiences are characterized by a memorable sensation. Therefore, experiences call for being “staged,” and involve the dramatizing of the service performance.

Lighting can be regarded as the main atmospheric tool to create drama for atmosphere. Results of the qualitative phase indicate that the staging of experience happens at two levels. First involves introducing a degree of involvement, for restaurants this would be the ‘show’ kitchen. Swinyard (1993) suggests that introducing involvement can magnify the evaluation of the quality of the experience. Thus, lighting can increase involvement by creating attention and drama. My findings suggest that one of the primary goals of lighting at an upscale restaurant is to set the scene and create visual hierarchy. Therefore, it is important to understand where and how the involvement is introduced, and what role lighting plays in order to set the scene for the experience.

Lighting Characteristics. The items generated for the ‘DineLight’ instrument was derived from both a review of associated literature and the results of my qualitative data analysis. These generated items were tested and analyzed to uncover correlations between lighting and important elements of the dining experience that the lighting can affect such as food perception,

time perception, noise perception, social interaction, and many more. The results of both qualitative and quantitative data produced two valuable reference tables for aspects of the dining experience and lighting characteristics, and another table for investing in lighting fixtures. These tables serve as guidelines that can be used by researchers, designers and restaurateurs to modify lighting based on the aspect of the dining experience that they want to improve.

Lighting Characteristics Table (49) shows the elements of the dining experience along with the different lighting characteristics that were used in the DineLight instrument. This table is an effective reference for researchers and practitioners, however, there are some aspects that should be noted.

Results showed that overall perception of comfortable lighting showed a strong correlation with almost all of the items of the dining experience tested in the instrument. This shows a weakness if lighting comfort is the only measure for lighting in restaurant, like the one used in Dinescape instrument (Ryu & Jang, 2008). Conversely, research showed that the level of comfort increased at relatively low levels of light, while comfort decreased with high levels of light (also noted by Hopkinson, Petherbridge, & Longmore, 1966). In my research, I could confirm a link between comfort and level of light (brightness). Moreover, brightness is considered relative, and many perceptions could be interpreted with brightness such as visibility of lighting fixtures, cool color temperatures, brightness of fixture surface.

Moreover, it seems that respondents of the survey may have misunderstood the term glare. Low glare was correlated with a nostalgic atmosphere, perception of spaciousness, and the kitchen and bar areas. On the other side, high glare did not reveal any correlations.

Results cannot really be explained other than to assume that participants did not fully comprehend the term “glare,” especially that the majority of the sample, English is not their first language.

Table 49 Lighting Characteristics and The Dining Experience

	Comfort	Glare	Intensity	Specular	Color	Distribution	Direction	
							Table	Walls
Entrance[15]	√		dim – average *	specular	colorful radiant	complex **focused**		√
Upscale Atmosphere	√		visible, dim*		warm*			
Romantic Atmosphere	√		visible, dim*			high contrast	√	√
Dramatic Atmosphere	√				radiant	focused		√
Cozy, Peaceful, Appealing Atmosphere	√				**warm**	uniform*	√	
Energetic Atmosphere			bright, dim*	specular	colorful radiant			
Authentic Atmosphere	√							
Nostalgic Atmosphere		low						
Music and Noise[16]	√		dim*			simple focused		√
Spacious Restaurant		low						
Privacy	√		dim		warm		√	
Cleanness	√		visible	specular				
Distinctive Background								√
Iconic Elements					warm			√
Kitchen & Bar	√	low		specular		focused	√	
Photography[17]	√		bright visible	specular	colorful, radiant	high contrast. focused	√	
To Be Seen	√		**bright visible**	specular	radiant	uniformed	√	
Conversation			dim*	specular	radiant	focused	√	
Time Perception			dim*			non-uniformed		
Communicate with Server	√		visible				√	
Reading the Menu	√		bright & visible	specular		focused	√	
Food Perception [18]	√		visible	**specular**	warm radiant	focused, non-uniform*, complex*	√	

[15] Results of welcoming atmosphere and wow factor were combined.
[16] Results of Music and Noise were combined. It is indicated here as “Pleasant”
[17] Results of taking pictures of the food and taking pictures of the diners were combined in Photography
[18] Results of the 5 measure of food perception were combined in Food Perception. refer to the results chapter of this dissertation for detailed correlations.

√ indicate required highly
Bold: suggested by qualitative data and confirmed by quantitative data
* only suggested by qualitative data but was not confirmed by quantitative data

It is also important to be noted that I combined the results of visibility of lighting fixtures with brightness. The reason for that is that I think respondents treated visibility of lighting as how bright the place looked. It is a common practice in manufacturing the lighting fixtures to increase the brightness of the surface of the lighting fixture, in order to increases perception of overall brightness of the space.

Although I provided an explanation of the term specular (meaning high reflection) in the survey, it appears that respondents were confused about the term. I suppose they treated the specular term as a positive impact of lighting akin to focal glow, since both are characteristics of reflectance. However, technically speaking, specular generally has a negative connotation while focal glow has a positive connotation, but both do depend on context.

Lastly, qualitative data suggested that dim lighting can convey an energetic atmosphere, however, quantitative data was contradictory and suggested there is a correlation with bright light. I did address this in the qualitative results section (Chapter IV) that lighting distribution and color temperature can convey a different feel of atmosphere even with the same intensity (brightness). Further research is needed to confirm these ideas.

Lighting Fixtures. Investment in lighting fixtures is important in defining the lighting experience within upscale the restaurant setting. Lighting fixtures enhance the dining experience, and can be iconic of culture and style, which in turn can affect perceptions of the price and quality of the restaurant. Table (50) shows the importance for investing for each of the five types of fixtures tested in the instrument based on elements of the dining experience. The importance is based on the strength of the correlation resulted from the survey. Some considerations should be noted though:

Table 50 Lighting Fixtures and The Dining Experience

	Iconic	Authentic	Stylish	Attractive	Quality
Welcoming Atmosphere		$			
Wow	$$	$$	$$	$$	$$
Romantic Atmosphere				$$	$$
Upscale Atmosphere				$$	$$
Cozy Atmosphere				$$	$$
Peaceful Atmosphere	$$		$$	$$	$$
Appealing Atmosphere	$$		$$	$$	$$
Energetic Atmosphere			$	$	
Nostalgic Atmosphere	$	$$	$$		$$
Authentic Atmosphere		$		$$	$$
Dramatic Atmosphere	$$	$	$$	$$	$$
Spacious Restaurant					
Privacy	$	$	$$	$$	$$
Cleanness	$$		$$	$$	$$
Distinctive Background			$		
Iconic and Architectural Elements	$	$$	$		
Kitchen and Bar	$$	$$	$$	$$	$$
Food Picture	$$	$			
Diner's Picture	$$	$$		$	$
Faces at My Table					
Faces at Other Tables Clearly.				$	$
Conversation Within My Table				$	
Conversation Between Tables.			$	$	$
Perception of Time[19]		$			
Visually Communicate with The Server		$$			$$
Reading the Menu				$	$
Seeing the Food	$	$		$$	$$
Food Acceptability	$$	$	$$	$$	$$
Food Appreciation	$		$	$	$
Appetizing Food		$	$	$$	$
Attractive Food	$$	$	$	$$	$$
Fresh Food	$$	$$	$$	$$	$$
Quality Food	$	$	$$	$$	$$

$ moderate importance in lighting fixture
$$ high importance in lighting fixtures

[19] Results of waiting time; to be seated and to get the food and were combined in perception of time.

- Entrance: There was a high correlation between welcoming atmosphere and 'wow' factor with lighting fixtures. Meaning that lighting fixtures can make a pleasing and surprising impression.
- Atmosphere perceptions (including all types of atmosphere tested in the instrument): lighting fixtures can add a lot of meaning to the atmosphere perceptions. But mostly attractive and quality fixtures are the strongest and most valuable lighting fixtures that can advance the atmosphere perception.
- Spaciousness: lighting fixtures were not statistically correlated with perceptions of spaciousness of the space.
- Privacy: lighting fixtures can create privacy as suggested in the qualitative data and confirmed in the quantitative results. Light from the fixture can define a personal zone, and thus create a perception of privacy.
- Cleanliness: lighting fixtures were correlated with perceptions of cleanliness, yet I was not able to determine why.
- Kitchen and bar: lighting fixtures can bring attention to the kitchen and bar area. Investing in appropriate fixtures can draw attention to those main features of the restaurant.
- Photography: lighting fixtures showed strong correlations with food and diners' pictures. This may be due to illumination from lighting fixture provide a decent layer of light for photography or this is due to lighting fixtures look good in pictures.
- Seeing faces: lighting fixtures show no correlation with seeing faces of people. This can be explained as lighting fixture can be an obstacle to see faces of diners, especially if the fixtures were placed down close to eye level. Another explanation can be that lighting fixtures can distract the attention from people's faces.
- Food Perception**:** lighting fixtures can reflect the character of the food served, convey meaning, and create harmony.

DineLight: The Instrument

A critical component of this research involved creating and developing an instrument to measure the impact of lighting on the dining experience at upscale restaurant setting. I termed

this instrument 'DineLight'. The instrument was based off diners' perceptions of performance levels of lighting in upscale restaurant contexts. It further assesses correlations between lighting characteristics and various dimensions of the dining experience at upscale restaurants.

This instrument extends Flynn's (1979) work. Flynn (1979) suggested that there are six categories of human impressions that can be influenced or modified by lighting design: perceptual clarity, spaciousness, relaxation and tension, public versus private space, pleasantness, and spatial complexity. However, Flynn's (1979) work only measured the impact of lighting in a subjective manner, limiting this impact to perceptions of space only. On the other hand, the DineLight instrument was able to measure the impact of lighting on perceptions of atmosphere and was able to assess connections between lighting and social interaction, service perception, food perception, time perception, and even mood perception. These new ways of measuring the impact of lighting extends our understanding the impact of lighting in our daily lives.

This easily accessible instrument could encourage empirical research focusing on lighting design in hospitality literature. Additionally, DineLight provides guidelines that restaurateurs and designers can employ. These measures can help practitioners understand the DineLight dimensions, and improve the experiential value of the dining experience.

The DineLight instrument can be used to investigate the direction and the strength of the dimensions included in this measure, and show the relative importance of lighting characteristics affecting overall diner quality perceptions. A DineLight report can be created using a restaurant's recent diner base, thereby providing restaurateurs with additional understanding of their diner's perceptions and how this may impact their overall satisfaction. In addition, practitioners can use instruments' generated scores to improve previous scores or even those of their competitors. restaurateurs with multiple restaurants can compare one restaurant result with another one score. Then, they can analyze strengths and weaknesses and develop a plan to prioritize lighting implementation strategies. For example, German Osio the restaurateur who owned central bistro and local bistro. Both restaurants were similar in menu and price offering, but differed in sales. Osio can use this instrument to compare the lighting condition in both restaurants, and

accordingly could figure his problem. Thus, each time the survey is administered, improvement strategies can be refined.

DineLight can be most effective when used along with the reference tables provided, periodically to help operators track changes in diner perceptions as well as trends in lighting the restaurant. In addition, restaurateurs who are redesigning their facilities can assess diner perceptions before making any significant financial investments.

This research and resulting instrument represents one of the few exploratory studies in lighting research which examines lighting and upscale restaurant settings from a quantifiable, experiential perspective. Although the DineLight instrument generated valuable results, further testing in a controlled experiment is needed to validate and refine the instrument (as discussed in detail in Chapter 6.)

DineLight is a useful starting point to evaluate and improve the quality of lighting in upscale restaurants. It's uncomplicated and standardized structure serves as a meaningful practical framework for tracking lighting performance in upscale restaurants. I believe that this foundational work provides a step forward in the complex process of assessing diners' perceptions of the quality of lighting inside the dining area of upscale restaurants.

Summary

This chapter discussed the key results and findings of qualitative and quantitative data. Results suggest that lighting can indeed affect elements of the dining experience such as atmosphere, service, sociability, and food. Included were two tables that summarized how specific lighting characteristics impact the dining experience at upscale restaurant settings. The product of this research, the DineLight instrument serves as an easily assessable and practical tool for both researchers and those in the restaurant industry to apply to assess lighting in their prospective settings. In addition, I emphasize that this research offers a much more fruitful means of regarding lighting, not just a discrete component of atmosphere but rather as a holistic aspect that interacts with all elements of atmosphere. Such an approach may be considered novel in the field of atmospherics and lighting literature and contributes to a greater understanding of the impacts of lighting.

CHAPTER VI CONCLUSION

Overview

The central goal of this research is to understand the impact of lighting on the upscale dining experience. My research was conducted in two phases. Phase I involved qualitative data collection that focused on discovering aspects of lighting that impact the dining experience. The primary methods used were interviews and observations. Phase II involved a quantitative analysis of survey data that provided the foundation to create a lighting instrument, which I call 'DineLight'. DineLight is used to test for significant correlations between lighting and the elements of the dining experience. This chapter discusses key findings, the limitations of this study and suggestions for future research, as well as the major implications of this research.

Key Findings

The data analyzed in Chapter IV and discussed in Chapter V revealed numerous results. However, in this section only key findings are summarized. These main findings are presented in relation to the research objectives established for this research.

The qualitative phase of this research revealed that the dining experience is comprehensive, and begins as soon as diners' walk through the door. The dining experience extends beyond simply satisfying hunger, and instead should be viewed a phenomenon that engages all the senses. Lighting impacts the four main aspects of the dining experience: atmosphere, service, sociality, and food. Light was also found to be used to 'stage' the dining experience by drawing attention to key features of the restaurant concept, such as focusing light on the table, or the show kitchen, thereby creating visual hierarchy in the space. Qualitative results suggest the following as important connections between lighting and the dining experience:

- Lighting can make entrance welcoming and attractive by diming and focusing the light, and providing good quality lighting (i.e. radiant and colorful)
- Lighting and music should be in harmony with each other: Loud music seems to be best matched with dimmed light, and vice versa.
- Lighting can change the mood of the restaurant, and thus bring flexibility to satisfy different target markets. This can be achieved using lighting controls.

- Lighting can affect the perception of the time, however, there is still no robust criteria on how to achieve that.
- Lighting should be modified based on the target market. For example, lighting levels can be adjusted according to general age of diners. The target market can vary during the day and day of the week, and accordingly lighting.
- Lighting can affect food perception in terms of food appreciation, food acceptability, food quality, freshness, attractiveness, and appetite.
- Food acceptability is a common term used in Gastronomy Literature to evaluate the impact of context on food. However, food appreciation is a term I introduced in this research to evaluate the impact of lighting on food, bringing the appraisal in the intention.
- Lighting fixtures can convey the character and philosophy of the food.
- Lighting fixtures can draw attention to the bar and open kitchen (or show kitchen) area, which increases perceived levels of diners' involvement.
- Lighting fixtures can create privacy in the dining space by defining personal zones.
- Two main lighting approaches were identified for restaurant lighting; the focused beam, and the background. The focused beam is used mainly if the food is the most important element of the dining experience; whereas, lighting the background is for restaurants that focus more on atmosphere.
- In terms of background lighting, lighting perimeter walls can boost atmosphere and mood perception.
- Focusing the lighting on the table can increase food acceptability, improve the reading of the menu, increase intimacy and create a romantic feel, facilitate conversation between the diners at the same table, as well as visual communication with servers.
- Being able to take good photos of the food appeared as an important new consideration in terms of lighting. This makes the dining experience more 'complete,' as it allows the diner to connect this individual experience to the greater experience of social media. Lighting intensity can be adjusted with portable light or flash on camera but lighting quality over the table should be consideration (high CRI).

Limitations and Suggestions for Future Research

As with every research, this research which took an exploratory approach to design research does have some limitations. For example, the research started with qualitative data collection with explorative nature, whereas the results cannot be generalized. The second phase attempted to confirm to and generalize the results of the qualitative phase. While this was the goal, not all the findings were able to be covered and tested. Overall, this research presents more of an exploratory research of the topic of restaurant lighting to examine how lighting affects dimensions of experience. Further studies replicating this framework but with larger sample sizes, should be done to confirm results seen in this research.

Although the qualitative sample of participants I interviewed were representative of various international locales, it perhaps does not provide a truly global representative view since the ethnicity of the majority of respondents was Middle Eastern. In addition, this sample was also dominated by men. It should be acknowledged that the sample population may not be an entirely accurate representation of the general population (Creswell, 2002a) .

In terms of limitations for the quantitative phase, there were challenges regarding sample and sampling strategy, as well as regarding the focus and the structure of the DineLight instrument. The sample size used in the quantitative phase of this study can be deemed acceptable when compared to other research previously done in the area of lighting perception (Flynn, 1979) and instrument development (Ryu & Jang, 2008). However, I used a relatively high number of items for the DineLight instrument, and thus increasing the sample size could very well provide more reliable data. Future research could apply the same model but increase sample size. This would also provide the opportunity to employ different statistical tests such as factor analysis and regression, which may yield more detailed and nuanced results.

This research and the DineLight instrument specifically, were developed for the upscale restaurant context, therefore I would caution against direct application to other contexts, such as fast food restaurants. However, future research could use this instrument across a variety of different restaurants settings, if the measure was further refined. Administrating the measures (with perhaps some slight adaptation) in other restaurant settings (e.g., fast-food restaurants,

casual restaurants) would be useful to determine the generalizability of the model, and test lighting theories drawn from this model.

The DineLight instrument also did not include any measures to assess arousal or emotion, because those aspects of experience were beyond the scope of this particular research. This would, however, be an interesting avenue of inquiry to explore how lighting helps a restaurant achieve particular emotion-based objectives, and at what cost.

Future researchers may wish to use the DineLight instrument to measure the interaction of lighting and the various dining experience components on important dining outcomes, such as diner's satisfaction, approach and avoidance behaviors, and return visits. A direct link between atmosphere and outcomes such as satisfaction and behavioral intentions can be seen in several studies (Chang, 2000; Chebat & Michon, 2003). These studies suggest that diners who are strongly motivated by the social aspects are more likely to be satisfied, return to the restaurant, and engage in behaviors such as talking positively about their experience. Atmosphere was also found to be a direct indicator of satisfaction, which demonstrates the crucial role atmosphere can play in the restaurant experience (see Chang, 2000). Given these research findings, the DineLight instrument could provide restaurateurs with another tool to manage satisfaction and positive approach behavior.

Another potential limitation was that the actual lighting conditions in the restaurant chosen by diners was unknown to me as a researcher. Evaluations of lighting were limited to diners' perceptions. While it is a goal of this research to examine diners' perceptions, the in ability for diners to understand the actual meaning of more technical terms such as glare or specular may have cause some confusion in the data. In the future, it would be beneficial to incorporate a controlled or naturalistic experiment framework where the condition of light is known to the research and even compared to diners' perceptions.

The research framework offered took a new perspective on lighting and the upscale dining experience by providing a focused picture of how lighting can affect the different aspects of the dining experience. However, a detailed examination of moderators and outcomes (moderators being age and gender, emotions, and outcomes being satisfaction and behavioral

intentions) was beyond the scope of this particular research study. The mediating role of demographic factors (age, and gender specifically), of the sample population have not been explored statistically in any great detail. Only general observations in qualitative phase were made about age but other further examinations into factors such as gender, educational level, and ethnicity would prove valuable. Future research could include these demographic moderators in exploring the effect of lighting characteristics on the different aspects of the dining experience.

Finally, one last aspect to recognize as a potential limitation was that participants in this study (both qualitative and quantitative phases) were not asked about or tested for color blindness. Research done by (Park, 2003) tested all respondents for color blindness prior to their experiment and excluded the respondents that tested positive for color blindness. Due to the nature of the quantitative phase in particular, it was difficult to actually test for color blindness among participants, therefore it is important to note how potential color blindness may affect research results.

Research and Practical Implications

This research provides insights into lighting as an atmospheric tool to elevate the upscale dining experience. It also highlights the interaction between lighting and other elements of the dining experience within upscale restaurant context. Dining out at restaurants constitutes a significant market-share, therefore those in the field of hospitality should be aware of the many factors (such as lighting) that can encourage diners to engage in this experiential phenomenon. As Alain Ducasse, an outstanding French Chef, stated:

> *Food is one part of the experience. And it has to be somewhere between 50 to 60 percent of the dining experience. But the rest counts as well: the mood, the atmosphere, the music, the feeling, the design, the harmony between what you have on the plate and what surrounds the plate.*

This research affirms that diners seem to perceive the dining experience under various lighting conditions, differently. These findings provide insight into the specific lighting characteristics and how those characteristics interact with other elements of the dining experience. This offers valuable understandings of the role of lighting in specific instances and

how lighting affects the overall atmosphere in hopes of engaging further research in this field of hospitability research.

Adopting two-phase methodology to incorporate both qualitative and quantitative methods proved to be quite successful. Conducting interviews and observations on lighting provided the opportunity to explore relatively unexamined ideas regarding the role of lighting and its impact on the dining experience. Interviews allowed participants to explain their views and allowed me as a researcher to analyze how they constructed meaning in regard to this. Interview data gathered from those active in this industry was valuable as it provided an emic foundation for constructing the DineLight instrument. This methodology can be used in other studies of lighting design for other types of spaces such as work spaces, healthcare, or educational facilities.

Professionals involved in the design of restaurants can benefit from the insights provided in this research. For instance, lighting characteristics should vary depending on the goal and nature, or culture and style of the restaurant, menu offerings, and the target market. The two tables (Table 49 and Table 50) generated in this research can be used as a valuable reference to guide the lighting design decisions. These decisions can then be assessed through the use of DineLight instrument.

Design practitioners and design educators can apply the various lighting techniques examined in this research regarding lighting intensity (brightness), color temperature, spatial distribution of lighting as factors for consideration. All of these characteristics are summarized in (Table 49 and Table 50). These provide excellent parameters for successfully executing the use of many variations based on color designation of the tableware, lighting perception and preferences. Findings from this research can be applied to restaurant lighting techniques to elevate the perception of the dining experience. Furthermore, it is important for designers and restaurateurs to be aware of what image they are trying to convey to potential diners. This objective should drive design decisions and the design process, and also their lighting choices.

In conclusion, this study found that lighting can indeed be an effective tool in elevating the dining experience at upscale context. My research also offers insights into how different lighting characteristics impact the dining experience, while also providing an innovative, new

assessment tool, DineLight. These relevant findings and models are accessible not only to academics but also designers in the field of hospitality.

REFERENCES

Alexander, S. (2014). Restaurant Design: Sometimes Great Food and Service Just Aren't Enough. Retrieved from http://www.restaurantreport.com/departments/biz_eight_design_tips.html

Altman, I. (1975). The Environment and Social Behavior: Privacy, Personal Space, Territory, and Crowding.

Andersson, T. D., & Mossberg, L. (2004). The dining experience: do restaurants satisfy customer needs? *Food Service Technology*, *4*(4), 171–177.

Areni, C. S., & Kim, D. (1994). The influence of in-store lighting on consumers' examination of merchandise in a wine store. *International Journal of Research in Marketing*, *11*(2), 117–125.

Arnold, M. J., & Reynolds, K. E. (2003). Hedonic shopping motivations. *Journal of Retailing*, *79*(2), 77–95.

Aronson, J. (1995). A pragmatic view of thematic analysis. *The Qualitative Report*, *2*(1), 1–3.

Babin, B. J., Darden, W. R., & Griffin, M. (1994). Work and/or fun: measuring hedonic and utilitarian shopping value. *Journal of Consumer Research*, 644–656.

Babin, B. J., Lee, Y.-K., Kim, E.-J., & Griffin, M. (2005). Modeling consumer satisfaction and word-of-mouth: restaurant patronage in Korea. *Journal of Services Marketing*, *19*(3), 133–139.

Babin, L. A., & Burns, A. C. (1998). A modified scale for the measurement of communication-evoked mental imagery. *Psychology & Marketing*, *15*(3), 261–278.

Baker, J. (1986). The role of the environment in marketing services: The consumer perspective. *The Services Challenge: Integrating for Competitive Advantage*, *1*(1), 79–84.

Baker, J., Grewal, D., & Parasuraman, A. (1994). The influence of store environment on quality inferences and store image. *Journal of the Academy of Marketing Science*, *22*(4), 328–339.

Berry, L. L., Zeithaml, V. A., & Parasuraman, A. (1985). Quality counts in services, too. *Business Horizons*, *28*(3), 44–52.

Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. *The Journal of Marketing*, 57–71.

Booms, B. H., & Bitner, M. J. (1982). Marketing services by managing the environment. *Cornell Hotel and Restaurant Administration Quarterly*, *23*(1), 35–40.

Booth, A., Carroll, C., Ilott, I., Low, L. L., & Cooper, K. (2013). Desperately Seeking Dissonance Identifying the Disconfirming Case in Qualitative Evidence Synthesis. *Qualitative Health Research*, *23*(1), 126–141.

Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. sage.

Boyce, P. R. (2014). *Human factors in lighting*. Crc Press.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Campbell, D. T., & Russo, M. J. (1999). *Social experimentation* (Vol. 1). Sage Publications, Inc.

Caplan, P. (1997). Approaches to the study of food, health and identity. *Food, Health and Identity*, 1–31.

Capstick, L. (2011). *Restaurants: Market Report Plus 2011*. Presented at the Keynote. Retrieved from www.keynote.co.uk

Chang, K. (2000). The impact of perceived physical environments on customers' satisfaction and return intentions. *Journal of Professional Services Marketing*, *21*(2), 75–85.

Chebat, J.-C., & Michon, R. (2003). Impact of ambient odors on mall shoppers' emotions, cognition, and spending: A test of competitive causal theories. *Journal of Business Research*, *56*(7), 529–539.

Chow, I. H., Lau, V. P., Lo, T. W., Sha, Z., & Yun, H. (2007). Service quality in restaurant operations in China: Decision-and experiential-oriented perspectives. *International Journal of Hospitality Management*, *26*(3), 698–710.

Clark, M. A., & Wood, R. C. (1999). Consumer loyalty in the restaurant industry: a preliminary exploration of the issues. *British Food Journal*, *101*(4), 317–327.

Creswell, J. W. (1999). Mixed-method research: Introduction and application. *Handbook of Educational Policy*, 455–472.

Creswell, J. W. (2002a). Educational research: Planning, conducting, and evaluating quantitative. *New Jersey: Upper Saddle River*.

Creswell, J. W. (2002b). Educational research: Planning, conducting, and evaluating quantitative. *New Jersey: Upper Saddle River*.

Creswell, J. W. (2012). *Qualitative inquiry and research design: Choosing among five approaches*. Sage.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Creswell, J. W., & Clark, V. L. P. (2011). *Designing and Conducting Mixed Methods Research*. SAGE.

Creswell, J. W., Goodchild, L. F., & Turner, P. P. (1996). Integrated qualitative and quantitative research: Epistemology, history, and designs. *HIGHER EDUCATION-NEW YORK-AGATHON PRESS INCORPORATED-*, *11*, 90–136.

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. *Handbook of Mixed Methods in Social and Behavioral Research*, 209–240.

Dalby, A. (2003). *Food in the Ancient World from A to Z*. Psychology Press.

De Silva, D., Elliott, C., & Simmons, R. (2013). Restaurant wars: spatial competition in UK restaurants.

Denzin, N. K., & Lincoln, Y. S. (2011). *The SAGE handbook of qualitative research*. Sage.

DePaulo, P. (2000). Sample size for qualitative research. *Quirks Marketing Research Review*, *1202*.

Dubé, L., & Renaghan, L. M. (2000). Creating visible customer value. *Cornell Hospitality Quarterly*, *41*(1), 62.

Ducasse, A. (n.d.). Ducasse Quotes. (n.d.). BrainyQuote.com. Retrieved October 19, 2017, from BrainyQuote.com Web site: https://www.brainyquote.com/quotes/quotes/a/alainducas672350.html. Retrieved from https://www.brainyquote.com/quotes/quotes/a/alainducas672350.html

Edwards, J. S., Meiselman, H. L., Edwards, A., & Lesher, L. (2003). The influence of eating location on the acceptability of identically prepared foods. *Food Quality and Preference*, *14*(8), 647–652.

Evans, J. R., & Berman, B. (1995). *Principles of marketing*. Prentice Hall.

Finkelstein, J. (1989). *Dining out: a sociology of modern manners.* Polity Press.

Flynn, J. E. (1988). Lighting-design decisions as interventions in human visual space. *Environmental Aesthetics: Theory, Research, and Application*, 156–172.

Flynn, J. E., Hendrick, C., Spencer, T., & Martyniuk, O. (1979). A guide to methodology procedures for measuring subjective impressions in lighting. *Journal of the Illuminating Engineering Society*, *8*(2), 95–110.

Fowler Jr, F. J. (2013). *Survey research methods*. Sage publications.

Gay, L. R., Mills, G. E., & Airasian, P. W. (2011). *Educational research: Competencies for analysis and applications*. Pearson Higher Ed.

Gibson, J. J. (1971). The information available in pictures. *Leonardo*, 27–35.

Glanville, P., & Young, H. (2002). *Elegant Eating: Four hundred years of dining in style*. V & A Publications.

Glanz, K., Basil, M., Maibach, E., Goldberg, J., & Snyder, D. A. N. (1998). Why Americans eat what they do: taste, nutrition, cost, convenience, and weight control concerns as influences on food consumption. *Journal of the American Dietetic Association*, *98*(10), 1118–1126.

Goldman, K. (1993). Concept selection for independent restaurants. *The Cornell Hotel and Restaurant Administration Quarterly*, *34*(6), 59–72.

Gordon, R. T., & Brezinski, M. H. (2016). *The complete restaurant management guide*. Routledge.

Green, D. M., & Butts, J. S. (1945). Factors affecting acceptability of meals served in the air. *Journal of the American Dietetic Association*, *21*, 415–419.

Greene, J. C., & Caracelli, V. J. (1997). *Advances in mixed-method evaluation: the challenges and benefits of integrating diverse paradigms.* Jossey-Bass Publishers.

Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, *11*(3), 255–274.

Gronroos, C. (1985). Internal marketing-theory and practice. *Services Marketing in a Changing Environment, American Marketing Association, Chicago, IL*, 41–7.

Grove, S. J., & Fisk, R. P. (1992). The service experience as theater. *ACR North American Advances*.

Guba, E. G., & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *ECTJ*, *30*(4), 233–252.

Gunasekeran, R. (1992). Choice of Up-market (Fine Dining) Restaurants by Young Professional and Business People. National University of Singapore School of Business Management. *Unpublished Cited in Mehta, SS and Maniam, B.(2002) Marketing Determinants of Customers' Attitudes Towards Selecting a Restaurant. Academy of Marketing Studies Journal*, *6*(1), 27–44.

Gustafsson, I.-B., Öström, Å., Johansson, J., & Mossberg, L. (2006). The Five Aspects Meal Model: a tool for developing meal services in restaurants. *Journal of Foodservice*, *17*(2), 84–93.

Hansen, K. V., Jensen, Ø., & Gustafsson, I.-B. (2005). The meal experiences of á la carte restaurant customers. *Scandinavian Journal of Hospitality and Tourism*, *5*(2), 135–151.

Harper, D. (2002). Talking about pictures: A case for photo elicitation. *Visual Studies*, *17*(1), 13–26.

Harris, R., Harris, K., & Baron, S. (2003). Theatrical service experiences: Dramatic script development with employees. *International Journal of Service Industry Management*, *14*(2), 184–199.

Heide, M., & Grønhaug, K. (2009). Key factors in guests' perception of hotel atmosphere. *Cornell Hospitality Quarterly*, *50*(1), 29–43.

Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: emerging concepts, methods and propositions. *The Journal of Marketing*, 92–101.

Hoffmann, G., Gufler, V., Griesmacher, A., Bartenbach, C., Canazei, M., Staggl, S., & Schobersberger, W. (2008). Effects of variable lighting intensities and colour temperatures on sulphatoxymelatonin and subjective mood in an experimental office workplace. *Applied Ergonomics*, *39*(6), 719–728.

Holbrook, M. B. (2000). The millennial consumer in the texts of our times: Experience and entertainment. *Journal of Macromarketing*, *20*(2), 178–192.

Holbrook, M. B., & Hirschman, E. C. (1982). The experiential aspects of consumption: Consumer fantasies, feelings, and fun. *Journal of Consumer Research*, *9*(2), 132–140.

Hopkinson, R. G., Petherbridge, P., & Longmore, J. (1966). *Daylighting*. Heinemann.

Huang, R.-H., Lee, L., Chiu, Y.-A., & Sun, Y. (2015). Effects of correlated color temperature on focused and sustained attention under white LED desk lighting. *Color Research & Application*, *40*(3), 281–286.

Hyun, S. S. (2010). Predictors of relationship quality and loyalty in the chain restaurant industry. *Cornell Hospitality Quarterly*, *51*(2), 251–267.

Jang, S. S., & Namkung, Y. (2009). Perceived quality, emotions, and behavioral intentions: Application of an extended Mehrabian–Russell model to restaurants. *Journal of Business Research*, *62*(4), 451–460.

Jensen, R. (1999). *The dream society: How the coming shift from information to imagination will transform your business*. McGraw-Hill New York.

Jordan, A., Schwartz, E., & McGhie-Richmond, D. (2009). Preparing teachers for inclusive classrooms. *Teaching and Teacher Education*, *25*(4), 535–542.

Kim, I., Jeon, S. M., & Hyun, S. S. (2011). The role of effective service provider communication style in the formation of restaurant patrons' perceived relational benefits and loyalty. *Journal of Travel & Tourism Marketing*, *28*(7), 765–786.

Kim, W. G., Lee, Y.-K., & Yoo, Y.-J. (2006). Predictors of relationship quality and relationship outcomes in luxury restaurants. *Journal of Hospitality & Tourism Research*, *30*(2), 143–169.

King, S. C., Meiselman, H. L., Hottenstein, A. W., Work, T. M., & Cronk, V. (2007). The effects of contextual variables on food acceptability: A confirmatory study. *Food Quality and Preference*, *18*(1), 58–65.

Kotler, P. (1973). Atmospherics as a marketing tool. *Journal of Retailing*, *49*(4), 48–64.

Ladhari, R., Brun, I., & Morales, M. (2008). Determinants of dining satisfaction and post-dining behavioral intentions. *International Journal of Hospitality Management*, *27*(4), 563–573.

Leitzmann, C., & Oltersdorf, U. (1985). Introductory remarks and definitions. *EURO-NUT Report*, *7*, 5–11.

Lenth, R. V. (2001). Some practical guidelines for effective sample size determination. *The American Statistician*, *55*(3), 187–193.

Lin, I. Y. (2004a). Evaluating a servicescape: the effect of cognition and emotion. *International Journal of Hospitality Management*, *23*(2), 163–178.

Lin, I. Y. (2004b). Evaluating a servicescape: the effect of cognition and emotion. *International Journal of Hospitality Management*, *23*(2), 163–178.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75). Sage.

Locke, L., Spirduso, W. W., & Silverman, S. (2000). *Research proposals that work*. New York: Sage.

Lovelock, C. H. (1981). Why marketing management needs to be different for services.

Magnini, V. P., & Parker, E. E. (2009). The psychological effects of music: Implications for hotel firms. *Journal of Vacation Marketing*, *15*(1), 53–62.

Mano, H., & Oliver, R. L. (1993). Assessing the dimensionality and structure of the consumption experience: evaluation, feeling, and satisfaction. *Journal of Consumer Research*, *20*(3), 451–466.

Maxcy, S. J. (2003). Pragmatic threads in mixed methods research in the social sciences: The search for multiple modes of inquiry and the end of the philosophy of formalism. *Handbook of Mixed Methods in Social and Behavioral Research*, 51–89.

McCracken, G. (1988). *The long interview* (Vol. 13). Sage.

Mehrabian, A., & Russell, J. A. (1974a). A verbal measure of information rate for studies in environmental psychology. *Environment and Behavior*, *6*(2), 233.

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

Meiselman, H. L. (2008). Dimensions of the meal. *Journal of Foodservice*, *19*(1), 13–21.

Meiselman, H. L., Hirsch, E. S., & Popper, R. D. (1988). Sensory, hedonic and situational factors in food acceptance and consumption. *Food Acceptability*, 77–87.

Meiselman, H. L., Johnson, J. L., Reeve, W., & Crouch, J. E. (2000). Demonstrations of the influence of the eating environment on food acceptance. *Appetite*, *35*(3), 231–237.

Mertens, D. M. (2003). Mixed methods and the politics of human research: The transformative-emancipatory perspective. *Handbook of Mixed Methods in Social and Behavioral Research*, 135–164.

Mertler, C. A. (2015). *Introduction to educational research*. SAGE Publications.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.

Miller, D. (2000). Qualitative research course packet. *University of Nebraska-Lincoln*.

Milliman, R. E. (1986). The influence of background music on the behavior of restaurant patrons. *Journal of Consumer Research*, 286–289.

Moghaddam, F. M., Walker, B. R., & Harre, R. (2003). Cultural distance, levels of abstraction, and the advantages of mixed methods. *Handbook of Mixed Methods in Social and Behavioral Research*, 111–134.

Morse, J. M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*, *40*(2), 120–123.

Muller, C. C., & Woods, R. H. (1994). An expanded restaurant typology. *The Cornell Hotel and Restaurant Administration Quarterly*, *35*(3), 27–37.

Namkung, Y., & Jang, S. (2007). Does food quality really matter in restaurants? Its impact on customer satisfaction and behavioral intentions. *Journal of Hospitality & Tourism Research*, *31*(3), 387–409.

National Restaurant Association. (2017). *Facts at a Glance*. Retrieved from http://www.restaurant.org/News-Research/Research/Facts-at-a-Glance

O'Dell, T., & Billing, P. (2005). *Experiencescapes: tourism, culture and economy*. Copenhagen Business School Press DK.

Park, N. (2003). Indoor lighting perceptions and preferences: A cross-cultural comparison.

Parsa, H. G., Self, J. T., Njite, D., & King, T. (2005). Why restaurants fail. *Cornell Hotel and Restaurant Administration Quarterly*, *46*(3), 304–322.

Patel, M. X., Doku, V., & Tennakoon, L. (2003). Challenges in recruitment of research participants. *Advances in Psychiatric Treatment*, *9*(3), 229–238.

Patton, M. Q. (2015). *Qualitative Research & Evaluation Methods* (Forth Edition). Sage Pupblications, inc.

Peryam, D. R., & Pilgrim, F. J. (1957). Hedonic scale method of measuring food preferences. *Food Technology*.

Pilgrim, F. J. (1957). The components of food acceptance and their measurement. *The American Journal of Clinical Nutrition*, *5*(2), 171–175.

Pine, B. J., & Gilmore, J. H. (1998). Welcome to the experience economy. *Harvard Business Review*, *76*, 97–105.

Pitte, J.-R. (1999). The rise of the restaurant. *Food: A Culinary History from Antiquity to the Present*, 471–80.

Raajpoot, N. A. (2002). TANGSERV: A multiple item scale for measuring tangible quality in foodservice industry. *Journal of Foodservice Business Research*, *5*(2), 109–127.

Reimer, A., & Kuehn, R. (2005). The impact of servicescape on quality perception. *European Journal of Marketing*, *39*(7/8), 785–808.

Robert, D., & John, R. (1982). Store atmosphere: an environmental psychology approach. *Journal of Retailing*, *58*, 34–57.

Robson, S. K. (1999). Turning the tables. *Cornell Hospitality Quarterly*, *40*(3), 56.

Russell, J. A., & Pratt, G. (1980). A description of the affective quality attributed to environments. *Journal of Personality and Social Psychology*, *38*(2), 311.

Ryu, K., & Jang, S. (2008). DINESCAPE: A scale for customers' perception of dining environments. *Journal of Foodservice Business Research*, *11*(1), 2–22.

Ryu, K., & Jang, S. S. (2007). The effect of environmental perceptions on behavioral intentions through emotions: The case of upscale restaurants. *Journal of Hospitality & Tourism Research*, *31*(1), 56–72.

Schechner, R. (1977). *Performance Theory*. London: Routledge.

Siguaw, J. A., Mattila, A., & Austin, J. R. (1999). The brand-personality scale. *The Cornell Hotel and Restaurant Administration Quarterly*, *40*(3), 48–5.

Spang, R. L. (2000). *The invention of the restaurant: Paris and modern gastronomic culture*. Harvard University Press Cambridge, MA.

Stevens, P., Knutson, B., & Patton, M. (1995). DINESERV: A tool for measuring service quality in restauran. *Cornell Hospitality Quarterly*, *36*(2), 56.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Procedures and techniques for developing grounded theory*. Thousand Oaks, CA: Sage.

Sulek, J. M., & Hensley, R. L. (2004). The relative importance of food, atmosphere, and fairness of wait the case of a full-service restaurant. *Cornell Hotel and Restaurant Administration Quarterly*, *45*(3), 235–247.

Summers, T. A., & Hebert, P. R. (2001). Shedding some light on store atmospherics: influence of illumination on consumer behavior. *Journal of Business Research*, *54*(2), 145–150.

Susskind, A. M., & Chan, E. K. (2000). How restaurant features affect check averages: a study of the Toronto restaurant market. *The Cornell Hotel and Restaurant Administration Quarterly*, *41*(6), 56–63.

Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of Retailing*, *77*(2), 203–220.

Swinyard, W. R. (1993). The effects of mood, involvement, and quality of store experience on shopping intentions. *Journal of Consumer Research*, *20*(2), 271–280.

Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social & behavioral research*. Thousand Oaks [etc.]: Sage.

Tesch, R. (2013). *Qualitative research: Analysis types and software*. Routledge.

Turley, L. W., & Milliman, R. E. (2000). Atmospheric effects on shopping behavior: a review of the experimental evidence. *Journal of Business Research*, *49*(2), 193–211.

Turner, V. (1974). Social dramas and ritual metaphors. *Dramas, Fields and Metaphors: Symbolic Action in Human Society*, 23–59.

Vogels, I. (2008). Atmosphere metrics. In *Probing experience* (pp. 25–41). Springer.

w Creswell, J. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications, Incorporated.

Wakefield, K. L., & Blodgett, J. G. (1996). The effect of the servicescape on customers' behavioral intentions in leisure service settings. *Journal of Services Marketing*, *10*(6), 45–61.

Wakefield, K. L., & Blodgett, J. G. (1999). Customer response to intangible and tangible service factors. *Psychology & Marketing*, *16*(1), 51–68.

Walker, J. R. (2015). *Exploring the Hospitality Industry, 2/e*. Pearson Education India.

Wall, E. A., & Berry, L. L. (2007a). The combined effects of the physical environment and employee behavior on customer perception of restaurant service quality. *Cornell Hotel and Restaurant Administration Quarterly*, *48*(1), 59–69.

Wall, E. A., & Berry, L. L. (2007b). The combined effects of the physical environment and employee behavior on customer perception of restaurant service quality. *Cornell Hotel and Restaurant Administration Quarterly*, *48*(1), 59–69.

Wang, C., & Burris, M. A. (1994). Empowerment through photo novella: Portraits of participation. *Health Education & Behavior*, *21*(2), 171–186.

Wansink, B. (2004). Environmental factors that increase the food intake and consumption volume of unknowing consumers*. *Annu. Rev. Nutr.*, *24*, 455–479.

Wansink, B. (2007). *Mindless eating: Why we eat more than we think*. Bantam.

Wansink, B., & Van Ittersum, K. (2012). FAST FOOD RESTAURANT LIGHTING AND MUSIC CAN REDUCE CALORIE INTAKE AND INCREASE SATISFACTION 1, 2. *Psychological Reports*, *111*(1), 228–232.

Warde, A., & Martens, L. (2000). *Eating out: Social differentiation, consumption and pleasure*. Cambridge University Press.

Wood, R. C. (1994). Dining out on sociological neglect. *British Food Journal*, *96*(10), 10–14.

Zaichkowsky, J. L. (1985). Measuring the involvement construct. *Journal of Consumer Research*, 341–352.

APPENDIX

APPENDIX A

INSTITUTIONAL REVIEW BOARD RESEARCH OF HUMAN SUBJECTS APPROVAL

ASU Knowledge Enterprise Development

EXEMPTION GRANTED

Michael Kroelinger
The Design School
480/965-5561
MICHAEL.KROELINGER@asu.edu

Dear Michael Kroelinger:

On 10/11/2016 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Lighting and The Dining Experience: An Exploratory Study for Instrument Development
Investigator:	Michael Kroelinger
IRB ID:	STUDY00004964
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Dalal INTERVIEW PROTOCOL.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • HRP-502c%20-%20TEMPLATE%20CONSENT%20DOCUMENT%20-SHORT%20FORM.pdf, Category: Recruitment Materials; • HRP-503a-TEMPLATE_PROTOCOL_SocialBehavioralV02-10-15.docx, Category: IRB Protocol; • DALAL ALSHARHAN PROPOSAL for IRB OCT.pdf, Category: Other (to reflect anything not captured above); • Recruitement .pdf, Category: Recruitment Materials;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 10/11/2016.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Dalal Alsharhan
Dalal Alsharhan

APPENDIX B

INTERVIEW PROTOCOL

INTRODUCTIONS

Hello, I am Dalal Alsharhan, a co-investigator of this study. I am a graduate student, in the PhD of Design, Environments, and the Arts program. This interview is conducted to fulfill the research work for my PhD Dissertation. You are selected because we believe your background and experience is relevant to our research project and your input will add to the richness of information we are looking for. I will ask you certain questions about your dining experience in upscale restaurants and the role of atmosphere/ambiance in creating this experience.

GUIDELINES

- No right or wrong answers, only differing point of view.
- We are audio recording.
- Rules for cellular phone if applicable. For example: we as that you turn off your phone. If you cannot and if you must respond to a call, please before you do so, ask the interviewer to stop recording

TO START WITH

- Do you want to maintain confidentiality?
    - If no, please, can you introduce your name, age, country, educational background, and experience/career background?
    - If yes, please, can you introduce your educational background, and experience/career background?
- How long did you work in your field? (this question will differ based on subject category (Diners, bloggers, designers, developers, restaurants owners, restaurant servers and restaurants managers)?

QUESTIONS

From now, whatever questions I would be asking it would be based on upscale restaurant. Please answer them in relation to your upscale dining perception, preference, and behavior

BACKGROUND OF UPSCALE RESTURANTS VISISTS

- How often do you dine in upscale restaurants?
- What are the purposes of your dining out at upscale restaurants? (Examples: Business or Leisure)
- Why do you dine out that much frequently? Why do you dine out?
- How would you describe your enjoyment in the dining experience at upscale restaurants?
- What you are looking for when you dine out? (Examples: satisfying hunger, social connection/status, trying new experiences, others to add)?
- What do you enjoy the most in dining out at upscale restaurant? and Why?
- What aspects that matters to you when you dine out

THE IDEAL DINING EXPERIENCE

- What is your preferred upscale restaurant?
- Why is it your preferred one?
- Can you describe its atmosphere/ambiance?

ATMOSPHERE AND DINING

- Can you explain what the “ambiance” of a restaurant mean to you?
- Do you think the atmosphere/ambiance can affect the dining experience? How?
- When does it affect it positively? How?
- When does it affect it negatively? and how?
- How atmosphere/ambiance factors inside the restaurant, like smell of food or the restaurant itself, the décor, the music played or noise, or the lighting is important to you and shape your dining experience?
- How do you think atmosphere/ambiance can affect food quality perception?
- How do you think atmosphere/ambiance can affect price perception?
- How do you think atmosphere/ambiance can affect service quality perception?
- What do you think the most effective element in the atmosphere/ambiance that can affect the dining experience?

PHOTO ELICITATION

- If the subject provides the picture:
    - Do you have a picture of your preferred upscale restaurant?
    - Can you describe the atmosphere/ambiance of this space?
    - What do you like and dislike about it? And Why?
    - What would you change about it?
    - How this atmosphere/lighting situation can affect your mood and reactions?
- If the researcher provides the picture:
    - Would you dine in this restaurant, or not? and why?
    - Can you describe the atmosphere/ambiance in this picture?
    - What do you like and dislike about it?
    - Do you think the atmosphere/ambiance in this picture can affect your mood while dining? How?
    - Can you describe the lighting in this picture?
    - What do you like about the lighting in this picture?
    - What do you dislike about lighting in this picture’?
    - What would you change in the lighting situation in this picture?

- How do you think that the lighting in this picture can affect your mood or behavior?

LIGHTING CHARASTERISTICS

- Going back to your preferred upscale restaurant, can you describe its lighting?
- Do you think lighting can affect your dining experience?
- How lighting can shape your dining experience?
- Can you describe your preferred lighting in upscale restaurant?
- What is your preferred level of brightness in upscale restaurant and why?
- Do you pay attention to the color of light?
- What do you think of the color of light (color temperature)? How you think if affects your dining experience?
- Can you remember a situation where lighting really bothered you in an upscale restaurant? What exactly bothered you? Can you describe it?
- How do you think light can affect your mood/emotions while dining?
- How do you think mood and light are related in upscale restaurant context? What relationship do they share?
- How do you think light can affect your behavior while dining?
- How do you think light can affect your appetite while dining?
- How do you think brightness can affect your attraction and attention in a restaurant? in a case of you walked by? And in a case if you are dining in?
- There has been a conventional association of brightness of light, like low brightness is for luxury and high-quality spaces; high-brightness/intensity lighting is for low-end or fast-food restaurants. Do you agree with this kind of a conventional association? And why?
- How do you think that “intensity/brightness” of the light has an effect on subjective (your) impression of food quality, price perception, and service quality in an upscale restaurant context?
- How do you think the distribution of light can affect your dining experience?
- What about daylight?

THE EXPEREINCE

- Of what we have discussed, would lighting be a factor affecting your decision to dine in a restaurant? either positively or negatively? how?
- How do you think you are paying for the dining experience?
- How do you think lighting can be part of this dining experience?
- How do you think lighting can push you to eat more or less? How? Or How do you think lighting can affect your appetite?

- How you think that lighting can help you socialize more or less in upscale restaurant setting?
- What about lighting that attract you in an upscale restaurant setting?
- How does lighting affect your reactions?
- In a dining experience; what do you think more effective in creating a mood or taking attentions: brightness vs. color temperature vs light distribution? And why?

CATEGORY BASED QUESTIONS
In addition to the above questions, the below questions are prepared for each category of subjects:

DESIGN PROCESS (For architects, Interior Designers, and Lighting Designers)
- How many restaurants did you design?
- How designing upscale restaurant is different than any other retail or service space? and why?
- What do you consider when designing lighting for upscale restaurant?
- How do you start your design process?
- Can you show me examples of your work for upscale restaurants?
- How do you evaluate it now?
- Can you describe your concept for lighting design and explain what you were trying to achieve?

FOR RESTAURANT SERVERS
- Can lighting affect your work performance either positively or negatively? How?
- Do you hear any complains about lighting from diners? Can you tell us about these complains?
- After being immersed in the restaurant environment, do you face any problems with lighting? Can you tell us about it?
- Do you face issues when you transit/walk from kitchen (high brightness) to the dining hall low brightness?
- How do you think designers should solve this problem?

FOR RESTAURANT AND FOOD BLOGGERS
- What are the goals of people when they go to upscale restaurants? what do they look for?
- What do you think restaurateur's/restaurant owners try to provide to attract diners?
- What do you think the trend now in atmosphere/ambiance? What people look for?
- What is the trend for lighting?

- How can atmosphere/ambiance shape/impact the dining experience? How can atmosphere/ambiance shape the dining experience?
- How can lighting shape the dining experience?

FOR DEVELOPERS, RESTAURANT CONCEPT CREATERS, AND RESTURANT OWNERS

- How do you think atmosphere/ambiance is important? What is the role of atmosphere/ambiance in shaping the dining experience?
- How much of an impact do you think lighting has on the dining experience?
- How do you think lighting is important? What is the role of lighting in shaping the dining experience?
- How much do you invest in lighting? Why? Is it a priority?
- What do you look for in lighting (distribution, brightness, color)?

CLOSING

- Is there anything that you can think of that we should know about that we haven't asked?
- Do you have any questions for us?

THANK YOU

APPENDIX C

BIOGRAPHIES OF INTERVEWEE

Abdulaziz AlHumaidhi is the founder of AlHumaidhi Architects. He has dual degrees in Architecture and Fine Arts from the Rhode Island School of Design in the United States. He has designed all kinds of restaurants from fast food chain restaurants, like Burger King and Nathans', to local cafes, and even some local concepts for upscale restaurants. He has a particular love for music and feels music is essential to creating the atmosphere for dining. He recently shifted to curating playlists for commercial environments, retail, and restaurants. His wife is also involved in the Food and Beverage Industry and runs a food truck.

Abdullah AlMudhaf is the co-founder and managing partner of the AM Group which includes such restaurants as: Donaraty Donner Kabab, Hotel Calcutta, Dawabala, and Little Ruby's Cafe. He is an experienced restaurateur having established seven restaurants. He graduated from Seattle University with a degree in Business Administration and Information Systems. He has always had a passion for good food and after spending time in Manhattan, New York, he was inspired to develop his own restaurants. He is very engaged in developing the design concept and pays close attention to lighting and atmosphere as key components of the overall design.

Adlah AlSharhan is culinary consultant and chef with the Kout Food Group. She studied at the Cordon Bleu in the United States and United Kingdom. She is an independent consultant that has helped to open numerous restaurants in the GCC region. While she is involved with every aspect of restaurant projects, her focus is on creating memorable food in a memorable atmosphere. Adlah describes this as incorporating, "eco-psychology," a field which she studied at the college level. She has collaborated with world renowned chefs like Jamie Oliver from Great Britain. Her most recent venture is the restaurant 'Scrambled' located in Saudi Arabia.

Andrew Gooi is a documentary filmmaker for the past four years who focuses primarily on films about food and chefs. He details not just their food but what their lives are like, and what they bring to the world of food. He is best known for his two minutes, short film series called 'Elements' where he featured an Arizona chefs working with the concepts: fire, smoke, ice, water, air, and earth. Andrew was born and raised in Malaysia but studied Civil Engineering in the United States.

His love of food comes from the food of Malaysia and he was especially inspired by the food of his grandmother. He feels that food should be approachable and everyone can learn about food. His website: Foodtalkies.com features his short films on food.

Basil AlSalem is a well-established restaurateur. He is the founder of numerous restaurants such as: Gastronomica, Slider Station, Burger Boutique, Cocoa Room, Nomad Kitchen, BRW, Roadside Dinner, and B+F. He first started out in Finance, graduating from the University of Denver in 1999. He worked as a financial analyst, banking analyst and moved on to real estate asset management.

Basil later transitioned to the restaurant industry after realizing he could make his passion for cooking and design into successful business ideas. He has special interests in lighting designed and is fully involved in not just this aspect, but actually is personally involved in recipe development and running the businesses himself.

Faisal AlNashmi is a chef and restaurateur with Almakan United Company Group which includes restaurants such as Street Almakan and Table Otto in Kuwait City. He is responsible for creating the food menus, research and development, operations, and expansion planning. He studied film direction and photography and he brings his eye for aesthetics to each of his projects. He attended culinary school at Le Cordon Bleu in London and worked at Lenotre for one year as a creative director. He then went on to consult for various restaurants, while also working as a head chef at Street Almakan.

Filip Vermeiren is a Lighting Designer, originally from Belgium. He studied architecture at the University of Leuven in UK and became a technical director for a contemporary dance company. He was very involved in developing theatrical techniques related to sound, light and staging. He later attended the University of London to do a Master's in Lighting Design. He then worked for DPA as a lighting consultant and then subsequently with Isometrics for 10 years. He is currently the founder director of inverse lighting with offices in London, Bangkok and Hong Kong. His work focuses primarily on high end retail as well as the upscale hospitality industry where he developed numerous projects. His firm is a multiple winner of the Restaurant & Bar Design Awards in the lighting design category. Then in 2016, he was a judge at Restaurant & Bar Design Awards.

German Osio has been a restaurateur for more than 18 years. He is the founder of the Osio Culinary Group. He has opened eight restaurants across the United States and plans to expand internationally to Spain. He studied Business Administration and Hospitality at Les Roches International School of Hotel Management in Switzerland, and worked as several upscale hotels and award-winning restaurants before opening up his own restaurants. Having attended culinary school, he is heavily involved in developing the food concepts for each restaurant. He is well known for his fusion restaurants such as Sumo Maya, which specializes in Mexican-Asian cuisine.

Isabel B is a food blogger who resides in Arizona. Her blog is called Tasty AZ, and the majority of her reviews concern brunch. She has been blogging for over two years on her website and using Instagram. She is also the food editor for Arizona Latino, where her reviews focus on restaurants in the Latino community in Arizona.

Joshua Lurie has been a professional food writer since 2005. He is based in Los Angeles. He is an avid traveler who incorporates travel and food in his blog. He is especially concerned with the atmosphere and overall experience of a restaurant in addition to the food. Joshua also works as a consultant and food tour guide.

Kevin Chan has been a fine dining blogger for over ten years (finediningexplorer.com). His work is very visually oriented and he visits restaurants all over the world. He has been interviewed for his work on fine dining blogging by various international magazines, including The London Times, The Guardian and New York Magazine.

He suggests that restaurant industry in China over the past five or six years has been starting to take more note of fine dining experiences and it is continuing to grow rapidly. He is recognized as the first person to eat at the world's top 50 restaurants and has a book out about this experience that has been translated into several languages. Kevin also currently works for an insurance company out of London, employing his mathematics and statistics background.

Khaled AlBaker is currently a chef and restaurant manager at Café Meem in Kuwait City. Cafe Meem is owned by NMC, which also owns the prestigious Lenotre Catering. He attended the University of Florida where he studied Accounting and Finance. Following his passion for food, he then attended culinary school in Miami and worked as a chef in Miami at 1826 restaurant under Danny Grant.

Nathan Pelger has had over 20 years' experience as a server at upscale and casual restaurants. He is currently employed at Big Matt's Breakfast. He has worked in four fine dining restaurants and really appreciates and emphasizes that this setting can be a place that inspires his passion. Nathan feels that the care of the customers and the attention to detail are key components of the fine dining atmosphere. He hopes to return to the upscale restaurant industry in the future.

Peter Veale is a Lighting Designer from United Kingdom. He is currently the Director of Firefly Lighting Design based in London. He studied Product Design and specialized in designing lighting fixtures. Peter has worked all over the work on numerous design projects, mostly in the hospitality industry. He worked for Isometrix for three years, both in Hong Kong and in London.

While then, he worked on designing for the world-famous Shangri-La Hotels in China. He also worked out of San Francisco, where his focus remains within the high-end hospitality industry. He is currently focusing on lighting design for upscale restaurants, hospitality, retail and residential locations.

Salem AlMudhaf is a blogger and self-described culinary traveler. He has had a passion for food since he was a young child. He has been blogging about his culinary expeditions since 2010 with a focus on fine dining. He has had a wide range of experiences, including Michelin Star restaurants. Salem notes that the whole restaurant experience is important, not just the food, and that every detail such as the presentation of the food and even the placement of the glasses impact the overall experience.

Veronique Kherian is from San Francisco and has been blogging about food since 2009. Her site is called Miss Cheesemonger, focuses on cheese, specialty food and the development of this food. Her work involves visiting farms, and specialty food makers to see them in these environments, and learn about what drives them to create for people. Veronique graduated from law school but decided to follow her passion for food and art. She also owns a portrait and food photography business.

Wes Kauble is the owner, the publisher, and writer of the Haiku Review, which is an Instagram food blog based in Los Angeles, United States. He has over 20,000 followers. He dines out at least 4-5 times a week, and with lunch it comes about 10-12 times a week. He has been passionate about food and food aesthetics since his childhood.

Yousef Alqaoud is an architect and restaurateur. He graduated from the University of Kuwait with a degree in architecture then completed an internship in Boston for landscape design. He also has a background in finance and managed local real estate funds for two years.

Yousif followed his passion for design and he started a design studio with his partner, Thari Alqabandi. Their business focuses on branding and interior design. Many of his design projects are restaurants. Their company is involved with every step of the development process including: coming up with the vision for the restaurant, the overall design, creating the menu, testing the food, and even helping with the operations. Recently, he designed and opened his own restaurant Terrazzo at Alshaheed park in Kuwait.

Zeyad Alobaid is a chef and restaurant owner. He is also an independent consultant. He studied at the Florida Culinary Institute in West Palm Beach Florida. Zeyad has spent over thirteen years in the Food and Beverage Industry, working his way up in numerous hotels and

restaurants such as Texas Roadhouse and Breakfast Club. As a chef, he played an important role in opening PF Chang restaurants in Dubai and in Kuwait. Zeyad recently opened his own restaurant Fogoda.

APPENDIX D

DINELIGHT INSTRUMENT

DineLight: an Exploratory Study for Instrument Development

Dear Participant,

I am a graduate student under the direction of Professor Michael Kroelinger in the Design School at Arizona State University. I am conducting a research study to explore how lighting at upscale restaurants may impact the dining experience and hence explore the most critical factors that contribute to this impact.

I am inviting your participation, which will involve answering 15 minutes online survey that will ask you about your opinion of lighting at upscale in restaurant. You have the right not to answer any question, and to stop participation at any time.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. You must be at the age of 18 and above to answer this survey.

Although there is no possible direct benefit to your participation, there are no foreseeable risks or discomforts to your participation. Yet, your responses will be anonymous. The results of this survey may be used in reports, presentations or publications, but your name will not be used. results will only be shared in the aggregate form.

If you have any questions concerning the research study, please contact the research team at: dalsharhan@asu.edu or Michael.Kroelinger@asu.edu . If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

Filling out the survey will be considered consent to participate.

Professor Michael Kroelinger, Ph.D., AIA, FIIDA
Professor Emeritus
Michael.Kroelinger@asu.edu

Dalal Alsharhan, M.S.D
PhD Candidate
dalsharhan@asu.edu

DineLight

INSTRUCTIONS

Before taking this survey
- There is no right or wrong answer.
- You should be in a restaurant that is categorized as upscale dining or above; upscale casual, chic casual and fine dining is all included.
- Please do not rate a fast food or fast casual restaurant.
- Please complete this survey while you are in the restaurant and by the end of your dining experience.

DineLight

Information about You and Your Visit

INSTRUCTION: Please choose the category that best describes you or fill in the blank.

* 1. What is your gender?

- ◯ Female
- ◯ Male
- ◯ Other (specify)

2. What is your age?

- ◯ Under 18
- ◯ 18 - 29
- ◯ 30 - 44
- ◯ 45 - 59
- ◯ 60+

* 3. What is your ethnicity?

- ◯ Caucasian
- ◯ Latino/Hispanic
- ◯ Middle Eastern
- ◯ African/African American
- ◯ Caribbean
- ◯ Asian
- ◯ Mixed
- ◯ Other (please specify)

* 4. What is your Nationality?

* 5. What is your highest level of education completed?

- ◯ High School or Less
- ◯ Vocational/Technical School
- ◯ Some College
- ◯ Bachelor Degree
- ◯ Master Degree
- ◯ Doctoral Degree (Ph.D)
- ◯ Professional Degree (MD, etc)
- ◯ Other (please specify)

* 6. What is your Marital Status?

- ◯ Never Married
- ◯ Married/Living with partner
- ◯ Divorced/Separated
- ◯ Widowed

* 7. What is your Work Status?

- ◯ Employed Full-time
- ◯ Employed Part-time
- ◯ Retired
- ◯ Unemployed
- ◯ Student

* 8. What is the name of the restaurant?

* 9. Where the restaurant is located?

City

Country

10. Is this restaurant considered an upscale restaurant (including casual chic and fine dining) ?

- ◯ Yes
- ◯ No

* 11. Are you present at the restaurant right now?

- ◯ Yes
- ◯ No
- ◯ No, but I have a good memory of one that I have visited recently

* 12. What day of the week you are visiting the restaurant?

- ◯ Weekday
- ◯ Weekend

* 13. Are you visiting this restaurant during dinner time?

- ◯ Yes
- ◯ No

* 14. Is Daylight (light coming from the sun) present and affecting your table?

- ◯ Yes
- ◯ No

* 15. How many people are accompanying you now?

- ◯ Only me
- ◯ 1 person
- ◯ 2 - 3 People
- ◯ 4 - 6 People
- ◯ 7 or more

* 16. What is the occasion for dining?

- ◯ Romantic Dinner
- ◯ Friends Dinner
- ◯ Family Dinner
- ◯ Business Dinner
- ◯ Other (please specify)

5

DineLight

ATMOSPHERE EXPERIENCE (PART I)

INSTRUCTION: This section asks questions which use rating scales: please choose the statement that best describes your opinion.

* 17. ATMOSPHERE PERCEPTION

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
Lighting creates a **welcoming** atmosphere	◯	◯	◯	◯	◯	◯
Lighting creates a **romantic** atmosphere	◯	◯	◯	◯	◯	◯
Lighting creates an **upscale** atmosphere	◯	◯	◯	◯	◯	◯
Lighting creates a **cozy** atmosphere	◯	◯	◯	◯	◯	◯
Lighting creates a **peaceful** atmosphere	◯	◯	◯	◯	◯	◯
Lighting creates an **appealing** atmosphere	◯	◯	◯	◯	◯	◯
Lighting creates an **energetic** atmosphere	◯	◯	◯	◯	◯	◯
Lighting creates a **nostalgic** atmosphere	◯	◯	◯	◯	◯	◯
Lighting creates an **authentic** atmosphere	◯	◯	◯	◯	◯	◯
Lighting creates a **dramatic** atmosphere	◯	◯	◯	◯	◯	◯

18. NOISE AND MUSIC PERCEPTION

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
The background music is **loud**	◯	◯	◯	◯	◯	◯
Noise Level is **unpleasant**	◯	◯	◯	◯	◯	◯

DineLight

ATMOSPHERE EXPERIENCE (PART II)

INSTRUCTION: This section asks questions which use rating scales: please choose the statement that best describes your opinion.

* 19. SPACE PERCEPTION

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
The restaurant looks **spacious**	◯	◯	◯	◯	◯	◯
Lighting creates **privacy**	◯	◯	◯	◯	◯	◯
The restaurant looks **clean**	◯	◯	◯	◯	◯	◯
The **background** walls are **distinctive**	◯	◯	◯	◯	◯	◯
Iconic and architectural elements such as artworks and flowers are **distinctive**	◯	◯	◯	◯	◯	◯
I felt **"WOW"** when I entered the space	◯	◯	◯	◯	◯	◯

* 20. OPEN KITCHEN & BAR PERCEPTION

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
Lighting draws **attention** to the **open-kitchen**	◯	◯	◯	◯	◯	◯
The **open-kitchen** look like a **show**	◯	◯	◯	◯	◯	◯
Lighting draws **attention** to the **bar**	◯	◯	◯	◯	◯	◯

DineLight

SOCIAL EXPERIENCE

INSTRUCTION: This section asks questions which use rating scales: please choose the statement that best describes your opinion.

21. SOCIAL EXPERIENCE

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
I am satisfied with the lighting quality for taking pictures of my food	◯	◯	◯	◯	◯	◯
I am satisfied with the lighting quality for taking pictures with people companying me	◯	◯	◯	◯	◯	◯
I can see faces of diners at **my table** clearly.	◯	◯	◯	◯	◯	◯
I can see faces of diners at **other tables** clearly.	◯	◯	◯	◯	◯	◯
Lighting is sufficient for **conversation** with my **table partners**	◯	◯	◯	◯	◯	◯
Lighting is sufficient for **conversation between tables.**	◯	◯	◯	◯	◯	◯

DineLight

SERVICE EXPERIENCE

INSTRUCTION: This section asks questions which use rating scales: please choose the statement that best describes your opinion.

* 22. SERVICE PERCEPTION

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
The waiting time to be seated **at my table** was reasonable	◯	◯	◯	◯	◯	◯
The waiting time t**o get the food** was reasonable	◯	◯	◯	◯	◯	◯
Lighting is sufficient to **visually communicate with the server**	◯	◯	◯	◯	◯	◯

DineLight

FOOD EXPERIENCE

INSTRUCTION: This section asks questions which use rating scales: please choose the statement that best describes your opinion.

23. FUNCTION OF LIGHTING

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
Lighting is **sufficient** to **read the menu**	◯	◯	◯	◯	◯	◯
I needed a **flash light** to **read the menu**	◯	◯	◯	◯	◯	◯
Lighting is sufficient to see the food	◯	◯	◯	◯	◯	◯

24. FOOD PERCEPTION

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
The food looks acceptable	◯	◯	◯	◯	◯	◯
I appreciate the food	◯	◯	◯	◯	◯	◯
The food is appetizing	◯	◯	◯	◯	◯	◯
The food is attractive	◯	◯	◯	◯	◯	◯
The food looks fresh	◯	◯	◯	◯	◯	◯
The food looks high quality	◯	◯	◯	◯	◯	◯

DineLight

LIGHTING EXPEREINCE (PART I)

INSTRUCTION: On the scales below, please scroll between the adjectives which best represents your perception about lighting within the restaurant space. Numbers "1" and "5" indicate a very strong perceptions. Numbers "2" and "4" indicate a fairly weak perception. Number "3" indicates you are undecided or do not understand the adjectives themselves. Please work quickly. There are no right or wrong answers.

* 25. Rate the **Brightness** of the restaurant lighting

Dim — Bright

* 26. Rate the **Glare** level of the restaurant lighting

Glare — Non-Glare

* 27. Rate the **Color Temperature** of the restaurant lighting

Cool — Warm

* 28. Rate the amount of color in the restaurant lighting

Colorless — Colorful

* 29. Rate how colors appear under the restaurant lighting

Dull — Radiant

* 30. Rate the **Lighting Distribution** of the restaurant

Uniform — Non-Uniform

* 31. Rate the **Lighting Distribution** of the restaurant

Unfocused — Focused

* 32. Rate the amount of **Contrast** in the restaurant lighting

Low contrast — High contrast

* 33. Rate the **Complexity of the Lighting Distribution** of in the restaurant

Complex — Simple

* 34. Rate the **Visibility** of the **lighting fixtures** in the Restaurant

Non-visible — Visibile

12

DineLight

LIGHTING EXPERIENCE (PART II)

INSTRUCTION: This section asks questions which use rating scales: please choose the statement that best describes your opinion.

* 35. LIGHTING APPLICATION

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
Lighting is **specular (high reflection)**	◯	◯	◯	◯	◯	◯
Lighting is **comfortable**	◯	◯	◯	◯	◯	◯
Lighting is **focused on table**	◯	◯	◯	◯	◯	◯
Lighting is **focused on the perimeter walls**	◯	◯	◯	◯	◯	◯

* 36. LIGHTING FIXTURE

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
Lighting fixtures are **iconic**	◯	◯	◯	◯	◯	◯
Lighting fixtures are **authentic**	◯	◯	◯	◯	◯	◯
Lighting fixtures are **stylish**	◯	◯	◯	◯	◯	◯
Lighting fixtures are **attractive**	◯	◯	◯	◯	◯	◯
Lighting Fixtures **indicate the high quality of the restaurant**	◯	◯	◯	◯	◯	◯

DineLight

BEHAVIORAL INTENTION AND SATISFACTION

INSTRUCTION: This section asks questions which use rating scales: please choose the statement that best describes your opinion.

* 37. BEHAVIORAL INTENTION AND SATISFACTION

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	N/A
I would like to **come back** to this restaurant in the future	◯	◯	◯	◯	◯	◯
I would **recommend** this restaurant to my friends or others	◯	◯	◯	◯	◯	◯
I am willing to **spend more time than I planned** at this restaurant	◯	◯	◯	◯	◯	◯
The dining experience is **memorable** at this restaurant	◯	◯	◯	◯	◯	◯
I like the **overall atmosphere** of the restaurant	◯	◯	◯	◯	◯	◯
I like the overall **lighting conditions** in this restaurant	◯	◯	◯	◯	◯	◯
Lighting makes me want to **stay for a longer time**	◯	◯	◯	◯	◯	◯
I am satisfied with the **overall dining experience**	◯	◯	◯	◯	◯	◯

DineLight

THANK YOU FOR YOUR PARTICIPATION

Thank you for participating in our survey. Your feedback is important.

38. Please let us know if you have any comments. Your opinion is valuable