USER PREFERENCE OF INTERIOR DESIGN ELEMENTS IN HOTEL LOBBY SPACES

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A THESIS PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF INTERIOR DESIGN

UNIVERSITY OF FLORIDA

2005

This document is dedicated to my parents, Michael and Catherine Rutkin, who have always shown me unconditional love and support, in spite of whether or not my behavior warrants it.

ACKNOWLEDGMENTS

I would like to thank Professor Larry Winner for meeting with me to discuss possible statistical methods for analyzing my research data.

I would like to thank Cori Robertson for helping hand render all of the images used in this research study as visual stimuli. With a total of 48 images, I could not have completed this task on time without her help.

I would like to thank Professor Joe Alba and Professor Alan Cooke for agreeing to be on my research committee and taking an interest in this study. I believe the different perspective brought into discussions by these two added significantly to my study. I believe that there are great similarities between interior design and product design, and I appreciate their willingness and enthusiasm to explore these similarities and for helping me to be a part of that as well.

Finally, I would like to thank Dr. Debra Harris. As my committee chairperson, Dr. Harris was indispensable throughout the process of conducting this research and writing this paper. She has offered guidance and support all along, and has also been a friend. This research study would absolutely not have been possible without her.

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of the University of Florida in Partial Fulfillment of the
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May 2005

Chair: Debra D. Harris
Major Department: Interior Design

Today in America there are 3.9 million hotel rooms spread across nearly 51,000 properties and on any given night, 64% of these rooms are occupied, indicating a significant number of people spending time not only in hotel rooms, but also in the public spaces of hotels, such as the lobbies. As the first space guests will encounter, and quite possibly the first impression guests will form of the hotel based on the physical environment, the lobby plays a crucial role in branding and creating the hotel's desired atmosphere. This study examines which variations of four interior design elements are preferred by hotel guests, and which elements are most important to overall preference of the lobby space. These design elements, which were chosen based on observations of existing hotel lobbies and reviews of literature pertaining to hotel lobby design, are 1) scale; 2) furniture type and arrangement; 3) finish materials; and 4) access to daylighting and views. Two opposing variations of each element were looked at during the data collection.

Three main groups stand to benefit from the findings of this research: 1) the hotel industry; 2) the millions of people that spend time in hotels each year; and 3) the design professions. By implementing the variations of each design element that are found to be preferred, hotels may increase their number of repeat customers, thereby increasing their revenues. As a second benefit, by identifying how to create lobby spaces that are more preferred by guests, the findings may provide design solutions to improve the travel experiences of millions by improving the quality of their stays in hotels. Finally, as a client-centered profession, the field of interior design will benefit from research that identifies the preferences of hospitality clients, an area of research not fully realized at this time. The findings of this study may provide design professionals additional knowledge to design successful hotel lobbies; perhaps the findings will lead to additional research for other hospitality facilities such as restaurants and theaters.

Using a four-way factorial Analysis of Variance to analyze the responses of thirty participants to visual stimuli representing hotel lobby spaces, it was proven that all four design elements have significant impacts on user preference of hotel lobby spaces. In order of relative contribution to preference, access to daylighting and views was the most affective, then came scale of the lobby and then materials. Seating type and arrangement had the least effect, although still quite significant. Of the variations examined for each element, large scale was preferred over small scale; access to daylighting and views was preferred over no access; softer materials such as wood and carpet were preferred to harder materials such as tile, terrazzo and slate; group seating arrangements that facilitate interaction were preferred over individual seating arrangements.

CHAPTER 1
INTRODUCTION

The history of hotels dates back to the earliest societies and echoes their expansion across the world, following the rise and fall of economies. In fact, the Code of Hammurabi in the 1800s B.C. specified the first known rules for tavern owners (McDonough, Hill, Glazier, Lindsay & Sykes, 2001). Hotels continued to become more common through the early 1000s as the caravan series moved along the Chinese silk route and into the 1600s with the growth of hotels associated with the European grand tour (McDonough et al., 2001). The first American hotel was the City Hotel in New York, which opened in 1874 (McDonough et al., 2001).Saloons were very popular in the West in the late 1800s and early 1900s when the Golden Age of Hotels saw the birth of many well known hotels such New York's St. Regis and the Plaza Hotel (McDonough et al., 2001). The hotel industry continued to thrive and the mid-1950s were marked by the growth of many chain hotels such as Holiday Inn, Marriott and Hilton (McDonough et al., 2001).

The first hotels were inns and taverns that provided little more than food and shelter for people who came to towns for trades or other temporary work (McDonough et al., 2001). As peoples' disposable incomes grew, what was once seen only as a necessary part of earning a living became a luxury (McDonough et al., 2001). With more time and money on their hands, peoples' curiosities about foreign lands were fueled and they were motivated to travel. As travel became more common and hotels more numerous,

competition between hotels began and each tried to differentiate itself from others (McDonough, Hill, Glazier, Lindsay & Sykes, 2001).

Today in America there are 3.9 million hotel rooms spread across nearly 51,000 properties (Hotels and Motels, 2001). The American Hotel and Motel Association reports that on any given night, 64% of these rooms are occupied (Hotels and Motels, 2001), indicating a significant number of people spending time not only in hotel rooms, but also in the public spaces of hotels, such as the lobbies. These hotels encompass a wide range in price and luxuriousness, which impact the hotel's service, amenities, and atmosphere. The lobby area plays a crucial role in branding and creating the hotel's desired atmosphere. The lobby is the first space guests will encounter, and quite possibly the first impression guests will form of the hotel, based on the physical environment (Andorka, 1997). How guests interpret and experience the lobby space may have important and lasting effects.

Purpose

The researcher hypothesizes that a well designed hotel lobby will make guests more comfortable and will encourage them to stay and relax, not simply check in or out, and then leave. This idea leads to the research question: What design elements in hotel lobbies are preferred by hotel guests? This study will determine the effects of four specific design elements on the degree of user preference of lobby spaces. These design elements, which were chosen based on observations of existing hotel lobbies and reviews of literature pertaining to hotel lobby design, are the following: 1) scale of the lobby; 2) furniture type and arrangement; 3) finish materials; and 4) access to daylighting and views. Two opposing variations of each element will be considered during the data collection phase of this research study.

Significance

The tourism industry in America is large and complex. It is a conglomeration of many fields including entertainment and theme parks, hotels and other lodgings, air travel, retail sales and restaurants. The industry plays an important role in the country's economy, providing numerous jobs and bringing in a significant amount of taxable revenue (Hotels and Motels, 2001). In fact, the hotel and motel industry alone brings in $93.1 billion dollars of annual revenue (Hotels and Motels, 2001).

The terrorist attacks of September 11, 2001, had severe negative effects on the tourism industry in America. In the months following the attacks, hotel occupancy was down nearly 40% (Schneider, 2002). Within the first 100 days after the attacks, the tourism industry lost approximately $40 billion in revenue, and nearly 273,000 jobs (Sigo, 2002). In response to the attacks, Americans' desires to stay at home and spend time with family grew tremendously. The next blow to the industry was the threat of a war with Iraq. In Florida alone, the $50 billion-a-year tourism industry stood to lose $3.9 billion worth of business ("War Would Cost," 2003).

An article, published in 2003, suggested that in order to improve the industry, the Federal Legislature gave Florida an additional $20 million to spend on advertising ("War Would Cost"). The increase in advertising expenditures, along with the passage of time, helped to revive the industry. In 2002 the number of visitors to Florida reached 75.5 million, an 8% increase over the 69.8 million in 2001 ("War Would Cost," 2003). Florida's tourism industry continues to improve and is now more than 85% recovered from the lows suffered in the months after the terrorist attacks (Schneider, 2003).

Considering the tremendous amount of time and money being spent in and on hotels each year, it is crucial that designers develop a more complete understanding of the

forces driving hotel choice and loyalty. Three main groups stand to benefit from the findings of this research: 1) the hotel industry; 2) the millions of people that spend time in hotels each year; and 3) the design professions. By implementing the variations of each design element that are found to be preferred, hotels may increase their number of repeat customers, thereby increasing their revenues. An example of the effect of lobby design on revenue can be seen in the renovation of the lobby at the Cleveland Airport Marriott. Before the renovations, the lobby had low ceilings and a poor traffic pattern to the front desk (Worcester, 1999). The renovated lobby has a new entrance that creates a strong sense of arrival, as well as new furniture, lighting, and more flexibility (Worcester, 1999). Post renovation, the hotel's average daily rates increased by $7 and a 15% rise in the corporate rate was expected for the summer months following (Worcester, 1999). As a second benefit, by identifying how to create lobby spaces that are more attractive to guests, the findings may provide design solutions to improve the travel experiences of millions by improving the quality of their stays in hotels. Finally, as a client-centered profession, the field of interior design will benefit from research that identifies the preferences of hospitality clients, an area of research not fully realized at this time. The findings of this study may provide design professionals additional knowledge to design successful hotel lobbies; perhaps the findings will lead to additional research for other hospitality facilities such as restaurants and theaters.

Literature Review

In review of the available literature, the lack of research involving hotel lobby design in general, and more specifically how it affects user preference of lobby spaces, is apparent. This lack of prior research reinforces the significance of, and need for, this study. The limited available literature can be divided into four relevant topics: 1) hotel

and lobby design; 2) consumer preference; 3) psychological comfort; and 4) methodological support.

Hotel and Lobby Design

Most people can think back to a memorable experience of staying at a hotel with friends or family. A hotel that is remembered is the direct result of thoughtful and successful planning, design and construction (McDonough, Hill, Glazier, Lindsay & Sykes, 2001). According to McDonough et al. (2001) hotels are in the "business of memories" (p. 1) and so, owners, architects and interior designers must work carefully to ensure a good and lasting memory for hotel guests. Hill Glazier Architects says that "the guest's first and last experience in the hotel should be a reminder of the excellence of the experience as a whole" (McDonough et al., 2001, p.2). Most frequently, the first and last experience a guest has in a hotel happen in the lobby, during check-in and check-out (Miller, 1995). A single negative experience can keep a guest from returning to a hotel. This will not only deprive the hotel of that person's future patronage, but possibly the patronage of that person's friends and family.

All hotels are a balance of host, guest, and place, and over time this balance has shifted from one component to another. There are several trends that can be seen in hotels today as a result of the current state of that balance. These trends include increases in technology; increases in guest sophistication; and emergence of cultural and green hotels (McDonough et al., 2001). These trends all affect the way new hotels are being designed and built, including the lobby space.

Effects of the high-tech movement can be seen all over hotels these days. For the past several years, hotels have been enhancing their available technologies in order to meet the ever growing demands of guests for easy access to the Internet and for high-

speed business tools in guest rooms and other public areas of the hotel, such as the lobby (McDonough, Hill, Glazier, Lindsay & Sykes, 2001). This process has included wiring and rewiring rooms with higher capacity telephone and data infrastructure and installing data ports in furniture, furnishings, and equipment. This has in turn forced changes in the layout of spaces and the design of desks, armoires, and other furniture. As the technologies are constantly changing and improving it is critical to implement flexible designs and utilize flexible materials in order to reduce future time, effort, and funds required to update these technologies (McDonough et al., 2001). In fact, according to Gordon Moore, founder of Intel, every 18 months processing power of machines doubles while costs remain constant, allowing for smaller hardware sizes and rapid advancements in functions, which will surely be reflected in the amenities hotel guests demand (McDonough et al., 2001). Developments in wireless technologies and abilities of PDAs to communicate with hotel systems suggest the traditional high profile design of the reception desk will decline, since guests will be able to check-in and open their doors all with their PDA (McDonough et al., 2001). It may even be conceivable that the lobby registration desk will become altogether obsolete.

With the increasing popularity of cable television and the Internet, consumers come into contact with a wide variety of designs, home improvements, and styles. The result is that they have attained an expanded design vocabulary and increased their expectations of various spaces, though not necessarily on a conscious level (McDonough et al., 2001). In turn, guests at hotels of every level are expecting more in terms of the incorporation of style and design in every space of the hotel, from guest rooms to lobbies.

As a result of the boom of technology-driven markets, which increased personal wealth for many, coupled with the rise of hotel guest sophistication, it has become clear to hotel owners and operators that guests can afford to, and will insist upon experiencing truly memorable, intellectually and personally rewarding hotel stays (McDonough, Hill, Glazier, Lindsay & Sykes, 2001). The demands for cultural and eco-tourism hotels are rising, and in response designers are creating properties that respect the environment in which it is built, as well as the fate of those people who live near or work at the property (McDonough et al., 2001).This supports the "green" movement in design, which started in the late 1960s and early 1970s and encourages environmentally friendly designs and materials (McDonough et al., 2001). According to McDonough et al. (2001), this includes things such as harvesting wood from sustainable forests for all millwork, using paints and carpet mastic free of harmful chemicals and vapors and using solar or wind power. Until recently, many hotel owners did not see sustainable design as cost effective because their up-front costs are often higher and payback periods longer (McDonough et al., 2001). However, growing demands from guests have begun to force designers, owners, and operators to factor these concerns into their plans (Pallet, Taylor & Jayawardena, 2003). Perhaps future technological advancements will result in less expensive ways to produce environmentally friendly materials.

Although these trends affect the design of the entire hotel, several other issues are more directly connected to the lobby space. While some hotel lobbies are thought to be well designed by their owners and support the needs and wants of their guests, there is a definite lack of research in the area to guide hotel owners and designers. The style and design of hotel lobbies are constantly changing, and the time of generic, cookie-cutter

hotels is coming to an end (Miller, 1995). According to Julie Miller (1995), it is the uniqueness of a lobby that grabs the guests' attention, and unexpected settings can be a pleasant surprise for frequent travelers. "The lobby is your calling card. If the lobby is not fresh, innovative or special in some way, the guest will feel uneasy about the accommodations he or she doesn't see and may elect not to stay or return to your hotel," says Paula Jo Boykin, president of Spectrum Design Services (Worcester, 1999, p. 40).

Bill Zanetis, owner of six hotel properties across America, uses the lobby as a way to give his guests a place to relax outside of their individual room (Miller, 1995). His lobbies include features such as bars, fireplaces, flexible seating areas, and slightly more intimate nooks where guests can read or socialize (Miller, 1995). While no formal research has been done, based on his own personal observations of hotel guests, Zanetis feels his lobbies have been very successful. In fact, for a few hours each evening the lobbies of his hotels are full of guests socializing and interacting with each other (Miller, 1995).

Zanetis's ideas are similar to those of Frank H. Andorka Jr. (1997) and Siguaw and Enz (1999) who emphasize the importance of creating a home-away-from-home feeling in hotels. According to this idea, the hotel lobby should resemble a home living room. Elements that may help create this feeling include residential style furniture, such as love seats and ottomans, and more residential style materials. Perhaps the most recent take on this idea can be seen in the W Hotel in Manhattan's Time Square. The W's lobby, including the far end which is actually called the "living room," is a long, cocoon like room with soft lighting, white leather ottomans and white wood floors (Fox, 2002). There are also two smaller niches that afford more intimate interactions. Vice President of the

hotel, Robert Koren, says the lobby is a combination of clean, simple lines and comfortable spaces (Fox, 2002). Fox (2002), Worcester (1999), and Lutyens (2001) all agree that the idea is not to create a living room that guests would see in their own home, but perhaps a living room from a home they could never dream of owning. Yvonne Jeziorski, general manager of Embassy Suites, says today's hotel lobby should not say "Welcome home," but rather "Welcome to your multimillion dollar home" (Worcester, 1999, p. 41). These ideas, however, are founded on the anecdotal experiences of hotel owners and designers rather than on formal research studies.

Fox (2002) and Worcester (1999) have discussed the positive effect that a local context in decor can have on a lobby space. According to Brad Elias, president of the Elias Design Group in New York, embracing the culture of a city will increase the success of a design, particularly in high-tourist locations such as New Orleans (Worcester, 1999). Elias and his team used this idea in the lobby renovation of the Westin Canal Place in New Orleans. They created a warm feeling in the lobby by introducing a mix of contemporary architecture, traditional antiques and lively colors to reflect the vibrancy of New Orleans (Worcester, 1999). While Elias feels the renovation has been successful, formal research studies on the affects of local décor in hotel and lobby design would add validity to these claims and ideas.

The final issue that needs to be addressed in hotel lobby design is functionality. Above and beyond everything else, a lobby must be functional. Lobbies serve many functions including check in and check out, an informal business center, food and beverage outlet, and sundry shop, and must be flexible enough to support all of these needs (Worcester, 1999). The layout of the lobby should create an easy and direct path to

the check-in counter. Placing the check-in counter with a direct line of sight to the entrance creates an added safety feature, since the staff can watch everyone who comes and goes. Another recent trend in lobby design is to use several check-in stations rather than one long counter (Andorka, 1997). This is thought to reduce the overwhelming feeling that having one large desk can create and facilitate more interaction between the staff and the guests (Andorka, 1997). Again however, research has not been conducted to analyze how guests actually feel about this.

Consumer Preference

Measuring consumer preferences is a major part of developing new products and determining the success of existing products (Cohen & Orme, 2004). Market researchers often measure preferences for colors, brands and flavors and the importance of certain product features in order to make recommendations about marketing strategy and product design (Cohen & Orme, 2004). The process of new product design combines many viewpoints including marketing, manufacturing, engineering, and human factors perspectives (Tarasewich, 1996). In marketing, consumer preference research is used to determine and focus on product features that will persuade a consumer to purchase one product over another (Tarasewich, 1996).During the manufacturing stages, costs and efforts of producing a product are weighed against potential returns (Tarasewich, 1996). The engineering aspect focuses on manufacturing specifications and the human factors viewpoint concentrates on ergonomics, usability and interaction issues (Tarasewich, 1996). New products are designed in an effort to fulfill the needs or wants of some population. The proper design of these new products is perhaps the most critical factor that determines whether or not the product, and in turn the developing company, thrives or fails. While satisfying some consumer need and following consumer preference is a

priority, many other factors are involved in product development, such as availability of materials, the manufacturing company's resources, and available manufacturing capabilities and technologies (Tarasewich, 1996). A hotel lobby, and perhaps any developed space, can ultimately be seen as a product. Likewise, the process of designing spaces can be compared to the new product design process. A space will not be successful if it does not meet the needs of its users, just as a new product will fail in the marketplace if consumers do not respond well to it. Like new product development, many issues are important in the design of a space including availability of funds, appropriateness and access to various materials, building and construction capabilities, and of course, user preference.

In both processes, design is important in terms of competitive advantage and the product life-cycle (Tarasewich, 1996). From the beginning of the development phase, product designers should consider every possible market in which a product could potentially be introduced. This type of planning will help eliminate the need to redesign for specific countries (Tarasewich, 1996). Likewise, it is imperative that designers of space consider every possible user group. While the space itself is by nature in one particular market, the space will need to cater to various user groups including guests of varying age, gender and nationality. In addition, designers must consider guests traveling for different reasons, such as business travel versus leisure travel. Considering all affected populations from the onset will increase the success rate of new products and spaces and elongate the products' ultimate life-cycle. According to Tarasewich (1996) a company must always focus on its customers to find a way to stand out among competing companies and create a clear advantage in the marketplace. Hotel owners are no different.

Peterson (2003) discusses the importance of incorporating consumer perspectives into architecture and interior design. Consumer research can be applied at both the front-end and back-end of interior design and architecture projects. At the front-end, pre-design research is implemented to determine the specific needs and wants of potential users of a space and also identify the projected uses of a space (Bechtel, 1997). Post-occupancy evaluations should be performed after the space has been occupied for one year to determine how the users feel about the space and whether or not it is successful in fulfilling the users' needs (Bechtel, 1997). A movement began in architecture and interior design in the 1960's that suggested using consumer perspectives in the design of buildings (Peterson, 2003). The movement was loosely based on the principles of survey research, similar to that used in the social sciences, but it lost momentum in the 1970's (Peterson, 2003). According to Lee Wright, Dean of The University of Texas at Arlington's School of Architecture, the lack of adopting and developing purposeful methods to incorporate the perspectives and preferences of future users of a space into its design can be seen as a direct effect of architecture school's emphasis on aesthetic elements and artistic freedom of the architect (Peterson, 2003). However, the recent emergence of post-occupancy evaluations suggests a change in that attitude, and an opportunity for research on consumer preferences to provide architects and designers with insights not only on the usability of space, but also on the aesthetic dimension as well (Peterson, 2003). John Sherry conducted this type of post-occupancy evaluation at the Marriott Marquis hotel in the form of focus groups with hotel guests (Peterson, 2003). Hotel guests reported many negative attitudes toward several hotel features, using descriptions such as "dizzying", "prison-like", and "like the LA freeway" (Peterson,

2003, p. 208). The information gathered from Sherry's consumer research was used in the redesign of the Marriot Marquis hotel. This research study is a form of pre-design research. It is the intention of this researcher that the information collected for this study will be used in the initial design phases of future hotel lobby spaces.

Comfort

Feelings of comfort can be affected by many things, including one's physical surroundings. It is assumed that hotel guests will be more comfortable in a space that includes variations of design elements that are found to be preferred. Hotels are at once public and private spaces, catering to the intimacies of home life such as sleeping and eating. While this contradiction builds mystery and excitement, it also provides difficult parameters for creating a comfortable space. The majority of available literature on comfort and design deals with physical comfort and thermal comfort ("Americans Crave", 2003). In fact, thermal comfort has been named the number one concern of travelers while staying in hotels rooms ("Americans Crave", 2003). While thermal comfort is an integral part of any public space, it is not the focus of this study.

According to Flynn (2004), travelers today want three things from a hotel: 1) connectedness, to both people and places; 2) physical and psychological comfort; and 3) more selection and choices in terms of guest rooms and other amenities offered. In fact, home, comfort, and security and considered the driving forces behind hospitality design in today's market (Flynn, 2004). In an attempt to provide a more comfortable environment, the trend is to increase the size and scale of both guest rooms and bathrooms, provide fewer, but higher quality finishes, furniture and fittings in guest rooms, and to increase lighting in guest rooms (Flynn, 2004). Flynn also suggests providing opportunities for interaction in lobby areas, such as installing internet kiosks,

so that people will take advantage of this public space. While Flynn (2004) discusses how to create comfortable environments, he does not define comfort or provide context.

One of the few applicable research studies examines how the interior design of airplanes works to create a comfortable environment. According to Shelly Zundell, senior manager with industrial design firm Teague, designers need to construct a residential feel, using soothing colors and calm designs in order to maximize comfort in airplanes ("The Psychology of Comfort", 2002). The desire to create a residential feel is similar to what some designers try to do in hotel lobbies, treating the space like a home living room. Color theory plays a role in this, as does the use of curved shapes, which are seen as friendly and safe, rather than hard edges ("The Psychology of Comfort", 2002). The study found that another way to increase overall comfort is to create fewer aggravations for the passenger when stowing and accessing luggage in overheard bins ("The Psychology of Comfort", 2002). The idea of creating fewer hassles with luggage can be applied to lobbies as well. A large number of travelers use rolling suitcases. Having zero threshold entrances and wide walkways will make maneuvering these suitcases easier for the traveler, increasing their overall comfort levels.

Marsden (1999) conducted a research study that attempted operationalize a similarly vague concept, homeyness. This term, much like the idea of comfort, does not have a concrete definition as individuals' beliefs and experiences are built into their own personal meanings of the term. In the same way that comfort is generally studied in a physical sense, homeyness has most frequently been studied in the context of traditional households (middle class married couples with young children living in owned single family homes, Marsden, 1999). In his attempt to define this term, Marsden (1999)

considered several themes: “issues of control, privacy, territoriality, security, choice, familiarity, and ownership; the house as the center of loving relationships and activities, and the house as an expression of social status as well as past and present personal identity” (p. 86). Correspondingly, several ideas were considered in defining the term comfort for the purpose of this study, including well being, safety, familiarity, happiness, control, and relaxation. The definition of comfort used for this study is meant to reflect and encompass all of these ideas.

The Tourism industry, hotel and lobby design, consumer preference and the concept of comfort are all interrelated and critical to this research study. The design of hotel lobbies can create feelings of great comfort or discomfort for guests. Implementing design elements that are found to be preferred will affect the success of creating comfortable environments. In reviewing the current literature, several instances were found where designers have used the word comfort to describe a lobby space. However, not once was the term defined, nor was there any evidence to show that the users of the space agreed with these claims. This research study is significant because it addresses hospitality design and business concerns that may benefit from a focus on user preference of design elements and comfort for hotel lobbies.

Methodological Support

This research study will utilize visual stimuli in order to collect data on user preference of design elements in hotel lobbies. There are several examples of studies that have successfully used various visual stimuli to measure some aspect of how people experience the built environment. These studies have found that responses to photographs of environments compare rather highly with responses to the actual environment (Marsden, 1999). Marsden used a Multiple Sorting Task with visual stimuli to examine

which architectural elements are viewed as *homey* in assisted living facilities. The Multiple Sorting Task asks participants to separate photographs or other images into categories. This study focused on variations of three architectural elements: roof line, main entry and building materials. Marsden (1999) listed several advantages that come from using photographs to represent environments:

> (a) the possibility of including buildings that are located in scattered places without having to obtain responses on site; (b) a reduction on the amount of time required of participants as a result; (c) the ability to focus on specific aspects of designated buildings; and (d) the ability to control for specific distractions such as inclement weather, seasonal differences, people, cars, signage, poles, wires, glare, and dark shadows. (pp. 87-88)

The Multiple Sorting Task helped to identify which architectural elements are important to people's perceptions of homeyness. For instance, pedestrian entries were rated as much more homelike than vehicular entries, as were one story buildings in comparison to two story buildings (Marsden, 1999). A series of open ended questions at the end of the sorting task supported and elaborated on these findings.

Wilson and Mackenzie (2000) asked participants to rate visual stimuli in an effort to examine the social attributes people derive from domestic interiors. In this study, participants were shown a series of photographs of residential living rooms and asked to describe the people they thought might inhabit them. In contrast to Marsden's research, there were no categories predefined by the researcher. Instead, participants were asked to develop their own descriptions, which included variations on sex, income, occupation, age, and family status (Wilson & Mackenzie, 2000). Wilson and Mackenzie (2000) showed that "people were able to derive social and personal qualities from an environmental context" (p. 345) and that people associate certain personal characteristics with physical features of an environment. This is important in supporting the research

about hotel lobbies and comfort. It can be assumed then, that hotel guests will make judgments about the hotel as an establishment and about what type of people would stay at a hotel, from the physical features of the building. This is critical because if a guest determines that a certain type of person would stay in a particular hotel based on the physical environment of the lobby, and they do not classify themselves as that type of person, they may feel unwelcome and choose to stay elsewhere.

In a comparable study, Arneill and Devlin (2002) used a Multiple Sorting Task to determine how waiting room environments in physicians' offices influence the perceived quality of care. The influence of the interior environment on perception is critical because patients' perceptions play a very powerful and important role in their overall satisfaction with healthcare (Arneill & Devlin, 2002). A physician's office waiting room must convey empathy, warmth and friendliness even before the patient interacts with staff, much on the same way that a hotel lobby space must portray the hotel's corporate image, identity and personality from the moment guests walk in the door. Participants in this study were asked to rate photographs of waiting room spaces based on two variables: (1) The quality of care they think would be delivered by the doctor of a particular waiting room, and (2) How comfortable they would feel in the environment (Arneill & Devlin, 2002). This study used a visual analog scale, asking participants to place an "X" somewhere along a 10 cm line, with the 0 cm point representing the least preferred and the 10 cm point being the most preferred (Arneill & Devlin, 2002). The waiting rooms varied in dimensions and scale, arrangement of furniture, and addition of other items in the space such as a television or magazines (Arneill & Devlin, 2002). The results of the study showed that waiting rooms that were nicely furnished, well lit, and contained artwork received higher

scores on both perceived quality of care and comfort levels (Arneill & Devlin, 2002). This researcher hopes to prove similar results, illustrating that the physical environment of a hotel lobby may affect the perceived quality of a hotel, including the overall perceived quality of rooms, staff, and amenities.

CHAPTER 2
METHODOLOGY

Simulation Research

This research study is an example of simulation research. This type of research was sparked by the common human fascination with the replication of real world realities (Groat & Wang, 2002). Simulation research is characterized by the generation of data, in a schematic form, that can be restored to the real-world context for its benefit (Groat & Wang, 2002). This type of research involves controlled replications of real-world environments, or hypothesized real-world environments for the purpose of studying dynamic interactions within that setting (Groat & Wang, 2002). In general, simulation research can be used to develop theories about the built environment and to test those theories (Groat & Wang, 2002). According to Crano and Brewer, simulation research is especially useful for testing theory-driven proposals for how the physical environment may affect some aspect of life for users of the space (Groat & Wang, 2002). Simulation research is similar to experimental research in that both methods isolate a particular context and manipulate variables (Groat & Wang, 2002). However, simulation research acknowledges that cause-effect relationships are typically not clear in real-world situations, which normally involve variables and interactions that are difficult to accurately isolate (Groat & Wang, 2002).

This type of research has many uses in research involving the built environment. Simulating a space may allow architects, designers, builders, and users to experience a space before it is actually built. This may help make them aware of any unforeseen

problems or changes that need to be made. A more common use for simulation research is to gather information about dangerous conditions without actually putting people in harm's way (Groat & Wang, 2002). For instance, researchers can observe simulations of a building's behavior in response to severe natural occurrences such as earthquakes or high winds. A similar type of test can be seen in almost any architectural or engineering class where students are asked to build a model bridge and load it with weights until it collapses, allowing the students to determine the strength of a bridge design. Simulation research is also used in testing of building materials (Groat & Wang, 2002). These materials go through tests imitating real-world strains before they can be permitted to be in commercial markets. These tests are generally mandated by government regulations (Groat & Wang, 2002). One such test performed by the Underwriters Laboratories (UL) allows fire-ratings for wall and ceiling assemblies to be specified after testing mock-ups under simulated fire conditions (Groat & Wang, 2002). Finally, simulation research can be used to measure subjective dimensions of human behavior and attitude in response to built environments (Groat & Wang, 2002).

Architects and designers often use mock-ups during design development as information collection to inform design decisions. An example of this type of simulation research is seen in a study done by Flynn, Spencer, Martyniuk and Hendrick (1973). The researchers set up an area in a lighting laboratory to simulate a conference room. They asked a total of 96 subjects to react to six different combinations of overhead down-lighting and wall-lighting. They measured participants' responses on four factors: evaluative impression, perceptive clarity, spatial complexity and spaciousness (Flynn, Spencer, Martyniuk & Hendrick, 1973). It was found that overhead down-lighting

simulations were seen in an unfavorable way more so than wall-lighting techniques, regardless of actual foot-candle intensity (Flynn, Spencer, Martyniuk & Hendrick, 1973).

Variables of Interest

This research study will measure the interaction between participants' preference levels and various design elements in hotel lobby spaces. The research will concentrate on four physical design elements: 1) scale; 2) materials; 3) furniture type and arrangement; and 4) access to daylighting and views. The researcher will define two categories for each element. The scale of the lobby will be categorized into small scale or large scale. Small scale lobbies will have low ceilings (9 ft.), small reception desks, smaller furniture and decorations, smaller details such as baseboards and window trim, and overall be small in size. Large scale lobbies will have high ceilings (15 ft.), large reception desks, oversized furniture and decorations, larger details such as baseboards and window trim, and overall be large in size. Finish materials will be categorized into hard materials, such as marble, tile, glass and metal, or soft materials, such as carpet, wood, leather and upholstery. Materials can be on floor or wall surfaces or part of furniture. Furniture arrangements will be individual seating or group seating. Individual seating areas will consist of chairs arranged in a way that does not support interaction between guests. On the other hand, group seating will use couches, loveseats, and chairs arranged in a way that will facilitate conversation and interaction. Access to daylighting and views will be accomplished through the use of windows, whereas spaces that do not have this access will not have windows.

Visual Stimuli

The researcher produced three sets of sixteen images, for a total of 48 images (see Appendix A). These images are simulations of hypothesized real-world spaces. Each of

the three sets will show every possible combination of the variations of the four design elements, all within one space. The sixteen possible combinations of elements are:

1. Small scale, Soft materials, Individual seating, No access to daylighting/views
2. Small scale, Soft materials, Individual seating, Access to daylighting/views
3. Small scale, Soft materials, Group seating, No access to daylighting/views
4. Small scale, Soft materials, Group seating, Access to daylighting/views
5. Large scale, Soft materials, Individual seating, No access to daylighting/views
6. Large scale, Soft materials, Individual seating, Access to daylighting/views
7. Large scale, Soft materials, Group seating, No access to daylighting/views
8. Large scale, Soft materials, Group seating, Access to daylighting/views
9. Small scale, Hard materials, Individual seating, No access to daylighting/views
10. Small scale, Hard materials, Individual seating, Access to daylighting/views
11. Small scale, Hard materials, Group seating, No access to daylighting/views
12. Small scale, Hard materials, Group seating, Access to daylighting/views
13. Large scale, Hard materials, Individual seating, No access to daylighting/views
14. Large scale, Hard materials, Individual seating, Access to daylighting/views
15. Large scale, Hard materials, Group seating, No access to daylighting/views
16. Large scale, Hard materials, Group seating, Access to daylighting/views

The three sets will be labeled Set A, Set B, and Set C. There will be few extra, if any, differences across designs for a given set aside from those involved in varying the four design elements. If there are other features included in the space, they will be exactly constant in all sixteen images. Using the sets of images from all three different spaces will allow more comparisons between data and increase the external validity of the findings. The images for the study will be drawn by the researcher using AutoCAD 2004, a computer aided drawing program commonly used by architects and interior designers.

The images will be printed out onto velum paper, each measuring 6”x9” in a landscape orientation, and then hand rendered by an interior design student at the University of Florida using Chartpak markers and Prismacolor colored pencils. Each rendered image will then be color photocopied onto glossy photograph paper and then laminated. The three different spaces used for the images will be based roughly on actual documented lobbies of hotels in Florida that are four-star rated based on Mobil Corporation’s five star rating system (see Appendix B). This five star rating system has been used for over 40 years in the U.S. and its ratings are based on cleanliness, service, guest safety, quality and condition of guest rooms, public spaces and furnishings, and the helpfulness of the staff (W., 1995). During the data collection process the sixteen images from each set will be attached to three 29”x41” grey foam core boards, one for Set A, one for Set B, and one for Set C (see Appendix C). The images will be attached by Velcro on the back that will be hidden from view and allow the easy rearrangement of their order. The images on each board will be displayed in four rows of four images each, with a one inch border and one inch between each image. This way the participants can see all sixteen images simultaneously. The images in each set will be clearly numbered from (1) one to (16) sixteen so that respondents can rate them. The images in each of the three sets with the same variations of each element will be assigned the same number. For instance, the images representing large scale lobbies with access to daylighting and views that have group seating and hard materials from Set A, Set B, and Set C will have be labeled #1. The sixteen images will be arranged in random order and then rearranged after every ten participants. Each different random order will be calculated by Greg Bender’s RAT (Randomize and Test) software. This software was available for free download from

http://thisoldtractor.com/gtbender/software.htm . After inputting the number of variables (four design elements) and the number of variations of each (two variations of each element) the RAT software produces as many randomized orders for the sixteen images as needed. The complete list of all randomized orders used is included in the Appendix D. For instance, the first three randomized orders are:

- A1 15-2-5-12-6-8-10-1-7-16-11-14-3-13-4-9
- B1 7-15-3-12-5-2-1-16-14-6-8-4-13-10-9-11
- C1 5-11-3-2-13-6-12-8-7-1-9-15-4-14-10-16

Data Collection Tool

The data collection tool for this study will be a questionnaire with a rating scale (see Appendix E). Before the participant is shown the images, each will be given a questionnaire to complete. The questionnaire will ask for basic demographic information such as age, sex, marital status and number of children. Each participant will also be asked whether their last travel experience was leisure travel or business travel. The questionnaire also provides space for the participant to record the results from each of the three sets of images. Each respondent will first be shown a board that contains one of three sets of sixteen images, Set A, Set B, or Set C. The respondent will be asked to rate each image based on their preference level of the space. The rating scale will range from one (1) to nine (9), with one (1) being “Prefer Least” and nine (9) being “Prefer Most”. The respondent will be shown a second and then a third set of images and asked to repeat the procedure. The three sets will be shown to each participant in random order. Each participant of the study will rate all sixteen images from all three sets. The questionnaire will also ask participants to explain why they rated each image as “Prefer Least” and as “Prefer Most”. The entire process should take between fifteen and twenty minutes. Groat

and Wang (2002) have reported that in the past, students have felt that this type of task, with a visual exercise, was an effective alternative to simply asking people to state their preferences in a conversation or interview. In addition, this type of task can begin to resemble a board game format, which can reduce test anxiety and the monotony which is often associated with surveys (Marsden, 1999).

Preference Scales

According to Kevin J. Clancy and Robert Garsen (1970), researchers are very interested in the quantitative aspects of the relationship between attitudes and behaviors, and in the ability of survey responses to predict actual consumer behavior. There are two commonly used preference scales, Monadic preference scales and Comparative preference scales (Clancy & Garsen, 1970). Monadic preference scales attempt to measure a consumer's preference in absolute terms, not in relation to anything else (Clancy & Garsen, 1970). For this type of scale, participants are exposed to one product or one image at a time. Conversely, Comparative preference scales attempt to measure a consumer's preference for one thing relative to another (Clancy & Garsen, 1970). For this type of scale, participants are exposed to multiple stimuli at once. Monadic preference scales are subject to response biases caused by certain response styles, which have to do with the test behavior of respondents and commonly refers to one's inclination to agree or disagree with items in spite of their content (Clancy & Garsen, 1970). It has been found that with this type of scale, some respondents tend to rate all stimuli in a favorable way, known as "yeasayers" while others tend to rate all stimuli in an unfavorable way, "naysayers" (Couch & Keniston, 1960). Comparative preference scales are relatively immune to this type of response-style bias because showing multiple stimuli at once reduces "the likelihood of respondent's rating multiple stimuli the same way" (Clancy &

Garsen, 1970, p. 34). With this type of scale, respondents are more likely to express preferences in a judicious manner, and so rate preferences in a way that is more predictive of actual behavior (Clancy & Garsen, 1970). The methodology used for this study is a Comparative preference scale since all sixteen images of a space are shown to respondents at once.

Participant Sampling

The participants for this study will be recruited from the waiting area at the Gainesville Regional Airport located at 3880 NE 39th Avenue, Gainesville, Florida. Mr. Tatum Fisher, Director of Operations at the Gainesville Regional Airport has supplied written permission to allow the collection of data at this location (see Appendix F). The researcher will select adults over the age of 18, both male and female. Approximately 30 participants will be recruited for this study. All of the potential participants will be asked to participate in a research study that focuses on guests' preference levels of hotel lobby spaces. Each will be given an informed consent document to read (see Appendix G). If he/she chooses to participate, he/she will sign the informed consent document, return it to the researcher, and then he/she will be given a copy of this document for his/her personal records. Each potential participant will also be ensured that participation in the study is strictly voluntary and that if he/she do choose to participate, his/her responses will be kept strictly confidential. The Internal Review Board of the University of Florida has determined that this study poses no more than minimal risk to participants (see Appendix H). In compensation for participation in this research study, participants will be given either a Hershey chocolate bar or a Pilot Precise ink pen.

In summary, this study falls under the category of simulation research. Using visual stimuli that are a drawn using computer software and then hand rendered, the researcher

surveys respondents on their preference level for hypothetical hotel lobby spaces. Participants will read and fill out an informed consent document prior to participation that details the procedure. The University of Florida Institutional Review Board has determined that this study poses no more than minimal risk to those who participate.

Pilot Study

In an effort to assess the appropriateness of the research tool to test the effects of scale, materials, seating type/arrangement and access to daylighting/views on preference for hotel lobby spaces, the researcher performed a pilot study prior to collecting the actual data. The pilot study took place at the same location, The Gainesville Regional Airport, and utilized the same visual stimuli and data collection tool prepared for the actual data collection. The only difference between this procedure and the actual data collection procedure was that participants were asked to voice any questions or concerns they had while participating in the study.

A total of seven participants took place in the pilot study. The only question asked during the actual procedure was where a door went to in one of the images. There were no questions regarding the differences in the images or what things were, including furnishings and materials. After participating, each participant was asked if there were any problems with the survey or if it was hard to understand. The only negative response was that it was fairly time consuming, requiring approximately twenty-five minutes to complete.

Results of Pilot Study

The data collected during the pilot study was analyzed suing the same statistical analysis that would be used on the actual data collection. These methods are described in Chapter 3. The pilot study found that each of the four design elements affected overall

preference rating of the lobby spaces. The scale of the lobby had the largest relative effect, with an F-test statistic of 30.688 and a corresponding significance value of 0.001. Whether or not the space had access to daylighting and views was second with an F value of 29.340 and a significance of 0.002. The third most important design factor in determining overall preference for a space was materials which had an F-test statistic of 7.934, and significance of 0.030. Finally, the seating type and arrangement had the smallest effect on preference, however the effect was still significant based on an alpha of 0.05. The F value was 7. 810 and the corresponding significance was 0.031. The pilot study found that these results were the same across all three sets of images.

The pilot study also produced preliminary results about which variations of each element was most preferred by users. Having access to daylighting and views through windows was preferred over not having such access; large scale lobbies were preferred to small scale lobbies; soft materials such as wood and carpet were preferred over hard materials such as slate and terrazzo; and group seating arrangements that afforded interaction were preferred over individual seating arrangements that did not. In fact, the image that had the highest mean preference rating for both Sets A and B was image #8, with means of 7.57 and 8.14 respectively. This is the image that represented large scale lobbies, access to daylighting and views, soft materials and group seating. In Set C, image #6 had the highest overall preference rating of 8.143. This image also represented large scale lobbies, access to daylighting and views and soft materials but instead had individual seating.

The Excel file with the input data from the pilot study is available in Appendix I.

Resulting Revisions

After completing the pilot study there were three changes made to the survey procedure. First, the original survey asked participants after rating each set of images to describe what they like about images they rated a nine, which was the highest possible score, and what they disliked about the images they rated a one, the lowest possible score. Upon reviewing the questionnaires from the pilot stuffy it was clear that the participants didn't always use ones or nines. In order to still get this supplemental information, the wording was changed. The new questionnaire to be administered in the actual data collection asked participants after each set to describe what they like about the image they rated the highest, regardless of what the high score was, and what they disliked about the image they rated the lowest.

The second revision that was made to the questionnaire dealt with recognized the difference in the images. After rating each entire set of images, a section was added asking participants to describe the main differences the saw between the set of sixteen images. This information will be used to reinforce that the study is in fact testing what it is supposed to test: the effects of scale, access to daylighting/views, materials and seating type/arrangement on overall preference ratings for hotel lobby spaces.

The final revision made to the questionnaire after completing the pilot study was the addition of a new scale. At the end of the questionnaire, after participants had rated the images from all three sets, participants would now be asked to rate the relative importance of each of the four design elements being considered to their preference for a space. The additional rating task used a scale on one to seven, with one being the least important and seven being the most important. The scale was not meant to be connected to any space in particular, but rather to interior environments in general. The

informational gathered from this additional scale will be compared to the relative order of importance calculated from the ratings of the image.

CHAPTER 3
STATISTICAL ANALYSIS AND RESULTS

After collecting the data, it was entered into Excel and exported to SPSS, a computer program for statistical analysis. Each participant's identification number will be in a row of the first column and their preference rating for each of the forty-eight images will be in the columns that follow, with the sixteen from Set A first, the Set B and then Set C. This data can be seen in its entirety in Appendix J.

Descriptive Statistics

Descriptive statistics will be run on the preference ratings for each image. The images in each of the three sets with the same variations of each element will be assigned the same number. For instance, the images representing large scale lobbies with access to daylighting and views that have group seating and hard materials from Set A, Set B, and Set C will have be labeled #16. Descriptive statistics are summary statistics of data already collected from a sample. These numbers present the observations in terms that are more meaningful and useful to the observer (Agresti & Finlay, 1999). Descriptive statistics include mean (or average) rating, median (middle) rating, and mode (most frequent) rating (Agresti & Finlay, 1999). These statistics will show which images received the highest and lowest rating on the preference scale. The same type of analysis will also be performed on the demographic information to summarize the characteristics of the sample population.

Analysis of Variance

After descriptive statistics are run on the data, an Analysis of Variance will be performed. Analysis of Variance was developed by R.A. Fisher in 1920 and was originally used for data dealing with agricultural experiments (Agresti & Finlay, 1999). Analysis of Variance is used to uncover the main and interaction effects of categorical independent variables on an interval dependent variable (Agresti & Finlay, 1999).

The main effect is the direct effect of each independent variable on the dependent variable and the interaction effect is the joint effect of two or more independent variables on the dependent variable. For this study, the qualitative explanatory variables are the four design elements being examined: scale, materials, furniture type and arrangement, and access to daylighting and views. Each of these explanatory variables has two levels. For instance, the independent variable scale has two levels: small scale and large scale. In addition, a fifth factor will be included: set. This will allow the researcher to determine if the effects of the other four variables are the same across the three sets of images. The quantitative response variable is the preference rating from the preference scale. The ANOVA simultaneously compares the means of several groups at once (Agresti & Finlay, 1999). A one-way ANOVA allows you to compare the means between different categories of one qualitative explanatory variable (Agresti & Finlay, 1999). This study will require the use of a five-way factorial ANOVA. The factorial ANOVA is used to assess the relative importance of various combinations of the independent variables (Agresti & Finlay, 1999). In a factorial design, all possible combinations of levels of the independent variables are represented as groups in the design. For this study, there are four independent variables with two levels each and one independent variable with three levels (Agresti & Finlay, 1999). This creates a design with forty-eight groups

(2*2*2*2*3=48) representing every possible combination of the design elements across the three sets. The complete list describing these groups was given in Chapter 2 on page 22.

F-Test Statistic

The key statistic in the Analysis of Variance is the F-test of difference of means, testing if the means of the groups formed by values of the independent variables are different enough not to have occurred by chance. If the group means do not differ significantly then it is inferred that the independent variables did not have an effect on the dependent variable. The null hypothesis for this test is that the mean preference ratings for each independent variable and their interactions are equal. In this case, $F=0$. The alternative hypothesis would be that they are not equal, or $F \neq 0$. From here, the F-test statistic is computed for each independent variable and then a corresponding p-value is found. The p-value is the probability that the determined difference in means would exist if the null hypothesis were actually true, and the means were equal. The p-value is also known as the significance. Furthermore, by reducing the sample size based on certain demographic characteristics, it will be possible to determine, for instance, specifically how married women with three or four children respond to the design elements.

Significance Levels

The Analysis of Variance will determine the effect size of each independent variable and all interactions on the dependent variable (Agresti & Finlay, 1999). The p-value, generally referred to as the significance, is a standardized measure of the strength of a relationship. The significance indicates the relative importance of a given main or interaction effect. These significances are computed as a function of differences in subgroup means by effect category. The significance of each factor is divided by the

pooled standard deviation to provide a coefficient that will allow comparison between the groups (Cortina & Nouri, 2000). In other words, the analysis will determine the strength of the relationship between preference for a space and scale, materials, access to daylighting and views, and seating type. The independent variable with the largest significance level will have the strongest and most significant effect of the respondents' preference of hotel lobby spaces. In tests with an alpha of five percent (5%), the significance level must be less than 0.05 to indicate that the independent variable does indeed have a significant effect on the dependent variable.

Eta^2 Statistic

A supplementary test statistic that will be determined is Eta^2, also called the *coefficient of nonlinear correlation*. This measure represents the ratio of the between-group sum of squares to the total sum of squares (Cortina & Nouri, 2000). The between-groups sum of squares is the effect of the group variable, in this case the interior design elements (Cortina & Nouri, 2000). In other words, Eta^2 is the percent of the total variation in the dependent variable, preference rating for a lobby space, accounted for by the variances between the possible combinations of the independent variables, the interior design elements (Cortina & Nouri, 2000). A larger value of Eta^2 means that a variable affected the dependent variable more so than a variable associated a smaller Eta^2. This is a measurement of how well one variable (one of the four design elements) predicts another (preference rating of a lobby space).

Confidence Intervals

After determining the F-test statistic for each independent variable and their interactions, a marginal mean value is computed for each level of the four independent variables, based on the preference scale of one to nine. From this marginal mean,

confidence intervals can be found based on an alpha level of 0.05. The confidence interval is a range of numbers within which the parameter is believed to fall (Agresti & Finlay, 1999). The parameter in the case of this study is the true population preference rating for each level of the four design elements in hotel lobby spaces. The probability that the confidence interval contains the parameter is called the confidence coefficient (Agresti & Finlay, 1999). Using an alpha level of 0.05, the confidence coefficient is 95%. For example, after computing the marginal mean preference for small scale lobbies the confidence interval provides the range within which one is 95% confident that the true population value of the mean preference for small scale lobbies is believed to fall.

Results

There were a total of thirty participants in this research study. All of the participants completed the entire process, responding to all forty-eight images. The Excel file with the initial data input is included in Appendix J.

Demographics

Of the thirty participants in the survey, twelve were between the ages of eighteen and twenty-five; seven were between the ages twenty-six and thirty-five; six were between the ages of thirty-six and forty-five; four were between the ages of forty-six and fifty-five; and one was over the age of fifty-six. Seventeen of the participants were male and thirteen were female; fifteen were single, thirteen were married, one was divorced and one was in the “Other” category. The large majority of participants, twenty-one of thirty, had no children; two had one child; three had two children; two had three children; and two had four children. Only three of the thirty participants stayed in hotels more than seven times a year; nine stayed in hotels five or six times a year; eleven stayed three or four times; and seven stayed one or two times. Finally, the large majority, twenty-one of

the thirty, traveled for leisure; seven traveled solely for business while two traveled for a combination of leisure and business. Table 3-1 summarizes this information.

Table 3-1: Demographics

Age			**# Kids**			**Hotels/ Yr**		
	#	**%**		**#**	**%**		**#**	**%**
18-25	12	40.0%	0	21	70.0%	0	0	0.0%
26-35	7	23.3%	1	2	6.7%	1 or 2	7	23.3%
36-45	6	20.0%	2	3	10.0%	3 or 4	11	36.7%
46-55	4	13.3%	3	2	6.7%	5 or 6	9	30.0%
56+	1	3.3%	4	2	6.7%	7+	3	10.0%
Total	30	100.0%	*Total*	30	100.0%	*Total*	30	100.0%
Marital Status			**Reason**			**Sex**		
	#	**%**		**#**	**%**		**#**	**%**
Single	15	50.0%	Business	7	23.3%	Female	13	43.3%
Married	13	43.3%	Leisure	21	70.0%	Male	17	56.7%
Divorced	1	3.3%	Both	2	6.7%	*Total*	30	100.0%
Other	1	3.3%	*Total*	30	100.0%			
Total	30	100.0%						

Descriptive Statistics for Images

Each of the forty-eight images, A1 through C16, was rated a total of thirty times on the preference scale of one to nine. The image in Set A with the highest mean rating was A8, with mean rating of 7.37. Image A8 represented a large scale lobby space with access to daylighting and views, soft materials and a group seating arrangement. The lowest scoring image from Set A was image A9, with a mean rating of 3.60. This image was of a small scale lobby without access to daylighting and views that used hard materials and an individual seating arrangement.

For Set B, the highest score was for image B8, with a mean rating of 7.50, while image B9 rated lowest with a mean of 3.47 out of the possible 9. Image B8 represented a large scale lobby space with access to daylighting and views, soft materials and a group seating arrangement. Conversely, image B9 showed a small scale lobby without access to daylighting and views that used hard materials and an individual seating arrangement.

Finally, for Set C, image C6 had the highest mean of 7.23 and image C9 had the lowest rating of 3.53. Image C6 represented a large scale lobby that hard access and daylighting and views and used soft materials. Unlike the other highest scoring images however, C6 had an individual seating arrangement rather than a group arrangement. Like the other two lowest scoring images, C9 represented a small scale lobby, no access to daylighting and views, hard materials and an individual seating arrangement. The three images had the greatest variation in rating were A13, B11 and C5 with standard deviations of 2.207, 2.255 and 2.303 respectively. A complete report of the descriptive statistics including the mean, mode and standard deviation for each image is in Table 3-2.

Table 3-2: Descriptive Statistics for Images

	Mean	Mode	St. Dev.		Mean	Mode	St. Dev.		Mean	Mode	St. Dev.
A1	3.67	4	1.605	**B1**	4.07	3	1.931	**C1**	4.23	5	2.046
A2	5.00	5	1.486	**B2**	4.97	4	1.866	**C2**	6.10	7	1.918
A3	4.53	6	1.634	**B3**	4.97	6	1.829	**C3**	4.37	5	1.671
A4	5.60	6	2.143	**B4**	5.83	5	1.931	**C4**	5.40	6	1.850
A5	4.47	4	1.995	**B5**	5.40	7	2.222	**C5**	5.27	7	2.303
A6	5.60	5	2.094	**B6**	6.63	8	1.847	**C6**	7.23	9	2.285
A7	5.43	6	1.906	**B7**	6.40	5	1.673	**C7**	4.87	6	1.907
A8	7.37	8	1.752	**B8**	7.50	9	1.834	**C8**	6.50	7	2.209
A9	3.60	2	1.958	**B9**	3.47	3	1.717	**C9**	3.53	1	2.193
A10	5.27	5	2.180	**B10**	4.77	5	1.675	**C10**	5.33	7	1.900
A11	4.60	5	2.027	**B11**	4.47	2	2.255	**C11**	3.77	4	1.851
A12	5.77	8	2.079	**B12**	5.63	4	2.025	**C12**	4.87	6	1.548
A13	4.60	6	2.207	**B13**	4.93	7	2.116	**C13**	4.70	5	2.103
A14	6.03	7	1.991	**B14**	6.03	7	1.752	**C14**	6.27	7	2.132
A15	5.63	5	1.903	**B15**	5.53	7	1.795	**C15**	4.57	5	1.888
A16	6.73	8	1.946	**B16**	6.53	8	2.013	**C16**	6.07	5	2.067

F-Test Statistics and Significance Levels

An F-Test statistic was computed in SPSS for each of the five factors (set, materials, scale, seating type/arrangement and access to daylighting/views) and the interactions between the factors. The larger the value for F, the greater the difference in mean preference rating for a space associated with that factor. After the F-Test statistics were calculated for each factor and the various interactions, a p-value or significance can

be determined. When using an alpha level of 5%, any significance value under 0.05 means that the factor or interaction had a significant effect on the overall preference rating for a space. Unlike the F-Test statistic values, the lower the significance value the stronger the effect.

Table 3-3: F-Test Statistics and Significance Levels

Factors	F	Sig.	Factors	F	Sig.
Set	1.245	0.303	Set-Materials-Scale	1.771	0.189
Materials	9.507	0.004	Set-Materials-Seating	1.651	0.210
Scale	58.023	0.000	Set-Scale-Seating	2.351	0.114
Seating	4.256	0.048	Materials-Scale-Seating	1.363	0.253
Access	74.302	0.000	Set-Materials-Scale-Seating	1.288	0.292
Set-Materials	5.253	0.012	Set-Materials-Access	0.565	0.575
Set-Scale	3.295	0.052	Set-Scale-Access	0.197	0.823
Materials-Scale	1.481	0.233	Materials-Scale-Access	3.650	0.066
Set-Seating	3.344	0.050	Set-Materials-Scale-Access	0.241	0.788
Materials-Seating	0.150	0.701	Set-Seating-Access	1.412	0.261
Scale-Seating	0.015	0.905	Materials-Seating-Acess	1.031	0.318
Set-Access	1.530	0.234	Set-Materials-Seating-Access	1.658	0.209
Materials-Access	0.017	0.898	Scale-Seating-Acess	6.069	0.020
Scale-Access	0.459	0.503	Set-Scale-Seating-Acess	2.000	0.154
Seating-Access	2.888	0.100	Materials-Scale-Seating-Acess	0.152	0.699
			Set-Materials-Scale-Seating-Acess	0.396	0.676

The access to daylighting/views had the largest F value, 74.302 with a p-value of approximately 0.00. The second largest value for F was for scale, 58.023 which also had an associated p-value of 0.00. Materials and seating type/arrangement were next, with F values of 9.507 and 4.256 and p-values of 0.004 and 0.48, respectively. Last of the five factors, the F value for set was lower than the other at 1.245. This fifth factor was insignificant with a p-value of 0.303.

A few of the interactions between the five factors produced significant results with considerably large F values as well. The two way interaction between set and materials had an F of 5.253 and a significance of 0.012; set and seating type/arrangement had an F value of 3.344 and a significance of 0.05. The only three way interaction to have a large F value was between scale, seating type/arrangement and access to daylighting/views, with

an F of 6.069 and a p-value of 0.020. Table 3-3 shows the F-Test statistics and significance values for all five factors and all of the possible interactions between them.

A ranking of the level importance of each of the four design elements was calculated a second way. After the pilot study, an additional scale was added to the end of the questionnaire asking participants to rate, in general, the relative importance of each of the four design elements being considered to their overall preference of a hotel lobby space. The possible scores were between one and seven. A rate of one meant the design element was not at all important and a seven meant that the design element was very important to the overall preference of a lobby space. Access to daylighting and views had a mean rating of importance of 6.63. Scale of the lobby space had a mean importance rating of 5.77. Materials were given a mean importance rating of 5.30 and finally, the mean importance rating for seating type and arrangement was 5.93.

Eta^2 Statistic

Eta^2, the coefficient of nonlinear correlation, is a number between 0 and 1.0. The closer Eta^2 is to one, the better predictor the independent variable is of the dependent variable. In this study, access to daylighting and views had the largest Eta^2, 0.719. Close behind was scale of the lobby, with Eta^2 of 0.667. The third greatest correlation was from materials, having an Eta^2 of 0.247. Finally, seating type and arrangement had an Eta^2 of 0.128. The fifth factor, set, was the worst predictor of the preference rating, with an Eta^2 of 0.082. This statistic orders the importance of the interior design elements the same was that the F-test statistic and significance level, further supporting the results already reported.

Confidence Intervals

The marginal mean preference rating was determined for both variations of each of the four interior design elements being examined. This value is based on the preference rating scale of one to nine, one being “Prefer Least” and nine being “Prefer Most”. The marginal mean preference rating for spaces with access to daylighting and views was 5.960. With the assigned alpha of 0.05, one can be 95% confident that the true population value of the mean preference rating for lobbies with access to daylighting and views falls between 5.540 and 6.380. For the opposing level, no access to daylighting and views, the marginal mean was 4.628 with a 95% confidence interval of 4.220 to 5.035. The marginal mean preference rating for large scale lobbies was 5.846 and one can be 95% confident that the true population value falls between 5.425 and 6.267. For small scale lobbies, the marginal mean preference rating was 4.742 with a 95% confidence interval of 4.343 to 5.140. Group seating arrangements had a marginal mean preference rating of 5.539. With the assigned alpha of 0.05, one can be 95% confident that the true population value of the mean is between 5.059 and 6.018. In contrast, individual seating arrangements had a marginal mean preference of 5.049 with a 95% confidence interval of 4.264 to 5.473. Finally, lobbies with soft materials had a marginal mean preference rating of 5.475 and a corresponding 95% confidence interval of 5.084 to 5.866. Lobbies with hard materials had a marginal mean of 5.112 and a 95% confidence interval of 4.702 to 5.523.

The standard errors ranged from 0.191 to 0.234. The largest standard deviation was associated with the group seating arrangement. The smallest standard deviation was for lobbies with soft materials.

Additional Analysis

In addition the statistical analysis performed on the group of participants as a whole, some additional calculations were performed to see if certain demographic characteristics affected how one responded to the different design elements in hotel lobbies. Specifically, the researcher determined the effect of sex and age on the significance level of each factor.

Sex and Significance Levels

Thirteen woman and seventeen men participated in this research survey. The only significant effect that the participants' sex had was on the interaction between materials, scale and seating type/arrangement. The F-Test statistic for the four way interaction was 4.441 and the significance value was 0.044, just slightly lower than the alpha of 0.05.

Age and Significance Levels

The participants in this study were separated into one of five age groups. The age group most represented was eighteen to twenty-five year olds, with twelve of the thirty participants falling within this range. The smallest representation was the fifty-six and over group, with only participant fitting in here. The only significant effect that the participants' age had was on the interaction between set, materials, scale and access to daylighting/views. The F-Test statistic for the five way interaction, computed using Pillai's Trace was 2.351 and the significance value was 0.031.

Detected Differences in Design Elements

After the pilot study, a section was added to the questionnaire asking participants to describe the main differences they saw in the each set of sixteen images. The purpose of this was to make sure that the participants were seeing the differences they were supposed to see: the two different variations of each of the four design elements. With 30

participants in the study, responding to each of three sets of images, there were 90 opportunities for a difference to be reported. If all 30 participants recognized a difference in a particular element in all three sets, there would be a 100% detection of difference rate. In actuality, differences in scale were reported 82 out of the possible 90 times, yielding a detection of difference rating of 91.11%. Differences in access to daylighting and views were reported 80 out of 90 times, which equals 88.89%. Participants reported noticing differences between individual and group seating arrangements 79 out of the possible 90 times, giving a detection of difference rating of 87.78%. Finally, 76 out of a possible 90 differences were reported for materials, which is 84.44%.

CHAPTER 4
DISCUSSION

The statistical analysis performed on the collected data produced definitive and meaningful results. The quantitative outputs of the analysis, supported by supplemental qualitative information gathered from participants, have the potential to greatly affect the future designs hotel lobby spaces. Not only did the study determine the variation of each of the four design elements considered that was preferred by participants, but also the relative importance of each design element to the overall preference rating for hotel lobby spaces.

Preferred Variations of the Design Elements

The four design elements under consideration in this study were scale, materials, seating type/arrangement and access to daylighting and views. Two opposing variations of each element were included in the images of the hotel lobby spaces in order to determine which variation was preferred. By comparing the preference scores for the images based on which variation of each element was represented and supplementing that with the participants' open-ended responses to questions regarding what they liked or disliked about each image, it was possible to determine the preferred variation of each of the four design elements. Again, participants rated their preference for each image on a scale of one to nine, one being "Prefer Least" and nine being "Prefer Most".

Access to Daylighting and Views

In reference to daylighting and views, the images used for this research study represented both spaces that had access to daylighting and views and those that did not.

Access to daylighting and views was obtained through the presence of windows in the hotel lobby spaces. Having access to daylighting and views was preferred over not having access ($F(1, 29) = 74.303$, $p<.001$).The mean preference rating for all of the spaces with access to daylighting and views was 5.96. The mean preference rating for all of the spaces without access to daylighting and views was 4.63. The cumulative effect on the difference in preference rating between spaces with access and spaces without access was 1.33. In addition, when participants were asked what they like and disliked about the spaces represented by the images, there were sixty-six reports of liking spaces with access to daylighting and views and fifty-nine reports of disliking spaces without access. There was only one report of liking the spaces without access and zero reports of disliking the spaces with access to daylighting and views. Positive comments about spaces with access to daylighting and views included that they were “comfortable”, “have an open feeling”, “like a living room” and “appealing”. On the other hand, the negative comments about the spaces without access included that they were “closed off”, “like a holding cell” and “confined”. These results show that participants definitely preferred spaces that had access to daylighting and views over spaces that did not.

Scale of the Lobby Space

Within the images used for this research study representing hotel lobby spaces there were small scale lobbies and large scale lobbies. The small scale lobbies had lower ceilings; smaller baseboards, trim and moldings; and other smaller decorative elements such as wall hangings. The large scale lobbies had higher ceilings; larger baseboards, trim and moldings, and other larger decorative elements. Large scale lobbies had significantly higher preference ratings than small scale lobbies ($F(1, 29) = 58.023$, $p<.001$). The mean preference rating for all of the spaces with large scale lobbies was

5.85. The mean preference rating for all of the spaces with small scale lobbies was 4.74. The cumulative effect on the difference in preference rating between small scale lobbies and large scale lobbies was 1.11. In addition, when participants were asked what they like and disliked about the spaces represented by the images, there were fifty-eight reports of liking large scale lobbies and fifty reports of disliking the small scale lobbies. There were only two reports of liking the small scale spaces and one report of disliking the large scale spaces. Positive comments about large scale lobbies included that they were "comfortable", "open", "inviting" and "elegant". On the other hand, the only positive comment about the small scale spaces was that it seemed "more personal". These results show a definite and overwhelming preference for large scale lobby spaces.

Seating Type and Arrangement

This study included two variations on seating type and arrangement: group seating arrangements that foster interaction and individual seating arrangements that do not. The arrangements were made up of various types of furniture including chairs, seats and sofas depending on the space represented in the three sets of images. Group seating arrangements were preferred over individual seating arrangements ($F(1, 29) = 4.256$, $p=.048$). The mean overall preference rating for spaces with group seating arrangements was 5.54. The mean preference rating for spaces with individual seating arrangements was 5.05. The overall difference in mean preference rating between spaces with group seating and individual seating was 0.49. This difference in effect is smaller than between the two variations of scale and access to daylighting/views. When asked to comment on specific likes and disliked about the images, there were forty-three reports of liking group seating and forty of disliking individual seating. However, there were seventeen reports each of liking individual seating and disliking group seating. It is noteworthy that eleven

of the seventeen reports pertained to the images in Set C. This is further explained in the sub-section titled Interaction between Set and Seating Type/Arrangement. Additional comments included that the group seating arrangements were “cozy”, “intimate”, “homey”, “comfortable” and “warm” and that the individual seating arrangements were “unfriendly”, “uninviting”, “uncomfortable” and “impractical”. This evidence shows that overall, the group seating arrangements that foster conversation and interaction among hotel guests were preferred over individual seating arrangements.

Materials Used in the Lobby Space

The forth design element considered in this research study was materials. The two variations of materials used in the images were hard materials and soft materials. Hard materials included such things as tile, slate and terrazzo. Soft materials were thing such as wood and carpet. Lobbies with sift materials were consistently rated higher than lobbies with hard materials ($F(1, 29) = 9.507$, $p=.004$). The mean preference rating for all of the spaces using soft materials was 5.48. The mean preference rating for spaces using hard materials was 5.11. This results in a difference of effect on overall preference rating between soft materials and hard materials of 0.36. Materials was the design element out of the four considered with the smallest difference in overall preference rating between its two variations. In the section of the survey where participants could provide additional comments, there were thirty-nine reports of liking soft materials and thirty of disliking hard materials. There were eight reports of liking hard materials and only six reports of disliking soft materials. Soft materials were considered “homey”, ”relaxing”, “warm” and “inviting”. The hard materials were seen as “cold”, “sterile”, “plain” and “loud”. All in all, softer materials were preferred by participants over the harder materials.

Table 4-1 reports the means and standard deviations for both levels of the four design elements. Means are based on a preference scale of one to nine, one being "Prefer Least" and nine being "Prefer Most".

Table 4-1: Means and Standard Deviations of Preference for Design Elements

Element	Level	Mean	Std. Dev.
Access to Daylighting/Views	Yes	5.960	0.205
	No	4.628	0.199
Scale of Lobby	Large	5.846	0.206
	Small	4.742	0.195
Materials	Soft	5.475	0.191
	Hard	5.112	0.201
Seating Type/ Arrangement	Group	5.539	0.234
	Individual	5.049	0.208

Significance of Design Elements

The first statistic of importance is the significance level associated with each design element under consideration, or the main affects from the Analysis of Variance mode. These elements which included scale of the lobby space, materials, seating type/ arrangement and access to daylighting/views, were all found to have a significance level under the assigned alpha of 0.05. These significance levels prove that each of these elements have a definite effect on users' preferences for hotel lobby spaces. Arranging these determined significance levels in ascending order produces an ordered importance of the effect of each element. The results show that having access to daylighting/views or not and the scale of a lobby space were tied for having the largest impact on preference. This means that the difference in overall preference rating between a small scale lobby and a large scale lobby, holding the other factors constant, was greater than for the other factors being examined. The next largest effect on preference rating came from materials. Finally, the design element that provided the least effect on preference rating, although

still significant based on an alpha of 0.05, was the seating type/ arrangement. These results were further supported by the fact that which set the image came from did not have a significant effect on preference rating. This means these results were constant over each of the three sets of images, which represented three different hotel lobby spaces. The Eta-squared statistics support this ordering of importance of the design elements to user preference of hotel lobbies.

According to these results, access to daylighting and views is the most important element; seating type and arrangement is the second most important; scale of the lobby is the third most important; and materials used in the space is the least important. This order is different from the ordered significance levels of the elements determined by the participants' ratings of the images. However, just as all of the elements were found to have a significant impact on overall preference rating based on an alpha of 0.05, all four elements had an importance rating well above 3.50, the median rating associated with no effect. This difference in order of importance found between the two tests suggests that quite often people do not know exactly what they want or like, or simply cannot verbalize it. In fact, 20 of the 30 participants rated the elements' order of importance differently than their preference ratings suggest. According to Gerald Zaltman, a Harvard Business School professor and creator of ZMET, a patented market research tool, 95% of all of the thinking that drives peoples' actions and decisions, occurs unconsciously, including consumer decisions (Leiber, 1997). This idea is well illustrated here.

Significance of Interactions between the Factors

A small number of the interactions between the five factors (the set the image was in and the four design elements) have significant results on preference rating. Again, this is determined by a significance level lower than the assigned alpha of 0.05. Three

interactions were significant: set and materials; scale, seating type/arrangement and access to daylighting/ views; and set and seating type/arrangement.

Interaction between Set and Materials

The interaction between the set the image was in and the materials used in the lobby space had the most significant effect on preference rating of all of the interaction effects (F (2, 28) = 5.253, p=0.012). This means that the affect of variation of materials (hard materials or soft materials) was different depending on which set the image was in (Set A, Set B or Set C). Upon further investigation, it is determined that in Set A, harder materials, in this case tiled floors and partially tiled walls, were preferred over softer materials, in the case wood strips on floors and partially on walls. However, the opposite was found in Set B and Set C. In Set B, square wood panels on the walls were preferred over square slate panels on the walls. In Set C, wood strip flooring accompanied with an

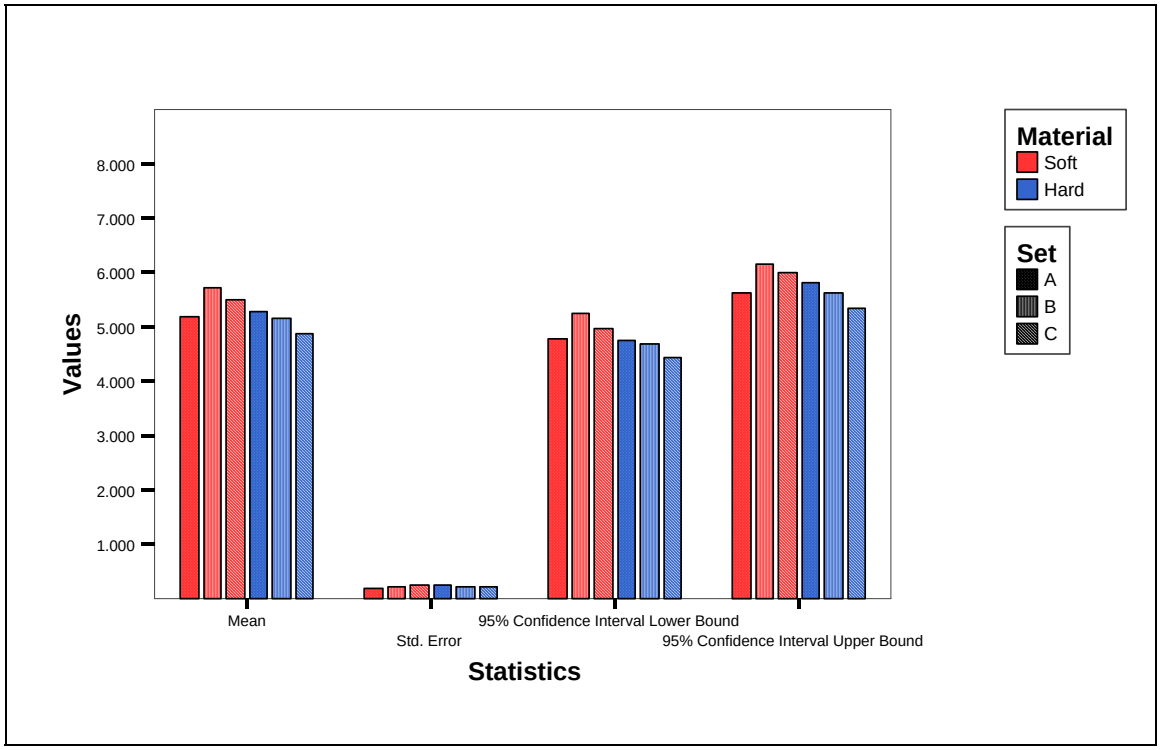


Figure 4-1: Interaction between Set and Materials

area rug was preferred over terrazzo flooring. The difference in preference for these materials was much larger in Set B and Set C (0.55 and 0.609 respectively) than in Set A (-0.071). In other words, the positive impact of the softer materials in Sets B and C was much more important to preference rating than the negative impact of the soft materials in Set A. The study also found that overall, softer materials such wood and carpet were preferred over harder materials such as slate and terrazzo. Figure 4-1 illustrates this interaction, showing the means, standard deviations and 95% confidence intervals.

Interaction between Scale, Seating Type/Arrangement and Access to Daylighting/Views

The second largest of the three significant interaction effects was between scale, seating type/ arrangement and access to daylighting/views ($F(1, 29) = 6.069$, $p=0.020$). This means that the affect of interaction between the variations of seating type/ arrangement (group seating or individual seating) and whether or not a lobby space had access to daylighting/views was different depending on the scale of the lobby space (small scale or large scale). Looking further at the results it can be seen that for lobby spaces with individual seating access to daylighting/ views is preferred. In lobby spaces with group seating access to daylighting/views is also preferred. The difference however, is that in spaces with individual seating, the difference in affect on preference rating between having access and not having access is greater than in the spaces with group seating. When taking scale of the lobby into consideration, the preference for the variation of each element does not change (having access to daylighting/views is still preferred in spaces with both individual and group seating and continues to have a larger affect in spaces with individual seating) but again the strength of the interaction changes.

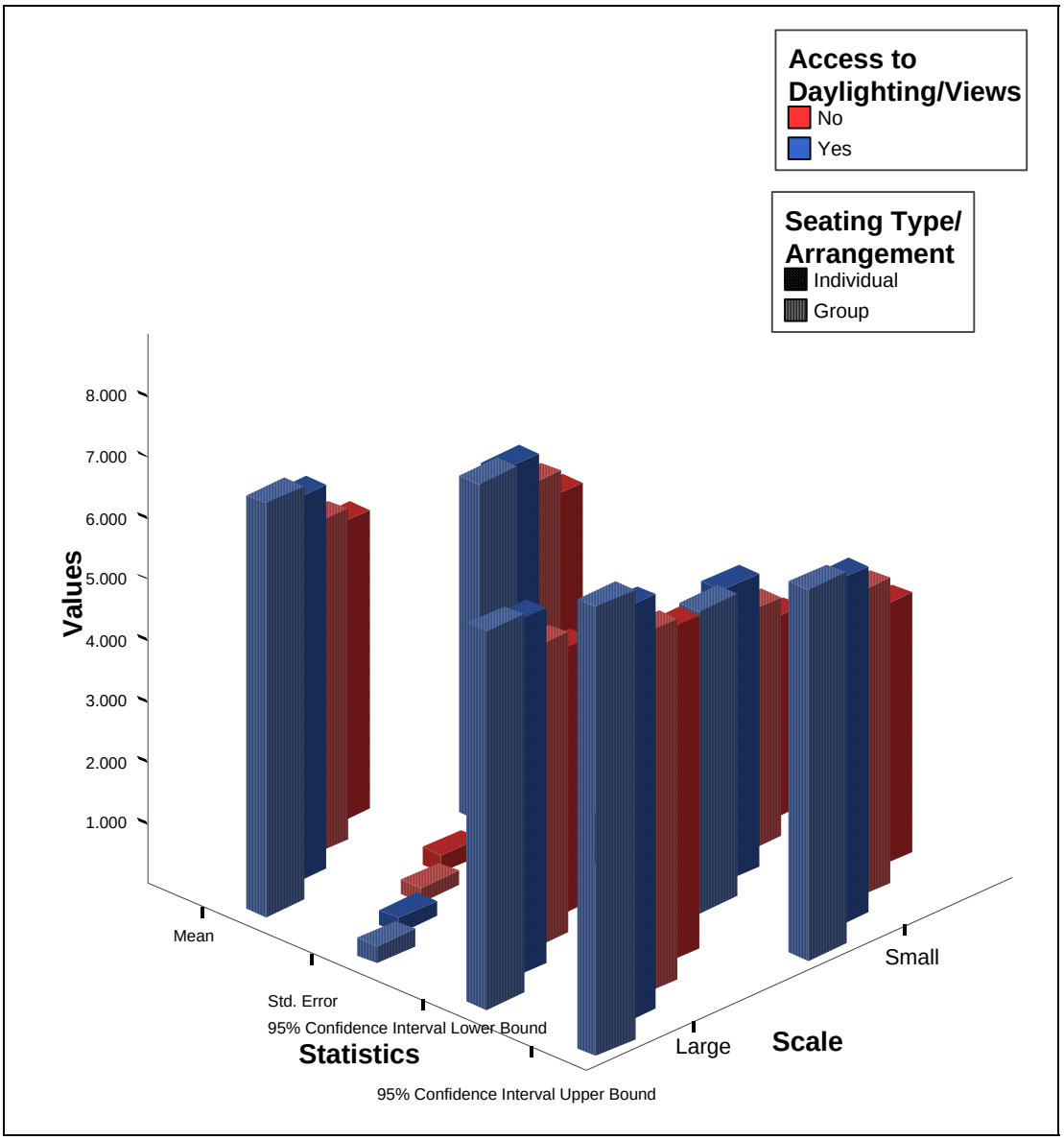


Figure 4-2: Interaction between Scale, Seating Type/Arrangement and Access to Daylighting/Views

The difference between the preference rating for spaces with individual seating and access to daylighting/views and the spaces with group seating and access to daylighting/views was greater for small scale lobbies than for large scale lobbies. The results of the study have shown that large scale lobbies are preferred over small scale lobbies and that group seating is preferred over individual seating. This interaction effect shows that the importance of a preferred variation of a design element (in the case having

access to daylighting/views) becomes increasingly more important when more less preferred variations of other elements that are included (individual seating and small scale lobbies). Figure 4-2 illustrates this interaction.

Interaction between Set and Seating Type/Arrangement

The third and final interaction to be of significance to preference rating of lobby spaces is the interaction between the set the image was in and the seating type/ arrangement ($F(2, 28) = 3.344$, $p=0.050$). This means that the affect of variation of seating type/arrangement (group seating or individual seating) was different depending on which set the image was in (Set A, Set B or Set C). In Set A, the individual seating arrangement included three individual chairs lined up in a row against a wall all facing the same direction and the group arrangement included a love seat and two individual chairs all facing each other. In Set B the individual seating arrangement included four individual chairs all facing away from each other while the group arrangement included the same four individual chairs facing toward one another. In both Sets A and B group seating was preferred over individual seating. However, the opposite was found in Set C. In Set C the individual seating arrangement was preferred over the group seating arrangement. The type of furniture in both cases was a single unit. In the individual arrangement the round piece of furniture allowed guests to sit facing the outside (see Figure 4-1). In the group seating arrangement, the round piece of furniture was shaped like a ring and guests sat on the interior, facing each other (see Figure 4-2). While the overall finding of the study dictate that group seating was preferred in general over individual seating, this interaction effect shows that participants favored the group seating as long as they had the option to have their own individual seat. In the case on Set C, where the group seating arrangement did not afford users this opportunity, the individual

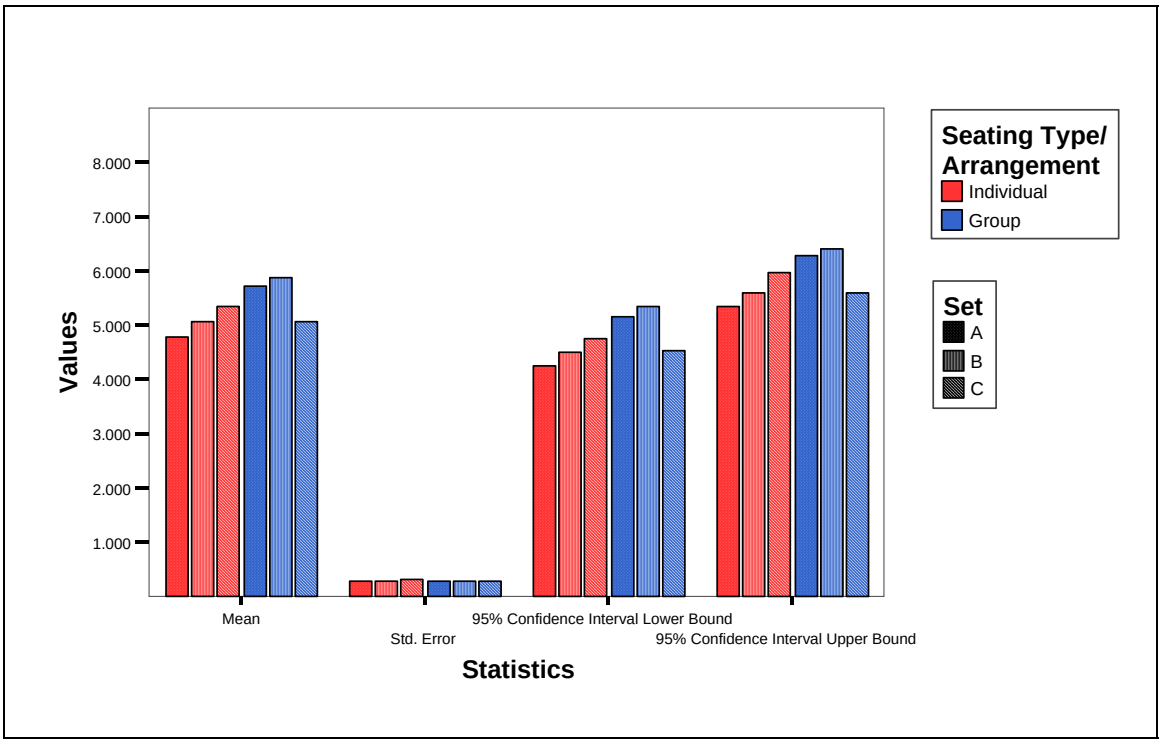


Figure 4-3: Interaction between Set and Seating Type/Arrangement

seating arrangement was preferred. The difference in preference for a space based on group seating versus individual seating was much larger in Sets A and B (0.929 and 0.825 respectively) than in Set A (-0.283). In other words, the positive impact of the group seating arrangement in Sets A and B was much more important to preference rating than the negative impact of the group seating arrangement in Set C.

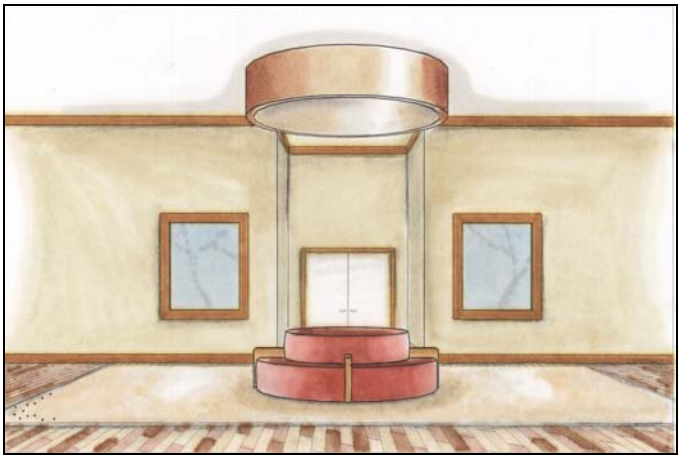


Figure 4-4: Set C, Individual Seating Arrangement

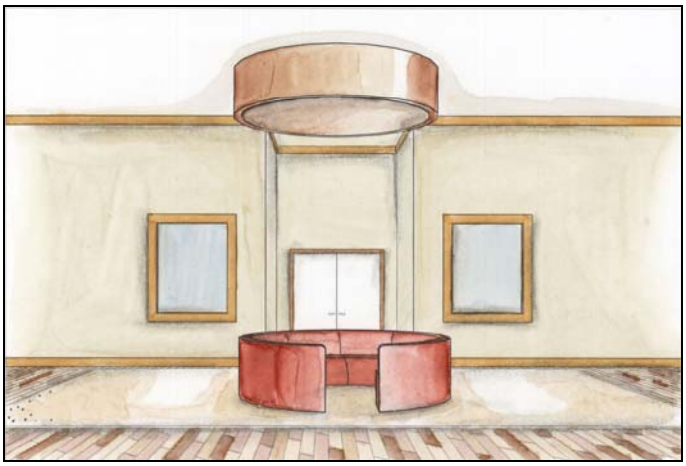


Figure 4-5: Set C, Group Seating Arrangement

Differences in Preference Based on Sex

As stated in Chapter 3, the sex of participants had a significant effect on the interaction between materials, seating type/arrangement and scale of the hotel lobby space ($F(1, 28) = 4.441$, $p=0.044$). After looking more closely at the data it can be seen that both males and females prefer group seating arrangements in both small and large scale lobbies with both hard and soft materials. For males, in spaces with both soft and hard materials the positive effect on overall preference rating between individual and group seating was greater for large scale lobbies than for small scale lobbies. For females in lobbies with soft materials, group seating arrangements added more to overall preference in large scale spaces than in small scale spaces as well. However, for females in lobbies with hard materials, group seating arrangements had a larger affect on overall preference rating in small scale lobbies than in large scale lobbies.

Differences in Preference Based on Age

Chapter 3 stated that there was a significant interaction between age, set, materials, scale and access to daylighting/views ($F(8, 50) = 2.531$, $p=0.031$). Interactions between so many factors are extremely complicated. In all of the possible combinations of age

group and set, having access to daylighting/views, soft materials and large scale lobbies were preferred. The significance of this interaction comes not from a difference in direction of these multi-level relationships but in the strength of them. All together these differences make the overall interaction significant, however when looked at separately the differences in strength are insignificant.

CHAPTER 5
CONCLUSION

The hospitality industry in America is extremely large, employing thousands of people and generating close to $100 billion dollars in annual revenue (Hotels and Motels, 2001). With nearly 64% of America's 3.9 million hotel rooms occupied each night, significant numbers of people experience these hotels daily (Hotels and Motels, 2001). With such large populations of users, hotels are exemplary spaces to implement good design. According to Miller (1995), the design of the hotel's lobby space is critical because this is usually the first space a guest encounters, and may generate lasting impressions about the hotel as a whole. Despite the importance of the physical spaces within hotels to guests' experiences, a surprisingly limited amount of research has focused on the area of hospitality design, and even less specifically on lobby design. The purpose of this research study was to determine the effect of various interior design elements on users' preference for hotel lobby spaces.

Findings

This study found definitive results about the relationship between the identified interior design elements and users' preference for hotel lobby spaces. The interior design elements specifically examined in this research study were scale of the lobby space, materials used, seating type and arrangement and access to daylighting/views. Not only do the findings of this study show which variation of each element was preferred, but also the relative importance of each element to the overall preference rating. The results of this study show that large scale lobbies, with higher ceilings and larger decorative

elements, are preferred over smaller scale lobbies; hotel lobbies with access to daylighting and views through the inclusion of windows are overwhelmingly preferred to spaces not having access to daylighting and views. Group seating arrangements that afford users the opportunity to interact and converse are preferred over individual seating arrangements. However, the study also found that while the group arrangements are preferred, users like to have the option of their own individual seat in the group setting. Finally, the majority of users prefer soft materials such as wood and carpet over harder materials like slate and tile. In addition, the effect on overall preference rating that can be attributed to each design element was greatest for access to daylighting and views and scale of the lobby space. Next in order of importance was the materials used in the space. Finally, though still having a significant effect on overall preference for a space was the seating type and arrangement. These finding are supported by both the F-Test statistics and corresponding p-value, and by the Eta^2 statistic.

Limitations of the Research

A few factors may have affected the results of this study. The first limitation is the type of research. Simulation research involves controlled replications of real-world environments, or hypothesized real-world environments for the purposes of studying dynamic interactions within that setting (Groat & Wang, 2002). This type of research can be used to generate and/or test theories about the built environment and how it affects the lives of users of the space (Groat & Wang, 2002). In this case, the replications of hypothesized real-world environments were the images created by the researcher to represent hotel lobby spaces. The theory being tested was whether the chosen interior design elements had an affect on the preference for hotel lobby spaces. The limitation associated with this type of relationship is that while simulation research is experimental

and manipulates variables and then acknowledges cause and effect relationships, these types of relationships are generally not clear in real-world situations where other variables and interactions are difficult to accurately isolate (Groat & Wang, 2002). In other words, while the research has proven definite relationships between the various design elements and preference for lobby spaces, the limitations with simulation research imply that it is impossible to determine the causality of the relationship.

The second limitation is that the other variables are impossible to control and eliminate in the built environment. All of the spaces used for this study were created with minimal extraneous variables outside of the four being examined. However, in order to create three distinct spaces for surveying, certain differences had to be included. The spaces are of somewhat different styles. For instance, Set A may be seen as more traditional while Set B may be seen as more modern. This style was affected by the shape of furniture and other elements. For instance, to test the effects of different materials, Set A had variations of wood strip floors and tile floors, both traditional options. Set B on the other hand, used both square wooden panels and square slate panels on the walls. These are less conventional uses and placements of materials. This type of difference in the hypothesized spaces may have affected users' preferences. In addition, when participants were asked to state the differences they saw among images and what they liked or disliked about the images, the most frequent response outside of the four controlled design elements was color. The color within each set of images was constant, but the colors changed from set to set. While the effect of color was not one studied in this research, it seems evident that color is likely to affect preference in many situations.

The third limitation is the specific spaces being surveyed. Three distinct spaces were included in this research survey represented in Set A, Set B and Set C. While this number of spaces creates a certain level of external validity, testing user preference of a larger number of hotel lobby spaces would reinforce the external validity and ability to generalize the findings of the research.

Finally, the fourth limitation is the number of participants in the study. With the 30 participants who rated the images, the study has found significant results. However, by sampling a larger number of participants, from a variety of locations, the results may be more meaningful and have more generalizability.

Implications for Research Findings

As a profession that is centered on addressing challenging design situations for clients, the field of interior design will undoubtedly benefit from research that identifies peoples' preferences. Specifically, this study intended to find results that would produce criteria for architects and designers of hospitality spaces in general and more specially, hotel lobby spaces. The results of this study will assist designers in guiding their clients toward more successful spaces. For example, the designer will be able to tell clients which type of materials are preferred by users. In addition, by knowing which elements increase a user's preference for a space the most, designers may help clients spend their funds in the right areas, resulting in the largest return on investment. In the case of hospitality design, return on investment comes from satisfied hotel guests; more successfully designed spaces that are preferred by customers will encourage repeat visits to a hotel (Worcester, 1999). This increases the hotel's total revenue and ultimately increases return on investment.

Directions for Further Research

The specialization of hospitality design is an area where research would be valuable but has not come to fruition. The researcher hopes that this study will generate interest in this neglected area. It is suggested that similar studies focus on which elements are considered and which spaces are considered.

Design Elements Considered

It would be useful to the industry of interior design to initiate research that determines the relative importance to overall preference and also which variation is preferred of additional interior design elements. Some of these elements may include color, artificial lighting effects, placement of registration desk, and implementation of a theme and flexibility, just to name a few. For instance, do users prefer bright and bold colors or muted tones? Are more brightly lit spaces preferred to more dimly spaces? Do users prefer one large registration desk immediately visible or several smaller registration stations spread throughout the lobby? Or would guests prefer automated registration kiosks? Would guests feel more comfortable if given the ability to control certain factors on the space such as lighting or seating arrangements?

Further, it would be interesting to examine the connection between differing designs of lobby spaces and activities that take place within them. Some larger lobbies are made of multiple areas including bars, lounges and gift shops. Can the interior design of the lobby as a whole promote the use of these other spaces? What other uses will design elements promote? Will more brightly lit spaces encourage business travelers to bring their laptops to the lobby and work there? Will more dimly lit spaces encourage couples to sit and relax in the lobby as opposed to their rooms? Context driven observations could help designers learn more about how users interact with the space.

Types of Spaces Considered

One of the fascinating things about hotel spaces is the contradiction created by it being both a public and private space. It is public in the sense that many people come and go freely. It is private in that many of the more intimate activates generally performed at home take place as well, such as eating and sleeping. This apparent contradiction creates very interesting parameters for designers. It would be useful to examine other similar spaces such as restaurants. It is clear that the atmosphere created in different types of restaurants encourages different types of behavior. What role does design play in this? How can designers create spaces in a way to promote the type of establishment desired by the owner of the space? Doing this type of research and then being able to compare and contrast the results from different types of spaces, such as hotel lobbies and restaurants, may uncover new relationships between the built environment and the users, and even promote further research.

Any and all forms of empirical research will have valuable effects on interior design. The approach used here is just one of a wide set of methods that designers can implement in order to fully develop a theory of consumer response to interior design.

Conclusions

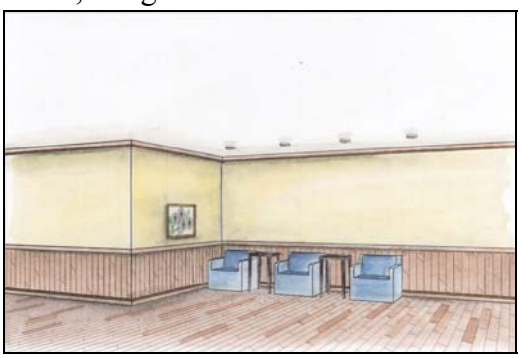
In conclusion, this research study has produced significant results in an area of study often ignored. It has been determined that there are clear relationships between scale of the hotel lobby, materials used, seating type and arrangement, access to daylighting and views and the overall preference for spaces. Perhaps more importantly, this study found that each of these elements has a different size of effect on preference for a lobby space. If the design guidelines are implemented by hospitality designers and architects, the developed space may improve both the users experience and the owners

business. Hopefully, the future will bring more studies to further supplement and expand upon these findings.

APPENDIX A
VISUAL STIMULI USED FOR DATA COLLECTION

Following are the 48 images used to represent three lobby spaces. There are three sets (A, B & C) with 16 images in each.

Set A, Image 1



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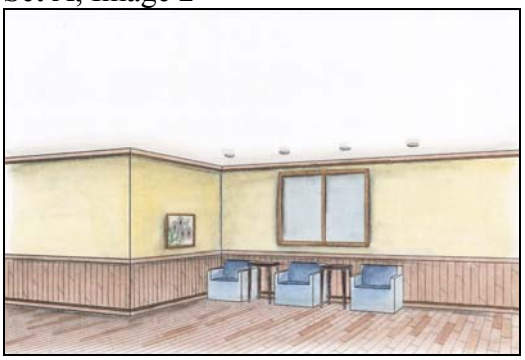

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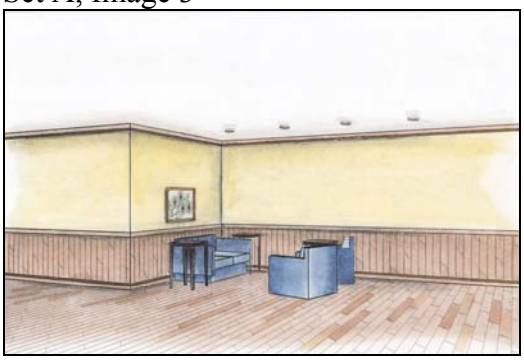

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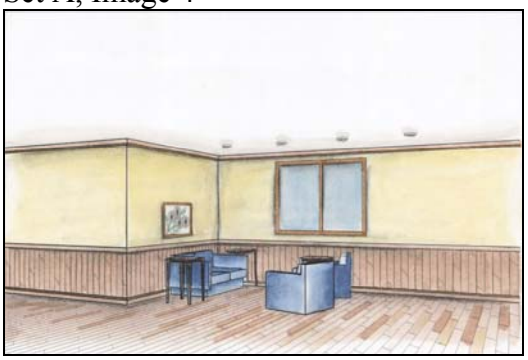

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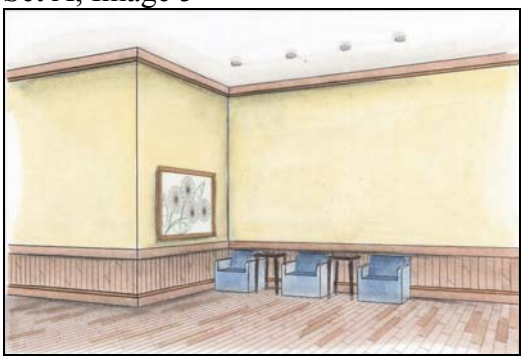

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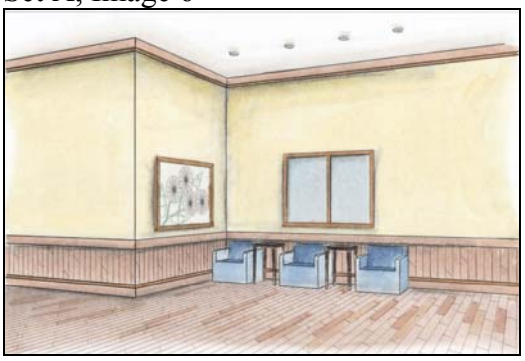
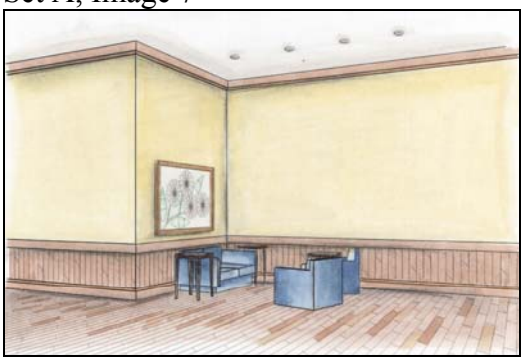


Figure A-1: Set A, Images 1-6

Set A, Image 7



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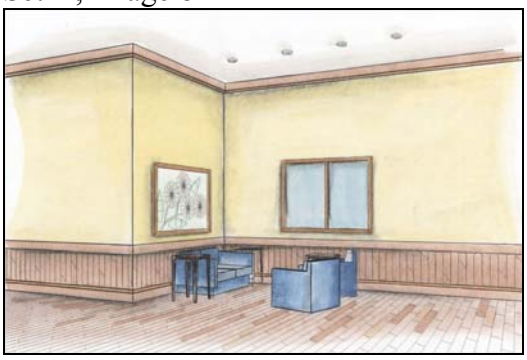
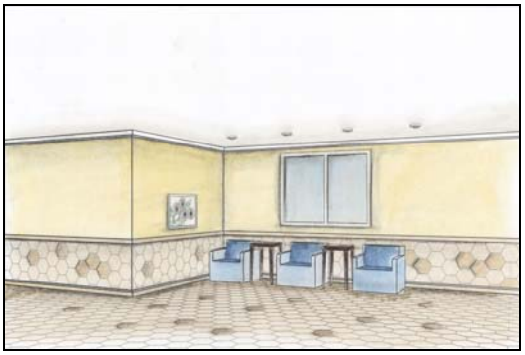


Set A, Image 9

Set A, Image 10



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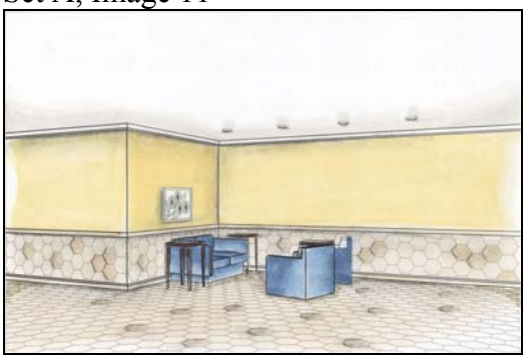

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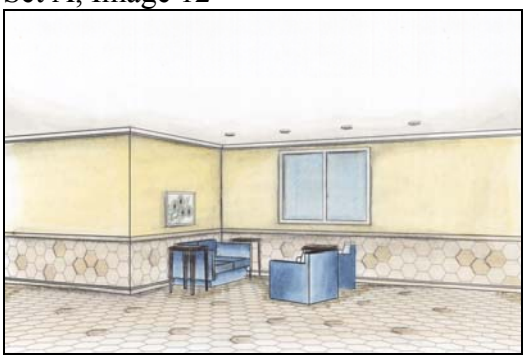

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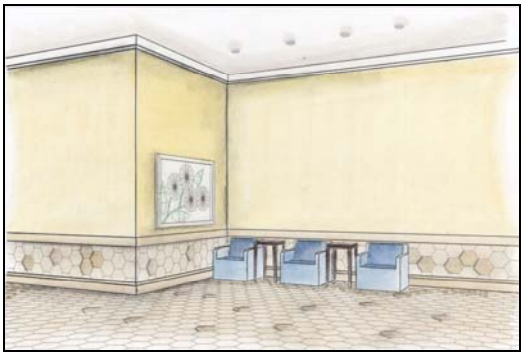


Set A, Image 14

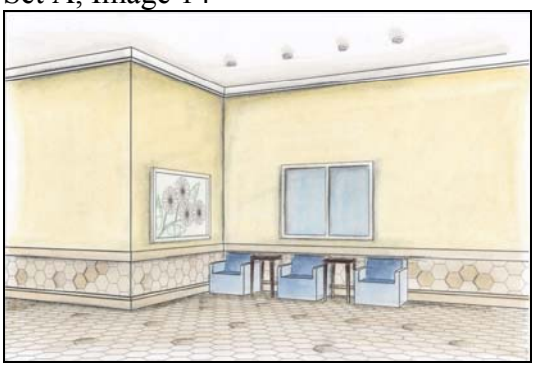
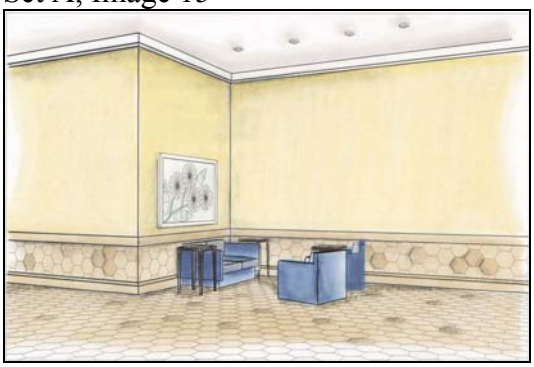
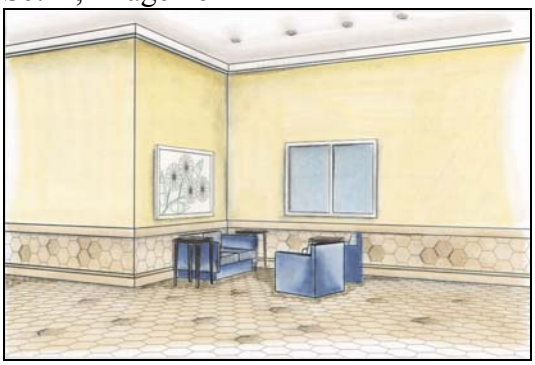


Figure A-2: Set A, Images 7-14

Set A, Image 15



Set A, Image 16



Set B, Image 1

Set B, Image 2

Set B, Image 3

Set B, Image 4

Set B, Image 5

Set B, Image 6

Figure A-3: Set A, Images 15-16; Set B, Images 1-6

Set B, Image 7

Set B, Image 8

Set B, Image 9

Set B, Image 10

Set B, Image 11

Set B, Image 12

Set B, Image 13

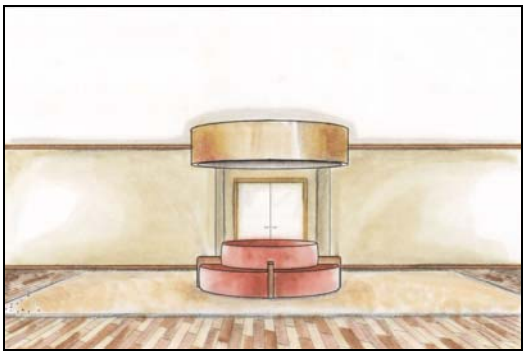
Set B, Image 14

Figure A-4: Set B, Images 7-14

Set B, Image 15

Set B, Image 16

Set C, Image 1



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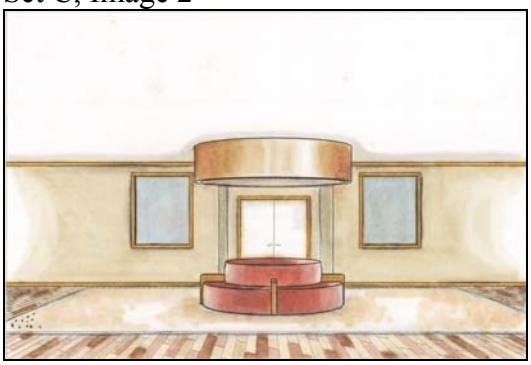

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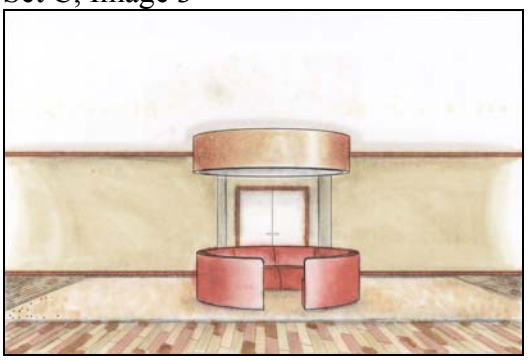

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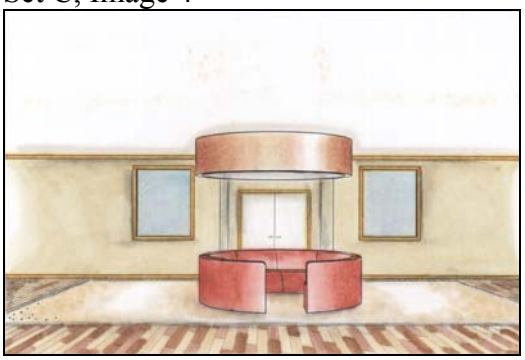

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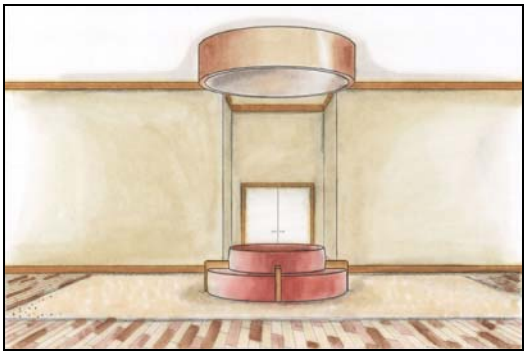

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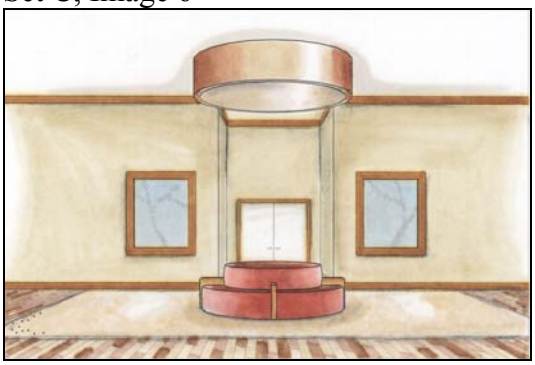
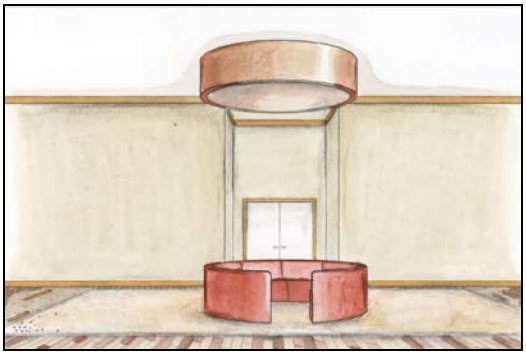


Figure A-5: Set B, Images 15-16; Set C, Images 1-6

Set C, Image 7



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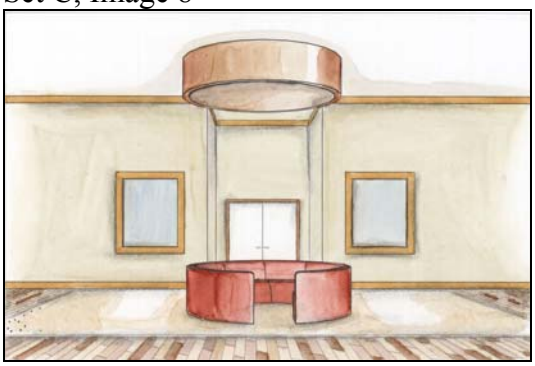

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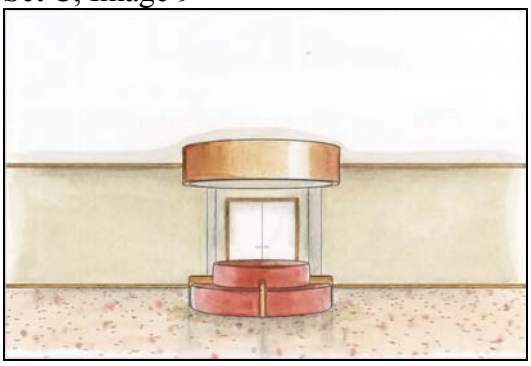

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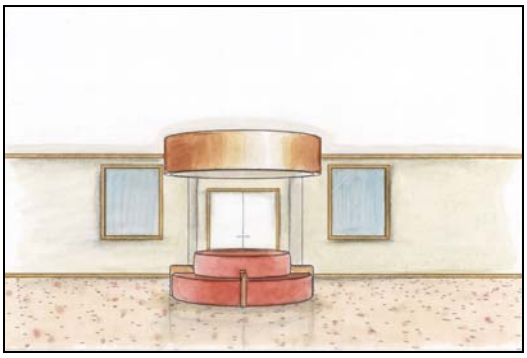

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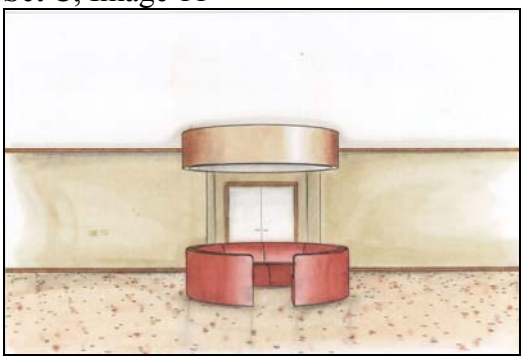

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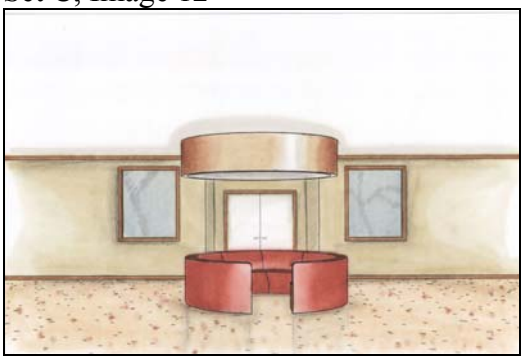

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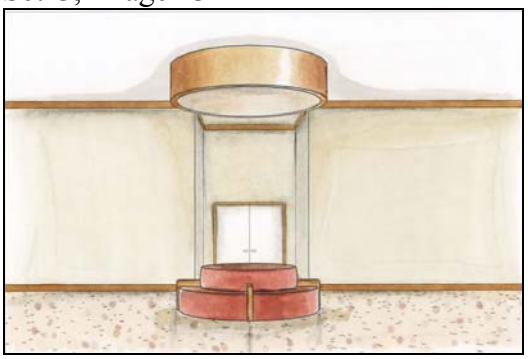

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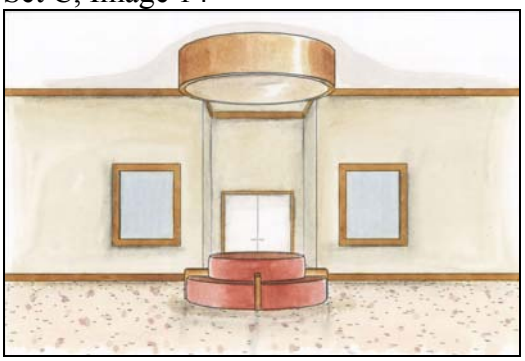
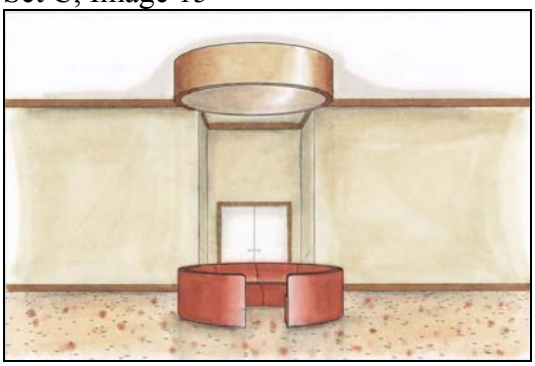


Figure A-6: Set C, Images 7-14

Set C, Image 15



Set C, Image 16

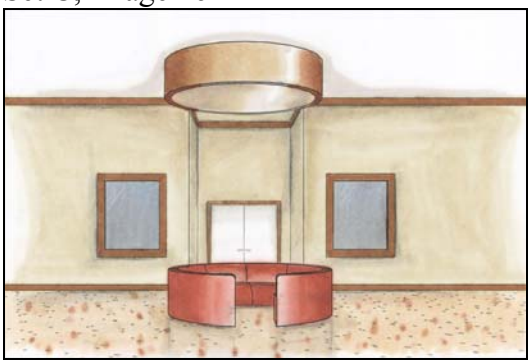


Figure A-7: Set C, Images 15-16

APPENDIX B
MOBIL FIVE-STAR RATING SYSTEM

The following is a description of Mobil's five star rating system and criteria for lodging facilities (Mobil travel guide, n.d.).

Mobil Stars: Lodging Star Definitions

Mobil Travel Guide

Click here for a printable PDF file.

★

A Mobil One-Star Lodging Establishment is a limited service Hotel/Motel that is considered a clean, comfortable and reliable establishment.

★ ★

A Mobil Two-Star Lodging Establishment is a Hotel/Resort that is considered a clean, comfortable and reliable establishment, but also has expanded amenities, such as a full-service Restaurant on the property.

★ ★ ★

A Mobil Three-Star Lodging Establishment is a Hotel/Resort which is well-appointed, with a full-service Restaurant and expanded amenities, such as, but not limited to: fitness center, golf course, tennis courts, 24-hour room service, and optional turndown service.

★ ★ ★ ★

A Mobil Four-Star Lodging Establishment is a Hotel/Resort/Inn which provides a luxury experience with expanded amenities in a distinctive environment. Services may include, but are not limited to: automatic turndown service, 24 hour room service, and valet parking.

★ ★ ★ ★ ★

A Mobil Five-Star Lodging Establishment provides consistently superlative service in an exceptionally distinctive luxury environment with expanded services. Attention to detail is

evident throughout the Hotel/Resort/Inn from the bed linens to staff uniforms.

Mobil Travel Guide recognizes the individualized nature of many different types of lodging establishments, such as bed-and-breakfasts, limited service inns, guest ranches and other unique hotel properties. For that reason, we have chosen to place our stamp of approval on the properties that fall into this category in lieu of applying our traditional Mobil One – Five Star rating.

Lodging Criteria and Expectations

** Note: The following criteria are suggested criteria of what a guest can generally expect at each star level. They are not individually mandated nor are they limited to those items listed below. These are merely a representative sampling of the hundreds of points covered during our inspection process. Additionally, at each level the lodging establishment is required to meet or exceed the requirements of the previous star rating. For example, a Two-Star hotel meets the criteria expectations of a Two-Star hotel as well as the One-Star hotel. A Three-Star hotel meets the criteria expectations of a Three-Star hotel, a Two-Star hotel and One-Star hotel, and so forth.*

★ **One-Star Lodging Establishment** is a clean, comfortable, and reliable, limited service establishment. Courteous service and good housekeeping, including daily maid service, are standard. Characteristics of a One-Star Hotel or Motel include:

Services Detail

- Staff is well-groomed with professional, neat and well-maintained attire.
- All staff encountered are pleasant and professional in their demeanor.
- Coffee, hot tea and breakfast pastry are available on-site (could be in-room).

Facilities Details

- Self parking area is free of debris, good condition; surfaces, curbs, paths.
- All outdoor walkways and approaches are well-maintained and cleaned.
- Outdoor awnings, signs, marquees, flags, and plantings are clean and in good condition.
- Public spaces are free of obvious hazards.
- Lobby floors, walls and ceiling are free of debris, marks and damage.
- Elevator landings, cars and doors/tracks are clean and in good condition.
- Guest room corridor floors, walls and ceilings are free of debris, marks, and damage.
- Vending and/or ice machines are located within one floor of guest room.
- Vending and/or ice areas and equipment are clean, well-lit, and well-maintained.
- All furniture, fixtures and equipment are clean, neat and well-maintained.
- Ashtrays throughout public areas are well-maintained and free of excessive debris.
- Temperature in all interior public areas are maintained in general comfort range.
- If public phonebook present, it is neat and in good condition.
- Public washrooms very hygienic and neat, with well-stocked paper and soap.
- Public washroom fixtures, walls and floors are in very good condition.
- If available, meeting rooms are well-signed so that it is easy to find and arrive at a specific room.
- If available, meeting room doors are in good condition, free of nicks and damage.
- If available, meeting room interiors are in generally good condition, including walls, floors and ceiling.
- Televisions feature cable TV (four networks plus four other channels).
- Direct dial phones with direct long distance dialing are available in each guest room.

Guest Room Detail

- Hardware and hangings (door locks, racks, artwork, etc.) are secure and in good condition.
- Carpet/floor is free of debris, stains, wear, loose threads, open seams, etc.
- Walls and ceilings are free of marks, stains and damage.
- Drapes are free of stains, damage; pull easily and hang properly.
- Furniture is free of dust, marks and damage.
- All printed material including collateral, phonebooks and stationery are neat, crisp and current.
- Drawers and shelves are clean, free of dust and debris.
- All light bulbs operate; all light fixtures and lamps are in good condition, clean.
- Mirrors and windows are free of smudges and damage throughout.
- If safe is provided, it is clean, functional and convenient.
- Room equipped with accurate, functional clock and radio/stereo.
- Color television works and is equipped with remote control, and is minimum 19".
- Ice bucket and glasses (may be molded plastic) are clean, hygienic.
- If minibar is present, it is hygienic, free of spills and damage, all products are sealed, price list present.
- If coffeemaker is present, it is hygienic, contains ample, sealed supplies and cups.
- All bedding and linens are free of debris, hairs, damage and stains.
- Room heating and air conditioning is easily controlled by guest and is quiet.
- Air is fresh and clean, no stuffiness or odors.
- Sink, tub, shower, toilet, bidet are very clean, free of hairs, stains and discoloration.
- Bathroom tile and grouting is clean, not discolored, cracked or mildewed.
- Faucets and drains operate smoothly and easily.
- Hygienic soap and shampoo is provided.
- Minimum bath linen is present: one bathmat; two each of facecloth, hand towel and bath towel.
- Towels are free of spots, stains, tears and obvious frays.
- If robes are provided, they are free of spots, stains and loose threads.

Specialized Facility Detail

- Pool/beach furniture is clean, hygienic and well-maintained.
- Pool deck or beach/sand is clean and free of excessive debris.
- Pool deck and tiling are in good condition, free of excessive damage or wear.
- Pool water is clean, free of debris and free of notable odors.
- Pool fittings and equipment (ladders, dive boards) are secure and in good condition.
- Tennis court surfaces are in good condition, free of damage and well-marked.
- Tennis courts and surrounding areas are clean and free of debris.
- Fixtures, nets, lights, fences are well-maintained and good condition.
- Pro shop/clubhouse interior are clean and well-maintained; displays and counters neat and tidy.
- Pro shop/clubhouse and surrounding areas are clean with well-maintained appearance.
- Golf carts are clean, well-organized and maintained.
- Rental equipment is clean and good condition, including bags.
- Floors throughout the casino are well-maintained and free of excessive debris.
- Air circulation in casino is adequate, not stuffy or smoky.
- Slot banks are free of excessive debris, soiled glassware and soiled ashtrays.
- Slot chairs are in good condition, clean and free of rips and stains.
- Cashier and change booths are tidy, well-organized and well-signed.
- game tops are well-maintained, free of damage and wear.

★ ★ **Two-Star Lodging Establishment** provides clean, comfortable and reliable accommodations along with expanded amenities and services, such as a full-service restaurant on-site. Guests at a Two-Star Hotel, Resort or Inn can expect to find all of the

qualities for a One-Star Hotel, or Resort plus the following characteristics:

Services Detail

- Front desk staff are articulate, smile and make eye contact.
- Staff is attired in well-fitting, consistent uniforms.
- Baggage assistance is available on request.
- The front desk is staffed twenty-four hours.
- Restaurant on-site serving three meals daily.
- If Inn, twenty-four hour guest service available on-call

Facilities Detail

- Lobby provides a comfortable seating area.
- and notices are professional, matching décor, not "homemade"
- Vending and/or ice machines are located on each guest floor
- Service doors are clean, free of marks and damage, and closed
- Public phones are convenient, clean and well-maintained
- Guest rooms equipped with data ports (guest can connect laptop to the Internet)
- A variety of different sized and appointed rooms available in hotel

Guest Room Detail

- Guest room door and frame free of marks, scratches and scuffs.
- Comfortable seating for two people (other than bed).
- Guest service directory, pad and pen/pencil present and conveniently placed
- Enclosed closets (means closets must have doors).
- There are a minimum six non-captive hangers.
- There are three spacious drawers or enclosed shelves (inside closet).
- A Luggage rack or bench provided; and adequate space to leave suitcase.
- Extra clean and hygienic blanket and pillow provided in room
- Lighting throughout the room is adequate.
- The room can be fully darkened.
- Full-length mirror present in room.
- A hairdryer present in room, clean and functional.
- Hygienic soap, shampoo and two other bath amenities are provided.

Specialized Facility Detail

- Guest can pick up e-mail and access the Internet from a Business Center workstation
- Business Center working areas are clean, tidy and professional
- Comfortable office-style chairs at the Business Center guest workstations.
- All fitness, treatment and relaxation areas are hygienic, neatly organized and maintained
- Spa reception area is well-defined, neat and professional
- Fitness equipment is clean, in very good condition, conveniently laid out
- Fitness/workout area is well-ventilated, with comfortable temperature
- Sound system or television provided in fitness/workout areas
- Towels are provided in locker and fitness areas
- Grooming area equipped with hairdryers; soap and shampoo conveniently placed
- All amenities are neatly and professionally presented; very hygienic
- Locker room, showers, sauna and hot tub extremely clean, hygienic appearance

★ ★ ★ **Three-Star Lodging Establishment** is an establishment that is well-appointed, with full services and expanded amenities. Guests at a Three-Star Hotel, Resort or Inn can expect to find all of the qualities for a Two-Star Hotel or Resort plus the following characteristics:

Services Detail

- Turndown service is available upon request.
- Valet parking is available.
- Baggage assistance is automatic.
- Same day laundry and dry cleaning available five days/week.
- Complimentary newspapers are delivered to room automatically.
- Complete room service is available.
- Workstation is available where guest can access Internet.
- Basic fitness equipment is provided, including treadmills and cycles.
- If Inn, restaurant on-site which serves full breakfast is available.
- If Resort, complimentary newspapers (or newsfaxes) are delivered to room automatically.

Facilities Detail

- High quality, varied, and major brand sundry selections are available in an on-site store.
- If public phonebook present, it is displayed in attractive cover.
- Pay-Movie selections are available through television.
- Suite (separate bedroom and living areas) accommodations are available.

Guest Room Detail

- Each guest room has two phones (one could be in the bathroom).
- Comfortable desk and chair are available for working, complete with telephone, data port, and light.
- Insulated ice bucket, vinyl or better, as well as glass glassware; clean and hygienic are present in room.
- Minibar is present (defined as selection several beverages and snacks).
- If Inn, refreshments present in room or readily available
- If coffeemaker is present, ceramic mugs and napkins are available.
- Pillows are plush and full, no foam.
- Framed artwork or interesting architectural features exist in room.
- Excellent lighting is provided in bathroom for makeup and shaving.
- Hygienic soap, shampoo and four other bath amenities are provided.
- Amenities are presented attractively, thoughtfully (not simply lined up on counter).
- Towels are of absorbent quality, with soft nap and no discoloration.
- If Inn, Pay-Movie selections available through television OR VCR/DVD in-room
- If Resort, guest room is of generous size, and provides ample seating for more than two persons.

Specialized Facility Detail

- If Business Center is present, a semi-private working area with workstation and telephone is available for guests.
- If a spa exists on site, robes and slippers or spa sandals are available in variety of sizes, and they are clean and in good condition.
- If spa or fitness center exists on site, complimentary amenities to include body lotion, shower caps, talc/deodorant and combs.
- If spa exists on site, at least two types of massage and either body treatments or facials are also offered.
- If tennis is available on site, water is available courtside.
- If pool or beach service is present, ample towels are available poolside or at the beach.

★ ★ ★ ★ **Four-Star Lodging Establishment** indicates an outstanding hotel providing the guest with a luxury experience in a distinctive setting, including expanded amenities and exceptional service. Guests at a Four-Star Hotel, Resort or Inn can expect to find all of the qualities for a Three-Star Hotel, Resort or Inn plus the following characteristics:

Services Detail

- Written confirmation is automatic or offered, either by mail, fax or e-mail.
- Guests name is used effectively, but discreetly, as a signal of recognition.
- The time from arriving at the reception area until registration is complete does not exceed five minutes (includes queuing).
- Bed is plush and inviting with oversized or numerous pillows.
- Bedcovers are elegant and stylish and with linens of exceptional quality and comfort.
- All written information is provided on good quality paper or pads, custom-printed or logoed.
- Bathroom presentation and placement of amenities and linens is thoughtful, careful, and elegant.
- Fresh ice is provided during evening service or at another time during the day.
- Turndown service is automatically provided.
- During turndown service, guest clothing is neatly handled and guest toiletries are neatly arranged and displayed on a cloth or shelf.
- Room service is delivered within 30 minutes.
- Room service order is delivered within five minutes of quoted time.
- One hour pressing is available.
- If resort, two hour pressing available
- Same day laundry and dry cleaning is available seven days/week.
- Wake-up call is personalized with guest’s name and time of day.
- Wake-up call is delivered within two minutes of requested time.
- Special service desk identified as concierge/guest service is situated apart from reception/front desk.
- If Inn, Workstation where guest can access Internet (may be "borrowed" office) is available.
- If spa services are present, treatments are begun and ended on schedule, within five minutes of expected or booked time.
- If spa services are present, during treatment, therapist appears to be genuinely expert, moving seamlessly through the treatment as described and expected.
- If casino services are present, when playing slots for more than 20 minutes, drink service is offered.
- If casino services are present, when playing a game for more than 15 minutes, drink service is offered.

Facilities Detail

- Lobby areas feature elegant live plants and/or fresh floral displays.
- A dedicated and secure luggage storage area is available.
- Public phones are equipped with seats, privacy panels and pad/pens.
- Public washrooms are furnished with upgraded materials and appointments/luxurious design.
- Televisions feature premium cable TV (two movie channels, two all-news, two financial).
- Guest room telephones have two lines.

Guest Room Detail

- Selection of at least 10 hangers including a variety of bars, clips and padded.
- In-room safe is present.
- If Inn, in-room safe is present or readily accessible on-site.
- If minibar is present, it is non auto-charge, and premium products are attractively displayed.
- Bed is triple sheeted or features washable duvets.

- Live plants are present in guest rooms.
- Shaving/makeup, lighted magnifying mirror is present.

Specialized Facility Detail

- Fitness equipment is available with personal headphones/televisions
- Current newspapers and national-title magazines are provided in fitness and locker areas.
- If spa, treatment rooms are equipped with individually controlled temperature and sound systems.

★★★★★ **Five-Star Lodging Establishment** has consistently superlative service and expanded amenities in a luxurious, distinctive environment, making this establishment one of the best in the country. Guests at a Five-Star Hotel, Resort or Inn can expect to find all of the qualities for a Four-Star Hotel, Resort or Inn plus the following characteristics:

Services Detail

- Staff is extremely well spoken, polite and clear, avoids slang and phrase-fragments.
- Staff is extremely well informed about requirements within their department.
- Overall service is flawless from initial reservation call to departure service.
- Choice of at least two complimentary newspapers is distributed.
- Twenty-four hour room service is available, including hot food.
- Any work undertaken by the staff is handled with complete professionalism, as would be expected by professional secretaries; and returned to guests neatly, in folders or envelopes.
- If Inn, choice of at least two complimentary newspapers are offered on-site.
- If Inn, a restaurant on-site, serving full breakfast and dinner is available.
- If pool service is available, guests are proactively greeted and escorted to their chairs, and set-up assistance is provided or offered.
- If pool service is available, during a 90 minute period and in warm conditions, some sort of complimentary refreshment is offered (for example, mineral water, fresh fruit, water spritz).

Facilities Detail

- Public washrooms feature well-maintained cloth towels, fresh plants or flowers.

Guest Room Detail

- Each guest room has three phones, including one in the bathroom.
- CD player/stereo is present and functional.
- Ice bucket and glasses are high quality (glass, metal, stone etc.), with tongs which are clean and hygienic.
- Fresh flowers are present in guest rooms.
- Separate shower and tub are present in bathroom.

APPENDIX C
PICTURES OF PRESENTATION BOARDS

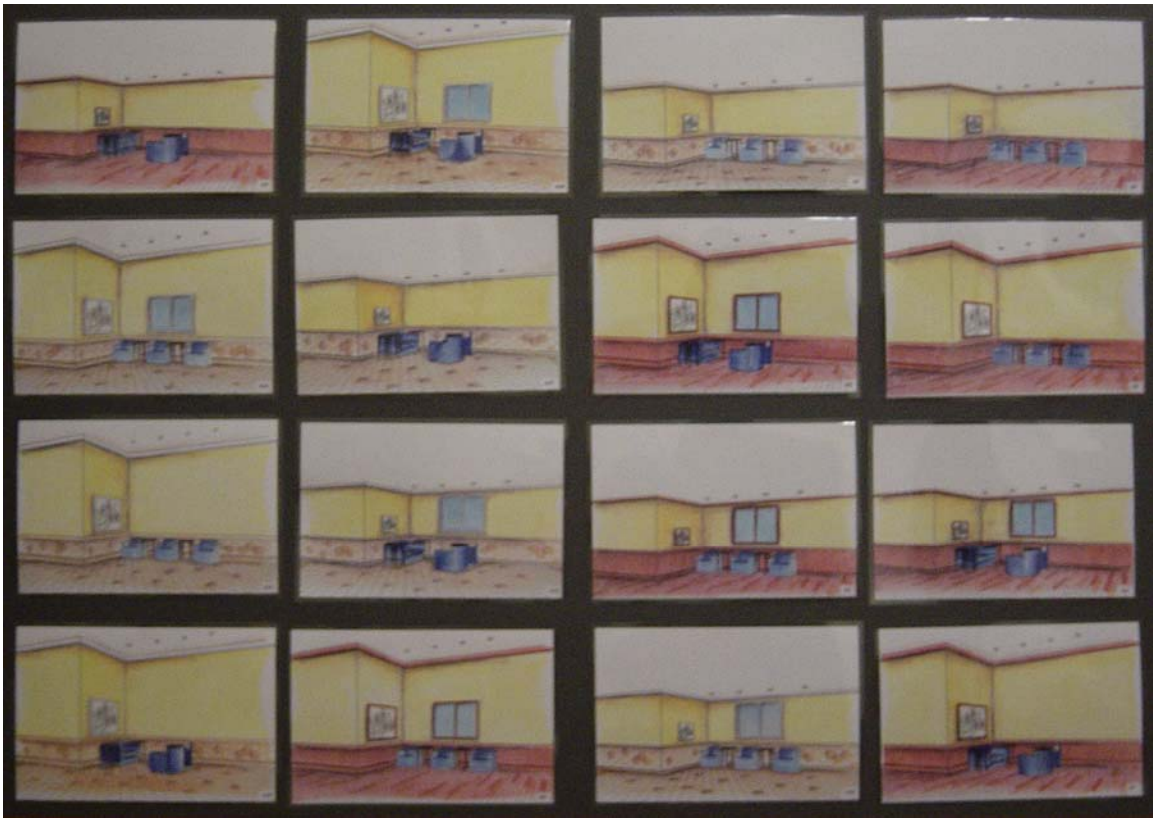


Figure C-1: Presentation Board, Set A

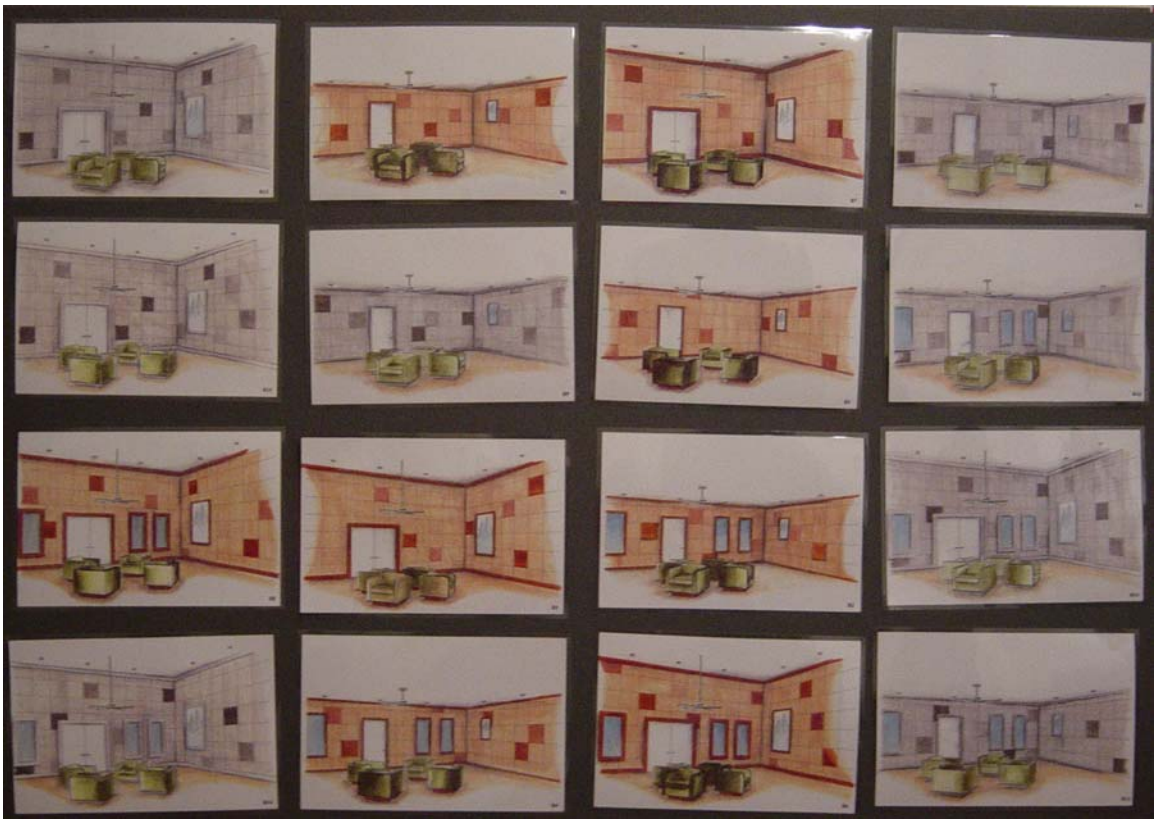


Figure C-2: Presentation Board, Set B

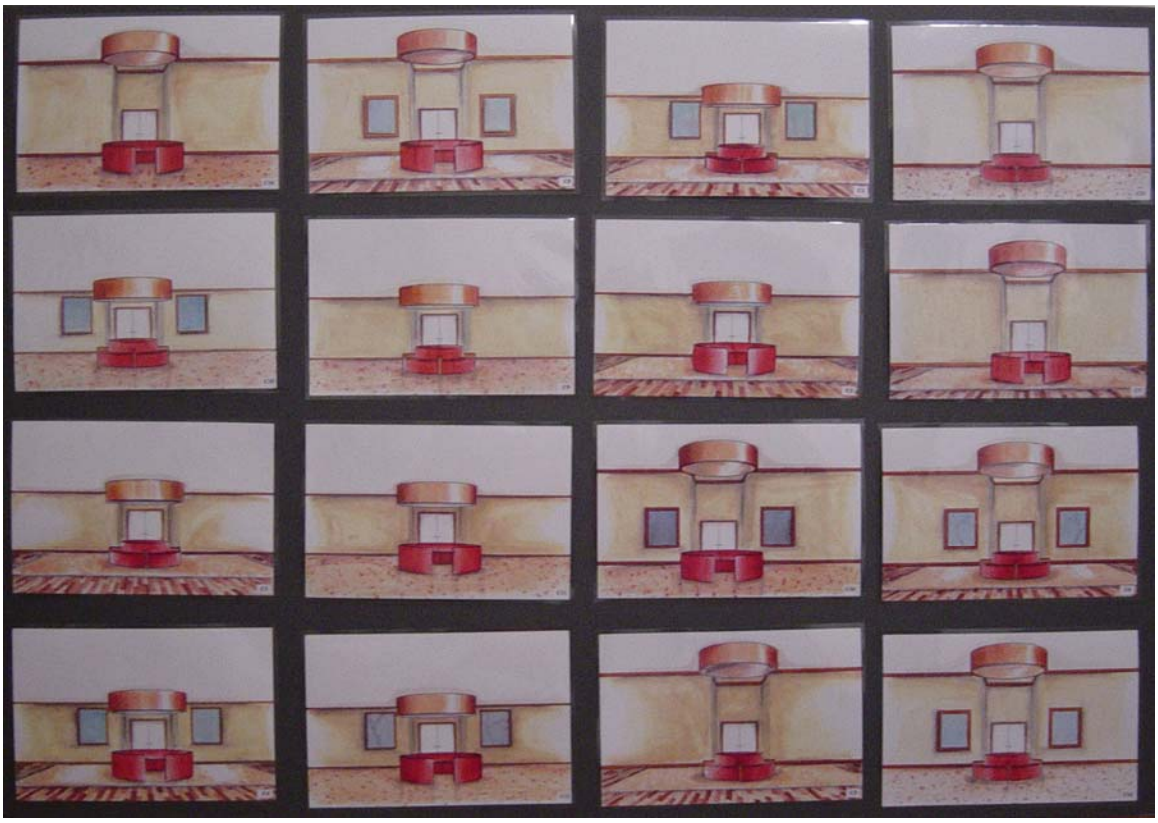


Figure C-3: Presentation Board, Set C

APPENDIX D
RANDOMIZATION OF IMAGES

The below summarizes the randomization of the images for data collection. Each set of the three sets of 16 images were presented to participants on a 29”x41” piece of grey foam core, in landscape format. The images were arranged in four rows of four images. In the chart below, the first row of numbers represents which spot on the board an image is in, while the numbers within the chart correspond to the numbered images. Spot “1” is in the upper left corner. Next to spot “1” but over one spot to the right is “2” and to the right of that “3” and the far right spot in the top row is “4”. The second row from the top starts with spot “5” and continues on like the first row. The bottom right corner spot is spot “16”. The first column represents the number of the randomization pattern and the set of images it applies to. For instance, the row associated with 1-A is the first randomization pattern for Set A.

Table D-1: Randomization Patterns for Sets A, B and C

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1-A	15	2	5	12	6	8	10	1	7	16	11	14	3	14	4	9
1-B	7	15	3	12	5	2	1	16	14	6	8	4	13	14	9	11
1-C	5	11	3	2	13	6	12	8	7	1	9	15	4	14	10	16
2-A	3	16	9	1	14	11	8	5	13	12	2	4	15	14	10	7
2-B	13	1	7	11	15	9	3	10	8	5	2	14	16	14	6	12
2-C	15	3	8	13	10	9	2	7	1	11	16	6	4	14	5	14
3-A	11	2	5	14	8	6	16	15	3	1	9	12	4	14	13	10
3-B	14	4	13	7	9	10	12	3	5	11	15	6	16	14	8	1
3-C	8	3	16	15	2	10	9	1	6	7	4	11	5	14	14	13
4-A	2	12	6	13	9	1	10	5	11	4	7	3	14	14	8	16
4-B	3	13	12	16	7	9	2	10	4	11	15	1	14	14	5	8

APPENDIX E
DATA COLLECTION TOOL

Please circle the category that you fit into:

1. Age: 18-25 26-35 36-45 45-55 56+

2. Sex: Male Female

3. Marital Status: Single Married Divorced Other

4. Number of Children: 0 1 2 3 4 5+

5. How many times a year do you stay in a hotel? 0 1-2 3-4 5-6 7+

6. Why do you usually travel? Business Pleasure

Please rate each image based on how much you prefer the space using the rating scale shown below. Record the letter of each set and the rating given to each numbered image below.

1	2	3	4	5	6	7	8	9
Prefer Least				Neutral				Prefer Most

FIRST SET: A B C (circle one)

1: _____ 9: _____

2: _____ 10: _____

3: _____ 11: _____

4: _____ 12: _____

5: _____ 13: _____

6: _____ 14: _____

7: _____ 15: _____

8: _____ 16: _____

Please list the number of each image you rated the **LOWEST** from the first set and briefly explain why you gave this rating.

_____

_____

_____

_____

_____

_____

Please list the number of each image you rated the **HIGHEST** from the first set and briefly explain why you gave this rating.

_____

_____

_____

_____

_____

_____

Please describe the differences you saw in the set of drawings.

_____

_____

_____

_____

_____

_____

_____

1	2	3	4	5	6	7	8	9
Prefer Least				Neutral				Prefer Most

SECOND SET: **A** **B** **C** (circle one)

1: _____ 9: _____

2: _____ 10: _____

3: _____ 11: _____

4: _____ 12: _____

5: _____ 13: _____

6: _____ 14: _____

7: _____ 15: _____

8: _____ 16: _____

Please list the number of each image you rated the **LOWEST** from the second set and briefly explain why you gave this rating.

_____

_____

_____

_____

_____

_____

Please list the number of each image you rated the **HIGHEST** from the second set and briefly explain why you gave this rating.

_____

_____

_____

_____

_____

_____

Please describe the differences you saw in the set of drawings.

_____

_____

_____

_____

_____

_____

_____

1	2	3	4	5	6	7	8	9
|				|				|
Prefer				Neutral				Prefer
Least								Most

THIRD SET: A B C (circle one)

1: _____ 9: _____

2: _____ 10: _____

3: _____ 11: _____

4: _____ 12: _____

5: _____ 13: _____

6: _____ 14: _____

7: _____ 15: _____

8: _____ 16: _____

Please list the number of each image you rated the **LOWEST** from the third set and briefly explain why you gave this rating.

_____

_____

_____

_____

_____

_____

Please list the number of each image you rated the **HIGHEST** from the third set and briefly explain why you gave this rating.

_____

_____

_____

_____

_____

_____

Please describe the differences you saw in the set of drawings.

_____

_____

_____

_____

_____

_____

_____

The design elements this research study is focusing on are:

- **Scale** – ceiling heights and size of other interior elements such as wall hangings and base boards
- **Materials** – type of materials used on floors and wall surfaces (wood, tile, stone, etc.)
- **Seating Arrangement** – what type of seating and how seats are arranged in relation to each other
- **Access to Daylighting/ Views** – presence or absence of windows to create a connection to the exterior space

Please rate the importance of each of these for elements in determining your personal preference for a hotel lobby space.

1	2	3	4	5	6	7
Least Important						Most Important

Scale _____

Materials_____

Seating Arrangement_____

Access to Daylighting/Views_____

APPENDIX F
PERMISSION TO COLLECT DATA

This document certifies that Kimberly Rutkin, graduate student at the University of Florida, has been given permission to collect data for her Master's Thesis at the Gainesville Regional Airport. The research topic involves Hotel lobby design and user preference. Kimberly will be showing images to people waiting in the waiting areas and asking them to rate them. Both parties understand that all participation is completely voluntary. Permission to collect data has been given for the time period of January 15 through January 30, 2005.

Kimberly Rutkin, Graduate student researcher — Date: 3/22/05

Tatum Fisher, COO/Director of Operations — Date: 3/22/05

Mr. Fisher can be reached at: tate.fisher@flygainesville.com

Figure F-1: Permission Letter from Gainesville Regional Airport

APPENDIX G
INFORMED CONSENT DOCUMENT

Informed Consent

Protocol Title: Interior Design of Hotel Lobbies and User Comfort

Please read this consent document carefully before you decide to participate in this study.

Purpose of the research study:

The purpose of this study is to determine which interior design elements are preferred in hotel lobbies. Specifically, this study will look at scale, materials, furniture type and arrangement, and access to daylighting and views.

What you will be asked to do in the study:

If you agree to participate, you will be given a questionnaire that asks for some basic demographic information. Then, you will be shown a set of sixteen of images of a hotel lobby space. The images are computer generated and rendered by hand. You will be asked to rate each image based on your preference of the spaces. You will give each image a preference rating on a scale of one (1) to nine (9), one (1) being "Prefer Least" and nine (9) being "Prefer Most". Any number of images can be given the same rating. There is space provided on the questionnaire to record the results of the rating task. After rating the first set of images, you will be shown a second set, and then a third set and asked to repeat the same procedure. The end of the questionnaire asks you to explain why you rated each image as "Prefer Least" and "Prefer Most".

Time required:

15- 20 minutes

Risks and Benefits:

This study is considered to have no more than minimal risk to participants. While there are no direct benefits of participating, this study will help designers and hotel owners give guests a more enjoyable experience. This may indirectly benefit participants in the future.

Compensation:

Each participant will be given a Hershey chocolate bar or a Pilot Precise ink pen.

Confidentiality:

Your identity will be kept confidential to the extent provided by law. Your information from the questionnaire will be assigned a code number. The list connecting your name to this number will be kept in a locked file in my faculty supervisor's office. When the study is completed and the data have been analyzed, the list will be destroyed. Your name will not be used in any report.

Voluntary participation:

Your participation in this study is completely voluntary. There is no penalty for not participating.

Right to withdraw from the study:

You have the right to withdraw from the study at anytime without consequence.

Approved By
University of Florida
Institutional Review Board 02
Protocol # 2004-U-1012
For Use Through 12/02/2005

Figure G-1: Informed Consent Document, page 1

Whom to contact if you have questions about the study:

Kimberly Rutkin, Graduate Student, Department of Interior Design, 416 ARCH, Phone: (352) 222-7206.

Dr. Debra D. Harris, College of Design, Construction, and Planning, 432 ARCH, Office: (352) 392-0252 ext.457, debraharris@dcp.ufl.edu, Fax: (352) 392-7266

Whom to contact about your rights as a research participant in the study:

UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; Office: (352) 392-0433.

Agreement:

I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description.

Participant: _____ Date: _____

Principal Investigator: _____ Date: _____

Approved By
University of Florida
Institutional Review Board 02
Protocol # 2004-U-1012
For Use Through 12/02/2005

Figure G-2: Informed Consent Document, page 2

APPENDIX H
INTERNAL REVIEW BOARD

UNIVERSITY OF FLORIDA

Institutional Review Board

98A Psychology Bldg.
PO Box 112250
Gainesville, FL 32611-2250
Phone: (352) 392-0433
Fax: (352) 392-9234
E-mail: irb2@ufl.edu
http://rgp.ufl.edu/irb/irb02

DATE: December 6, 2004

TO: Kimberly Rutkin
550 NE 8th Avenue
Gainesville, FL 32601

FROM: Ira S. Fischler, Ph.D., Chair
University of Florida
Institutional Review Board 02

SUBJECT: **Approval of Protocol #2004-U-1012**

TITLE: *Interior Design of Hotel Lobbies and User Comfort*

SPONSOR: None

I am pleased to advise you that the University of Florida Institutional Review Board has recommended approval of this protocol. Based on its review, the UFIRB determined that this research presents no more than minimal risk to participants. Given your protocol, it is essential that you obtain signed documentation of informed consent from each participant. Enclosed is the dated, IRB-approved informed consent to be used when recruiting participants for the research.

It is essential that each of your participants sign a copy of your approved informed consent that bears the IRB stamp and expiration date.

If you wish to make any changes to this protocol, including **the need to increase the number of participants authorized**, you must disclose your plans before you implement them so that the Board can assess their impact on your protocol. In addition, you must report to the Board any unexpected complications that affect your participants.

If you have not completed this protocol by December 2, 2005, please telephone our office (392-0433), and we will discuss the renewal process with you. It is important that you keep your Department Chair informed about the status of this research protocol.

IF:dl

Equal Opportunity/Affirmative Action Institution

Figure H-1: Internal Review Board Approval

APPENDIX I
PILOT STUDY DATA

Table I-1: Demographics

SUB.	AGE*	SEX**	MAR. STATUS***	# KIDS	# HOTELS/YR****	REASON*****
1	2	1	2	0	4	3
2	2	2	1	1	4	1
3	1	2	1	0	5	1
4	1	1	1	0	3	2
5	1	1	1	0	2	2
6	2	1	1	0	3	2
7	2	1	2	3	3	2

***** 1=18-25; 2=26-35; 3=36-45; 4=46-55; 5=56+
****** 1=FEMALE; 2=MALE
******* 1=SINGLE; 2=MARRIED; 3=DIVORCED; 4=OTHER
******** 1=0; 2=1-2; 3=3-4; 4=5-6; 5=7+
********* 1=BUSINESS; 2=LEISURE; 3=BOTH

Table I-2: Pilot Study, Set A

SUBJECT	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16
1	4	5	4	5	4	6	8	8	2	5	4	4	6	6	3	6
2	1	2	4	5	3	3	5	4	5	4	8	7	4	3	9	7
3	4	6	5	8	6	5	5	9	1	6	4	5	3	5	6	7
4	4	4	5	5	4	4	4	4	3	2	3	3	4	3	3	3
5	3	4	4	5	3	4	4	5	3	3	4	6	3	4	4	5
6	4	4	6	5	4	5	6	7	5	5	5	5	5	4	5	6
7	2	4	3	7	8	8	1	3	2	6	2	5	7	9	8	6

Table I-3: Pilot Study, Set B

SUBJECT	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16
1	3	4	5	5	5	6	5	8	2	3	3	3	4	4	4	5
2	5	4	5	6	4	4	6	7	4	5	6	8	6	6	7	9
3	5	5	7	7	5	5	7	8	3	3	4	6	5	4	5	6
4	4	3	3	5	3	3	4	6	3	4	4	3	3	4	3	4
5	2	3	3	4	2	4	5	6	2	3	3	5	2	3	4	5
6	5	5	5	5	6	6	7	6	6	6	5	5	4	6	8	7
7	2	3	2	7	8	9	2	4	3	6	3	5	6	9	7	5

Table I-4: Pilot Study, Set C

SUBJECT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
1	4	4	4	6	7	7	5	7	4	5	3	6	5	7	6	7
2	3	6	2	4	7	8	4	4	4	5	3	4	6	9	4	5
3	5	7	4	7	6	9	5	6	3	5	1	4	5	7	4	6
4	4	6	5	5	4	7	4	5	4	5	4	5	3	5	3	6
5	3	5	3	4	5	7	2	3	3	4	3	3	5	5	2	4
6	4	8	4	7	3	5	4	5	4	7	4	4	4	7	3	6
7	5	3	2	5	7	9	3	3	4	4	1	3	4	4	4	4

APPENDIX J
DATA

Table J-1: Demographics

SUB.	AGE*	SEX**	MAR. STATUS***	# KIDS	# HOTELS/YR****	REASON*****
1	4	1	2	2	3	2
2	4	2	2	3	3	2
3	5	1	2	4	3	2
4	1	1	2	0	4	2
5	4	2	1	2	5	1
6	3	2	2	3	5	1
7	1	1	1	0	5	2
8	3	2	2	1	2	1
9	3	1	2	1	2	3
10	3	1	2	0	3	1
11	3	1	2	0	3	1
12	1	2	1	0	4	2
13	1	2	1	0	2	2
14	1	2	1	0	2	2
15	2	1	2	0	4	2
16	4	2	3	4	4	1
17	1	1	1	0	4	2
18	1	2	1	0	3	2
19	1	2	1	0	4	2
20	1	1	1	0	3	2
21	1	2	1	0	4	1
22	1	2	1	0	3	2
23	2	2	1	0	4	2
24	2	2	2	0	3	2
25	2	1	2	0	2	2
26	1	1	1	0	2	2
27	2	2	1	0	2	2
28	3	2	2	2	4	3
29	2	2	4	0	3	2
30	2	1	1	0	3	2

***** 1=18-25; 2=26-35; 3=36-45; 4=46-55; 5=56+
****** 1=FEMALE; 2=MAL
******* 1=SINGLE; 2=MARRIED; 3=DIVORCED; 4=OTHER
******** 1=0; 2=1-2; 3=3-4; 4=5-6; 5=7+
********* 1=BUSINESS; 2=LEISURE; 3=BOTH

Table J-2: Data, Set A

SUBJECT	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16
1	1	2	1	1	2	3	1	5	2	1	1	3	1	4	1	5
2	5	5	5	6	6	6	6	8	4	6	6	5	5	7	7	6
3	2	4	5	6	3	4	6	8	2	4	5	6	4	4	5	8
4	3	4	5	6	4	5	6	8	3	4	5	6	6	6	6	7
5	4	6	1	3	8	9	3	3	3	6	1	2	7	5	6	4
6	5	3	3	3	4	7	5	9	2	3	5	3	7	8	7	8
7	3	6	5	8	6	8	8	9	3	8	7	8	6	8	8	9
8	5	4	6	8	3	5	7	8	2	6	4	5	2	5	5	7
9	2	4	4	3	2	9	9	9	2	9	5	9	9	9	9	9
10	2	3	4	4	4	6	3	5	7	8	4	4	7	9	5	5
11	4	5	6	6	5	5	6	7	4	5	7	8	5	6	6	7
12	2	2	6	9	2	2	6	8	2	2	7	9	2	2	7	9
13	4	7	5	7	6	7	5	8	3	4	4	5	4	6	5	6
14	5	8	5	6	3	9	5	9	6	8	7	7	5	8	6	9
15	3	5	6	6	4	4	7	8	3	5	4	6	3	4	4	8
16	2	6	4	9	4	6	7	9	1	6	7	8	5	6	8	9
17	4	5	6	1	8	2	8	8	9	5	3	3	2	7	7	1
18	5	7	6	6	8	7	8	8	5	7	5	6	7	8	7	7
19	6	7	2	3	8	9	4	5	6	7	2	3	8	9	4	5
20	4	5	7	7	5	4	5	9	4	6	8	8	4	7	8	9
21	4	5	6	6	5	6	6	7	5	7	6	7	6	7	7	8
22	8	5	5	8	7	4	6	4	6	9	5	7	6	7	5	6
23	2	6	2	5	2	5	2	8	3	5	1	6	3	6	2	7
24	5	6	6	7	4	5	5	9	5	5	6	8	6	6	8	8
25	6	7	7	8	6	7	7	9	5	7	6	8	6	7	6	8
26	3	4	4	6	3	5	6	9	1	2	3	4	2	3	4	5
27	4	5	4	4	4	8	5	5	4	5	3	5	5	7	5	5
28	3	4	3	4	3	4	4	5	1	2	1	2	1	2	3	4
29	1	4	3	5	1	2	2	6	1	2	4	5	1	3	3	5
30	3	6	4	7	4	5	5	8	4	4	6	7	3	5	5	8

Table J-3: Data, Set B

SUBJECT	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16
1	1	1	5	3	1	5	5	7	1	1	3	1	1	5	3	1
2	7	5	5	4	6	7	8	7	3	5	4	4	4	4	3	4
3	1	4	5	5	2	4	5	7	1	5	4	6	3	5	6	7
4	5	7	6	7	8	7	7	9	5	7	6	7	6	7	7	9
5	3	3	2	3	7	8	5	5	5	4	2	3	7	7	4	5
6	3	4	4	6	6	7	5	8	2	4	2	6	2	7	5	8
7	6	8	8	8	8	8	8	9	6	8	8	8	7	8	8	9
8	3	5	6	8	3	5	6	8	3	5	6	8	3	5	6	8
9	2	2	2	5	7	9	7	9	2	5	2	9	8	9	6	8
10	7	6	7	3	3	4	9	7	7	2	8	4	6	3	7	4
11	6	7	6	6	6	7	8	7	4	5	6	4	5	6	5	6
12	5	6	6	8	5	8	6	7	6	6	9	9	7	7	9	7
13	6	8	4	7	7	8	7	9	4	5	5	4	5	6	6	6
14	2	2	6	8	3	6	7	9	2	4	8	8	5	7	5	9
15	3	4	4	5	4	5	5	9	3	4	3	4	4	4	5	7
16	4	6	6	9	6	7	8	9	1	5	2	6	6	6	7	7
17	5	5	3	4	9	9	3	1	2	6	3	7	7	8	1	2
18	5	7	6	6	8	6	9	9	5	7	4	6	8	8	8	8
19	6	7	2	3	8	9	4	5	6	7	2	3	8	9	4	5
20	4	4	9	9	4	4	9	9	4	4	9	8	5	4	8	8
21	4	6	3	4	5	6	6	7	3	4	2	4	5	6	4	5
22	7	5	7	9	7	9	7	8	5	5	3	4	2	5	4	6
23	3	6	2	5	5	8	5	7	3	7	2	7	4	7	4	6
24	4	6	5	6	5	6	5	7	4	6	4	6	3	6	5	7
25	7	7	7	8	7	8	8	9	4	6	6	7	7	7	6	8
26	3	4	4	5	5	8	7	9	1	2	2	4	2	3	4	5
27	4	4	5	5	7	6	8	9	3	4	5	5	6	7	7	8
28	2	3	3	4	2	3	3	4	3	3	4	4	4	4	5	6
29	1	2	5	7	1	3	6	7	1	2	5	8	1	3	7	8
30	3	5	6	5	7	9	6	8	5	5	5	5	7	8	7	9

Table J-4: Data, Set C

SUBJECT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
1	1	8	1	1	1	8	1	2	1	7	1	1	1	7	1	1
2	5	6	6	5	7	9	6	7	6	6	4	5	5	8	6	5
3	1	2	4	6	1	5	5	5	2	2	5	6	1	4	5	8
4	4	6	5	6	6	7	5	6	3	4	3	5	5	6	5	6
5	1	3	2	3	1	1	2	1	1	1	2	3	1	1	1	3
6	4	6	7	7	7	8	6	9	5	5	2	3	7	7	4	5
7	1	6	1	8	5	9	5	9	1	7	3	8	3	9	4	9
8	7	9	4	5	7	9	4	6	6	9	4	5	7	9	4	5
9	3	7	3	7	8	9	2	9	1	3	2	6	7	8	7	9
10	1	2	7	8	2	6	8	9	2	5	7	7	3	3	6	6
11	4	5	6	5	5	5	5	7	5	6	6	5	6	5	5	8
12	5	9	5	7	7	9	3	6	2	8	2	4	2	7	5	6
13	6	8	5	5	7	9	6	4	9	6	4	5	5	7	4	5
14	6	7	4	4	7	9	3	7	4	6	2	3	7	9	4	6
15	5	6	5	6	6	8	5	8	4	5	4	5	5	6	5	7
16	3	7	6	8	5	7	8	9	1	5	2	6	5	5	5	6
17	3	5	5	3	2	1	2	2	1	3	4	6	5	5	3	2
18	5	7	5	6	7	9	7	9	5	7	6	7	6	8	9	9
19	6	7	2	3	8	9	4	5	6	7	2	3	8	9	4	5
20	9	9	6	8	9	9	8	8	6	6	7	6	7	7	6	7
21	4	5	5	6	5	6	6	6	6	7	6	6	6	6	8	9
22	3	4	5	4	4	8	5	7	1	6	8	4	4	2	2	9
23	5	4	1	2	2	8	2	7	2	3	1	4	2	7	2	7
24	5	7	4	5	6	5	5	4	5	7	4	5	6	5	3	5
25	8	8	6	7	7	9	7	7	6	7	4	6	8	8	6	7
26	4	5	5	6	5	6	6	9	1	2	3	4	3	4	4	5
27	5	6	5	7	5	7	6	8	4	5	5	6	5	6	6	7
28	6	4	4	4	8	4	4	7	4	4	4	3	4	4	6	4
29	3	7	4	4	4	9	6	6	4	5	4	3	5	9	5	4
30	4	8	3	6	4	9	4	6	2	6	2	6	2	7	2	7

Table J-5: Data, Importance Rating of Elements

SUBJECT	SCALE	ACCESS TO DAYLIGHTING/VIEWS	SEATING TYPE/ ARRANGEMENT	MATERIALS
1	7	5	7	6
2	6	7	7	6
3	5	7	7	5
4	7	7	7	6
5	7	7	7	6
6	7	7	4	6
7	7	7	6	2
8	4	7	7	6
9	6	7	5	6
10	6	7	7	6
11	6	6	6	6
12	5	7	7	4
13	5	7	6	7
14	7	7	6	5
15	6	7	3	6
16	3	5	7	7
17	5	7	7	3
18	6	7	5	5
19	5	4	7	2
20	5	7	7	6
21	6	6	4	3
22	6	7	4	6
23	6	7	6	3
24	6	7	5	6
25	4	7	5	6
26	4	7	6	4
27	7	5	4	6
28	7	7	7	7
29	6	7	7	7
30	6	7	5	5

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BIOGRAPHICAL SKETCH

Kimberly was born and raised in South Florida, as the second oldest of five children. Throughout grade school, she spent her spare time dancing and doing competitive gymnastics. After graduating from North Miami Beach Senior High School in June of 1998, Kimberly received a 100% tuition scholarship at the University of Florida in Gainesville, Florida.

During her undergraduate years at the University of Florida, Kimberly studied finance and mass communications. She graduated in May of 2002 with a Bachelor of Science in business administration and a minor in mass communications, with honors. After careful consideration, she decided to start graduate school immediately, in the field of interior design. Interior design had always been appealing and interesting to Kimberly, but it just took her a while to realize it was a viable career option.

Kimberly started the Master of Interior Design program at the University of Florida in August of 2002. She knew right away that she had made the correct decision about her field of graduate study. Throughout her years in the interior design program, Kimberly developed a strong interest in how people relate to the built environment and how the design of a space can affect the people in it. She was particularly fascinated by this relationship within the context of hospitality spaces. It is from this interest that her research topic evolved.

After her May 2005 graduation, Kimberly plans to work for an interior design firm that specializes in hospitality design in Southern California.